

Universal Design of Student Development Programs and Services

Disability Services as a Resource: Advancing Universal Design

Karen S. Kalivoda and Margaret C. Totty
The University of Georgia

Many institutions of higher education have established disability services offices to assist in implementing the basic regulations of the Americans with Disabilities Act (ADA; 1990). This chapter offers a brief overview of the mission of these offices and describes some common ways disability services offices can assist both students with disabilities and the campus community. Suggestions are proposed on how to utilize the support available from these standard service delivery systems and at the same time advance the concept of Universal Design.

The Americans with Disabilities Act (ADA; 1990) mandates that institutions of higher education provide equal educational opportunity to students with disabilities. Higher education administrators and student development professionals are faced with difficult decisions regarding how to provide the most efficient and cost-effective access throughout the institution. The law requires a particular person to be assigned to coordinate ADA compliance for the institution, but does not require a specific office to serve students with disabilities. However, most colleges and universities have chosen to establish offices to address specific disability concerns of students (Schuck & Kroeger, 1993).

The purpose of this chapter is to offer practical information for institutions, both public and private, small and large, to assist in implementing the ADA's basic regulations. The authors will offer a brief overview of the mission of disability services offices, describe common assistance available from disability services offices to both students with disabilities and the college or university community, and suggest how to implement Universal Design within the campus community.

Establishment of Disability Service Offices

As early as 30 years ago, institutions were challenged to set up offices through

which “all assistance and activities [for students with disabilities] would be channeled” (Pinder, 1979, p. 8). Many institutions established new positions to coordinate equal access needs for students with disabilities and others assigned these extra responsibilities to an existing position such as the dean of students. Program design for disability services programs, whether comprehensive or specific, varies widely just as size and characteristics of institutions vary. With the establishment in 1977 of the Association on Handicapped Student Service Programs in Postsecondary Education, now named the Association on Higher Education and Disability (AHEAD), disability services providers gained support on how to provide services to individuals with disabilities pursuing postsecondary education. AHEAD is an international organization of professionals with a mission to increase full participation of persons with disabilities in higher education. The growth in the AHEAD membership, from 36 charter members in 1977 to 2,200 in 2001, reflects the growth in disability services offices throughout the nation (J. Jarrow, personal communication, August 24, 2001).

These offices share a common goal of assisting institutions in fulfilling their responsibility to provide equal access to qualified students with disabilities (Kalivoda & Higbee, 1989). The term equal access means equal availability of all

programs and freedom of participation for all students with disabilities. Equal access does not guarantee equal outcomes nor does it promote favoritism of one group over another or result in the lowering of academic standards.

Documentation of Disability

Federal statutes require that institutions of higher education provide appropriate accommodations and modifications for students with disabilities. Institutions are not required to provide evaluative testing to establish the presence of a disability (U.S. Department of Education, 1998). However, some institutions do have on-site evaluators that diagnose learning disabilities (LD), attention deficit hyperactivity disorders (ADHD), and psychological disorders. It is a student’s responsibility to present current and adequate documentation of a disability. This procedure can be confusing to students who enter college from public secondary special education programs. Public school systems may conduct evaluations as part of students’ individual plans for disability-related educational services (Silver, 1992). Should the most recent documentation from a health professional be outdated, students may be required to seek, at their own expense, more current documentation. Many institutions require diagnostic evaluations no more than three years old. Others are more flexible as long as the documentation specifically states the diagnosis and

adequately addresses current level of functioning and necessary accommodations. As long as it is current, disability documentation certified by a qualified health professional should not be questioned by an institution. The institution does have the authority, however, to determine the appropriate accommodations that it should provide (Jarrow, 1997).

Health related conditions, such as lupus, cystic fibrosis, Crohn's disease, and multiple sclerosis may simply require verification from the student's health care provider. Should the condition wax and wane, the disability service representative may require frequent updates to verify flare ups that functionally limit the student. Students with cognitive deficits due to an acquired brain injury are usually asked to provide the results of neuropsychological testing. A thorough neuropsychological evaluation will provide ample information to determine necessary and appropriate accommodations for the student.

There is considerable controversy over the documentation requirements for ADHD and LD (Zirkel, 2000). AHEAD suggests guidelines to assist institutions in establishing the appropriate criteria and to encourage a general sense of uniformity in documentation requirements across the nation. Most institutions of higher education will require students to provide a recent

evaluation conducted by a qualified health professional experienced in the diagnosis and treatment of ADHD and LD. Offering the student a list of qualified evaluators may facilitate prompt implementation of support services. The evaluation should address the specific academic and support service needs of the student. This information is rarely included in an evaluation report unless specifically requested from the referral source. It is recommended that a set of questions regarding the academic needs of the student be sent to the evaluator with each referral.

Program Standards

Dukes (2001) conducted research with 1000 postsecondary professionals at disability services offices in North America to determine which service components they deemed essential to ensure equal educational access for students with disabilities. Nine general categories of service delivery with 27 standards were identified as essential regardless of type of institution, funding source, location, or admissions policy. The AHEAD membership recently approved the program standards for disability services offices in higher education and they are briefly described below (Shaw & Dukes, 2001).

The first category consists of consultation, collaboration, and awareness. It includes advocating for students with

disabilities and ensuring their adequate representation on campus committees. Disability personnel may find that they provide the only voices that speak to the needs of this population on campus. This makes the development of good working relationships with key departments around campus critical to the enhancement of equal opportunity. Providing academic departments with disability awareness training and information about disabilities and resources available to assist them can decrease attitudinal barriers that result in stereotyping and discrimination toward people with disabilities.

The second category, information dissemination, promotes equal access by informing the campus community about the availability of services for students with disabilities. To promote equal access to the campus community, it is important that disability services offices coordinate and provide auxiliary aids such as alternative print, interpreter services, and adaptive technology. Auxiliary aids, not limited to the college classroom, should be provided at all institution-sponsored activities and programs (Kalivoda & Higbee, 1994).

Faculty and staff awareness, the third category, involves consultation with faculty, staff, and administrators regarding appropriate academic accommodations for students with disabilities. Faculty are chiefly responsible for providing academic

adjustments for students with disabilities in their classes. Instructors are not asked to lower academic standards or to provide adjustments that are excessive, but they are expected to make reasonable accommodations. If academic adjustments are not provided by faculty, students with disabilities will be at an academic disadvantage.

Academic adjustments, the fourth standard, establishes the responsibility of determining the appropriate academic adjustments with the disability services office. This is based on student interviews, analysis of appropriate documentation, consultation with health professionals, and legal guidelines.

Disability services offices are also encouraged to be actively involved in instructional interventions, the fifth category. Shaw and Dukes (2001) state that this involves encouraging institutions to provide “instruction in learning strategies (e.g., attention and memory strategies, planning, self-monitoring, time management, organization, problem-solving)” (p.85). Most institutions have an academic assistance program or learning center where students can either take classes or attend workshops on learning strategies or work one-on-one with a counselor for coaching. Hand-in-hand with this category, the sixth is counseling and advocacy,

through which disability specialists help their students to learn how to advocate for themselves.

The seventh category addresses the importance of developing policies and procedures. Written policies and procedures may cover issues such as student rights and responsibilities, institutional rights and responsibilities, confidentiality, formal complaint guidelines, and the determination of reasonable accommodations (Shaw & Dukes, 2000). Jarrow (1997) states that the development of written policies and procedures is critical to “demonstrating a good faith effort on the part of the institution to meet its responsibilities to persons with disabilities in an equitable and consistent manner” (p. 7).

Following up on the importance of having an effective program, the eighth category involves program development and evaluation. Frequent evaluations to obtain student feedback on satisfaction with services will help in identifying ways to improve the program. Schuck and Kroeger (1993) emphasize the importance of a comprehensive evaluation plan that includes data on students served to justify the need for fiscal resources. The final category of standards involves the training and professional development of disability services personnel.

Support Services

To guarantee students with disabilities equal access to higher education, many institutions have or are establishing support services that uphold the nine categories of AHEAD program standards. Marion & Iovacchini (1983) assert that basic services to assure program accessibility were provided by most colleges and universities in the early 1980s. Necessary accommodations and services will vary from student to student and across institutions. The following, however, are common services available to students through disability support offices: (a) weekly meetings with a counselor or disability specialist to maintain support, monitor academic progress, and provide an early warning system so that the student receives additional services as needed; (b) time extensions on tests and assignments when appropriate; (c) adjustment and restructuring of class assignments as individually warranted; (d) test taking in a separate and quiet location to reduce distractions commonly associated with the classroom environment; (e) note takers in the classroom to supplement the student’s notes; (f) the provision of assistive listening systems; (g) document conversion (e.g., from print to Braille) services; (h) sign language interpreters; (i) real-time captioning; and (j) assistive technology, which will be discussed in the final section of this book.

Additional services provided are often above and beyond legal requirements and are made available as resource allocations permit. Programs that have acquired ample financial support from the institution, federal grants, or private development activities, may develop exemplary programs and services for students with disabilities. These services constitute “best practices” in disability services offices and are offered in efforts to enrich the lives of students with disabilities who seek the goal of higher education (Shaw & Dukes, 2001). Services may include the following: (a) student support groups; (b) priority registration to ease initial frustration and tension and to enable the student to select classes at times of optimal concentration or to allow for scheduling of regular medical appointments; (c) curriculum counseling regarding course selection and scheduling; (d) written contracts to assist the student in achieving academic or personal goals; (e) academic support groups for review and discussion of barriers encountered on a college campus; (f) orientation to classrooms, buildings, and the campus, and (g) coaching to help students stay focused on specific goals, and overcome disability-related challenges (e.g., organization, prioritization, follow-through).

Universal Design

In an ideal world, Universal Design would provide access to all people in advance rather than after the fact. Aune

(2000) states, “In universal design, environments and activities are designed in such a way that they are accessible to anyone, regardless of the person’s functional limitations” (p.57). The following case study is offered to describe the application of Universal Design to a college setting.

Ideal Case Scenario

Caroline is a sociology major at a large public university. She is blind and obtains most of her texts and other reading assignments electronically. All her texts are available on e-text and her instructors use accessible web designed course materials. Caroline scans last minute reading assignments handed out in class at various computer labs on campus. She has a computer and scanner in her residence hall room but she often prefers to use the computer lab with her peers. Once the material is scanned and saved onto disk, Caroline uses a computer workstation at the sociology computer lab that is equipped with speech output software. This allows her to listen to the printed material independently at her preferred time and pace.

Caroline independently navigates around campus. All crosswalks have audible signals, drivers announce each bus stop, and all facilities have signs in raised characters and Braille. Campus lectures and programming sponsored by campus

activities have handouts prepared in Braille to provide Caroline the opportunity to fully participate along with her peers. The university offers audible display for all visually oriented communication (e.g., maps, computer terminals, posters, newspapers, fliers, overheads), which makes Caroline feel welcome and included in university-sponsored events.

Shared Responsibility for Equal Access

In this scenario, there is little need for disability services offices. Unfortunately, Universal Design is still an aspiration and disability services offices are continually relied upon to coordinate and provide routine equal access requests. Establishing separate administrative units to assist students with disabilities helps meet legal requirements of equal access, but may also enable others to abdicate responsibility for interacting with students who have disabilities and providing equal access. Pinder (1979) cautions institutions about relying excessively on disability support offices:

Special, separate offices such as these also tend to reaffirm the old standards of segregation on the campus because faculty, students, and administrators are simply not used to routinely dealing with disabled students—and it is much easier to delegate this

responsibility to a special office

However, it is natural for people to be reluctant in dealing with new and different things. The separate, special bureaucratic units provide anyone looking for such avoidance with the perfect method of dealing with disabled students while not having to deal personally with them. (p. 9)

Hall and Belch (2000) concur that these special offices can serve a well-needed role of easing students into the college or university and helping them feel that they matter, but they also have to consider the unintended consequences, “. . . special programs and centers also relieve staff who are not located in those centers from acting on their responsibility to understand and address the diverse needs of under represented groups” (p. 13).

This dilemma demands that disability service professionals increase education about the responsibility of each faculty and administrative unit in providing equal access. There are several steps that administrators, faculty, and staff members can take to reduce or eliminate potential blocks to equal access. The top administration should publish and disseminate a policy statement regarding the legal mandate to provide accommodations. The policy statement should clearly state that the administration encourages and

supports accommodations for students with disabilities and that the responsibility for providing access to all programs and activities resides with each department. For example, the administration could mail out a brochure to all faculty and staff, accompanied by a letter from the president's office. In addition, the institution might sponsor professional development workshops to educate faculty and staff regarding how to best meet the needs of students who have disabilities. Prior to scheduling such workshops, it would be helpful to survey potential attendees regarding their knowledge of legal and educational issues. This will enable workshop facilitators to prepare to address pertinent questions or dilemmas from workshop participants. Staff and faculty may also provide scenarios for role plays or small group discussion that would offer practical solutions to common problems.

Obstacles to Universal Design

The true concept of Universal Design is to create at the onset an educational environment to meet all learners' needs. In reality, however, many institutions are firmly established and have facilities and programs that do not meet this ideal. Practical suggestions for architectural and program access needs of students who have disabilities are addressed below.

Architectural Inaccessibility

Many older institutions have facilities that were constructed before the implementation of federal and state requirements for architectural accessibility. The ADA does not require the installation of elevators in all existing facilities; therefore, access to older structures may be limited to the main floor via a lift or ramp. Programs or departments located on inaccessible floors must find alternative methods of providing accessibility. The law requires what is termed "programmatic access" (Office of the Attorney General, 1991). This means that the program may be moved or the information requested (e.g., financial aid forms, admissions applications) may be brought downstairs or sent directly to the student. Equitable service needs to be provided for students with disabilities; this may require extra time and patience from program staff. Suggestions that may assist in providing programmatic access for programs and services located in facilities that are architecturally inaccessible are listed below (Kalivoda & Higbee, 1994):

1. Advertise in all publications and announcements (e.g., campus newspaper, newsletters) that programmatic access is guaranteed for people with limited mobility. Provide the name of a contact person and telephone number for obtaining information about access. A general

access statement communicates to people with disabilities that they are welcome to participate in the program. The statement may read “Alternative access will be arranged for people with limited mobility. Call (person or office) by (date) for specific requests.”

2. Equip the accessible floor with a campus phone for students to use to call offices located on inaccessible floors. Assure that existing and newly installed phones are at the appropriate height (48" forward approach, 54" side approach). Include the location of the phone on the building directory. Post phone numbers of offices located on inaccessible floors both on the building directory and next to the telephone.

3. Provide accessible locations for offices and services that meet important student needs and require personal rather than mail or telephone contact. Examples include counseling, career planning and placement, academic advising, multicultural affairs, language laboratories, tutorial services and disability services.

4. Provide internal and external signs to direct people where to go to

obtain services or get the information they need. Buildings where there is access to at least one floor must provide accessibility information about the program on existing building directories. Buildings without a directory should request that one be installed in order to comply with the ADA. Buildings with no access should provide outside signs directing people either to an outside phone line or to an accessible building where they can obtain the information they need. The phone line should automatically ring in a designated office in the inaccessible building. A representative from that building would then meet the person at an accessible location.

5. Request a multi-use conference room to be made available on the first floor of any building that is otherwise inaccessible. If this is not possible, network with offices on the first floor of the building and with offices in accessible buildings in the vicinity to arrange for an accessible and private meeting room.

6. Forward requests for modest renovation projects (e.g., signs, curb cuts, door handles, grab bars) to the institution’s disability resource office or physical plant.

7. Relocate programs and events that are scheduled in buildings that are architecturally inaccessible.

8. Provide access to all departmental information and resources, e.g., books, bulletin board notices and information on the internet or web sites. This may entail sending a catalogue of resources to patrons.

9. Communicate to faculty and staff in each department their responsibility to provide equal access to all people, even if it poses an inconvenience. (pp. 135-136)

Providing Program Access

Removing architectural barriers is of great importance, but it is only one of the commonly recognized barriers to access for students with disabilities. The removal of concrete and obvious physical barriers only affects a small subgroup of the disability population. Commonly overlooked obstacles that impact students with a wide variety of disabilities are programmatic access barriers. Although these are critical to ensuring equal access, they are often overlooked because they are not the easiest to implement (Jarrow, 1993). The ADA requires us to move beyond the obvious needs of students with mobility impairments and to address the highly individualized

needs of the entire population of students with disabilities (Office of the Attorney General, 1991).

Kalivoda and Higbee (1994) provide suggestions that may help in making programs accessible:

1. Include a general access statement in all publications and announcements. This communicates to people with disabilities that they are welcome. The statement may read “Access provided for people with disabilities. Call (person or office) by (date) for specific requests.”

2. Offer printed material in alternate forms. Taped versions, large print and Braille copies make visually oriented material available to people with limited vision. Be aware of resources for Braille printers in the community or geographic area.

3. Communicate the availability of Assistive Listening Devices (ALD) for people attending programs. One common ALD, the FM System, is a small transmitter that amplifies the speech of the speaker while eliminating background noise. An FM system can be purchased for under \$1000. Several can be made available for check out through a centralized campus audiovisual service.

4. Advertise that a sign language interpreter is available upon request. This offers people who are deaf equal access to programs. Major campus-wide events should recognize the need for an interpreter and arrangements should be made well in advance. The presence of an interpreter also enhances awareness and acceptance of students with disabilities. Interpreters can be scheduled through the institution's resource office if one exists, or assistance in locating a qualified freelance interpreter is available through each state's Interpreter Referral Service.

5. Relocate programs that are architecturally inaccessible. Develop a close working relationship with the office on campus that assists in space allocation. Identify one of the most modern and convenient buildings on campus for a possible meeting site. Assure that accessible parking spaces are readily available.

6. Secure accessible transportation for programs that are reserving university vehicles. Contact the campus department responsible for transportation or the off-campus contractor to request a lift equipped van or bus. (pp.134-135)

These suggestions are not limited to academics. Noninstructional activities are a vital aspect of college life and critical to the development of the student as a well-rounded individual; therefore, students with disabilities should be incorporated into programming available for the rest of the student body. Nutter and Ringgenberg (1993) emphasize the importance of the above activities for student affairs units to successfully invite, involve, and retain students with disabilities.

Suggestions to Enhance Learning

Functioning successfully at an educational institution can be difficult for students who have disabilities that impact learning, organization, and social interaction. Students with head injuries, for instance, may have problems with communication, memory, comprehension (especially learning new information), organization, decision making, and flexibility. This can affect registration, study skills, meeting class and administrative deadlines, and establishing relationships with faculty, staff, and other students. The following strategies are offered to assist faculty, counselors, advisors and student development professionals:

1. Try to learn more about the needs of students who have disabilities. In-service

workshops conducted by campus and community disability professionals can enlighten both you and your staff.

2. Communicate your willingness to work with students' different learning and organizational needs. Express your support both in writing (e.g., on a course syllabus or in a brochure) and orally. Allow students to identify themselves as having a disability in writing rather than having to say it in the presence of their peers.

3. Attend to a student's concerns carefully and repeat back your understanding of the student's situation. When approached with a student problem, choose a quiet place to meet. Try to work through some alternatives and consequences in a systematic way. Use your expertise to make suggestions for solutions.

4. Meet with students you are instructing, counseling, or advising within the first two weeks of the academic term to determine necessary accommodations.

5. Give students step-by-step written information about your program or policy and allow an opportunity for questions or clarification of procedures.

6. Learn what your campus offers for students with disabilities. Acquaint yourself with other campus resources and key people to contact so that you can offer clear and specific referrals. It is helpful to supply the

name of a contact person and location of the office or department and phone number, so that the student can schedule an appointment.

7. Post notices announcing deadlines for advisement, registration, or various student activities in strategic places well before the deadline, but also communicate these deadlines to all students via e-mail if possible.

8. Be flexible with students who might need alternative avenues for meeting class requirements. For example, students with disabilities such as visual impairments, attention deficit hyperactivity disorders, learning disabilities, acquired brain injuries, or psychological disorders might need to have their tests provided on disk so that the printed material can be converted into an accessible form such as large print, Braille, digital format, or audiotape.

9. Put together a mediation program using someone who understands disability access issues and is interested in working out amicable solutions. Students who have disabilities that affect communication, flexibility, and organization sometimes encounter difficulties with other students in group activities due to their disorganization and poor communication skills.

10. Keep in mind that although students with disabilities are subject to the same standards as any other college student, they

may need to take an alternative route to achieve those standards.

Conclusion

This chapter provides a brief overview of the mission of disability services offices, describes typical ways these offices assist students with disabilities and the campus community, and proposes suggestions on how to advance the concept of Universal Design. Universal Design considers the needs of all learners prior to the beginning of classes rather than trying to accommodate the needs of students on a case-by-case basis when requested. Regrettably, Universal Design is still an ideal. Until it becomes reality, institutions must assure that students with disabilities are provided equal educational opportunity. That is why colleges and universities have established separate administrative units to ensure that legal requirements of equal access are met.

This chapter identifies and describes common standards for disability services offices and offers practical information for faculty and administrators in the hope that they will step up and meet the challenge to enhance learning for students with disabilities. The information this chapter provides can help alleviate common concerns and questions about how to provide equal access to all programs and activities. In the meantime, both students with disabilities and their nondisabled peers

will benefit from an ongoing discussion about Universal Design at institutions of higher education. Perhaps in the not too distant future, college and university representatives will assume the responsibility for meeting the needs of each individual learner rather than relying on disability services offices to accommodate students with disabilities.

References

- Americans with Disabilities Act of 1990, 42 U.S.C.A. § 12101 *et seq.* (West 1993).
- Aune, B. (2000). Career and academic advising. In H. A. Belch (Ed.), *Serving students with disabilities* (pp. 55-67). New Directions for Student Services, No. 91. San Francisco: Jossey-Bass.
- Dukes, L. M. (2001). The process: Development of AHEAD program standards. *Journal of Postsecondary Education and Disability*, 14(2), 62-80.
- Hall, L. M., & Belch, H. A. (2000). Setting the context: Reconsidering the principals of full participation and meaningful access for students with disabilities. In H. A. Belch (Ed.), *Serving students with disabilities* (pp. 5-17). New Directions for Student Services, No. 91. San Francisco: Jossey-Bass.

- Henderson, C. (1999). *College freshmen with disabilities*. Washington, DC: American Council on Education.
- Jarrow, J. E. (1993). Beyond ramps: New ways of viewing access. In S. Kroeger & J. Schuck (Eds.), *Responding to disability issues in student affairs* (pp. 5-16). New Directions for Student Services, No. 64. San Francisco: Jossey-Bass.
- Jarrow, J. E. (1997). *Higher education and the ADA: Issues and perspectives*. Columbus, OH: Disability Access Information & Support.
- Jaschik, S. (1993, February). Backed by 1990 law, people with disabilities press demands on colleges. *The Chronicle of Higher Education*, 39(22), A 26.
- Kalivoda, K. S., & Higbee, J. L. (1989). Students with disabilities in higher education: Redefining access. *Journal of Educational Opportunity*, 4(1) 14-21.
- Kalivoda, K. S., & Higbee, J. L. (1994). Implementing the Americans with Disabilities Act. *Journal of Humanistic Education and Development*, 32(3), 133-137.
- Marion, P. B., & Iovacchini, E. V. (1983). Services for handicapped students in higher education: An analysis of national trends. *Journal of College Student Personnel*, 24(2), 131-138.
- Nutter, K. J., & Rigggenberg, L. J. (1993). Creating positive outcomes for students with disabilities. In S. Kroeger & J. Schuck (Eds.), *Responding to disability issues in student affairs* (pp. 45-58). New Directions for Student Services, No. 64. San Francisco: Jossey-Bass.
- Office of the Attorney General, Department of Justice (1991, July). Non-discrimination on the basis of disability in state and local government services; Final rule. *Federal Register*, 28 CFR Part 35.
- Pinder, P. (1979). Obligation of the disabled student: Reasonable self-help. In M. R. Redden (Ed.), *Assuring access for the handicapped* (pp. 1-10). New Directions for Higher Education, No. 25. San Francisco: Jossey-Bass.
- Section 504, Rehabilitation Act of 1973, 29 U.S.C. § 794 as amended (1973).

- Schuck, J., & Kroeger S. (1993). Essential elements in effective service delivery. In S. Kroeger & J. Schuck (Eds.), *Responding to disability issues in student affairs* (pp. 45-58). New Directions for Student Services, No. 64. San Francisco: Jossey-Bass.
- Shaw, S. F., & Dukes, L. L. (2001). Program standards for disability services in higher education. *Journal of Postsecondary Education and Disability*, 14(2), pp. 81-90.
- Silver, L. B. (1992). *Attention deficit hyperactivity disorder: A clinical guide to diagnosis and treatment*. Washington, D. C.: American Psychiatric Press.
- U.S. Department of Education, Office for Civil Rights (1998). *Auxiliary aids and services for postsecondary students with disabilities: Higher education's obligations under section 504 and Title II of the ADA*. [On-line]. Available: www.ed.gov/offices/OCR/docs/auxaids.html
- Zirkel P. A. (2000) Sorting out which students have learning disabilities. *The Chronicle of Higher Education*, 47(15), B15.

The First-Year Experience

Jeanne L. Higbee
University of Minnesota

Karen S. Kalivoda
The University of Georgia

This chapter discusses the implementation of Universal Design in a number of programs and services for prospective and new students, including admissions, orientation, registration, and first-year experience courses.

The importance of Universal Design of programs and services begins even before students are enrolled. This chapter will address admissions, orientation, and first-year experience courses and programs.

Admissions

The admissions process can play a significant role in students' choice of institution. A seemingly disinterested staff member can dissuade a student from pursuing admission. An admissions web site that is difficult for anyone to navigate can frustrate applicants and create critical barriers for students with some types of disabilities.

Students are not required to disclose a disability when applying. Some students

wait to share information regarding their disability until after they have been accepted at an institution because they fear discrimination. Even then, some students with disabilities are hesitant to make their disabilities known; they do not want to be labeled on the basis of disability. Some have been segregated into "special" classes or tracked in high school and are concerned about college course placements. Students have the right to withhold this information, and when they choose to exercise this right it can make planning difficult. Universal Design, planning for all potential situations, can prevent stumbling blocks from arising later, when there may not be adequate time to address them appropriately.

On the other hand, it is helpful for students to contact the institution's disability services office as soon as they have been

admitted, or even before, so that they can be informed about what services are available, procedures for arranging for accommodations, testing policies, and so on. Disability services providers and students can then work together to ensure that necessary documentation of the disability is on file and develop a plan of action. Sometimes students will need to undergo another evaluation to update their documentation. For example, some institutions require that testing for a learning disability be recent, occurring within a specific time period. Students who wait to contact disability services until they experience academic difficulty may find that it is several months, perhaps even an entire term, before they can receive services or modifications or accommodations, because they need to seek further documentation. Thus, it can be beneficial for both the institution and the student to disclose a disability early in the process. It is up to the admissions office to establish rapport, create an environment that welcomes diversity, and communicate that the decision to self-disclose will not have negative ramifications. It is also imperative that the admissions office provides information regarding how to contact the disabilities services office to all new students. Some institutions include a separate postage-paid response form in all letters of admission to encourage students with disabilities to provide information to the institution, or

even better, directly to the campus office for disability services.

Orientation

Once admitted, the next contact students have with the institution is often new student orientation. Implementing Universal Design in orientation programs becomes a complex process because orientation often includes testing, advising, registration, campus tours, meals, and an overnight stay in a residence hall, as well as educational and social programs. Arranging these activities is likely to involve people representing a variety of functions and offices in both academic and student affairs. It is critical for the planning process to begin with consideration of the needs of all students. If the tenets of Universal Design are central to the development of the orientation program, it will be much easier to create an experience that is welcoming to all students. Accommodations added later are likely to be perceived as afterthoughts, which indeed they are.

Testing

If placement testing occurs during orientation, testing schedules must be flexible in order to provide extended time and private testing rooms for students whose disabilities warrant these accommodations. Faculty and administrators need to reconsider the role of timed tests in the

placement process. Is there any legitimate reason why students should not be allowed to complete a set of math problems or write an essay, rather than being assessed according to how much they can accomplish in a given amount of time? Would many students be likely to perform better on placement tests if given the opportunity for more time if they need it? Even if students do not need additional time, knowing that it is available can reduce stress. Would higher scores on placement tests be a negative occurrence? Have institutions conducted research to determine whether timed placement tests are more accurate predictors of academic achievement than untimed tests? At colleges and universities that require standardized tests for admission, how much additional testing is really necessary for placement? These questions are posed to encourage the reexamination of placement testing policies, not just in terms of accommodating students with disabilities, but to better serve all new students.

Advising

Aune (2000) suggests that application of student development theory, including Astin's (1993) theory of involvement and Tinto's (1993) theory of integration, can assist advisors in using what they already know about *all* students to better serve students with disabilities. Similarly, consideration of Chickering's (1969; Chickering & Reisser, 1993) seven vectors

of college student development can remind advisors that college students are faced with multiple intersecting developmental tasks, and that although some of these tasks may pose greater challenges for students with disabilities, just as they may for students who do not have a disability, facilitating the development of "the student as a whole" (American Council on Education, 1937; reprinted in National Association of Student Personnel Administrators, 1989, p. 39) is the primary goal. Aune suggests that advisors take the following steps to implement Universal Design in providing services for all students:

Recognize their assumptions about disability and how those assumptions affect their behavior toward students with disabilities. . . . Create an atmosphere of mutual respect and trust. . . . Understand how disability and the environment interact to create barriers. . . . Use flexibility and creativity to solve problems. . . . Address disclosure issues. . . . Achieve a balance in focus between disability issues and issues all students face. . . . Balance support with fostering independence. . . . (p. 58)

Unfortunately, the duration of advising appointments during orientation is generally brief, and students often go directly from advisement to registration. Advisors may

barely have time to point out options within the core curriculum, with no opportunity to become acquainted with the individual interests and needs of the student. Thus, for the most critical first term of college, students may be least prepared to make knowledgeable choices when registering for courses. There may be no time to address issues like whether to enroll in a lecture-based section or a computer-assisted section of the same course; how a student's interests, skills, past educational experiences, or disability might affect the decision to take art, music, or drama appreciation to meet a fine arts requirement; where to look up class locations to determine whether it is feasible to sign up for classes during consecutive class periods; and how to decide what time of day to schedule classes. For students with disabilities, not unlike student athletes, students who work, students who are parents, and many others, some of these decisions may have a significant impact on success during the first term of college. If questions like these are addressed in educational sessions about core curriculum choices during orientation or in advisors' groups or learning communities, advisors can then focus more of their attention on individualizing the advising process.

Registration

On-line options at many institutions have enhanced opportunities to apply Universal

Design to registration policies and procedures. However, registering on-line can also be frustrating when it is unclear why some pathways become blocked. Similarly, if registration is web-based, it is imperative that the registration website be accessible. (Further information on web accessibility and assistive technology is provided in the final section of this book.) In addition to providing computer stations with assistive technology to make on-line registration accessible to all students, it is imperative for support staff to be available to answer questions during orientation. If registration is completed from a distance, rather than at a centralized site during orientation, individualized assistance should be available, at least during regular work hours, on-line and via telephone, and also via telecommunication devices such as TTY for students with hearing impairments.

Campus Tours

Walking or bus tours are common components of new student orientation. Tours must be designed so that they do not discriminate or segregate students and parents with disabilities, including mobility, vision, and hearing impairments. A common solution for accommodating students with mobility impairments, for example, is to provide separate vans for the families of wheelchair users. Thus, these students and their parents do not have the same opportunities for interaction as other

families. If some participants must ride a bus with a lift, all students and parents in that group should ride the same bus. Creative approaches, such as the use of golf carts and audiotaped narratives supplemented by written text, can make the traditional campus walking tour more enjoyable for all, especially in inclement weather. Campuses can also provide universally accessible virtual tours on their websites. Virtual tours would also be beneficial to all students when planning course schedules that allow adequate time to get from building to building, and when making housing decisions.

Housing and Meals

The residence halls used for orientation should be chosen with the most flexible room arrangements and modern facilities (e.g., elevators, air conditioning) in order to accommodate all participating students. (A separate chapter of this book provides further information regarding the implementation of Universal Design in residence life facilities and programs.) Meals and snacks should be planned to allow choices that accommodate diverse student needs, which can be related to food allergies, religious beliefs, and health issues. Dining facilities must be accessible to students with mobility, hearing, and vision impairments. These students must not be placed in a position in which they need to ask other students to “wait on” them.

Educational and Social Programming

In addition to “ice breakers” and other social activities, it is not unusual for orientation programs to include educational programs on topics like alcohol and drug awareness and communication in roommate relationships. Orientation is also an ideal time to provide programs that focus on multiculturalism. Workshops that include discussions of contemporary films or small group consideration of case studies are just a couple of ideas for educational programs that can be implemented in a way that is entertaining and fun. It is important that in programs like this diversity be broadly defined to include race, religion, ethnicity, home language, social class, gender, sexual orientation, and disability.

Freshman Seminars and Other First-Year Experience Courses

There are myriad models for freshman seminars and orientation-type courses. On some campuses freshman seminars are taught by faculty from departments across campus and are content-based. Many campuses also have a diversity requirement for graduation, meaning that all students are required to complete at least one course that addresses diversity issues. Content-based freshman seminars with small enrollments taught by full-time faculty members provide another ideal opportunity to engage students

in discussions of multiculturalism in an environment that establishes ground rules and facilitates trust (Higbee, 2001, 2002; Jehangir, 2001).

First-year experience courses (e.g., Gardner & Jewler, 2002) often focus on skill development and adjusting to college life. Many topics that are traditionally included in these courses, such as time management and relieving stress, can be of particular importance to students with disabilities. In discussions of communication skills, an emphasis on self-advocacy assists all students in asserting themselves in a manner that commands respect and does not infringe on the rights of others. Elementary and secondary school policies and procedures, especially for students with disabilities, often place the parent in the role of advocate. Students are not in charge of requesting services for themselves; generally a team that includes parents, teachers, a counselor, and perhaps a member of the administration, decide what is best for the student. This poses a considerable challenge for new freshmen, who are suddenly responsible for communicating their own needs. For some students with disabilities, who may have very specific and immediate concerns, and may also fear being stereotyped or not being taken seriously, or who may be reticent about discussing their disability for myriad other reasons, the inability, inexperience, or

unwillingness to communicate with faculty and staff may be the greatest barrier to achievement. Developing self-advocacy skills is crucial to college success.

Diverse Program Models

Hartman (1993) discusses the importance of summer transition programs for students with disabilities and describes some of the early model programs. She explains the impact of major legislation on increasing access for people with disabilities at institutions of higher education. Once the doors of educational opportunity were opened for people with disabilities, colleges and universities saw the need for the development of transition programs. In the 1980s, institutions such as Wright State University, St. Paul Technical College, the University of North Carolina at Charlotte and Central Piedmont Community College all offered programs to students with disabilities to help prepare them for college or to help them select the best college program for their needs. Although programs such as these were instrumental in enhancing access and retention for students with disabilities, many still accommodated students with disabilities by segregating them.

Samberg, Barr, Hartman, & Murray (1994) describe three model summer transition to college programs designed specifically for students with learning

disabilities. These programs ranged from three days to seven weeks and were intended to supplement the general orientation program offered at the institutions. Samberg et al. identify common successful strategies used by the projects, including “training in self-advocacy skills, instruction in study skills, instruction in time management, learning strategies training, orientation to disability support services . . .” (p. 75). In addition to introducing students to academic skills for college success, these programs offered an opportunity for social interaction with peers with similar disabilities.

HORIZONS

Dale (1995) describes a federally-funded TRIO program, HORIZONS, at Purdue University, designed to facilitate transition and to increase retention of students who are first generation, low-income, and have physical disabilities. This program utilized a freshman orientation course titled “Strategies for Effective Academic Performance.” The class included instruction in effective study methods and instruction on personal development. The success of the program is evident by the higher retention rate reported for students who participated in HORIZONS. Also of interest are the results of the participant evaluation of the program. Although services such as tutoring, study skills training, and computer training were valued, participants rated “just knowing that help

was available” on the evaluation form as the most important service. This highlights the importance of making personal contacts with students and introducing them to a variety of available services.

Project Excel

The University of Arkansas developed Project Excel, a summer transition program for students with disabilities. The purpose of the program was to facilitate transition and to promote academic excellence (Serebreni, Rumrill, Mullins, & Gordon, 1993). A small group of 12 high-achieving students with varying types of disabilities were chosen to participate in the program. The six-week program included activities to address psychosocial adjustment, academic development, and orientation to the campus and community. The participants evaluated Project Excel as “good” to “excellent.” Similar to other model programs, most participants reported that the most beneficial facet of the program was the opportunity to make contact with new people.

Student Transition and Retention Program

The Student Transition and Retention (STAR) Program at the University of Georgia (UGA) was created to assist new students with disabilities in making connections at the university and in learning how to utilize campus resources. The

theoretical foundation for the program is Astin's (1984, 1985) theory of involvement. When students become involved in campus life, they are more likely to be retained at the institution and to be satisfied with their educational experience. Astin (1985) noted that one of the most critical factors is contact with faculty, becoming acquainted with members of the faculty outside the traditional classroom environment. It is not unusual for students with disabilities to feel isolated and reluctant to seek help. (Willis, Hoben, & Myette, 1995). A primary goal of the STAR program is to introduce students to one another and to some of the faculty and staff members who hold key support positions.

During the 1997-1998 academic year, the UGA Office of Disability Services (ODS) surveyed current students with disabilities regarding their adjustment to college life. Students were asked to make recommendations for facilitating the transition for new freshmen and transfer students. The STAR program was designed to address those ideas and suggestions. In order to inconvenience families as little as possible, five one-day sessions of STAR were piloted during summer 1998 in conjunction with the university-wide orientation program; families attended STAR for an additional day following participation in orientation. Separate schedules of activities were established for

students and parents. The maximum enrollment per session was 10 students, so that the program could be tailored to meet individual student needs and so that each student would have several opportunities for one-to-one and small group interaction with disability service providers and a faculty member from the Division of Academic Assistance (ACA). ACA provides learning support in the form of elective courses, workshops, tutoring, a learning center, and academic counseling in such areas as setting goals and objectives, time and stress management, motivation, learning styles, career exploration, and adjusting to college life.

The schedule of activities included (a) introductions and a tour of the Office of Disability Services, including private testing rooms and a computer laboratory that is equipped with virtually every form of technology available to accommodate students with disabilities; (b) a visit to the ACA Learning Center (LC), including the opportunity to complete two instruments on computers in the center, one to assess preferred learning styles and one to explore choice of major and career opportunities, and group interpretation of the results; (c) a videotape that relates personal style to career choice, followed by exploration of how students use their five senses to learn, and how to use their perceptual strengths to their advantage, applying this information to

specific study strategies such as the Cornell format of note taking (Longman, 1999; Pauk, 1974); (d) a box lunch, which also provided an opportunity to interact informally with faculty, staff, and current students; (e) a discussion of university policies, procedures, curricula, and graduation requirements; (f) individual meetings between students and the ODS staff member who would serve as their disability specialist in the fall; and (g) role plays of self-advocacy skills.

Students and parents responded to separate evaluation forms that asked them to rate each activity on the schedule on a scale of one (i.e., not at all helpful) to five (extremely helpful). Parents' mean overall rating of the STAR program was 4.80 on a scale of one (i.e., not at all helpful) to five (extremely helpful); students' was 4.47. Parents and students were unanimous in indicating that they would recommend the STAR program to other new students with disabilities and their parents. All of the students also responded "yes" when asked, "Do you think participation in this program will help you feel more comfortable in the fall (a) seeking services at the Office of Disability Services, (b) seeking services or attending programs in the Division of Academic Assistance, and (c) making the transition to university life?" A representative parent comment was "I am feeling more confident that [student] has

made the correct choice of [institution] after attending the STAR program." Several students expressed the importance of having the opportunity to meet other students with disabilities. This program, which can be easily replicated at other institutions, is considered by participants and faculty and staff alike to be a very worthwhile addition to new student orientation for students with disabilities.

Conclusion

Institutions are still grappling with how to design orientation and first-year experience programs for students with disabilities that serve specific student needs without segregating students. Although programs like STAR can be instrumental in allaying student fears and responding to individual concerns that cannot be addressed during regular orientation sessions, they still require an additional time commitment not asked of other students. On the other hand, they do not restrict students with disabilities from participating fully in the institution's regular orientation program. Similar issues arise when considering the possibility of offering separate sections of first-year courses for students with disabilities, or for student athletes, or for returning adult students, "underprepared" students, or any other group for that matter. Administrators must weigh the potential advantages against the barriers erected when students are

segregated on the basis of any group membership. On the other hand, when student development professionals creating first-year programs consider the principles of Universal Design early in the planning process, they can embed information targeted to specific groups in the contents of integrated courses and activities, enhancing the first-year experience for all students.

References

- American Council on Education. (1937). *The student personnel point of view*. Washington, DC: Author.
- Astin, A. W. (1984). Student involvement: A developmental theory for higher education. *Journal of College Student Personnel*, 25, 297-308.
- Astin, A. W. (1985). *Achieving educational excellence*. San Francisco: Jossey-Bass.
- Astin, A. W. (1993). *What matters in college? Four critical years revisited*. San Francisco: Jossey-Bass.
- Aune, B. (2000). Career and academic advising. In H. A. Belch (Ed.), *Serving students with disabilities* (pp. 55-67). New Directions for Student Services, No. 91. San Francisco: Jossey-Bass.
- Chickering, A. W. (1969). *Education and identity*. San Francisco: Jossey-Bass.
- Chickering, A. W., & Reisser, L. (1993). *Education and identity* (2nd ed.). San Francisco: Jossey-Bass.
- Dale, P. M. (1995). A successful college retention program. *College Student Journal*, 30(3), 354-361.
- Ellis, D. B. (1985). *Becoming a master student* (5th ed.). Rapid City, SD: College Survival.
- Gardner, J. N., & Jewler, A. J. (2002). *Your college experience: Strategies for success* (5th ed.). Belmont, CA: Wadsworth.
- Hartman, R. (1993). Transition to higher education. In S. Kroeger & J. Schuck (Eds.), *Responding to disability issues in student affairs* (pp. 31-43). New Directions for Student Services, No. 64. San Francisco: Jossey-Bass.
- Higbee, J. L. (2001). Promoting multiculturalism in developmental education. *Research and Teaching in Developmental Education*, 18(1), 51-57.
- Higbee, J. L. (2002). Addressing current events in classroom discussions. *Research and Teaching in Developmental Education*, 18(2), 85-90.

- Jehangir, R. R. (2001). Cooperative learning in the multicultural classroom. In D. B. Lundell & J. L. Higbee (Eds.), *Theoretical Perspectives for Developmental Education* (pp. 91-99). Minneapolis, MN: Center for Research on Developmental Education and Urban Literacy, General College, University of Minnesota.
- Longman, D. G. (1999). *College learning and study skills* (5th ed.). Belmont, CA: Wadsworth.
- National Association of Student Personnel Administrators (1989). *Points of view*. Washington, DC: Author.
- Pauk, W. (1974). *How to study in college* (2nd ed.). Boston: Houghton Mifflin.
- Samberg, L., Barr, V., Hartman, R., & Murray, T. (1994). *Educating students with disabilities on campus: Strategies of successful projects*. Washington, DC: HEATH Resource Center, National Clearinghouse on Postsecondary Education for Individuals with Disabilities, American Council on Education. (ERIC Document Reproduction Service No. ED393254)
- Serebreni, R., Rumrill, P. D., Mullins, J. A., & Gordon, S. E. (1993). Project Excel: A demonstration of the higher education transition model for high-achieving students with disabilities. *Journal of Postsecondary Education and Disability, 10*(3), 15-23.
- Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student retention* (2nd ed.). Chicago: University of Chicago Press.
- Willis, C., Hoben, S., & Myette, P. (1995). Devising a supportive climate based on clinical vignettes of college students with attention deficit disorder. *Journal of Postsecondary Education and Disability, 11*, 31-43.

Residential Living For All: Fully Accessible and “Liveable” On-Campus Housing

Martha E. Wisbey and Karen S. Kalivoda
The University of Georgia

On campus housing for college students is a critical part of postsecondary educational life. Residence hall facilities and programs are typically located within the overall academic surroundings, thus making the location of where students sleep, study, eat and live in close proximity to their classrooms and to campus resources and services. Ideally, students with disabilities, like their peers, will be able to access their living spaces without any interruption or specific additional need for accommodation. The concepts of Universal Design features are those that are comfortably useable by all people, not just people with disabilities. Universal Design expands the scope of accessibility by suggesting that all spaces and environments in the community be useable by people with disabilities. This chapter addresses various aspects of residential life from a Universal Design perspective. The authors provide student affairs professionals suggestions on how to create an environment that is optimal for all students, staff, and faculty working and living in residence halls on campus.

“ I know this is a big campus but my daughter uses a wheelchair for her disability, what are the residence hall buildings like? Does she have to live in a special place in a specific dorm or are all your buildings equipped to handle wheelchair access? How close is she to classes?” Just getting off the phone after fielding several questions from a mother of an incoming student at my university, I had to take a minute to grasp the number of specific questions she had regarding her daughter’s room assignment. I did not know how to respond, which was rather disturbing because I have been in the student services

field for over 15 years. I promised I would get back in touch with her after I talked with several other colleagues. I was unaware of what our office could offer her daughter and had honestly never thought about some of the issues she raised. During the conversation, it became apparent that I needed to gain some knowledge about how we accommodate students with disabilities in our residence halls.

With over five different theme housing programs, 20 different buildings ranging in size from 100 to 1000 students, and housing facilities dating back to the early 1900s, I

knew we had isolated spaces that would offer students with mobility impairments a place to live on campus. These spaces were designed and planned with only the intent of being able to get a wheelchair into a residence hall room and a bathroom. No other access issues were addressed in these adaptations.

As a parent, this student's mother wanted assurance that her daughter was not just in an accessible room, but also part of the mainstream of the co-curricular life that typically takes place in a residence hall. According to Ratzka (1994), when designing structures for residences, do we look at the structures for "visitability" or do we look at them from a "liveability" criterion? This mother wanted to be sure her incoming freshman daughter would have liveability with other new students. She sought information not only about the actual room where her daughter would live, but where she would eat, how she would get around on campus, and other aspects of campus life.

As the Assistant Director for Residence Life, I knew some of our new buildings had "handicapped accessible" rooms, but they were located across campus in buildings designed for upperclass students, not in buildings where first-year students primarily lived. I could tell from the mother's tone that she hoped her daughter was able to enter college just as any student would, without any extra obstacles. Her phone call

was intended to smooth the way and I knew this was new territory for me, and maybe it was new for most persons within our department. Student assignments follow a standard format for the institution; the sign up process involves the following: get the name, roommate request, if applicable, and desired building preference, then assignments are made on a first come, first serve basis. It is hard to state if the building she would be placed in would be able to provide the "seamless" entry into the University that her family was seeking.

This chapter and my subsequent journey into gathering facts about accommodating students with disabilities in residential life offers student affairs practitioners some insight into planning residential communities that apply Universal Design concepts. These universal concepts and principles allow students with different abilities to live side-by-side and can offer designers of residence halls "an opportunity to engage them [students] within worthwhile learning activities alongside their peers" (Blamires, 1999, p. 161).

Living Facilities for Students: Historical Overview

Residence hall facilities in the United States were established as student housing early in the history of higher education. The idea of residential colleges was brought from universities in England and was seen

as places for educating the “whole” student. Faculty would spend hours after class sharing time with students in their residential living spaces (Winston & Anchors, 1993). During the period after the civil war until the early 1900s, German university influences were brought to many campuses. Professors were returning from Germany with the belief that housing students was not the intended mission of the university. During this period residence halls became less educationally defined and more distinctive facilities for “out of class” activities to take place, and typically focused on conduct issues unrelated to the overall learning atmosphere. The term dormitory signified a living space for a bed, a desk, and a few other items for living as a student on campus. The primary place for learning was designated as the classroom. The dormitory-type barrack became a standard on many college campuses (Winston & Anchors).

Over the last half of the twentieth century, dormitories transformed from just rooms with beds into living communities where students are encouraged to continue their learning process in their living spaces. Today, many residence hall buildings provide common areas where kitchens, laundry rooms, study halls, and living spaces for students provide a greater level of comfort and services. In addition, student affairs professionals are hired as residence hall staff and offer intentional programmatic

opportunities for students. Programs offered range from social interaction activities to educational seminars for students to gain knowledge outside the classroom. Professors conduct lectures and informal chats with students in common areas of their residences mirroring residential living in the early days of higher education.

College Environment Issues

On large university campuses, residence halls offer smaller communities for students to meet and get to know each other. The effort is made to create smaller communities within the large campus setting to stimulate interaction among students, especially new students, and create support systems that will offer students the chance to make connections with their peers. Peer interactions, involvement on campus, and faculty contact are all important parts of student retention (Tinto, 1987). For students with disabilities, as for all students, these are a critical components of their success as students. Happiness and satisfaction in their surroundings can lead students to get involved and feel as though they matter and belong. “Students have feelings of marginality when they do not think they matter; they feel out of place, alienated, not central, lack connections, or feel as if they do not belong.” (Winston & Anchors, 1993, p. 464). Students with disabilities may automatically feel like they are different because of their need for a special

accommodation, or because they have a visible disability that makes them look different than their peers, such as using a wheelchair, a cane, or a guide dog.

On some campuses, residence halls are seen and utilized as extensions of the campus experience; many colleges use residential facilities to house other services for students or to create areas around residence hall buildings where recreational and other activities take place. Housing can become an important part of a student's daily life and can offer a place for creating friendships, learning new things, and developing their "home" away from home. Students with disabilities are looking for the same opportunities as their peers. They may need to articulate their specific need for accommodations, as evidenced in the initial story in this chapter, but they are not seeking spaces that are separate or even "special," they are seeking residence hall designs that are universally useable (McGuinness, 1997).

Residence Hall Universal Design Features

What would universally designed residence halls feature? In essence, any aspect of the residential hall building can be used by anyone regardless of his or her level of ability or disability. Universal features are intended to enhance building components to provide flexibility for the user. Specific components are placed in different places, or

carefully selected for a variety of uses within the living setting. For example, electrical outlets can be placed higher than usual above floors for access, standard but wider doors can be selected for installation, and steps into buildings can be eliminated (Ratzka, 1994).

The intent of Universal Design is to make life simpler for everyone and make housing usable for more people at the least amount of cost to the institution. Lusher and Mace (1989) define Universal Design as an approach to design that accommodates people of all ages, sizes, and abilities. Housing professionals are faced with buildings that reflect post-World War II educational standards (McGuinness, 1997). Two different perspectives have occurred in response to making modifications based on the Americans with Disabilities Act (ADA; 1990): (a) An institution makes permanent changes by renovating a building space or room to accommodate a student, or (b) an institution makes temporary adaptations to an existing space without expensive renovation. Regardless of the response to creating an environment that meets the letter or spirit of the law to allow a student to utilize a facility, a residence hall need not look like it is designed for specific types of users. When applying Universal Design principles, planners are encouraged to start small and simple, and consider what issues are related to the look, cost, safety, gender and cultural appropriateness. Typically, it is

much easier to accommodate the unique needs of a student with a disability in a newly constructed residence hall than in an existing building; however, both facilities need some time and attention and should be “developed in a sensitive and sensible manner” (Rydeen, 1999, p. 56). The idea of renovating space for an individual specific student presents unique challenges for housing professionals. For many practitioners, the daily demands of their role can serve to limit their proactive response in making specific accommodation changes in their buildings. Housing professionals may only react to the requests that they receive and only respond based on the need.

When considering the universal design of a space for all people with different abilities, housing personnel should address several different levels of design. Although it isn’t always possible to think of everything when considering these issues, it is important to keep some basic ideas in mind. In addition, consulting current students with disabilities to assist in creating this environment would be an asset and a way to truly conceptualize some of the needs that might not occur to an able-bodied person. It is easy to make assumptions based on typical life experiences and to overlook some obvious and easy ways to make changes in the overall residence hall building. “Today’s architects address the life cycle of buildings. It is time that they began to address the life cycle of people as well. Universal design is

considerate of the human lifespan and the continuum of abilities of all individuals” (Mace, 1990, p.2).

Architectural Suggestions for Universal Design

There are a number of common issues related to moving through open spaces, including hallways, entrance ways, and open space areas. The following suggestions are offered to address possible obstacles related to moving through open spaces in hope of enhancing Universal Design in residence halls.

Moving Through Open Spaces

1. Avoid creating areas that are so small that persons cannot move back and forth with ease.
2. Provide a full-length side light at entry door.
3. Ensure space utilization is orderly and defined.
4. Install appropriate directional signs for use of space or services.
5. Assist students with visual impairments by using specific color schemes and providing Braille information.
6. Eliminate any sharp projecting objects from wall space.

7. Place any decorative benches, plants, or furniture in areas other than the main circulation routes.

8. Be sure doors have adequate width for connecting hallways to common areas and to ensure easy traffic patterns (consult architectural guidelines for required dimensions).

9. Provide open access in and out of the building via curb cuts, inclines, and ramps that are easily maneuvered.

10. Place accessible water fountains, telephones, and other service machines (e.g., vending, automated teller machine [ATM]) at heights that enable easy access.

Residence Hall Doors

Entry into student space and any other common area space must have lever handles and lighting above doorways. Automatic doors and delayed action door closer devices ease access for all students.

Bathrooms

There should be at least one, and preferably two accessible bathrooms for students on each floor. If renovations are needed, utilizing a closet or utility space can usually offer additional square footage for a universal shower stall and bathroom space. Guidelines for accessible bathrooms include: (a) slightly more square footage

than a conventional bathroom, allowing for full mobility of a wheelchair; (b) fixtures provided at appropriate heights; (c) grab bars on shower or tub walls; (d) faucets for showers and tubs located at appropriate heights and close to the outside rim, making them easy for anyone to reach; (e) shower stall large enough for wheelchairs, (f) full length mirror, and (g) adjustable height showerheads.

Bedroom areas

Residence hall bedroom areas are the actual rooms where students sleep, study, socialize and spend a large portion of their time. Ideally, the space provides students with many options for creating a comfortable and easy to use environment for their clothes, books, computer, bed, any permissible appliances, and other items such as personal hygiene items, cleaning items, laundry, and trash. Beyond comfort and ease, these spaces must also provide safety features.

Suggestions for bedroom areas include: (a) notched mounting blocks to allow for closet rods to be lowered or raised, accommodating students of all heights, (b) light switches and electrical receptacles located at a height that is reachable for persons at different heights, (c) wider passageways from hallways leading into bedrooms, (d) moveable furniture that can be removed or changed to accommodate any

specific furniture need, (e) desks and chairs that can be raised or lowered, (f) sinks in rooms that are lowered to accommodate students in wheelchairs but also accessible to students of all heights, (g) audio-visual fire alarm boxes, and (h) flexible lighting options for desk areas and overhead room lights.

Kitchen Areas

Accessibility considerations are critical for students who want to use the residence hall kitchen. Suggestions to improve access to kitchen areas for all residents include: (a) single-lever controls on kitchen faucets to facilitate easy operation and adjustments of water temperatures and volume, (b) light switches and electrical receptacles located at a height that is reachable for persons of different heights (c) side-by-side refrigerator in close proximity to the oven and stove, (d) front mounted controls on stove and oven, (e) adjustable height counters and cabinets, and (f) knee space under the sink and cook top.

Some of the items listed for Universal Design architectural changes can be helpful for students with both temporary and permanent disabilities. Universal Design principles in housing are also critical for residence hall entrances, bathrooms, and other common areas like the lounges, academic spaces, recreational areas, and kitchens. This overall approach to making

changes throughout the building will allow all residents to remain in the community rather than being confined to a specific area in the building.

Universal Programming

Lehmann, Davies, and Laurin (2000) reported that barriers encountered by students with disabilities in their study included: (a) lack of understanding of disabilities in general on the part of fellow students, staff, and faculty; (b) lack of adequate resources or services to tackle college challenges; (c) lack of financial support; and (d) lack of self-advocacy skills. Specific programs can be offered in the residence halls to help educate peers and increase student understanding about disability related biases and stereotypes. Students with disabilities can be asked to help create programs to educate their peers also. The support of students with disabilities in offering programs can serve to help empower them. Students with disabilities must be provided with equal opportunities to serve in leadership roles, such as officer and staff positions. Inclusion and involvement can offer students a voice for sharing with their peers as well as staff and faculty. Also associated with this type of invitation is the chance for students with disabilities living in a residence hall to be able to learn new skills in advocating for themselves and taking a leadership role

within the campus community. By starting at the level of their residential community, students can gain confidence in themselves and their ability to confront attitudes or actions that occur throughout their college career on campus or in society as a whole.

Residence hall staff are required to offer diversity training programs on most campuses and their efforts should expand beyond issues of race, ethnicity, and sexual orientation to include educational programs on both visible and invisible disabilities. Vander Patten (1993) found that paraprofessionals in residence halls can effectively model favorable attitudes toward college students with learning disabilities and can facilitate development of these attitudes among students on their floors and in their buildings.

Another aspect of Universal Design programming involves the inclusion of all persons in programs that are offered in the residence halls. For example, if a program on a floor is announced through a poster or written flyer advertising the date, time, and place for the activity, how can a person who is visually impaired know about the event? Ideally, staff would leave an auditory message on the student's answering machine, talk to the student personally, or if appropriate prepare the flyer in Braille and put it in the student's mailbox. However, a more universal approach might be to announce the program to all students via

e-mail, especially on campuses that have designated e-mail as their official means of communication with students. Students with visual impairments can easily access e-mail with the use of assistive technology.

Careful program planning also involves identifying a location for events where students of all abilities can feel included. If the residence hall common space is a room that has only steps leading to it, and no ramp or elevator for access, it would be wise for a staff member to avoid using this location so that all students can attend the event. The ADA requires programs to move beyond the obvious needs of the mobility impaired and begin to address the highly individualized needs of the entire population of students with disabilities. Advertising the residence hall's intent to provide access allows housing staff to plan specific programs that will allow all students to participate in a program. Suggestions that may assist in making a program accessible are:

1. Include a general access statement in all publications and announcements. This lets students with disabilities know they are welcome and that they can contact a person planning the event to make specific requests.
2. Offer printed material in alternate forms. Taped versions, large print, Braille copies, and electronic media make visually oriented material available to people with vision impairments.

3. Communicate the availability of assistive listening devices for people attending programs.

4. Advertise that a sign language interpreter is available upon request.

5. Relocate programs that are architecturally inaccessible.

6. Secure accessible transportation for programs that require off-campus activities or programs in other areas beyond the residence hall.

Even if staff do not see themselves as having social barriers or discriminatory attitudes towards students with disabilities, social distance, avoidance, and lack of foresight in planning can lead students with disabilities to perceive barriers from them (Denny & Carson, 1994). Subtle symbols such as providing alternative forms of a newsletter or including sign language interpreters for an event to be sure students with hearing loss can attend will reveal to students that the office of residence life truly regards and recognizes each individual. It may take more effort and more time to be inclusive, but the messages sent to students with disabilities will factor into their overall satisfaction with the campus environment.

Staff Development Issues

In creating residence halls that follow Universal Design principles, the

development and training of student paraprofessional staff living with students on the halls, as well as professional staff, is crucial to the success of this concept. The philosophical aspect as well as the physical signs of change in the environment will determine how the atmosphere will impact all students in the development of community.

To fully understand and actualize the Universal Design concept in the residential living environment, staff should become knowledgeable about Universal Design. Staff, especially student staff working directly with students on the floor, need to be educated about Universal Design principles and implementation. Ideally, after they gain this knowledge, they will develop positive attitudes that promote sensitive and proactive responses to a built environment that meets all students' needs. The seven established Universal Design principles that the Center for Universal Design at North Carolina State University established can guide the design process and help in the evaluation of design work (Story, 1998). The principles are (a) equitable use, (b) flexibility of use, (c) simple and intuitive use, (d) perceptible information, (e) tolerance of error, (f) low physical error and (g) size and space for approach and use. By using these principles to train and teach staff, residence life personnel can begin to support the goals for offering this type of environment.

Students with disabilities, like other subpopulations on college campuses, may experience prejudice, discrimination, and even neglect in some cases when attempting to obtain an education in a postsecondary setting. Staff may get questions from students on a floor about a student's disability. The more that is offered to help staff recognize and embrace students as individuals, the more staff can offer in responding to fellow students. "Reduction of attitudinal barriers becomes more possible when physical barriers in the environment are removed" (Chang, Tremblay, & Dunbar, 2000, p. 154). If the residence hall has the physical indications of change to suit individual students on a floor, discussions may occur with staff and other students on why this change and this design has become a component of their living environment. The teachable moments or passive learning that staff as well as students experience may help them recognize the value and positive aspect of these changes. This type of intervention is critical to the overall success of this design approach.

Helping student staff develop a personal awareness of the environmental needs of students with disabilities can add to their overall understanding of design changes. Simulated programs that have students experience the use of a wheelchair, crutches, canes, darkened glasses, or other temporary disability can add significance to the

understanding of accessibility needs for students with disabilities. Caution should be taken to advise students that because they are "pretending" to have a disability for an experience during training; they should not take on any superior knowledge in respect to another student's experience. Even though you might be in a wheelchair and gain some insight about the challenges that a student may face, the fact that you as an able-bodied student can get up and walk away from the chair separates you from the real day-to-day life of a person who utilizes a wheelchair. This factor requires discussion and may even be strengthened by inviting students with disabilities to assist with the actual student staff training.

The ultimate goal in involving staff with knowledge and attitudes that mirror the overall Universal Design concepts would be to have them engage in recognizing new and creative ways to improve the actual environment in which they work as resident assistants, graduate residents, or hall or complex coordinators. Staff members set examples for others students in the living environment and typically serve as role models. Ideally, students will gain a perspective in their residence that would extend to the rest of the campus, thus making the overall attitude towards the creation of a universal environment a common and expected part of life. "There will be direct benefits of increased

convenience, accessibility, and sociability for [all] people... “ (Stone, 1998, p. 12). The prevailing attitude the Universal Design philosophy would provide is that functional challenges are simply part of the norm on a college campus.

Housing and the Law

Discrimination has been a major barrier to access for persons with disabilities and others seeking to obtain adequate housing in society. In an effort to eliminate discrimination and to support the right of people with disabilities to live in the community of their choice, Congress enacted the Fair Housing Amendments Act of 1988. Congress added some special provisions to the Fair Housing Act to protect persons with disabilities and families with children (U.S. Commission on Civil Rights, 1994). It was intended to strengthen and enforce Fair Housing requirements and to extend civil rights protections for persons with disabilities. This Act covers most housing, but in some circumstances housing operated by private clubs, organizations, or institutions that limit occupancy to members can be exempt. Institutions of higher education should be responsive to the standards set by the Act.

The Act provides that modifications to a residential hall space for a student with a disability cannot be at the expense of the student. In addition, no institution can refuse

to make reasonable accommodations in rules, policies, practices, or services if necessary for a student with a disability. For example, “no pets” policies must allow students with a visual impairments to keep a guide dog in their residence hall space. There are specific legal guidelines for accessibility features for new buildings after 1991 that have an elevator and four or more units. Following the architectural suggestions for Universal Design listed previously in this chapter will assist university personnel in complying with federal regulations.

Two other legislative statutes that impact housing professionals in relation to students with disabilities are the ADA and Section 504 of the Rehabilitation Act of 1973. Federal and state statutes constitute the relationship defining the rights and responsibilities of students and their institutions. Section 504 contains housing-specific requirements. Housing “shall be available in sufficient quantity and variety so that scope of handicapped students’ choice of living accommodations is, as a whole, comparable to that of non-handicapped students” (84.45[a]). The ADA expands the rights granted under Section 504 and applies to both public and private institutions (Kalivoda & Higbee, 1989). Discrimination in public accommodations includes a failure to remove architectural or communication barriers unless the removal

is not readily achievable. The criteria for evaluating whether the removal is readily achievable include the cost, the financial resources available to the facility, resources available to the entity, and the type of operation. Primarily, the law provides for the goods, services, and accommodations to be provided in the most inclusive way to fit the needs of the individual (Winston & Anchors, 1993).

The Ideal Residence Hall

What would the type of hall described in this chapter look like? How would students with visual impairments feel when entering their assigned building, or how would students in wheelchairs make their way around their building? Let's look at an ideal day in the life of any new student entering University XYZ. Many of the features discussed go beyond the legal requirement for a postsecondary educational institution; however, for residential living professionals who embrace Universal Design policies, the suggestions made are intended to provide some thought-provoking design ideas.

If all things were possible within a specific residence hall, a resident assistant (RA) would greet students on opening day at the side curb, complete with curb cuts appropriate for access and for allowing items to be unloaded onto hand cranks and carts for moving items to their rooms. A few volunteer student helpers would be available

for the unloading process also. Students would have received a time in their assignment letter when they were asked to arrive so that traffic jams and chaos could be minimized. Upon getting things removed from their cars, they would go to the parking areas adjacent to the buildings and park, or to the parking decks where accessible buses would be driving back and forth to the specific residential halls. Refreshments, including water, would be available in the lobbies of all buildings.

The entry way to each building would be flat, with no steps leading up to the building, and the doors would be wide and electronically operated to open when a person approached. On opening day, the doors would be propped open for easy entry and the hallways and lobby would be clear of debris. Student staff would be available to answer questions, serve cold drinks, and walk parents and students around to specific service areas within the buildings.

All bathrooms would have wide entryways for access and at least one sink lower and one restroom stall large enough for a wheelchair or scooter, with grab bars installed at functional heights. At least one shower stall would be equipped with accessible shower controls, a shower chair or bench, and grab bars, and have plenty of space for maneuverability. All signage would also be in Braille and posted at

accessible height. The alarm system would include both strobe and sound alarms. The water fountains, vending machines, and telephones throughout the building would be at different levels for access, at least two of each side-by-side to offer varying heights.

A student entering the building would be able to hear instructions on locations of specific services or see instructions through appropriate signage. The actual residence hall rooms would have outlets and light switches at varied heights. Closet rods in clothes areas would be adjustable and desks, chairs, and beds would be moveable and able to be raised, lowered, or removed if necessary. Lighting would be offered on a dimmer switch for students' specific needs in providing overhead light beyond what is available via desk lamps. All doorknobs throughout the building would be lever handles facilitating use by people with mobility and dexterity impairments. Elevators would be available in all buildings of more than one story.

Materials that would improve acoustic considerations such as carpeting, furniture, and upholstery type, and curtains would be added to assist in absorbing noise throughout the facility. In addition, hallways would be wide and well lit for safety and ease of moving through the facility. All common areas would have open knee spaces under counters, sinks, and

desks. RAs and other staff throughout the building would be representative of the overall population of students at the institution and barriers of exclusion would be removed to offer all students of all abilities the chance to get fully involved in residence hall life.

During the evening of the first day, students would be invited to participate in a welcome activity at which all staff would be present and access to the event would be available for all students, regardless of abilities. Interpreters would be present; assistive listening devices and enlarged print and Braille copies of any material handed out would be provided. The program would be planned for the different abilities of all students living in the hall.

Conclusion

Returning to the story of the mother who called regarding her daughter's accommodations, the overall barrier-free design of Universal Design would offer the residence life program buildings that normalize living space for all students. "Instead of creating 'special places' accommodating 'special' individuals" (Stone, 1998, p. 16), residence halls would be built or renovated for students with varying needs. This concept makes common sense and helps provide residential communities that are conducive to inclusion. The simple and practical mode of building

spaces that are light, spacious, minimally cluttered, and attractive for students does not need to result in extra cost or create “separateness” for a student with a disability who is entering the institution. Utilizing Universal Design principles also eliminates the possible embarrassment of the professional who is unprepared to respond in a personal and regarding way to a parent or student asking about the facilities. Universal Design promises to remove the “stigmatizing burden none of us need to carry” (Stone, 1998, p. 14).

References

- Americans with Disabilities Act of 1990, 42 U.S.C.A. § 12101 *et seq.* (West 1993).
- Blamires, M. (1999). Universal Design for learning: Re-establishing differentiation as part of the inclusion agenda? *Support for Learning, 14* (4), 158-163.
- Chang, B. V., Tremblay, K. R., & Dunbar, B. H. (2000). An experiential approach to teaching Universal Design. *Education, 121* (1), 153-158.
- Denny, G. S., & Carson, E. K. (1994). *Perceptions of campus climate for students with disabilities*. Fayetteville, AR: Arkansas University (ERIC Document Reproduction Service No. ED 380 929)
- Fair Housing Act Amendments of 1988, 42 U.S.C. § 3601 *et seq.*
- Fair Housing and Equal Opportunity. (2001, July 6) *U.S. Department of Housing and Urban Development* [On-line]. Available: <http://www.hud.gov/fhe/fheact.html>
- Kalivoda, K. S., & Higbee, J. L. (1989). Students with disabilities in higher education: Redefining access. *Journal of Educational Opportunity, 4* (1) 14-21.
- Lehmann, J. P., Davies, T. G., & Laurin, K. M. (2000). Listening to student voices about postsecondary education. *Teaching Exceptional Children, 32* (5), 60-65.
- Lusher, R. H., & Mace, R. I. (1989). Design for physical and mental disabilities. In J. A. Wilkes & R. T. Packard (Eds.), *Encyclopedia of architecture* (pp. 748-763). New York: John Wiley & Sons.
- Mace, R. (1990). *Definitions: Accessible, adaptable, and Universal Design*. [On-line]. Available: http://www.design.ncsu.edu/cud/pubs/center/fact_sheets/housdef.htm The Center for Universal Design, North Carolina State University.

- McGuinness, K. (1997). Beyond the basics. *American School & University*, 69 (11), 39-41.
- Ratzka, A. (1994, June). *Cost-benefits of universal building design*. Paper presented at the International Congress on Accessibility, Rio de Janeiro, Brazil.
- Rydeen, J. E. (1999). Universal Design. *American School & University*, 71 (9), 56-59.
- Section 504, Rehabilitation Act of 1973, 29 U.S.C. § 794 as amended (1973).
- Stone, K. (1998). Practical, beautiful, humane. *Inside MS*, 16 (3), 12-17.
- Story, M. F. (1998). Maximizing usability: The principles of Universal Design. *Assistive Technology*, 10 (1), 4-12.
- Tinto, V. (1987). *Leaving college: Rethinking the causes and cures of student attrition*. Chicago: University of Chicago Press.
- U.S. Commission on Civil Rights. (1994). *The Fair Housing Amendments Act of 1988: The enforcement report*. Washington, DC: Author.
- Vander Patton, J. J. (1993). Residence hall students' attitudes toward resident assistants with learning disabilities. *Journal of Postsecondary Education and Disability*, 10 (2), 21-2.
- Winston, R. B., Anchors, S., & Associates. (1993). *Student housing and residential life*. San Francisco: Jossey-Bass.

Implementing Universal Design in Learning Centers

Jeanne L. Higbee
University of Minnesota

Shevawn B. Eaton
Northern Illinois University

This chapter defines the mission, functions, and goals of college and university learning centers and then describes how the implementation of Universal Design facilitates the achievement of these goals for all students. The authors also address testing services commonly provided by learning centers for students with disabilities. The chapter concludes with a discussion of physical accessibility issues.

The primary mission of every postsecondary institution is to educate students effectively. Early in the history of American higher education, it became clear that effective learning also meant developing support services to meet the academic needs of students (Enright, 1994). College and university learning centers have become home to a wide variety of services that enhance learning among all students at the institution. In addition, learning centers often play a role in the delivery of services for students who require developmental support, including underprepared students and students with disabilities.

Mission, Functions, and Goals

The development of the learning center on any given campus is grounded in the history and mission of that institution. When a college or university provides access for students who have developmental needs, retention of those students often requires programmatic support beyond the curriculum. However, whether open admissions or highly selective, institutions have an obligation to engage in activities that promote the intellectual development of all students. Levels of student preparedness are always relative; at any given institution there will be students who are more talented

in some disciplines than in others, and students who have developed skills and habits that are more conducive to learning than others. The nature of the support needed, the funding available, and the political position of the institution all contribute to decision-making regarding learning center functions.

Changing demographics have also influenced the nature of academic supports provided in postsecondary education. After World War II, for example, the GI Bill enabled many veterans to go to college. A large number of these students were not adequately prepared for the rigors of college work. As a result, learning assistance programs and learning centers became institutionalized to support veterans in their academic pursuits (Johnson & Carpenter, 2000; Martha Maxwell, 2000). Similarly, in the 1960s the initiation of many access-oriented programs, such as financial aid, brought another wave of diverse students to college for the first time. Meanwhile, the changing face of the work place required more adults to return to school following gaps in their education. The resulting diversity in skills and experiences created an explosion of learning centers and support services designed to meet the broad range of academic needs of students. Based on that historical change in higher education, a majority of learning centers evolved during the 1970s (Devirian

et al., 1975; Enright, 1994). The emergence of learning centers has been reflective of the changes in diversity and access on a campus.

Often the origin of a center defines its function, at least initially. Prager (1991) cites three models that guide most centers: (a) those that emerged from the disciplines, such as math labs and writing centers; (b) those that grew as extensions of the library; and (c) those that were created as “stand-alone” programs, with no or limited connections to other institutional functions. Centers can provide a wide range of activities that include assessment; counseling-based services; academic assistance in mathematics, writing, reading, and the development of learning skills and strategies; and technological support. In addition to traditional models such as peer and professional tutoring, service delivery systems can include programs like Supplemental Instruction (SI) and Video-based Supplemental Instruction (Arendale, 1998; Peled & Kim, 1995) and paired, linked, or adjunct courses (Blinn & Sisco, 1996; Bullock, Madden, & Harter, 1987; Dimon, 1981; Resnick, 1993) that attach instruction in strategies such as note taking and preparing for exams to courses considered “high risk” (i.e., with low retention rates or high failure rates). Many learning centers provide services such as workshops on topics like time management and test anxiety, computer tutorials in

subjects like mathematics and foreign languages, or the opportunity to participate in learning communities or collaborative study groups. Finally, centers may be the home to developmental or basic skills curricula.

Services may be provided in person, on-line (Johnson & Carpenter, 2000), or via videotape or cable-access television (Thomas & Higbee, 1998). Learning centers were initially born to meet the needs of students who have the capacity to succeed academically, but for a variety of reasons may require additional resources or different approaches to learning. For this reason, centers often have become the place on campus to experiment and utilize nontraditional or cutting edge delivery systems to assist students, looking to technology and instructional innovations to provide complementary ways to enhance learning (Foelsche, 1999).

Goals for learning centers may include promoting academic success, enhancing student learning, improving retention and graduation rates, and providing services for students with disabilities (Kay & Sullivan, 1978; Prager, 1991). Some learning centers are designed to support all students, and some are targeted to meet the specific needs of particular populations. Students with disabilities have long been considered one of the primary target groups for learning centers (Casazza & Silverman, 1996). Some

centers evolved initially to provide exclusive services to this population (Enright, 1994). It is imperative for all learning center administrators to maintain sensitivity and openness to universal support for students. Students with hidden disabilities may come to the center to seek help, sometimes without sharing information about their particular disability or needs (Eaton & Wyland, 1996). Planning for such situations will help maintain the confidentiality of the student and create a center that is truly accessible to all students. Universal Design (UD) provides a means by which the curriculum and educational tasks can be adapted and mastered more effectively by all students, particularly those with undisclosed invisible disabilities, whose learning needs might otherwise not be met.

The philosophy of Universal Instructional Design (UID) is to design curricula in such a way so that accommodation is built into the program. In the learning center, materials and delivery systems can also include Universal Design guidelines and assumptions. The myriad programs and services that may be made available by learning centers demonstrate Universal Design because they provide multiple means of facilitating the acquisition of knowledge. However, they also represent numerous challenges for planning and implementation in a manner that is accessible to all students.

Services for All Students

It is not difficult to adapt some of the individualized services provided by learning centers for students with virtually any disability. One-to-one tutoring, for example, may require arranging for a sign language interpreter or real time captioning for a student with a hearing impairment, but if tutoring appointments are scheduled in advance for all students, making these arrangements should not pose overwhelming obstacles. Similarly, computer-assisted tutorials may require the provision of assistive technology, but it is necessary to equip some computer stations in every learning center with the technology to make all programs and services accessible to any student. If students are able to sign up for computer time in advance, students with disabilities will not have to wait for a computer terminal. On the other hand, it is important to note that providing assistive technology does not guarantee accessibility. For example, a screen reader will read across lines of columns in a table, rather than down the column. The final section of this book provides further information on creating accessible tables. When possible, computer tutorials and other programs can be placed on the server, providing accessibility to all students, whether working within the learning center or from a distance.

As indicated in the next section of this book, the implementation of Universal Instructional Design, whether within the classroom curriculum or in learning center programs like workshops, Supplemental Instruction, and paired, linked, or adjunct courses, will also require advance planning. Workshop facilitators, SI leaders, and instructors must consider how to include all learners by presenting information in a variety of ways. For example, material provided on overhead transparencies or via power point slides should also be presented orally, provided on handouts in both regular size and enlarged print, and made available on disks or to download from a web site. Workshops, SI sessions, and courses can be videotaped so that students can view the tapes in the learning center, check them out to view at home, or if possible, watch on public cable access television. Videotapes should include closed captioning.

Video services can be beneficial for all students who work, have family responsibilities that make it difficult to attend at the times that programs and services are made available, or are not able to attend due to illness. In addition, providing courses, SI lessons, or tutorial sessions on tape and TV through the learning center can make it possible for students who have disabilities like asthma or cystic fibrosis, or require surgery during the academic term, to maintain their academic

responsibilities (Thomas & Higbee, 1998). Many students also benefit from being able to pause or stop videotaped lectures in order to take more accurate notes or to ensure that they really understand the material.

On-line services can also benefit all students. However, for some students with disabilities, synchronous discussions can become exclusive rather than inclusive. Just as in collaborative study sessions occurring in the learning center it may be necessary to allow time for “translation” so that students with auditory impairments can participate fully when assisted by a sign language interpreter or real time captioning interpreter, synchronous on-line chats can disadvantage some students with visual impairments, mobility impairments, and reading-oriented learning disabilities, to name a few. These factors must be taken into consideration when creating on-line programs and services. Thinking inclusively in the planning stages makes all services more accessible to all students.

All web information for students, including learning center information sites as well as other on-line programmatic functions, must be given careful consideration for accessibility. Often, visually attractive or high tech websites can be problematic for students with disabilities. Therefore, it is important that websites be made with minimal graphic additions, or

offer a “text only” version of the site that can be downloaded or modified for students with visual impairments. *Bobby Worldwide*, for example, provides guidelines and evaluative tools for the accessibility of websites (Center for Applied Special Technology, 1999). Text versions of sites also provide an excellent way of developing simple handouts for all students to use.

Finally, learning center administrators, expecting that students with disabilities will come to the center, need to offer training and increase sensitivity of staff through professional development activities. When learning center administrators anticipate needs early, staff can be prepared to change delivery systems or to direct students to different resources for assistance.

Disability Services Housed Within Learning Centers

Some learning centers provide services specifically for students with disabilities, while others physically house the institution’s disability services for students. Under the latter model, especially on smaller campuses, the learning center may be the only location that provides computers with assistive technology. In this situation, students with disabilities may be less segregated than on campuses with separate facilities for disability services. However, especially at larger institutions, if assistive

technology is not made available in computer labs throughout the campus, it is imperative that the learning center be centrally located and make the same hardware and software provided around campus accessible to all students. It is not appropriate, for example, for a student with a disability to be required to complete statistics assignments in the learning center when all other students are doing the assignment in the statistics lab.

Testing Services

On some campuses the learning center is the site designated for proctoring tests when extended time or other modifications are indicated as part of a student's individualized plan for accommodation. Students with Attention Deficit Hyperactivity Disorder, learning disabilities, acquired brain injuries, or some psychological disabilities may require a private testing room in order to reduce distractions. Students with anxiety disorders may require a testing environment that eliminates sources of stress, such as other students leaving when they finish early.

It would be wonderful to be able to provide extended time and a more conducive testing environment for all students who could benefit, including students who do not have a documented disability but do suffer from test anxiety. In many classrooms, time limits are placed on quizzes and tests

because of the length of standard class periods, not because the time factor is an essential component of performance of the task. The ability of learning centers to provide testing with extended time for all students depends on the availability of space and staff.

Learning centers may also provide other types of testing services for students with disabilities, such as reading a test aloud for a student with a vision impairment, or transcribing audio taped oral responses for a student with a mobility impairment. Or the learning center might provide assistive technology such as a screen reader or voice recognition software to enable students with disabilities to "read" or to respond orally to exams. At the present time the cost of this software makes it prohibitive to expect learning centers to provide these technologies for all students. But as further technological advances occur, and costs diminish, it is not unreasonable to anticipate that learning centers will be able to make more choices for demonstrating knowledge available to all students if faculty members are willing to be flexible in their approaches. New forms of technology may make it easier for faculty to test the use of higher order thinking skills among students.

Physical Accessibility

Innovations in computer technology, as discussed in the final section of this book,

address many issues of accessibility for students with disabilities who want to make full use of learning centers. Other considerations include how spaces are designed, flexibility in furniture arrangements, and adjustable workstations.

Welcoming Reception Areas

Reception areas should be easily accessible and welcoming. Reception counters should be 28 to 34 inches tall, so that students seated in wheelchairs have ready access to staff and to printed materials provided on the counter. Signage should be provided in contrasting colors in raised text and Braille at appropriate heights. Trained personnel should be ready to provide information about programs, make referrals, schedule appointments, and direct students to appropriate services and staff. Descriptions of services, staff directories, and handouts should be available in multiple formats, including large type, Braille, and on audiotape and computer disk.

Use of Space

Learning centers should include both individual and group rooms for tutoring and study skills counseling, if provided, as well as for testing. Entrances, corridors, rooms, pathways, and computer stations must be sufficiently large to accommodate wheel chairs and scooters. Adjustable height workstations are more comfortable for people of various sizes as well as for

students with mobility impairments. Study carrels provide a level of privacy that can be appreciated by any student. Circular tables for study groups facilitate communication while also allowing flexible seating arrangements.

Lighting

Windows that allow for natural lighting can make learning spaces more welcoming if other factors are taken into consideration. Installation of windows that filter ultraviolet light will benefit all students, but are particularly important to students with disabilities like lupus and students who suffer from migraine headaches. In addition to providing window blinds to reduce glare on computer screens at different times of day, computer monitors should be equipped with glare guard. It is preferable that overhead lighting not be fluorescent, but when there is no choice, it is important to properly maintain fixtures and replace bulbs regularly. Flickering bulbs can trigger seizures. Adjustable individual work station lighting can also be beneficial for all students. Task lamps should be equipped with “soft” or “low light” bulbs.

Regulating Noise

Policies enacted to regulate noise levels (e.g., policies related to use of cell phones and pagers) benefit all students, not just those with hearing impairments. In addition, wall, ceiling, and flooring materials should

be selected to minimize noise. Study carrels and partitions should be sound-absorbent. Separate spaces should be created for group activities so that the natural flow of conversation does not disrupt the concentration of individuals working on computer tutorials or studying alone. Implementing these practices to promote Universal Design creates a more welcoming and efficient learning environment for all students.

Conclusion

With forethought, learning centers are an ideal place to implement the principles of Universal Design and Universal Instructional Design. On many campuses learning centers play a vital role in enhancing student retention. It is imperative that learning centers be universally accessible.

References

- Arendale, D. (1998). Increasing efficiency and effectiveness of learning for freshman college students through Supplemental Instruction. In J. L. Higbee & P. L. Dwinell (Eds.), *Developmental education: Preparing successful college students* (pp. 185-197). Columbia, SC: National Resource Center for The First-Year Experience and Students in Transition, University of South Carolina.
- Blinn, J., & Sisco, O. (1996). "Linking" developmental reading and biology. *National Association for Developmental Education Selected Conference Papers*, 2, 8-9.
- Center for Applied Special Technology (1999). Bobby worldwide. Retrieved April 25, 2002, from <http://www.cast.org/Bobby/>
- Bullock, T., Madden, D., & Harter, J. (1987). Paired developmental reading and psychology courses. *Research and Teaching in Developmental Education*, 3(2), 22-29.
- Casazza, M., & Silverman, S. (1996). *Learning assistance and developmental education: A guide for effective practice*. San Francisco: Jossey-Bass.
- Devirian, M. C., et al. (1975). *A survey of learning program centers in U.S. institutions of higher education*. (ERIC Document Reproduction Service No. ED112349)
- Dimon, M. (1981). Why adjunct courses work. *Journal of College Reading and Learning*, 21, 33-40. Reprinted in M. Maxwell (Ed.) (1994), *From access to success*. Clearwater, FL: H&H.

- Eaton, S., & Wyland, S. (1996). College students with Attention Deficit Disorder (ADD): Implications for learning assistance professionals. *The Learning Assistance Review*, 1(2), 5-22.
- Enright, G. (1994). College learning skills: Frontierland origins of the learning assistance center. In M. Maxwell (Ed.), *From access to success: A book of readings on college developmental education and learning assistance programs* (pp. 31-40). Clearwater, FL: H&H.
- Foelsche, O. K. (1999). *Implementation and implications of digital services in learning centers*. (ERIC Document Reproduction Service No. ED450707)
- Johnson, L., & Carpenter, K. (2000). College reading programs. In R. F. Flippo & D. C. Caverly (Eds.), *Handbook of college reading and learning* (pp. 321-363). Mahwah, NJ: Lawrence Erlbaum Associates.
- Kay, R. S., & Sullivan, L. (1978). *Learning centers: Alternatives to bridging the gap between secondary and postsecondary education*. (ERIC Document Reproduction Service No. ED155574)
- Martha Maxwell: An oral history. (2000). In J. L. Higbee & P. L. Dwinell (Eds.), *The many faces of developmental education* (pp. 9-13). Warrensburg, MO: National Association for Developmental Education.
- Peled, O. N., & Kim, A. C. (1995). Supplemental Instruction in biology at the college level. *National Association for Developmental Education Selected Conference Papers*, 1, 23-24.
- Prager, C. (1991). *Learning centers for the 1990s*. ERIC Digest. (ERIC Document Reproduction Service No. ED338295)
- Resnick, J. (1993). A paired reading and sociology course. In P. Malinowski (Ed.), *Perspectives in practice in developmental education* (pp. 62-64). Canandaigua, NY: New York College Learning Association.
- Stewart, T. C., & Hartman, K. A. (2001). Finding out what the campus needs: The process of redefining a learning center. *The Learning Assistance Review*, 6 (1), 39-49.
- Thomas, P. V., & Higbee, J. L. (1998). Teaching mathematics on television: Perks and pitfalls. *Academic Exchange Quarterly*, 2(2), 29-33.

Universal Design in Counseling Center Service Areas

Kathleen B. Uzes and Daley O. Connelly
The University of Georgia

The implementation of the concept of Universal Design in counseling center service areas for students with disabilities can increase the number and diversity of students served. This in turn supports the mission statement of the counseling center and the institution's mission. By knowing and understanding the needs of students with disabilities and incorporating the concept of Universal Design, counseling centers can provide services and accommodations befitting the ever-increasing diverse populations on college campuses. This chapter will address incorporating Universal Design into service areas such as outreach programming, consultation, groups, and individual counseling. Case studies will be provided to demonstrate how students with disabilities can benefit from counseling provided by most counseling centers.

Counseling centers on university and college campuses have mission statements that endeavor to support the personal and professional growth of students. It is the role of counseling centers to support the mission statement of the university or college (Kiracofe et al., 1994) by facilitating the mental health of as many students as possible with the resources available to them. Many counseling centers are multifaceted, offering students direct services, personal, career, and group counseling, and broader outreach programming and consultation. According to Archer and Cooper (1998), there is a

continuing need to provide counseling for traditional-age students with “normal” career and developmental needs and crises (identity development, value clarification, sexuality and intimacy, death, relationship endings, parental divorce) as well as the need to attend to the special concerns of returning adult students (career and life changes, family and relationship issues, stress, time management).
(p. 13)

Many problems and concerns are widely shared by college students whether they

have disabilities or not (Cormin & Hackney, 1993; Nutter & Ringgenberg, 1993), so the types of services already provided by counseling services on many campuses will enhance the undergraduate experience of all students. For example, students with disabilities seek time-limited individual counseling services such as therapy, support, or personal development for many of the same reasons that other students seek counseling.

Counseling centers are also utilized in providing consultation and support to the college or university community when a student is in distress and for other campus emergencies. It is no surprise that, given the great need for mental health services on campus and the ever-shrinking resources available to counseling centers, most centers adhere to different versions of what is called a “short term model” of counseling. This model allows services to the most students, while students needing years of care are referred to community resources. It is, therefore, possible that a student who is being seen by a therapist in the community can also be seen at the counseling center for short-term career counseling. Likewise, referrals can be made from agencies on campus to the counseling center for the same issues outlined by Archer and Cooper (1998). It would be important to have a consultative relationship with the referring agency. For example, if the disability

services office were the referral source it would be important in some cases to obtain a release of information so that the counselor and disability specialist could work together in providing the best services for the student. It would also assist both agencies in keeping abreast of the current issues, gaining feedback on programs that are being offered, and looking for productive means of working together. In addition the counseling center can be very valuable as a resource to help refer students with disabilities who need longer term counseling that is not provided by the counseling center.

Accessibility of Counseling Services

Physical accessibility is one of the most fundamental components of Universal Design. If the counseling center were located in an architecturally inaccessible facility, then alternative access would need to be provided (Kalivoda & Higbee, 1994). For example, if the counseling center were located on the second floor of a building with no elevator and the student seeking counseling used a wheelchair or was unable to ascend or descend stairs due to a mobility impairment, then an alternative accessible place to meet the student would be needed. It should be borne in mind that there are individuals with mobility impairments that are not obvious. These individuals might

have a prosthetic, be on medications, or have a chronic illness that leaves them physically weak. Any alternative meeting place used to accommodate students with mobility impairments would need to provide the same fundamental environment that would be provided for other students. If clients were normally met in a quiet one-on-one setting, then a comparable site that would ensure the same degree of confidentiality would need to be provided. On the other hand, a universally designed counseling service would be located where all students have equal access to individual and group counseling spaces.

Along with one-on-one counseling, many counseling centers also provide groups, outreach programs, and consultation with faculty and student groups. There are specific issues when presenting programs or groups that can potentially arise when the accessibility needs of the audience are not known. For example, for workshops held in residence halls, Greek organizations, or for a drop-in “lunch and learn,” the number attending the programs or the needs of those attending would not necessarily be known in advance. If the program were planned for a targeted group of students, it would be important for the presenter to inquire in advance if anyone in the targeted audience needs accommodations. If the concept of Universal Design were already implemented, then not knowing the audience

needs would not be an issue. All the possible needed accommodations would already be in place.

In addition to meeting in an accessible location, in a Universal Design setting counseling staff would have developed alternative forms of all handouts, thus prepared should an individual who is blind or has a visual impairment decide to attend the outreach program. Having the handouts prepared in advance and available in Braille, large print formats, on tape, and on disk would not only meet the Americans with Disabilities Act (ADA 1990) requirements, but would also provide an open and accepting environment. This allows students to feel valued (Schlossberg, Lynch, & Chickering, 1989). Also, small changes in presentation style will aid people with visual impairments. For example, when using visual aids like overhead transparencies or power point slides, it would be helpful to replace the nonspecific “this” and “that” with more specific descriptions of what is being discussed, and not to assume that everyone in the audience is able to read the text on the screen. This approach will benefit not only those with a visual impairment, but also those who are not visual learners, as well as participants who do not have a clear view of the screen. In addition, for each program a sign language interpreter would be provided in the event that a student with a hearing impairment

would be attending. If the presenter is utilizing a videotape, then the videotape would be captioned and the television would have captioning capability.

Of course, some of these accommodations may be impractical or simply too costly, such as providing a sign language interpreter for all programs, whether needed or not. One alternative would be to require all participants to register in advance, and indicate if any accommodations are needed, thus allowing the program to be accessible for all those who attend. Another suggestion, particularly for counseling workshops or programs to be held in residence halls or Greek houses, is to have a contact person who knows the needs of the audience relay any accommodation needs to the presenter in advance.

The concept of accessible handouts would also apply to brochures or any other print materials that are provided or used by the counseling facility. In order to promote program access and the option of alternative formats, all advertisements of services in the form of publications and announcements would state that these accommodations can be provided. A contact person and contact information should also be provided (Kalivoda & Higbee, 1994) for all programs and services.

Counseling Concerns of Students with Disabilities

The following section presents case studies of students who were referred to the counseling center by campus agencies (e.g., disability services, housing), friends, and faculty. These case studies are examples of students with disabilities who accessed counseling services to address mental health issues in the same manner as other students. They illustrate some of the developmental concerns of students with disabilities. It is our hope that the case studies will give the reader examples of how the counseling center can be of service to help students with disabilities deal with psychological concerns.

Case Study One: Loss and Acceptance

A 24-year-old female diagnosed with a disease that caused her to become legally blind during early adolescence was referred to the counseling center to cope with the reentry to school. She was experiencing a great deal of anxiety about approaching her professors to discuss her needs for accommodations in the classroom. Much of her anxiety in these situations had to do with the anger and grief she was feeling about losing her sight, which was something she had never been able to verbalize. By working on these issues, she was able to

gain more confidence in approaching others and expressing what she needed in the classroom situation. Although this issue was related to the individual's visual impairment, the counselor did not have to be an expert in the field of blindness. The counselor was not there to cure or to "fix it all." Rather, the role of the counselor was to identify the source of the difficulty and help the student develop effective coping skills to function more productively.

Case Study Two: Personal and Career Adjustment

A young man who started college as a typical freshman was involved in an accident his second semester in school that left him paralyzed from the waist down. After a year in recovery, he returned to the university using a wheelchair for mobility. He was still involved in physical therapy in the hope that he would one day no longer need to use a wheelchair. Upon returning to school many unforeseen issues arose for him. His relationships with his friends were now very different. Going out with friends to restaurants, bars, and sporting events was no longer the casual event it once was for him. He now had to deal with transportation and accessibility concerns. He became depressed as he compared the reality of his new situation to how he once functioned, as well as the lack of understanding from his friends. In working with this student, it was

important to help him through the grieving process over the feeling of overwhelming loss. The counselor also helped the student become more assertive in identifying and addressing his needs with his friends and family. There were also some career issues involved in working with this client. Before the accident he was majoring in forestry and was planning to be a forest ranger. Other opportunities in the forestry field were investigated to find a good match for him, taking into consideration his interest and his mobility issues.

Case Study Three: Interpersonal Relationships

A thirty-two year old female was referred to the counseling center to work on marital problems. She had been diagnosed with severe carpal tunnel syndrome, which resulted in surgery that left her with nerve damage to her dominant arm. Due to her limited manual dexterity, she experienced difficulty in many areas of her life, such as caring for her young child, writing, or typing for any length of time. She was also limited in her ability to drive her car. These limitations resulted in her having to rely on her husband for assistance. The client reported that her husband expressed a great deal of resentment concerning her requests for help. This ongoing situation left her feeling frustrated with his lack of assistance in her day-to-day life, as well as the lack of

support for her career aspirations. Her husband was not willing to take part in couple's counseling; therefore, she was seen individually. During the therapeutic process the client became aware the absence of support had been an issue for her and her husband even before she experienced difficulties with her arm. The client made a decision to divorce and terminated counseling shortly after her divorce was final.

Case Study Four: Behavior Modification and Values Clarification

A twenty-year-old junior majoring in psychology was referred to the counseling center to explore career issues. The client reported that he wanted to continue his education in a field of study that would enable him to work with people; however, he did not have a specific career objective in mind. He disclosed that he was diagnosed with Attention Deficit Hyperactivity Disorder at the age of nine and was placed on medication at that time. He had been on and off medication since then and wanted to explore non-medical options to address the difficulties with initiative that he experienced with the Attention Deficit Hyperactivity Disorder. In working with this client, certain considerations had to be taken into account, based on his inability to sustain focus for extended periods of time. He was also able to identify areas that

caused him difficulty, such as his limited attention span and his impulsive behavior. To accomplish the behavior modification, the client was instructed in self-relaxation, as well as how to anticipate instances that would exacerbate his hyperactivity. Career batteries were administered with specific emphasis on skills, abilities, and values to determine the client's strengths as well as to clarify his values. As a result, a field of study was chosen that would enable him to work with people as well as tap into the strength of his high energy level. In the end, he chose to pursue a career in working with juvenile delinquents.

Conclusion

In conclusion, it should be kept in mind that the principle of Universal Design is based on obtaining the most ideal situation in implementing services to as many students as possible. With the ever-increasing number of students with disabilities on campus, the implementation of the concepts encompassing Universal Design into the counseling center service area would help support the counseling center in its goals and mission statement.

References

- Americans with Disabilities Act of 1990, 42 U.S.C A. Section 12101 et seq. (West 1993).

- Archer, J., & Cooper, S. (1998). *Counseling and mental health services on campus: A handbook of contemporary practices and challenges*. San Francisco: Jossey-Bass.
- Cormier, S. L., & Hackney, H. (1993). *The professional counselor. A process guide to helping* (2nd ed.). Needham Heights, MA: Allyn & Bacon.
- Henderson, C. (1999). *College freshmen with disabilities*. Washington, DC: American Council on Education.
- Kalivoda, K. S., & Higbee, J. L. (1994). Implementing the Americans with Disabilities Act. *The Journal of Humanistic Education and Development*, 32(3), 133-137.
- Kiracofe, N. M., Donn, P. A., Grant, C. O., Podolnick, E. E., Bingham, R. P., Bolland, H. R., et al. (1994). Accreditation standards for university and college centers. *Journal of Counseling and Development*, 73, 38-43.
- Nutter, K. J., & Ringgenberg, L. J. (1993). Creating positive outcomes for students with disabilities. In S. Kroeger & J. Schuck (Eds.), *Responding to disability issues in student affairs* (pp. 45-58). San Francisco: Jossey-Bass.
- Schlossberg, N. K., Lynch, A. Q., & Chickering, A. W. (1989). *Improving higher education environments for adults*. San Francisco: Jossey-Bass.



Resources and Future Directions

Universal Design and Technology

Karen S. Kalivoda and Margaret C. Totty
The University of Georgia

Developments in technology promise new opportunities for all students both in higher education and the workplace. It is incumbent upon everyone involved in higher education to assure that programs are accessible to all students. The purpose of this chapter is to acquaint educators with new technology available to accommodate students with disabilities, promote equal access and advance the concept of Universal Design.

Since the passage of the Americans with Disabilities Act (ADA) of 1990 higher education administrators and faculty are faced with difficult decisions regarding how to provide the most efficient and cost-effective access throughout the institution (Dustin & Prolan, 1995). At the same time, the introduction of technology into the teaching process has revolutionized higher education, opening new avenues for teaching and creating new opportunities for all students. Effective use of new technology requires a fundamental rethinking of how instruction takes place (O'Donnell, 1996). The purpose of this chapter is to offer practical information about how to incorporate new technologies in the college or university classroom, laboratories, and learning centers. Now that advances in

computer technology have made adapted computer products more efficient, practical, and cost effective, it is reasonable to expect institutions to take proactive steps to accommodate students with disabilities (Wilson, 1992a, 1992b).

Responsibility for providing access to all programs and activities resides with each department of a college or university as well as with the institution as a whole. In order to provide appropriate computer accommodations, the faculty and staff may need support from other resources on campus. Although some institutions may have a disability resource office with a designated technology specialist to assist with disability related computer needs, faculty members bear the responsibility for

ensuring that students with disabilities have equal access to their classes, just as program directors are responsible for providing equal access to all programs and services under their auspices.

Legal Guidelines

The provision of educational auxiliary aids to students with disabilities is necessary so that they may enjoy equal educational opportunity. Auxiliary aids include a wide range of services and devices for ensuring effective communication. The Department of Justice provides a list of examples but it is not meant as an all-inclusive or exhaustive list of possible or available auxiliary aids and services. To do so would omit new devices that become available from emerging technology.

(1) Auxiliary aids and services include qualified interpreters, notetakers, transcription services, written materials, telephone handset amplifiers, assistive listening devices, assistive listening systems, telephones compatible with hearing aids, closed caption decoders, open and closed captioning, TDDs, videotext displays or other effective means of making aurally delivered materials available to individuals with hearing impairments.

(2) Qualified readers, taped texts, audio recordings, Brailled materials, or other effective methods of making visually delivered materials available to individuals with disabilities.

(3) Acquisition or modification of equipment or devices and other similar services and actions. (Office of Attorney General, 1991, p. 35717)

The Federal Register (Office of Attorney General, 1991) also provides guidelines to assist institutions of higher education in determining necessary auxiliary aids, as follows:

(A) A public entity shall take appropriate steps to ensure that communications with applicants, participants, and members of the public with disabilities are as effective as communications with others.

(B) (1) A public entity shall furnish appropriate auxiliary aids and services where necessary to afford an individual with a disability an equal opportunity to participate in, and enjoy the benefits of, a service, program, or activity conducted by a public entity.

(2) In determining what type of auxiliary aid and service is necessary, a public entity shall give primary consideration to the requests of the individual with disabilities. (p. 35721)

The preceding definition states that equal opportunity must be provided to any “service, program, or activity.” Therefore, auxiliary aids on a college campus are not limited to the classroom but extend to learning labs and computer sites, as well as student development programs and services. Understanding that access to technology is considered an “auxiliary aid” is of great importance to avoid litigation, but this should not be the driving force for providing students with disabilities with an equal opportunity to participate.

Universal Design for Computer Access

The proliferation of computer labs throughout institutions of higher learning has been phenomenal. Many residence halls, student centers, administrative offices, classrooms, learning centers, and libraries have computer labs of their own (Olsen, 2001). The majority of the departmentally operated labs have specialized hardware and software pertinent to their instructional needs. The use of these specific software programs is integral to many classes and

must be accessible to students with disabilities. In addition, many programs run off a departmental server, which makes it necessary for students to work on programs in the departmental lab. The progress in these areas results in a system of extensive and sophisticated computer facilities for students. If the growth occurs without consideration of architectural or technological accessibility issues, students with disabilities will not have equal opportunity to participate. In the past, personnel from disability service offices have handled the issue of disability access to computer labs on a case-by-case basis. Larger institutions of higher learning commonly have a designated office for students with disabilities that offers some adaptive technology (Lance, 1996). Smaller institutions may incorporate the services into another office, such as the offices of student or academic affairs. The increasing number of students with disabilities as well as the growing number of campus labs makes the method of relying solely on these offices no longer feasible.

Committee for Computer Access

It is suggested that institutions of higher learning establish a committee to explore computer access for students with disabilities on their campus. The committee should include representatives from the following areas: students with disabilities, disability service providers, faculty, campus

computer centers, learning center, and academic affairs administration. The committee charge should include surveying all campus computer sites to determine the degree of accessibility and to make recommendations on how to improve access and comply with the requirements for equal educational opportunity as outlined in the ADA. In support of these objectives, the committee should identify a list of problems, propose recommendations, and describe the minimum adaptive and assistive devices required to make these labs accessible to all students. The committee should also propose recommendations for the implementation and ongoing support of the computer facilities with the goals of containing cost, providing a consistent computer environment between labs, and providing continued compliance with the ADA as the community with disabilities changes and technology advances.

The regulations of the ADA, recent Office for Civil Rights decisions, and court cases suggest appropriate assistive technologies for campus computer labs (Castorina, 1994; U.S. Department of Education, 1998). Rather than providing every possible assistive technology in each computer lab, it is proposed that all computer labs be upgraded to have a minimum standard of accessibility for students with disabilities. The minimum standards will meet most students' access

needs and demonstrate a good faith effort by the institution to provide equivalent access to computer facilities for students with disabilities. However, additional adaptive technology may need to be provided in particular circumstances.

Policy for Minimum Standards

It is proposed that institutions establish a policy to require a minimum standard of access compliance in all computer labs on campus. The technology access standards will then become fundamental when creating or upgrading a lab. These standards are not only for persons with visual and mobility impairments, but are also for people with a wide range of disabilities. Many of the adaptations proposed may also prove useful to students without disabilities. For example, Dragon Naturally Speaking, which converts speech to text, can be utilized by any student who is better able to express ideas orally as opposed to in writing. Likewise, textHELP! Read & Write is an advanced grammatical program that could serve to assist any college student with the writing of papers. For the majority of students with disabilities the minimum standards will be sufficient to provide equal access to computers in the lab. When specialized accommodations beyond the minimum compliance standards are needed, personnel from the disability services office may provide assistance.

In an effort to ensure equal access to all computing facilities on campus, the committee may find it helpful to offer suggestions of software, hardware, and peripherals to accommodate students with visual impairments, cognitive or learning disorders, psychological disorders, mobility impairments and limitations in manual dexterity. Figure 1 illustrates an example of minimal standards established for computer

labs on college campuses. Descriptions of hardware and software are provided within this chapter. Vendors and costs should be included on each campus’s list for ease of purchase. However, it should be noted that prices for technology can change drastically over relatively short periods of time, so information such as that provided in Table 1 is time sensitive.

Figure 1. Proposed Minimal Standards for Campus Computer Labs: Adapted Software and Hardware, and Vendor.

Software, Hardware and Peripherals	Vendor	Budget Estimate*
ZoomText (magnification software)	AiSquared	\$400.00
inLARGE (magnification for Mac)	Alva Access Group	300.00
JAWS (screen reader software)	Arkenstone	800.00
outSPOKEN (screen reader for Mac)	Alva Access Group	700.00
Kurzweil 1000 (text to speech)	Lernout & Hauspie	1,000.00
Kurzweil 3000 (text to speech)	Lernout & Hauspie	2,000.00
Dragon Naturally Speaking (speech to text)	Dragon Systems	200.00
textHELP! Read & Write	textHELP Systems Ltd.	125.00
Inspiration K - 12	Inspiration Software, Inc.	75.00
Scanner (use with text to speech software)	Hewlett Parkard/Epson	1,500.00
EZ Magnifier (screen magnifier)	EZ-MAG	200.00
Ergonomic Adjustable Workstation	Ergonomic Resources, Inc.	700.00
Mice, Joysticks, Trackballs	Logitech	100.00
Alternative Keyboards		250.00
Monitor (21 inch or larger)		750.00
*Budget estimates are listed to provide an overall perspective on the costs of assistive technology. Exact prices may fluctuate considerably over time.		

Many disability service offices provide departmental computing facilities with technical consultation and specialized technologies that are needed beyond the minimum standards. If available, these offices can also assist departmental labs in initial setup, ongoing support, and use of the adaptive and assistive technologies. It is the responsibility of each computer lab to provide ample space and a computer workstation that will accommodate the recommended hardware and software adaptations. Although disability services offices will provide recommendations and advice concerning the upgrade and set up of various adaptive devices, the major proprietor of the lab will be the primary agent for the technical support (i.e., installation and maintenance) of the adaptive hardware and software in the lab. It is the responsibility of the major lab proprietor to ensure that all adaptive devices are installed and are working properly at all times.

Hardware and Software Adaptive Technology

The introduction of computers into higher education created a unique set of problems for some students with disabilities. Developments in adaptive technology, however, have helped to overcome most of these access problems. An understanding of the issues involved and the resources available to resolve them is essential for

ensuring equal access to higher education for students with disabilities. A list of hardware and software resources, including those discussed in the above minimal standards, is provided at the end of this chapter. The most common technology solutions are described below.

Kurzweil

Kurzweil provides software packages that scan, read, and write. Available for use on a personal computer, Kurzweil 1000 requires a scanner to provide text recognition and voice synthesis for people who are blind or visually impaired. To use Kurzweil 1000, a person places a book or document face down on the scanner bed and presses a scan button. The software reads the printed material, recognizes the text, and speaks the contents of the page using human sounding synthetic speech.

Although the Kurzweil 1000 is particularly useful for students who have visual impairments, the Kurzweil 3000 may also be helpful to students with specific learning disabilities and other cognitive disabilities, especially when combined with graphic interfaces. The Kurzweil 3000 is another text recognition and voice synthesis software package that addresses reading difficulties such as dyslexia and reading problems associated with cognitive disabilities by improving reading comprehension and providing assistance in

writing. The Kurzweil 3000 is also bilingual, so it can assist all students in the learning of foreign languages by ensuring correct pronunciation of words.

Screen Reader Software

The primary means of computer access for persons who are blind is screen reader software. Screen readers, such as JAWS and OutSPOKEN 3.0 on Windows/DOS machines and OutSPOKEN 9.0 on the Macintosh, translate the screen contents into voice output. The Macintosh requires only the software; Windows/DOS machines require an external or internal voice synthesizer, such as a DEC-Talk. Some newer voice synthesis programs utilize a sound card, such as SoundBlaster, as the voice synthesizer. Many Windows machines now come equipped with these cards, so an additional voice synthesizer may be unnecessary. Voice output with the old command line interfaces, such as DOS, was fairly simple. The situation has become much more complex with the proliferation of graphic user interfaces (GUI), such as those created for Macintosh and Windows. Users must now maneuver through menu bars, icons, and folders. Fortunately, newly developed screen reader software offers a multitude of navigational tools for the virtual desktop. Screen readers not only give navigational information but can also read the contents of windows, such as a word processing document. Key commands allow

the user to go backward and forward in the document and speech output allows the use of menus.

Braille Computer Output Devices

One consequence of the increased use of computers is that knowledge and usage of Braille has declined among young people who are blind. Books on tape or books in a digitized format on a disk that can be read by a screen reader have provided an entirely new avenue of access to materials. Braille computer output devices, such as those from AlvaAccess, now translate what is on the screen into a tactile Braille pad, but the effectiveness of such devices is dependent on the user's proficiency in Braille.

Screen Enlargement Devices

Persons with low vision can have computer access through hardware or software screen enlargement devices. The software packages, such as ZoomText for Windows/DOS computers and CloseView for the Macintosh, enlarge the contents of the screen from 2 to 16 times. With both software and hardware screen enlargement it is advisable to have a larger monitor, a minimum of 17 inches, but preferably 21 inches.

Auditory Signals

It has become the norm now for computers to give audible signals, such as a

beep, for alert messages. Macintosh and Windows can be set up to give a visual signal, such as a flashing menu bar, along with the auditory signal. This innovation may be particularly helpful for students with hearing impairments.

Dictation and Voice Recognition Software Programs

Students with dexterity impairments, whether they have limited or no hand use, will find dictation software programs useful. A common dictation software program today is DragonDictate Naturally Speaking Preferred. Recently companies such as International Business Machines (IBM) and Kurzweil Educational Systems have introduced similar packages. The basic notion behind dictation software is that anything entered by keyboard or mouse can be accomplished via voice input. Navigational aspects of computer use can be achieved by voice command: opening, saving, and closing files; moving around in documents and applications; and operating control panels. Text can be entered by voice alone without recourse to a keyboard. Voice recognition software packages have become more sophisticated with the advent of continuous speech recognition and require much less training time to achieve good voice recognition. This newly improved software overcomes the need to use unnatural voice patterns and invites a

broader population of users. De La Paz (1999) supports this alternative mode of composition for students with learning disabilities and provides suggestions for enhancing successful text production.

Alternative Keyboards

Alternative keyboards, such as the one handed BAT personal keyboard, provide access for students with limited hand dexterity. The BAT personal keyboard comes in a right or left-handed version. The keyboard has seven keys and the user learns specific chords for each character of the keyboard. These keyboards require very little hand movement and, with a small amount of training, users can achieve high rates of input. Ergonomically designed keyboards, such as Maxim Adjustable Keyboards, can be beneficial to all users.

HeadMaster Plus

Students without any hand use can have access to computers by means of devices such as the HeadMaster Plus. This device, which is worn on the head, consists of an infrared sending unit and a receiving unit hooked up to the computer. By means of a sip and puff tube, the user can move around and operate the icons on the computer screen. Virtual keyboard software, which puts a keyboard on the computer monitor, will allow the student to type with the HeadMaster Plus.

Personal Digital Assistants

Students who have medical conditions such as fibromyalgia, muscular dystrophy, multiple sclerosis, post polio, carpal tunnel syndrome, and rheumatoid arthritis may not be able to use the traditional keyboard. Although these disabilities may inhibit effective use of a keyboard, students may still be capable of producing a handwritten script. Personal digital assistants (PDAs) are miniaturized hand-held computers that allow one to write directly onto the screen with a stylus. These devices are equipped with handwriting recognition software that converts the handwritten script to a typed format. The user can perform typical computer operations with the PDA such as a variety of software applications and e-mail. Students commonly use them in the classroom setting for taking lecture notes and in computer labs to compose essays and term papers.

Other Technologies

Assistive Listening Devices

Depending on the classroom environment, students with hearing impairments, cognitive processing deficits, and attention deficit hyperactivity disorder may choose to use an assistive listening device (ALD). The ALD amplifies and transmits the instructor's voice to students

anywhere in the lecture hall as if the students were situated in close proximity to the instructor. The ALD reduces interference from environmental noises such as air conditioners, conversation between other students, shuffling of papers, and other distracting noises in a typical classroom setting. Depending on institutional needs such as size of classroom, number of users, and acoustics, a determination can be made regarding which type of system would be most beneficial to the student as well as practical for the academic setting. The most common types of ALDs are frequency modulated (FM) systems, which operate on radio frequencies, and infrared systems, which operate on infrared light waves.

The FM system, which is comprised of a pocket size transmitter and receiver, is a convenient and transportable system for college students. The instructor wears a lapel microphone attached to the amplifier. The amplifier unit can be placed in a pocket or clipped on a belt or waistband. If the instructor intends to remain in one place, the microphone can be clipped onto a podium or connected directly to a sound system. Amplification occurs for the speaker only; therefore, the instructor must repeat questions and comments from the other participants. The student wears the receiving unit, which functions similarly to a powerful hearing aid.

Real Time Captioning

Real time captioning, often referred to as “text interpreting,” is a recent development that has made lectures and classroom discussion accessible to students who have hearing impairments. This development is especially helpful for deaf students who never learned sign language (e.g., students who have experienced a recent hearing loss) or in situations where there is a shortage of sign language interpreters. A real time captioning apparatus consists of three parts: a computer, a translation and transceiver device, such as Rapidtext, and a display monitor. This apparatus can be made into a portable system by using a laptop computer and a liquid crystal display panel monitor. A transcriptionist accompanies the student to class and types the lecture or class discussion, which then appears on the monitor in front of the student. Computer-assisted note taking involves similar equipment and a transcriptionist, who must have the ability to quickly condense and paraphrase lectures. Both systems have advantages and disadvantages and should be chosen based on the individual needs of students.

Prototype speech recognition and text output devices under development may someday replace the need for a transcriptionist. These devices will take the form of a small hand held computer and will be able to recognize speech and translate it

into text. Developers predict that several of the devices will also have the ability to produce voice output of text that is entered into them by keyboard or stylus. Real time captioning and computer-assisted note taking do not require any extra time or effort from that faculty member, and offer an alternative to providing lectures on the web.

Document Conversion

The ADA (1990) requires that written material be converted into alternative formats such as audiotape, Braille, or digitized text. Written materials include textbooks, lecture handouts, brochures, handbooks, financial aid and admission forms, and instructional manuals. Document conversion may require optical character recognition software, scanners, four-track tape recorders and duplicators, Braille printers, Braille translation software, and other devices. Although an institution may have a central resource office available to provide this service, each department may be responsible for converting its written materials to the requested format. Faculty may not put this responsibility on the student with a disability.

Telecommunication Devices for the Deaf

Students with communication disorders may also wish to converse with faculty, staff, and other students over the telephone.

To place telephone calls, students with a speech or hearing disability commonly use a Telecommunication Device for the Deaf (TDD). The TDD has a keyboard and visual display to assist in the communication. Both parties must have a TDD unless using Telecommunication Relay Services (TRS). Further information about this service is available in the local telephone book. TRS allows a student using a TDD to communicate with people who only have access to a standard voice telephone. The student uses the TDD to call the TRS; then the TRS provider communicates the student's message orally to the other person and vice versa. However, direct contact with the student via a TDD is preferred. TDDs range in cost from \$300 to \$700. For many students, staff, and faculty members, electronic mail has replaced the TDD. Faculty and staff often communicate with all students, not just those with disabilities, via e-mail. On some campuses all students are now responsible for being cognizant of all information communicated via e-mail in the same way that they have been held accountable for knowing the contents of the college catalog or student handbook in the past.

Audiotape Recorders and Books on Tape

Students with a variety of disabilities use tape recorders. Students with visual disorders often tape record lectures as an

alternative to taking notes. Taped lectures are also used by students with various cognitive or sensory and perceptual disorders such as acquired brain injuries or attention deficit hyperactivity disorder. For instance, students with significant and measurable impairments in processing and retaining information, problems with visual memory, difficulties in remembering important information, or severe attention problems often need both visual and auditory methods of learning.

Recording for the Blind and Dyslexic (RFB&D), a national nonprofit organization based in Princeton, New Jersey, provides books on tape to students. They have an extensive library of prerecorded books and provide recordings of books or texts upon request. These materials are mailed directly to the student. Complete contact information for RFB&D is provided at the end of this chapter.

Cognitive Aids

Other resources available for students with acquired brain injuries, attention deficit hyperactivity disorder, or other learning disorders include speller-thesaurus-dictionary devices such as WordSmith v2.0; writing assistants such as Co:Writer 4000; and grammar, punctuation, or style checkers such as those included in Microsoft Word and Corel WordPerfect. Similarly, calculators assist students who have

dyscalculia and other learning disabilities that may involve reversing digits or signs, scrambling fractions or exponents, or other difficulties in mathematical problem solving.

The World Wide Web

The World Wide Web (WWW) holds the promise of transforming curriculum and instruction. The WWW is particularly prone to inaccessibility, not from intent or malice, but simply due to the lack of awareness on the part of many web site creators. Web site design requires an understanding of the needs of students and the best ways to accommodate them. A thoughtfully designed web site can bring instructors closer to students with disabilities by facilitating the flow of communication without the meta processes of taping, Braille, and sign language interpreting. In addition to information provided later in this book, Waddell (1998) outlines ADA accessibility requirements for web pages and offers practical suggestions for creating accessible sites. Additional resources that will assist in making web pages accessible are compiled by the federal government and provided in the resource list at the end of this chapter.

Conclusion

As the participation of students with disabilities increases, it is anticipated that faculty and administrators will encounter

more students with disabilities in their classes, learning centers, and computer labs. It is incumbent upon everyone involved in higher education to assure that technology is accessible so students with disabilities have equal opportunity to participate in the academic venture. The developments in technology promise new opportunities for all students both in higher education and the workplace.

References

- Americans with Disabilities Act of 1990, 42 U.S.C.A. § 12101 *et seq.* (West, 1993).
- Castorina, C. (1994). Project EASI: Spreading the word about adaptive technology. *Change*, 26(2), 45-47.
- De La Paz, S. (1999). Composing via dictation and speech recognition systems: Compensatory technology for students with learning disabilities. *Learning Disability Quarterly*, 22(3), 173-182.
- Dustin, R. L., & Prolan, R. (1995). The perils of ignoring the Disabilities Act. *The Chronicle of Higher Education*, 41(38), B1-B2.
- Lance, G. D. (1996). Computer access in higher education: A national survey of service providers for students with disabilities. *Journal of College Student Development*, 37(3), 279-288.

- Office of the Attorney General, Department of Justice (1991, July). Non-discrimination on the basis of disability in state and local government services; Final rule. *Federal Register*, 28 CFR Part 35.
- Olsen, F. (2001). Spending on information technology rises 13%, survey finds. *Chronicle of Higher Education*, 97(32), A53.
- O'Donnell, J. J. (1996). The digital challenge. *Wilson Quarterly*, 20(1), 48-49.
- Section 504, Rehabilitation Act of 1973, 29 U.S.C. § 794 as amended (1973).
- U.S. Department of Education, Office for Civil Rights (1998). *Auxiliary aids and services for postsecondary students with disabilities: Higher education's obligations under section 504 and Title II of the ADA*. [On-line]. Available: www.ed.gov/offices/OCR/docs/auxaids.html
- Waddell, C. D. (1998). *Applying the ADA to the Internet: A web accessibility standard* [On-line]. Available: <http://www.rit.edu/~easi/law/weblaw1.html>
- Wilson, D. L. (1992a). New federal regulations on rights of the handicapped may force colleges to provide better access to technology. *The Chronicle of Higher Education*, 38(21), A1.
- Wilson, D. L. (1992b). System allows the disabled to use computers. *The Chronicle of Higher Education*, 38(21), A22.

Technology Transformation and Disability: Universally Accessible Web Tables

Brian Shapiro
University of Minnesota

Tables are extremely convenient for organizing data, text, and images on a World Wide Web (WWW) page. However, they can create significant accessibility barriers for persons who are blind and rely on serial assistive devices such as screen readers to access Web content. This chapter discusses how the efficient and effective design of accessible Web content requires coordination among multiple emerging technologies and activities: governmental and private sector standard setting, Web authoring tools, graphical browsers, screen readers, and accessibility evaluation tools. It then provides examples to illustrate the principles, accessibility tradeoffs, and implementation difficulties that shape the design of accessible Web tables.

Accessible course content is a cornerstone of Universal Instructional Design (UID). The World Wide Web (WWW) can promote UID objectives by making course content accessible to students from remote locations around the clock. Appropriately designed Web documents employ useful pedagogical techniques such as adequate conceptual foregrounding, orientation information, hierarchical layout, and user-controlled hyperlinks to related Web content. To render Web content accessible to individuals who are blind, electronic documents can be

converted to alternative formats such as Braille and synthesized speech. However, Web content can either promote or obstruct access by individuals with or without disabilities, depending on how the content is presented, structured, and implemented in hypertext markup language (HTML). Web accessibility barriers are especially acute for individuals who are blind or visually impaired, the groups most often excluded from Web sites.

This chapter examines how appropriately designed Web tables can remove access

barriers for persons who rely on screen readers (i.e., speech synthesizing software) to access Web content. Tables are extremely convenient for organizing data, text, and images in rows and columns on a Web page. Tables also facilitate configural processing (e.g., the identification of meaningful patterns across data rows and columns). However, if tables are not marked properly in HTML or are not rendered with a reasonably sophisticated screen reader, persons who are blind may be unable to access and use the table content. Unfortunately, even state-of-the-art Web technology and allegedly equivalent alternatives cannot render all Web table content universally accessible for all purposes. Persistent accessibility barriers have important implications for postsecondary education and the federal laws that mandate universally accessible Web content.

The remainder of this chapter is organized in three sections. First, it describes how the efficient and effective design of accessible Web content requires coordination among multiple Web technologies and activities: authoritative governmental and private sector accessibility standards, accessible Web authoring tools, reasonably sophisticated graphical browsers and screen readers, and automated accessibility evaluation tools. Second, it provides examples to illustrate the principles, accessibility tradeoffs, and

implementation difficulties that shape the design of accessible Web tables. Third, it provides a summary and discusses the implications of persistent accessibility barriers for postsecondary education.

Multiple Necessary Conditions for Universally Accessible Web Content

Universal access requires Web content to be accessible to all people, regardless of their disabilities and the devices they use to interact with Web content. However, Web content authors cannot bear full responsibility for designing accessible Web pages (Paciello, 2000, p. 6). This section describes how evolving Web accessibility standards, Web authoring tools, user agents, and accessibility evaluation tools collectively can promote universal accessibility.

Government Legislation

Widely adopted and competent Web accessibility standards help define and achieve universal access. Government legislation provides authoritative accessibility standards, increases the public's awareness of disability, and motivates the design of accessible Web content. For example, Section 504 of the U. S. Rehabilitation Act of 1973 protects people in federally funded programs from discrimination on the basis of disability.

Under Section 504, colleges and universities that receive federal funds must not discriminate in recruitment, admission, or treatment of students. Section 508, a 1998 amendment to the Rehabilitation Act of 1973, mandates that electronic and information technology be accessible to people with disabilities. Many Section 508 requirements adopt the World Wide Web Consortium's Web content accessibility recommendations and guidelines, discussed below. Finally, the Americans with Disabilities Act of 1990 mandates that examinations and courses be accessible.

The objectives of achieving reasonable accommodations and finding equivalent alternatives make it necessary to identify and prioritize accessibility objectives. These issues are discussed next.

Private Sector Standards: The World Wide Web Consortium

The World Wide Web Consortium (W3C) leads the development of international technical standards for web accessibility. To help all interested parties achieve accessible Web content, W3C publishes a series of documents to improve the accessibility of Web content, user agents, authoring tools, and evaluation tools (W3C, 2000a, 2000b, 2000c, 2000d, 2000e, 2000f). The W3C documents provide technical specifications and guidelines to ensure the interoperability of emerging Web software and hardware technologies.

Different degrees of accessibility. W3C (2000c, pp. 4-5) assigns each guideline or checkpoint to one of three priority levels to designate the likely impact on accessibility, as indicated in Figure 1. Web content developers *must* satisfy Priority 1 (i.e., Essential) checkpoints because otherwise one or more groups will find it impossible to access Web documents. Web content developers *should* satisfy Priority 2 (i.e., Important) checkpoints because otherwise one or more groups will find it difficult to access Web documents. Finally, Web content developers *may* address Priority 3 (i.e., Beneficial) checkpoints because otherwise one or more groups will find it somewhat difficult to access Web documents. By prioritizing the accessibility checkpoints, the W3C enables resource-constrained Web content authors to address the most important accessibility barriers first.

Figure 1 gives examples of Table markup guidelines for each priority level. W3C (2000a, 2000b, 2000c, 2000d, 2000e, 2000f) also issued accessibility guidelines for other Web content (e.g., frames, forms, layers, style sheets, images, multimedia, and scripts), and for authoring tools and user agents.

Many features that make tabular structures accessible to several disability groups will also benefit the Web community as a whole (cf., Silver, Bourke, & Strehorn, 1998, pp. 47-48). To promote universal

access to web tables, the W3C provides guidelines for both structural and presentation markup. Structural markup pertains to a table’s logical structure (i.e., the structure of its row and column headers). Presentation markup pertains to visual formatting, such as text centering and

boldface text. Guidelines 5.1 and 5.2 stipulate that structural markup for row and column headers in data tables is essential (i.e., Priority 1), because otherwise persons who use screen readers will be unable to identify a data cell’s row and column context. Missing headers impair some

Figure 1. W3C priority levels and table markup checkpoints.

Priority levels ¹	Consequences of nonconformance ¹	Table markup checkpoints ¹
<i>Priority 1</i> (Essential): A Web content developer <i>must</i> satisfy this checkpoint.	One or more groups will find it impossible to access Web documents.	5.1 For data tables, identify row and column headers.
		5.2 For data tables that have two or more logical levels of row or column headers, use markup to associate data cells and header cells.
<i>Priority 2</i> (Important): A Web content developer <i>should</i> satisfy this checkpoint.	One or more groups will find it difficult to access Web documents.	5.3 Do not use tables for layout unless the table makes sense when linearized. If the table does not make sense when linearized, provide an alternative equivalent.
		5.4 If a table is used for layout, do not use any structural markup for the purpose of visual formatting.
<i>Priority 3</i> (Beneficial): A Web content developer <i>may</i> address this checkpoint.	One or more groups will find it somewhat difficult to access Web documents.	5.5 Provide summaries for tables.
		5.6 Provide abbreviations for header labels.
<p>Notes</p> <p>1. Source: World Wide Web Consortium (W3C). (November 6, 2000c). Techniques for Web Content Accessibility Guidelines 1.0, W3C Note, pp. 4-5, 8. Copyright © 2000 World Wide Web Consortium (Massachusetts Institute of Technology, Institut National de Recherche en Informatique et en Automatique, Keio University). All rights reserved. http://www.w3.org/TR/2000/NOTE-WCAG10-TECHS-20001106/. Document status: produced and endorsed by the Web Content Accessibility Guidelines Working Group.</p>		

groups' ability to locate a cell in a table's overall structure, and can make it almost impossible to identify patterns across row and column data. To provide visual cues for a table's hierarchical structure, some authoring tools automatically format headers as centered and boldface text. To provide the same visual formatting in layout tables that have no true headers, Guideline 5.4 stipulates that Web authors should directly format the text with presentation markup rather than with structural markup. The use of structural markup to achieve only visual formatting in tables that have no real table header structure might confuse individuals who rely on screen readers to access table content. However, this confusion probably would not prevent access entirely, so Guideline 5.4 is considered Priority 2. Finally, table summaries and abbreviations for header labels, as specified in Guidelines 5.5 and 5.6, are considered only Priority 3 (i.e., Beneficial) because they have a lesser impact on accessibility.

The priority levels provide general guidelines for deciding which accessibility features should be addressed first. However, the priority levels do not perfectly predict how extensively a particular violation would impair access. Accessibility barriers partly depend on how users interact with the content. For example, even though missing column headers are considered to be a Priority 1 (most severe) violation, they

probably would not prevent any users from accessing small and structurally simple tables. In contrast, even though a missing table summary is classified as a Priority 3 violation, it might make it very difficult for some users to understand and navigate through large and complex tables.

W3C's checkpoints, techniques, and policies for making Web content accessible. The W3C guidelines provide checkpoints and techniques organized by topic and priority, and they currently represent industry best practices. The guidelines express three important policy positions on the design of universally accessible Web content. First, the guidelines generally do not discourage Web content developers from using any particular media, but rather explain how to make the media more accessible to a diverse audience. For example, the guidelines do not suggest that Web content authors should avoid using tables, but rather explain how to use structural markup and other techniques to make tables more accessible (e.g., see W3C, 2000c, pp. 8, 19).

Second, some W3C guidelines recommend HTML techniques that are not yet fully implemented in user agents (i.e., graphical browsers and screen readers). For example, HTML 4.0 specifies standards for table markup that can allow appropriately designed user agents to associate a table cell

with any subset of its headers. For HTML examples of structural markup for table columns and rows, see Paciello (2000, pp. 112-118) and W3C (2000e, pp. 16-22; 2000f, pp. 16-18). Such table markup is particularly important for data tables with complex structures (i.e., nested column and row headers). However, until user agents fully implement the most recent table markup techniques, individuals who are blind will have difficulty accessing complex data tables. Engelen et al. (1997, p. 37) recommend avoiding tables until HTML techniques and user agents ensure their accessibility, but effective alternatives unfortunately do not exist for many kinds of tabular data.

Third, the W3C recommends that Web content authors consider redesigning pages to make them accessible before resorting to alternative pages. The rationale is that making the original pages more accessible is likely to improve them for all users, and alternative pages tend to be less frequently updated than the original pages.

Authoring tools. W3C (2000a, p. 4) defines “authoring tools” as any tools that produce Web content, including tools that transform non-HTML documents into HTML documents. Authoring tools create most Web content, so it is important that they produce accessible Web content by default, make it easy for Web authors to create accessible content, and be accessible

to authors regardless of disability (W3C, 2000a, pp. 4-6, 9-10). Authoring tools can help prevent, detect, and fix accessibility problems if they conform to accessibility standards, provide online documentation, and incorporate accessibility checks in the product (W3C, 2000a, p. 4). For example, some authoring tools enable authors simply to check a box in order to insert appropriate HTML table markup for row and column headers. To be most effective, authoring tools should be designed for authors who are not necessarily expert users of the authoring tool and not necessarily knowledgeable about Web content accessibility.

User agents. W3C (2000b, p. 7) recommends that users be able to interact with Web content with a variety of input and output devices, including visually displayed text, synthesized speech, and Braille. If Web content developers and authoring tools provide markup for accessible content, appropriately designed user agents (e.g., graphical browsers, media players, plugins, and assistive technologies) can then render that content accessible to users (W3C, 2000b, pp. 29, 38). For example, users who cannot visually scan columns, rows, and table headers might use a screen reader to navigate through a table. However, sophisticated table navigation techniques are possible only when a table is marked up properly and user agents support recent HTML techniques for accessibility (Paciello, 2000, p. 96; W3C, 2000e, p. 4).

Accessibility evaluation tools. Automated accessibility evaluation tools help Web content authors identify potential problems and provide hyperlinks to the W3C technical specifications and guidelines. Accessibility software tools include Bobby (Center for Applied Special Technology [CAST], 2000), Wave (Pennsylvania's Initiative on Assistive Technology [PIAT], 2000), and a Web accessibility checker for the Dreamweaver 4 authoring tool (Macromedia, 2000). Bobby sorts a Web site's accessibility violations by W3C priority level and provides links to the online W3C checkpoints. Wave provides similar information in a graphical format, and is particularly useful for identifying the reading sequence in tables rendered by screen readers. The Dreamweaver 4 accessibility checker is fully integrated with Dreamweaver 4, but it provides a less extensive evaluation than Bobby and Wave. The automated accessibility tools streamline the design of accessible Web content, but they do not completely remove the need for human judgment. Thus, it is a good idea to have individuals with various disabilities check the web site for accessibility.

Summary

Universally accessible Web content requires coordination among Web authoring tools, user agents, and evaluation tools. The technologies are rapidly changing and are not fully synchronized. Web authors are important gatekeepers of Web accessibility,

but they alone cannot bear the full responsibility for designing accessible Web content.

Applications of Universal Design Principles for Web-Accessible Tables

Web table content is accessible if users can easily obtain and use it. Below, several examples illustrate how appropriately designed Web tables can improve their accessibility for all user groups, regardless of disability. However, Web tables cannot be made universally accessible for all purposes. Some accessibility barriers are unsolvable because serial assistive devices such as screen readers poorly support nonlinear or configural processing of tabular information.

Tables with Simple Structures

To make a table's row and column structure accessible to persons who use screen readers, Web authors should use the table header (TH) element to explicitly define the table's cell and row headers, and avoid using presentation elements such as bold and centered text to make cell contents merely look like headers in a graphical text browser. These prescriptions are described in Figure 1, W3C Checkpoint 5.1. To illustrate, Figure 2 displays Microsoft Corporation's income statement in parallel

columns. The table in Figure 2 has a simple structure, with only one row header and one column header for each table cell.

I clicked on a checkbox in Dreamweaver 4 to designate the row and column headers in Figure 2. Dreamweaver automatically inserts the HTML code for the TH element and formats the headers in bold and centered

text (I overrode the CENTER element for some row headers in Figure 2). I created the table caption by coding the TABLE CAPTION element myself (Dreamweaver 4 does not assist authors here). A table caption could be created outside the table and placed right above it, so that it appears as it does in Figure 2, but the TABLE CAPTION element is better because it enables the caption to be

Figure 2. A partly accessible large table with a simple structure.

The column and row headers are explicitly designated as column and row headers in the table's structural markup.

The table caption is part of the table's structural markup, and the table has a summary that can be rendered by a screen reader.

	1998	1999	2000
Revenue	\$15,262	\$19,747	\$22,956
Operating expenses:			
Cost of revenue	2,460	2,814	3,002
Research and development	2,601	2,970	3,775
Sales and marketing	2,828	3,231	4,141
General and administrative	433	689	1,009
Other expenses	526	115	92
Total operating expenses	8,848	9,819	12,019
Operating income	6,414	9,928	10,937
Investment income	703	1,803	3,182
Gain on sales	0	160	156
Income before income taxes	7,117	11,891	14,275
Provision for income taxes	2,627	4,106	4,854
Net income	\$ 4,490	\$ 7,785	\$ 9,421
Earnings per share:			
Basic	\$ 0.92	\$ 1.54	\$ 1.81
Diluted	\$ 0.84	\$ 1.42	\$ 1.70

structurally related to the table. Finally, I created a table summary for Figure 2 using the TABLE SUMMARY element, again by coding it myself. Table summaries should be placed at the beginning of table markup because they provide important orientation information for individuals who use screen readers.

JAWS for Windows 3.7 (Freedom Scientific, 2000) screen reader software renders the table caption just as it appears in a graphical browser. Although the table summary is not visible in a graphical browser, JAWS renders the summary in Internet Explorer 5.5 as follows:

This table displays the Income Statements for Microsoft Corporation, for the years ended June 30 1998, 1999, and 2000 respectively. The table has four columns and 18 rows. The first column gives the account names. The next three columns give the account balances for 1998, 1999, and 2000 respectively. All table values are stated in millions of U.S. dollars, except earnings per share data.

However, it should be noted that Jaws 3.7 for Windows does not render the table summary for Figure 2 in Netscape 4.7. The screen reader performance variations across different graphical browsers undermine the goal of universally accessible Web content.

JAWS will render a table differently depending on how the user chooses to navigate through the table. JAWS sequentially renders the third and fourth rows of the table as “Operating expenses; Cost of revenue: 2,460; 2,814; 3,002.” When reading one cell at a time in the fourth row, JAWS reads the column headers, dollar amounts, and row numbers (no row number is given for the first cell), as follows: “1998: 2,460; 1999: 2,814, row 4; 2000: 3,002, row 4.” When reading down the year 1999 column from the fourth row to the fifth row, JAWS reads the row header and then gives the dollar amount followed by the column number, as follows: “Sales and marketing: 3,231, Column 3.” To summarize, when a table’s structure is coded using the HTML techniques specified in W3C (2000e, pp. 16-22; 2000f, pp. 16-18), a table cell’s headers and rows are accessible to persons using screen readers, albeit more slowly and less completely than for persons using graphical browsers.

Importantly, access to row and column headers is necessary but not sufficient for performing certain essential tasks. For example, to perform financial statement analysis, users must identify patterns across row and column data, as well as use the tabular data to compute and analyze financial statement ratios. Even with proper HTML techniques, pattern matching and

manipulation of tabular data remain largely inaccessible to individuals who use screen readers.

Tables with Complex Structures

More complex tables have nested row or column headers. For example, the table in Figure 3 is small but it has a complex structure, with three column headers for the years 1999-2001 and two row axes for Business Segment and Account. In order to be rendered properly by a screen reader, the

headers and axes must be coded using the techniques described in Paciello (2000, pp. 114-116) and W3C (2000e, pp. 16-22; 2000f, pp. 16-18). Dreamweaver 4 does not automatically insert the proper code for table axes, so I inserted the code by hand. For the Year 2001 column, JAWS renders the third row of Figure 3 as follows: "Business Segment: Drugs; Account: Sales, \$5,123, Row 3." Shifting one cell to the right, JAWS reads "Year: 2000, \$5,049, Column 4." Shifting down one cell, JAWS

Figure 3. Accessible small table with a complex structure.

Sales, Cost of Sales, and Gross Margin for Jim's Drug & Foods, by Business Segment and Year (\$ in thousands)				
Business Segment	Account	2001	2000	1999
Drugs				
	Sales	\$5,123	\$5,049	\$4,834
	Cost of sales	3,042	2,891	2,788
	Gross margin	\$2,081	\$2,158	\$2,046
Groceries				
	Sales	\$9,074	\$7,756	\$6,701
	Cost of sales	\$6,182	\$5,289	\$4,421
	Gross margin	\$2,892	\$2,467	\$2,280

reads “Business Segment: Drugs; Account: Cost of sales, 2,891, Row 4.” Although HTML standards for table axes and headers do not completely eliminate accessibility barriers, they make it possible for users to locate a table cell in the table’s overall structure.

Accessibility Barriers Created by the HTML PRE Element and Word-Wrapped Columns

Figure 4 displays text in word-wrapped parallel columns using the HTML PRE (i.e., fixed format) element. The text appears to

employ a table layout in a graphical browser, but the tabular structure is not visible to screen readers because the HTML TABLE element is not used. The bottom of Figure 4 shows that the text would be rendered unintelligible by a screen reader which accesses the text left to right, top to bottom, one line at a time. In some cases, the accessibility problem can be fixed by using the TABLE element (e.g., with two columns and one row) to create text in parallel word-wrapped columns. Such a text layout table can be rendered intelligible by recent screen readers, which can be configured to

Figure 4. Inaccessible text layout table using the HTML PRE (fixed format) element.

<p>This table was created using the HTML PRE element. The text appears to be displayed in parallel word-wrapped columns, even though it does not use the TABLE element.</p>	<p>However, this text layout table would be rendered unintelligible by screen readers that access the text one line at a time, from left to right and top to bottom.</p>
<p>A screen reader would render the above text as follows:</p>	
<p>This table was created However, this text layout using the HTML PRE table would be rendered element. The text unintelligible by screen appears to be displayed readers that access the in parallel word-wrapped text one line at a time, columns, even though it from left to right and does not use the TABLE top to bottom element.</p>	

read an entire table cell's contents before proceeding to the next cell. However, text layout tables are not rendered well in all

graphical browser and screen reader combinations. For example, JAWS 3.7 for Windows can render parallel word-wrapped

Figure 5. Some problems with tables and forms: Securities and Exchange Commission (SEC) Edgar search dialog box (URL = <http://edgar.sec.gov/cgi-bin/srch-edgar>).

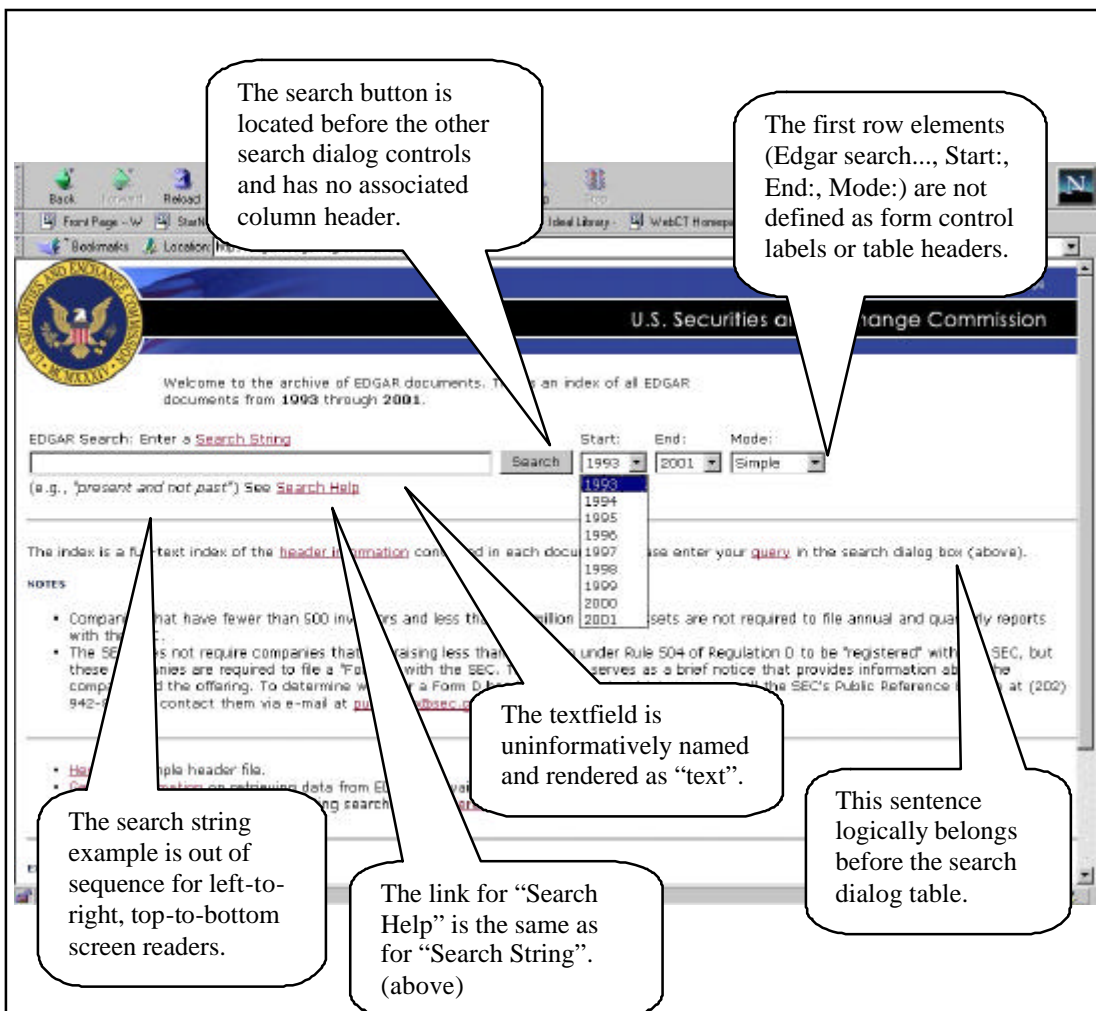


table columns properly in Internet Explorer 5.5, but not in Netscape 4.7. To accommodate screen readers that do not correctly handle parallel column word-wrapped text, W3C (2000c, p. 12) recommends providing a linear text alternative for each text layout table.

Accessibility Problems with Layout Tables and Forms

Form controls such as text fields, combo boxes, drop-down menus, and submit buttons enable users to interact with Web content. Tables are a convenient way to organize form controls on a Web page. To ensure accessibility with nonvisual user agents, the controls must be properly positioned and explicitly associated with their labels. Figure 5 illustrates a layout table with form controls to search the Securities and Exchange Commission (SEC) online database of corporate financial reports.

The SEC Web page creates several accessibility problems. First, the form control labels in the first row of the search table are not formally designated as labels or table headers. This makes it difficult or impossible for screen readers to associate each form control with its label. Second, the Search button is located between the search string text field and the other search controls, and it does not have a label. Consequently, the first row of the table gives the mistaken impression that the second row

has only four form controls, when in fact it has five. Third, the example search string appears in the third table row, below the search string text field. Although the example search string is logically positioned for most users, it is poorly positioned for persons who are blind because it would be read last by screen reader software. Fourth, the table does not use the TABLE CAPTION element to designate a caption. The Web page does, however, give some orienting information above the table where it states “Welcome to the archive of Edgar documents. This is an index of all EDGAR documents from 1993 through 2001.” The two sentences that appear immediately below the table also provide important orientation information, and thus they logically belong above the table.

Figure 6 uses output from Wave 2.01 (PIAT, 2000) to illustrate how a screen reader would render the SEC Edgar layout table sequentially, from left to right and top to bottom. Wave displays the table cell borders and reveals that the table consists of 11 cells laid out in five columns and three rows. The arrows indicate the direction and the numbers indicate the order in which a screen reader would read the cell contents. When read sequentially, the labels in the first row are not explicitly associated with their corresponding form controls. Thus, it will be difficult for those who use screen readers to associate the labels with the form controls on the second row.

The form control accessibility problems can easily be fixed by displaying the form controls in two columns and five rows, with the labels in the left column and the controls in the right column. This two-column layout would aid left-to-right and top-to-bottom

access (Paciello, 2000, p. 59), but it would not serve all users equally well. For example, Figure 7 illustrates that the five-column layout is better for users who rely on graphical browsers, because it leaves more space to display the search results on

Figure 6. Wave (PIAT, 2000) demonstration of left-to-right, top-down screen reader sequence for Edgar search dialog (URL = <http://edgar.sec.gov/cgi-bin/srch-edgar>).

The boxes show each separate element read by a screen reader. The search dialog consists of eleven cells in five columns and three rows. .

The numbers indicate the sequence of elements read by screen readers. The search dialog is comprised of elements 21-30 and is read left to right, one row at a time from top to bottom.

The search button has no corresponding label and is out of sequence.

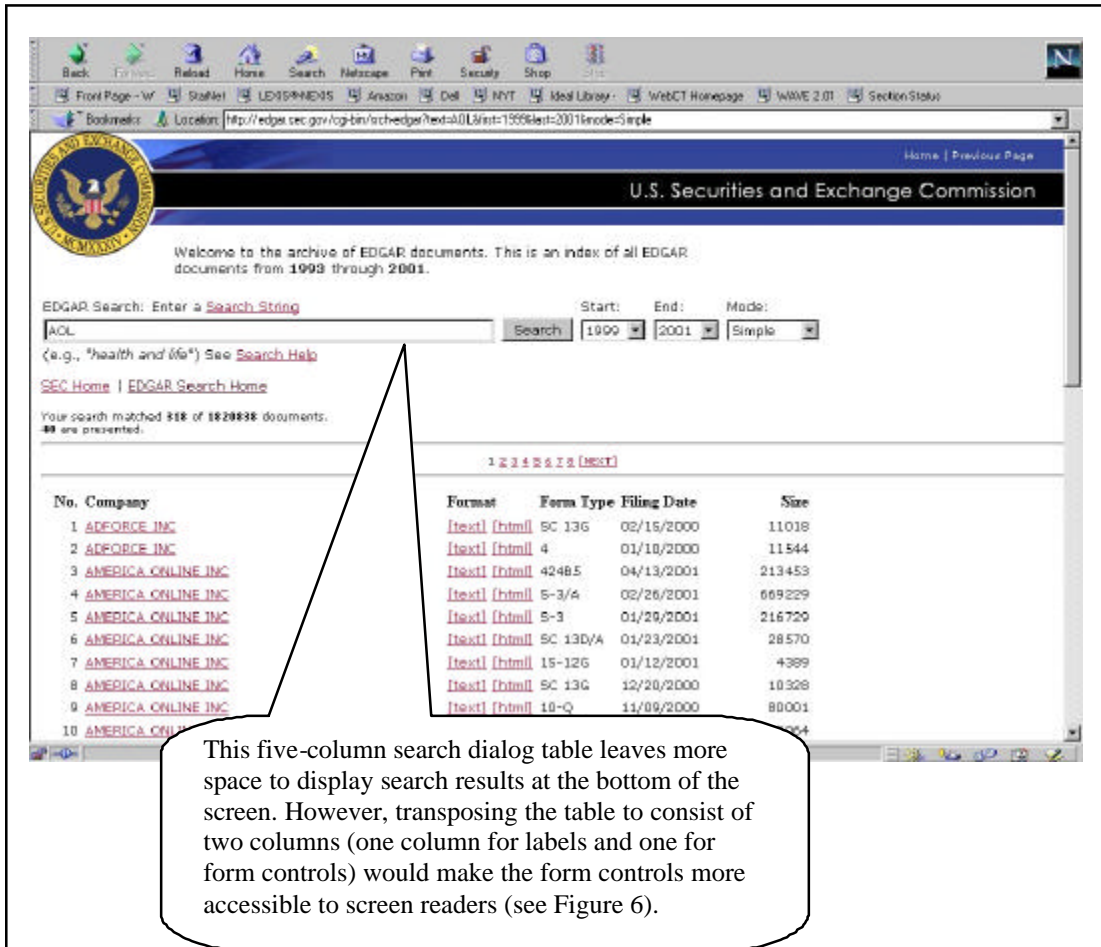
People who rely on screen readers would find it difficult to access the controls because the labels in cells 21-24 are not directly associated with the form controls.

→ 17	→ 18	→ 19		
		Welcome to the archive of EDGAR do	This is an index of all	
→ 20		EDGAR documents from 1993 th	2001 .	
→ 21	EDGAR Search: Enter a Search String .	→ 22 Start:	→ 23 End:	→ 24 Mode:
→ 25	<input type="text"/>	→ 26 Search	→ 27 93	→ 28 2001
→ 30	(e.g., "SEC headquarters") See Search Help .	→ 29 Simple		
→ 31				

the bottom of the Web page. Rather than modify this format for all users, in this case it might be better to provide an alternative Web page for screen reader access.

Figure 8 illustrates a revised SEC Edgar Web page modified in Dreamweaver 4. It includes three principal revisions, starting from the top of the page. First, to provide adequate orientation information, the text

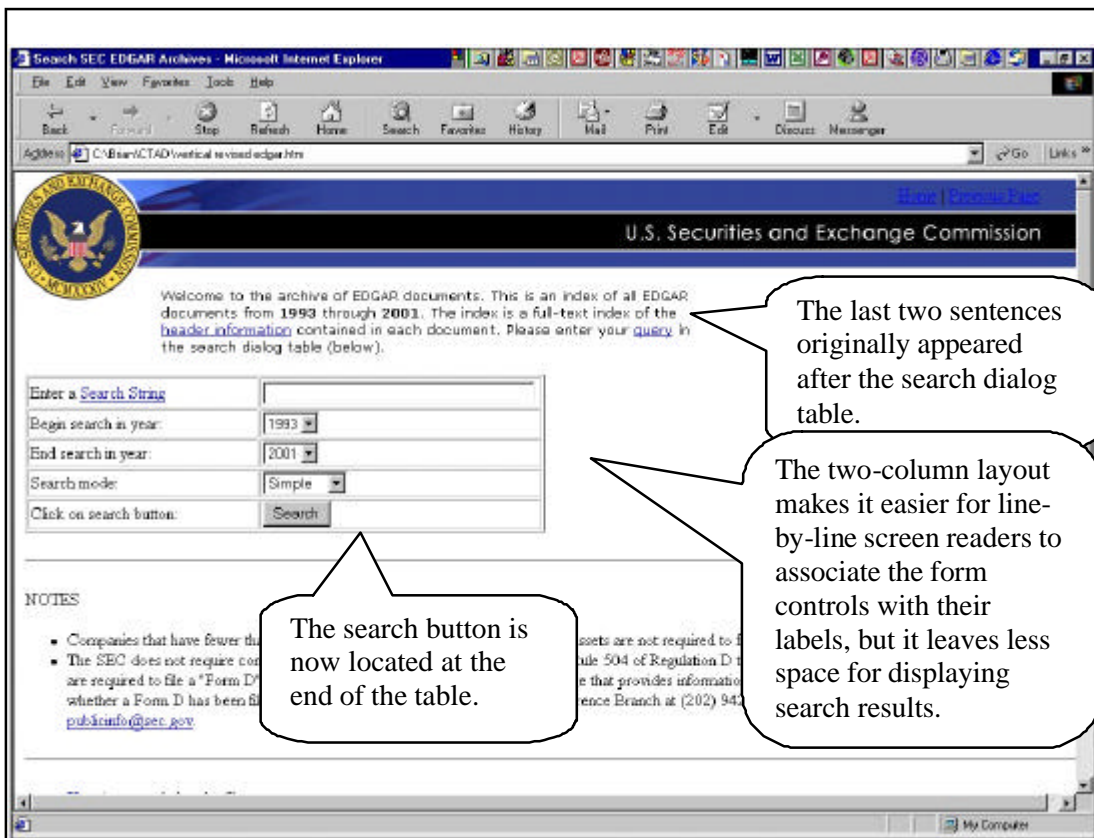
Figure 7. SEC Edgar search results are displayed below the horizontal search controls (URL = <http://edgar.sec.gov/cgi-bin/srch-edgar>).



that appears at the top of the page now includes the two sentences that originally appeared below the table. Alternatively, this same information could be rendered with the TABLE CAPTION element. Second, the form controls and their labels are now displayed in two columns. Until screen readers support explicit associations

between labels and form controls, this two-column layout will make it easier to implicitly associate each control with its label (W3C, 2000d, pp. 41-43). Third, the search button is now located after the other form controls, so that persons who are blind can more easily specify all of their search parameters before they submit their search.

Figure 8. SEC Edgar search page modified in Dreamweaver 4 (Macromedia, 2000) to make it more accessible (original URL = <http://edgar.sec.gov/cgi-bin/srch-edgar>).



Summary

This section used several examples to illustrate some techniques for designing universally accessible Web tables. Universally accessible Web tables require not only appropriate HTML techniques, but also user agents that fully implement those techniques. For tasks that mainly require serial processing, appropriate HTML techniques will render table content accessible to persons who rely on screen readers. For tasks that involve complex pattern matching or configural processing, Web tables will remain largely inaccessible even with reasonably sophisticated HTML techniques and user agents.

Discussion

An objective of Universal Instructional Design is to make Web content accessible to all people, regardless of disability. This chapter argues that universal access requires effective coordination among multiple Web technologies and activities. Although Web content authors are important gatekeepers of accessibility, they cannot satisfy accessibility standards on their own. Other necessary conditions include authoritative accessibility standards, user-friendly Web authoring tools with integrated accessibility evaluation tools, and reasonably sophisticated user agents that implement the most recent HTML techniques for accessibility. This chapter used several

examples to illustrate how Web tables can be designed to improve their accessibility to persons who are blind.

However, universal access to Web table content is not perfectly attainable, for two principal reasons. First, graphical Web browsers and assistive technologies such as screen readers do not fully implement the most recent HTML accessibility techniques for table summaries, multiple row and column headers, and form control labels. It is not reasonable to expect Web content developers to avoid using tables until user agents can take full advantage of the recommended HTML techniques. Tables often are the most effective way to convey important structural relationships among cell data, and approximately equivalent alternatives often do not exist. For example, the provision of linearized tables on alternative Web pages cannot convey important relationships among multiple cells.

Second, even if all user agents were to fully implement the latest HTML accessibility techniques, some Web table content still would not be fully accessible to persons who are blind. For example, financial statement analysis requires users to identify unusual patterns across row and column data, and to compute financial statement ratios using data from multiple cells. Although Web tables can be coded so

that screen readers can appropriately render their row and column headers, even the most recent HTML techniques do not enable persons who are blind to quickly and easily detect patterns and manipulate cell data. Linearized tables would only make such tasks more difficult.

Such persistent accessibility barriers have important implications for education. First, whenever possible, educators still should attempt to employ the most recent accessibility techniques. This not only will satisfy the basic federal requirements for accessibility, but it will also make it unnecessary to retrofit a Web site each time user agents more fully implement existing HTML techniques. Second, in order to anticipate accessibility barriers, educators need to think carefully about how their students must interact with Web content in order to complete course assignments. In some cases, full compliance with state-of-the-art accessibility standards will not sufficiently address the needs of students with disabilities. Although there are no simple guidelines or heuristics to help educators identify discipline-specific Web accessibility barriers, many of the most persistent barriers likely involve complex pattern matching and other kinds of configural processing. Such problems exist not only for Web tables, but also for images and other structural elements not discussed in this chapter.

To promote awareness of persistent accessibility barriers in postsecondary education, I invite readers to submit their insights about Web accessibility barriers that are not amenable to technological fixes to bshapiro@csom.umn.edu. Submitted ideas will be posted at http://www.tc.umn.edu/~shapi007/access_barriers/index.htm.

References

- Americans with Disabilities Act of 1990, 42 U.S.C. 12101 (1990).
- Center for Applied Special Technology (CAST). (2000). *Bobby v3.2*. Peabody, MA: CAST, Inc. Retrieved January 30, 2001 from <http://www.cast.org/bobby/>
- Engelen, J., Evenepoel, F., Gladstone, K., April, G., Allemeersch, F., Willems, D., Wesley, T., & Becker, S. (1997). *The art of providing access to electronic documents*. Leuven, Belgium: Katholieke Universiteit Leuven. Retrieved July 23, 2001 from <http://www.esat.kuleuven.ac.be/teo/index.en.htm>
- Freedom Scientific (2000). *Henter-Joyce Jaws for Windows*. St. Petersburg, FL: Freedom Scientific.
- Macromedia (2000). *Dreamweaver 4*. San Francisco, CA: Macromedia.

- Paciello, M. G. (2000). *Web accessibility for people with disabilities*. Lawrence, KS: CMP Books.
- Pennsylvania's Initiative on Assistive Technology (PIAT). (2000). *Wave v.2.01*. Temple University: The Institute on Disabilities. Retrieved July 23, 2001 from http://www.temple.edu/inst_disabilities/piat/wave/
- Section 504 of United States Rehabilitation Act of 1973. 29 USC §794.
- Section 508 (Electronic and information technology). (1998). 29 USC §794d.
- Silver, P., Bourke, A., & Strehorn, K. C. (1998). Universal instruction design in higher education: An approach for inclusion. *Equity and Excellence in Education* 31(2), 47-51.
- United States Rehabilitation Act of 1973. 29 U.S.C. 701.
- World Wide Web Consortium (W3C). (2000a, February 3). *Authoring Tool Accessibility Guidelines 1.0, W3C Recommendation*. Madison, WI: Trace R & D Center, University of Wisconsin. Retrieved July 23, 2001 from <http://www.w3.org/TR/2000/REC-ATAG10-20000203/>
- World Wide Web Consortium (W3C). (2000b, October 23). *User Agent Accessibility Guidelines 1.0, W3C Working Draft*. Madison, WI: Trace R & D Center, University of Wisconsin. Retrieved July 23, 2001 from <http://www.w3.org/TR/2000/WD-UAAG10-20001023/>
- World Wide Web Consortium (W3C). (2000c, November 6). *Techniques for Web Content Accessibility Guidelines 1.0, W3C Note*. Madison, WI: Trace R & D Center, University of Wisconsin. Retrieved July 23, 2001 from <http://www.w3.org/TR/2000/NOTE-WCAG10-TECHS-20001106/>
- World Wide Web Consortium (W3C). (2000d, November 6). *HTML Techniques for Web Content Accessibility Guidelines 1.0, W3C Note*. Madison, WI: Trace R & D Center, University of Wisconsin. Retrieved July 23, 2001 from <http://www.w3.org/TR/2000/NOTE-WCAG10-HTML-TECHS-20001106/>
- World Wide Web Consortium (W3C). (2000e, November 6). *Core Techniques for Web Content Accessibility Guidelines 1.0, W3C Note*. Madison, WI: Trace R & D Center, University of Wisconsin. Retrieved July 23, 2001 from <http://www.w3.org/TR/2000/NOTE-WCAG10-CORE-TECHS-20001106/>

World Wide Web Consortium (W3C).
(2000f, November 6). *CSS Techniques
for Web Content Accessibility
Guidelines 1.0, W3C Note*. Madison,
WI: Trace R & D Center, University of
Wisconsin. Retrieved July 23, 2001
from [http://www.w3.org/TR/2000/
NOTE-WCAG10-CSS-TECHS-
20001106/](http://www.w3.org/TR/2000/NOTE-WCAG10-CSS-TECHS-20001106/)

Where Do We Go from Here? Universal Design as a Model for Multicultural Education

Heidi L. Barajas and Jeanne L. Higbee
University of Minnesota

This chapter encourages educators to think more broadly about Universal Design and Universal Instructional Design as models for inclusion for all students in postsecondary settings.

When theorizing, conducting research, creating policy, and shaping practice, we often ask questions like, “What is the next logical step?” “How can we expand into new areas of thought?” “Where do we go from here?” To those of us involved in the development of this book and in projects like Curriculum Transformation and Disability (CTAD), the answer has seemed obvious. To date Universal Design as a model for inclusion in postsecondary education has been applied only to disability. While Universal Design is still a relatively new concept, it is time to expand its implementation in keeping with its definition. If we are to succeed in designing educational spaces in a manner that takes into consideration the needs of all learners, then it is imperative to engage in a

paradigm shift that places the inclusion of all students at the core of educational planning. Rather than an extension of a model for accommodation, Universal Design should be perceived as a means for actively engaging all students in the learning process, regardless of age, gender, race, religion, ethnic origin, language, social class, sexual orientation, or disability.

Where Have We Been?

The terminology of inclusion has changed over the last five decades, not because of political correctness, but because of an exploration and absolutely necessary evolution of how we have perceived “difference.” In the 1950s and 1960s we “tolerated” (e.g., Chickering, 1969)

individual differences. The United States was perceived as a “melting pot” (Park, 1950), a term that assumes the assimilation of diverse cultures. Within this context, “universal” might imply “one size fits all.” Over the following decades we moved from tolerance to “acceptance,” but why should there be a need to “accept” *who*—or more pertinently to this model, *what*—someone is? Our intentions may have been good; the shift from tolerance to acceptance was an honest attempt to move in the right direction, but this focus still placed difference in a negative light.

Indeed, in the process of writing about and conceptualizing a truly universal approach to instructional design, we realized even the word “difference” is currently in transformation in terms of what we mean when we talk about difference and how our practice is affected by that discussion. We can predict the trajectory of what is meant by the word “difference” by looking at changes in other signifiers that originated as a resistance to negative stereotypes. The word “special,” for example, used to be a positive signifier indicating educators needing to meet a particular kind of educational support (e.g., special education). Over time, the meaning and the practice attached to “special” has been used to segregate students. Sooner or later, if not presently, the word “difference” will shift to a meaning that implies an outsider status

that is negative. Originally, the use of difference was a positive indicator of valuing people’s rights to their own individuality and positive self-definitions that replaced being stereotyped as the deficit “other.” In other words, there is value in difference as opposed to indifference or disdain for difference.

The new millennium is a time of acknowledging, rather than tolerating or accepting, individual and cultural differences. Within this context, Universal Design in postsecondary education can take on new meaning to create an expanded vision of inclusion, one that places the education of all individuals at the heart of how we as educators think, how we practice, how we talk, and how we approach research.

Implementing Universal Design as a Multicultural Phenomenon

A discussion of implementation must begin with a clear understanding of what historical ghosts we continue to deal with in education. One ghost we refer to is the assumption that our classroom policies and practices are essentially neutral, and in place for the fair and equal treatment of all students. We may recognize that educational institutions inherently privilege students who own particular social characteristics and ideology, and may even acknowledge this creates some “climate” issues for what

we term “diverse” groups of students. However, what we may not identify is that we continue to see the core curriculum, and classroom policies and practices, as neutral in terms of the gender, age, ability, race, home language, religion, and social class of the student. Our continued focus on the universal assumptions of assimilation is inevitable if we do not consider the more hidden assumption of neutrality. Even with steadfast and earnest attempts to increase the size of the schoolhouse door, to include or even infuse multiple voices in our curricula and practices, it is as if we do so with an invisible weight around our neck that does not quite allow us to take a much needed step forward. In her research that examines how teaching practices are affected by teacher training in multiculturalism, Sleeter (1996) indicates that although

teachers were enthusiastic about the program because they were acquiring much new information . . . they were adding that information into conceptions they already had about the workings of the social system, rather than reconstructing those conceptions. (p. 76)

Sleeter’s point is that we need to be reflective about how we make changes in what we think and do. However, part of that reflective process is being critical about what we think and do. Otherwise, we end up

believing we have created a universal design because we have added some information to our classroom strategies, but few of us have substantially restructured our thinking, practices, and policies.

We suggest that a result of restructuring our thinking through a paradigm shift that places UID into the instructional methodologies in the higher education classroom is that many kinds of access issues may be addressed, including multicultural concerns (i.e., multiple racial, ethnic, cultural, gender, and class concerns). In addition, there is a relationship between general access, multicultural access, and the application of UID that strengthens the general usefulness as well as the appeal of a “universal” model. However, thinking through these relationships critically is a necessary step to synthesize multiple access needs into UID.

There is no better time to work through shifting our thinking, curricula, practices, and policies in educational settings than at the development stages of UID in higher education. Although formal research provides important empirical examples of students’ educational process, we as educators sometimes forget to connect what we know to what we do in the classroom. Adding an alternative learning component is a step, but may remain a part of a mechanical, normative education because

one of the assumptions of “neutral” institutions is that all students will participate in the new component in much the same way. In order to find a truly universal model, we need to change our definition of universal, beginning with the idea that centering our classroom activities and requirements around what we used to consider “special needs” students in reality creates a classroom that simply promotes student-centered learning for all students.

How do we begin to make the kind of shift we have described? We know how to do so in words. Banks (2000) calls for educators to

reform the cultures of the nation’s schools, as well as the curriculum, to institutionalize and legitimize the knowledge systems, perspectives, ideologies, and behaviors of diverse ethnic, racial, cultural, social class, and language groups . . . that more liberatory and multicultural paradigms and canons be constructed and institutionalized. (p. 38)

The first step is agreement that this is the direction our shift needs to take, and it is a challenging one. Banks, like many of us who attempt to work from a “liberatory and multicultural paradigm,” assumes educators have embraced the value of this kind of thinking. Moore (2002) suggests that curricular transformation in the sciences

often begins “when students, faculty, and administrators recognize that women, ethnic minorities, economically disadvantaged students, and others have been excluded from science and wonder how this has affected science” (p.86). In addition, we now have some 25 years in which multiculturalism has been actively pursued through textbook revision and curricular changes to inform us. Many educators involved in attempting to address access and climate issues through the multicultural process are frustrated because the work done to make the curricula multicultural, as well as what appear to be well-integrated textbooks, continues to be criticized (Sleeter, 1996).

Both Sleeter (1996) and Banks (1996) attribute the frustration of those attempting to address multicultural issues in curricula and classroom practices, and the criticism aimed at these changes, to the propensity of educators to produce multicultural changes that adhere to White, conservative renditions of what America is and who gets to define what “American” means. Although we would agree that this continues to be at the core of our inability to transform our thinking, policy, and practice, we also acknowledge that what Sleeter and Banks identify occurring in American education is also about normative and conservative thinking affecting curricula and classroom practices globally. What remains constant in

either a global or American frame is the necessity to consider that neutralized or even invisible frameworks are driving what we think and do.

Finally, as we move forward in our attempts to transform educational practices, we should do so learning from transformative processes that have succeeded in bringing us to where we are today. Recollecting those processes reminds us that a paradigm shift is not a snapshot of education we take, consider, and pronounce done. Paradigm shifts are an ongoing process accomplished through small steps. Although we are critical of attempts to institutionalize and legitimize the knowledge systems, perspectives, ideologies, and behaviors of diverse ethnic, racial, cultural, social class, and language groups, the attempts have been good ones. And, being critical is what moves us forward. In addition, considering the new scholarship emanating from this country and the rest of the world, particularly that by the increasing numbers of scholars who have traditionally been marginalized, transformative measures today should look different. Whatever we do to consider and implement a more universal instructional design, like other transformations before us, will look good but will not be what we ultimately want it to be, or have the affect we may have thought it would. But by taking small steps to continue the

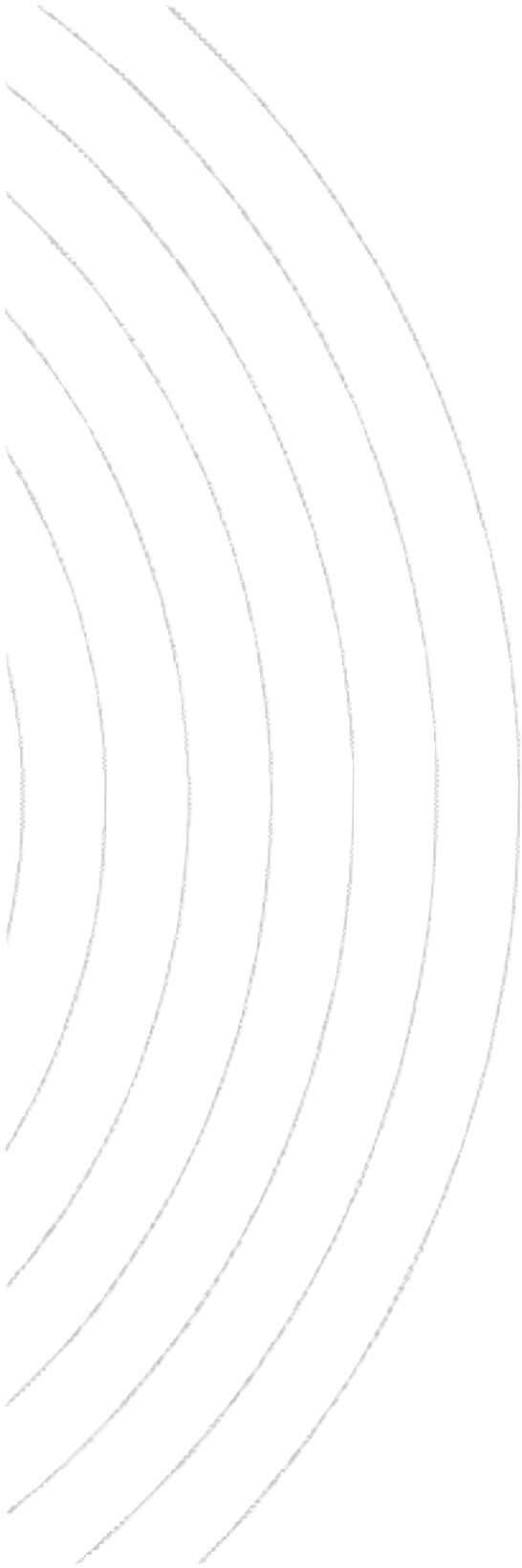
transformation of educational programs, services, curricula, pedagogy, and policy, we will get closer to making our vision a reality.

References

- Banks, J. A. (2000) The social construction of difference and the quest for educational equality. In R. S. Brandt *Education in a new era*, (pp. 21-45). Alexandria, VA: Association for Supervision and Curriculum Development.
- Banks, J. A. (1996). The Canon debate, knowledge construction, and multicultural education. In J. A. Banks (Ed.), *Multicultural education, transformative knowledge, and action* (pp. 3-29). New York: Teachers College Press.
- Chickering, A. W. (1969). *Education and identity*. San Francisco: Jossey-Bass.
- Moore, R. (2002). The lessons of history: Transforming science to include developmental education. In D. B. Lundell & J. L. Higbee (Eds.) *Histories of developmental education* (pp. 83-94). Minneapolis, MN: Center for Research on Developmental Education and Urban Literacy, General College, University of Minnesota.

Park, R. (1950). *Race and culture*. Glencoe, IL: Free Press.

Sleeter, C. E. (1996). *Multicultural education as social activism*. Albany, N.Y.: State University of New York Press.



Appendices

Resources: Assistive Technology

Karen S. Kalivoda and Margaret C. Totty
The University of Georgia

1. *Assistive Listening Devices*, such as the Comtek AT_216 fm system, function as a remote microphone for users, enabling a person with impaired hearing improved listening, clarity, and better understanding by subduing high levels of background noise, reverberation effects, and distance between the speaker and listener. Comtek, http://www.comtek.com/AT_216_system.html

2. *ALVA Delphi 440 or 480* www.aagi.com (with 40 and 80 characters of Braille respectively) “reads” text on the computer screen line-by-line, then sends it to the user as Braille on a Braille display. This product is perfect for the student who is visually impaired, and is fully compatible with JAWS, outSPOKEN, and many other screen reader software programs. ALVA Access Group, http://www.aagi.com/aagi/aagi_home.html

3. *Anthro Carts* are ergonomic, fully adjustable workstations that easily adjust to the needs of wheelchair users. The workstations are very durable. Anthro, www.anthro.com

4. *BAT Personal Keyboard* is a fully functioning keyboard for one hand. The keyboard is easy to learn and use, and operates on an input system called “chording.” It is a good assistive solution for not only one-hand keyboard users and individuals with a limited range of motion, but for students with visual impairments as well because the keyboard has only seven keys and finger location problems are eliminated. Infogrip, www.infogrip.com

5. *Clearview 700* www.optelec.com is a computer-compatible video magnifier. This system displays magnified text and computer images simultaneously for students with visual impairments. Optelec US, www.optelec.com

6. *CloseView* is a utility included in every Macintosh computer that allows users to magnify the screen up to 16 times. This is a cost-free tool for individuals with visual impairments not unlike the Display Settings function found in Microsoft Windows. Apple Computer, www.apple.com/disability/easyaccess.html

7. *Co:Writer 4000* is an assistive tool that helps students during the writing process. Its built in writing assistant with “intelligent word prediction” alleviates some of the most common frustrations for students with learning disabilities, dyslexia, and ADHD. Don Johnston, www.donjohnston.com

8. *DECTalk* text-to-speech technology transforms ordinary text into natural-sounding speech. It provides a high level of speech quality and accuracy, producing clear, correct pronunciation of single characters, words, phrases, and proper names. DECTalk offers personalized voices, and it has extensive user controls to ensure optimum performance. DECTalk claims to be the smallest, fully featured, format-based synthesizer offered in the world. Force Computers, www.forcecomputers.com

9. *DragonDictate Naturally Speaking Preferred for Windows/DOS* is a voice-recognition program that types as you speak. It is a great tool for students with mobility impairments, specifically those who are unable to use a standard keyboard. It is also recommended for students with visual impairments, as it eliminates the need for typing. Dragon Systems, www.dragonsystems.com

10. *HeadMaster Plus* is a head pointing system that provides full mouse control of computers to persons who cannot use their hands but who have good head control. As

the user moves his or her head, the cursor moves on the screen. It can be used in conjunction with on-screen keyboards, such as WiViK, for word processing and other text entry. This product is perfect for the student with severe mobility impairments and limited range of motion. Prentke Romich, www.prentrom.com/access/hmaster.html

11. *Inspiration* is a program that facilitates the writing process for persons with cognitive disorders. It can also be used by all students by all students as an effective study tool. Based on the visual learning technique known as concept mapping, *Inspiration* helps clarify thinking, deepen understanding, increase retention, and develop organizational skills. Inspiration Software, www.inspiration.com

12. *Job Access with Speech (JAWS) for Windows* is an invaluable tool for students with visual impairments. It is a top of the line screen reader with Internet capabilities, e-mail access, and full compatibility with Microsoft products such as Office 2000. Henter-Joyce, www.hj.com

13. *Kurzweil 1000* scans, reads, and writes for people who are blind or have visual impairments. It functions in conjunction with a scanner and voice synthesis on a personal computer to convert text into speech. Kurzweil Educational Systems, <http://www.lhsl.com/kurzweil1000/>

14. *Kurzweil 3000* provides an auditory and visual presentation of scanned text and images on the computer screen. It is simple to use because all it takes is a basic knowledge of scanning, and is a useful tool for people with learning disabilities, visual impairments, or anyone with reading difficulties. Kurzweil Educational Systems, <http://www.lhsl.com/kurzweil3000/>

15. *Maxim Adjustable Keyboards* are ergonomic keyboards that alleviate strain on fingers and wrists. They are beneficial for people who have carpal-tunnel syndrome. Kenesis, www.kinesis-ergo.com

16. *outSPOKEN 3.0 for Windows and outSPOKEN 9.0 for MacIntosh* are screen reader software programs with Braille and/or speech output. They are fully compatible with most Windows applications and are also multilingual; the software is available in a number of languages. These products are mostly appropriate for the blind, but the screen-reading feature may be helpful for students with reading problems, such as dyslexia. ALVA Access Group, www.aagi.com/aagi/aagi_home.html

17. *Quicktionary ReadingPen* is a hand-held, pen shaped, high-resolution scanner with advanced text-to-speech technology. It functions as an assistive technology tool for people with visual impairments or reading difficulties. It is completely portable and enables users to see

and hear the scanned text. Wizcom Technologies, www.seikosmart.com www.wizcomtech.com

18. *Raised Line Drawing Kit* enables the student who is blind to do slope problems in mathematics and related fields. MaxiAids: Products for Independent Living, <http://www.maxiaids.com/index/html>

19. *Rapid Caption* is the most advanced Windows-based captioning system available today. It is used with a steno machine and the *RAPIDTEXT* paperless writer. It excels in translation speed and ease-of-use for realtime captioning. The Rapid Caption interfaces to most steno machines and the *RAPIDTEXT* writer. *RAPIDTEXT*, <http://info@rapidtext.com/>

20. *SoundBlaster* is a type of sound card. It is an expansion board that enables a computer to manipulate and output sounds. Creative Technology Limited, <http://www.soundblaster.com/>

21. *textHelp! Read & Write* is an assistive program designed specifically for students with varying degrees of reading and writing difficulties, including ADHD and dyslexia. It contains a number of helpful features, including word prediction, screen reading, homophone support and a 180,000-word dictionary for use with spell check. textHELP Systems, www.texthelp.com

22. *WiVik2* accesses any Windows application with on_screen keyboard software using any pointing device or switches with scanning. WiViK 2 allows any pointing device to be used to enter text into any Windows application. Bloorview MacMillan Centre, www.WiVik.com

23. *WordSmith v.2.0* is an additional toolbar for Word 97/2000/XP. Utilized primarily by persons with cognitive disabilities as a writing aid, it can help develop word recognition and vocabulary, do advanced spell checking, provide audible definitions for homophones, increase literacy through its thesaurus function and assist in developing sentences. textHELP Systems, www.texthelp.com

24. *Write:OutLoud* is a talking word processor with a talking spell checker. It is made for students with learning disabilities and students with visual impairments. It speaks while students write, so mistakes are easily corrected as the student works through a word processing document. Don Johnston, www.donjohnston.com

25. *Zoomtext* is another screen magnification program that includes support for all Windows platforms and allows magnification up to 16 times with advanced edge smoothing. This software is valuable for students with low-vision and is extremely easy to use. Ai Squared, <http://www.aisquared.com/>

Biography of Suggested Readings

- Abberley, P. (1987). The concept of oppression and the development of a social theory of disability. *Disability, Handicap and Society*, 2 (1), 5-19.
- Academy for Educational Development (1994). *Self-esteem: Issues for the adult learner*. (ERIC Document Reproduction Service No. ED374343)
- Academy for Educational Development (1995). *Adults with learning disabilities: Definitions and issues*. (ERIC Document Reproduction Service No. ED387989)
- Academy for Educational Development (1995). *Screening for adults with learning disabilities: The role of the practitioner in the assessment process*. (ERIC Document Reproduction Service No. ED387988)
- Aiex, N. K. (2000). *Newspapers as a teaching resource for adult learners*. ERIC Digest D150. (ERIC Document Reproduction Service No. ED440428)
- Aksamit, D., Morris, M., & Leuenberger, J. (1987). Preparation of student services professionals and faculty for serving learning-disabled college students. *Journal of College Student Personnel*, 28(1), 53-59.
- Asselin, S. B. (1993). Enhancing faculty awareness and knowledge of students with disabilities. *Community College Journal of Research and Practice*, 17(3), 283-289.
- Aune, E. (1996). Successful strategies for accommodating students with disabilities. *Disability Compliance for Higher Education*, 1(3), 12-14.
- Babbitt, B. C. (1998, March). *University curriculum project—Professors reflect on impact*. Paper presented at the California State University-Northridge Conference on Technology and Persons with Disabilities, Los Angeles, CA.

- Bailey, J. (1994). Do students with disabilities value college education? *Journal of College Student Development, 35*, 494-495.
- Bardine, B. (1997). *Working with learning disabled writers: Some perspectives*. Kent, OH: Kent State University, Ohio Literacy Resource Center. (ERIC Reproduction Service No. ED 406 554)
- Barnard, J. (1997, May/June). The World Wide Web and higher education: The promise of virtual universities and online libraries. *Educational Technology, 30-34*.
- Barr, A., Donahue, W., Podrid, A., & Seeling, S. (1987). *Successful college tutoring: Focusing on the learning disabled student in the learning center*. Brooklyn, NY: Long Island University.
- Barrett, K. E. & Pullo, R. E. (1993). Attitudinal change in undergraduate rehabilitation students as measured by the attitudes towards disabled persons scale. *Rehabilitation Education, 7*, 119-126.
- Beaubien, R. L. (1999, March). *Adult learning disabilities in intensive English programs: A call for action*. Paper presented at the TESOL National Conference, New York, NY
- Berliss, J. (1994). Boon or bust? Access to electronic publishing by individuals using adaptive computer technology. *Journal of the American Society for Information Science, 45*(10), 753-759.
- Bigaj, S. J. (1995). *Accommodation strategies for postsecondary students with learning disabilities: A survey of faculty attitudes and use*. Unpublished doctoral dissertation, University of Connecticut.
- Bohman, P. (2000) The applicability of the ADA to the Internet. *Center for Persons with Disabilities (CPD) News, 23*(2), [Electronic Version]. Available: <http://www.webaim.org/articles/ada>
- Bohman, P. (2000) Universal design and disability access to the web. [Electronic Version]. Available: <http://www.webaim.org/articles/webnet2000>
- Borland, J., & James, S. (1999). The learning experiences of students with disabilities in higher education: A case study of a UK university. *Disability & Society, 14*(1), 85-101.

- Bourke, A., Strehorn, K. C., & Silver, P. (1997). *Tracing the links in the chain of accommodation: A study of university of Massachusetts' faculty members' provision of accommodations to students with learning disabilities*. Paper presented at the Annual conference of the American Educational Research Association, Chicago, IL. (Eric Reproduction Service No. ED408764)
- Bourke, A. B., Strehorn, K. C., & Silver, P. (2000). Faculty members' provision of instructional accommodations to students with LD. *Journal of Learning Disabilities, 33*(1), 26-32.
- Bowe, F. G. (2000). *Universal Design in education - Teaching nontraditional students*. Westport, CT: Bergin & Garvey.
- Brinckerhoff, L. C., Shaw, S. F., & McGuire, J. M. (1992). Promoting access, accommodations, and independence for college students with learning disabilities. *Journal of Learning Disabilities, 25*(7), 417-429.
- Brochtrup, M., & Kelley, C. (1995, Fall). Strategies in math for college students. *Latest Developments, 4*-6.
- Burgstahler, S., Comden, D., & Fraser, B. (1997). Universal access: Designing and evaluating web sites for accessibility. *Choice, 34*, 19-22.
- Burns, J. P., Armistead, L. P., & Keys, R. C. (1990). Developing a transition initiative program for students with handicapping conditions. *Community/Junior College, 14*, 319-329.
- Butler, D. L. (1995). Promoting strategic learning by postsecondary students with learning disabilities. *Journal of Learning Disabilities, 28*, 170-190.
- Carlisle, J. F., & Chang, V. (1996). Evaluation of academic capabilities in science by students with and without learning disabilities and their teachers. *Journal of Special Education, 30*(1), 18-34.
- Cassuto, L. (1999) Whose field is it, anyway? Disability studies in the academy. *The Chronicle of Higher Education*. [Electronic Version]. Available: <http://chronicle.merit.edu/colloquy/99/disability/background.htm>
- Caudill, G. (1998). Matching teaching and learning styles. *Technology Connection, 4*(8), 11,24-25.

- Chang, B., Tremblay, K. R., & Dunbar, H. (2000). An experimental approach to teaching Universal Design. *Education, 121*, 153.
- Chang, M. K., Richards, S. J., & Jackson A. (1996). *Accommodating students with disabilities: A practical guide for faculty*. (ERIC Document Reproduction Service No. ED404827)
- Charlton, J. I. (1998). *Nothing about us without us: Disability oppression and empowerment*. Los Angeles: University of California Press.
- Chickering, A. W., & Ehrmann, S. C. (1996, October). Implementing the seven principles: Technology as lever. *AAHE Bulletin*, 3-6.
- Chickering, A. W., & Gamson, Z. F. (1987, March). Seven principles for good practice in undergraduate education. *AAHE Bulletin*, 3-7.
- Chubon, R. C. (1992). Attitudes toward disability: Addressing fundamentals of attitude theory and research in rehabilitation education. *Rehabilitation Education, 6*, 301-312.
- Cohn, P. (1998). Why does my stomach hurt? How individuals with learning disabilities can use cognitive strategies to reduce anxiety and stress at the college level. *Journal of Learning Disabilities, 31*, 514-16.
- Cokley, K. (2000). Perceived faculty encouragement and its influence on college students. *Journal of College Student Development, 41*(3), 348-352.
- Collins, T. (1989). *A summary of the Learning Disabled College Writers Project at the University of Minnesota—General College*. (ERIC Document Reproduction Service No. ED303819)
- Collins, T., & Price, L. (1986). *A guide to selecting word-processing software for learning disabled college writers*. (ERIC Document Reproduction Service No. ED267412)
- Collins, T., & Price, L. (1986). *Testimony from learning disabled college writers on the efficacy of word processing in their writing process*. (ERIC Document Reproduction Service No. ED267411)
- Collins, T., Engen-Wedin, N., Margolis, W. & Price, L. (1987). Learning disabled writers and word processing: Performance and attitude gains. *Research and Teaching in Developmental Education, 4*(1), 13-20.
- Conyers, L. M., & Szymanski, E. M. (1998). The effectiveness of an integrated career intervention for college students with and without disabilities. *Journal of Postsecondary Education and Disability, 13*, 23-34.

- Corrigan, M. J. (1998). Counseling college students with disabilities: Legal, ethical, and clinical issues. *Journal of College Counseling, 1*, 181-89.
- Cosden, M. A. & McNamara, J. (1997). Self-concept and perceived social support among college students with and without learning disabilities. *Learning Disability Quarterly, 20*, 2-12.
- Council for Exceptional Children (1989). *College planning for students with learning disabilities*. ERIC Digest #466. (ERIC Document Reproduction Service No. ED314917)
- Cowen, S. E. (1988). Coping strategies of university students with learning disabilities. *Journal of Learning Disabilities, 21*(3), 161-164.
- Cullen, J. P., Shaw, S. F. & McGuire, J. M. (1996). Practitioner support of self-advocacy among college students with learning disabilities: A comparison of practices and attitudes. *Journal of Postsecondary Education and Disability, 12*, 2-15.
- Day, S. L., & Edwards, B. J. (1996). Assistive technology for postsecondary students with learning disabilities. *Journal of Learning Disabilities, 29*(5), 486-492.
- Demmans, D. (1993). Math and the learning disabled student: A practical guide for accommodations. *Research and Teaching in Developmental Education, 9*(2), 95-96.
- Dukes, L. L., & Shaw, S. F. (1999). Postsecondary disability personnel: Professional standards and staff development. *Journal of Developmental Education, 23*(1), 26-31.
- Elacqua, T. C., Rapaport, R. J., & Kruse, B. G. (1996). Perceptions of classroom accommodations among college students with disabilities. (ERIC Document Reproduction Service No. ED400640).
- Ellett, L. (1993). Instructional practices in mainstreamed secondary education classrooms. *Journal of Learning Disabilities, 26*, 57-64.
- Fairweather, J. S., & Shaver, D. M. (1990). A troubled future? Participation in postsecondary education by youths with disabilities. *Journal of Higher Education, 61*, 332-348.
- Fast, M., & Cabal, T. (1997). *Proposal for modification of Spanish instruction for students with learning disabilities*. Amherst, MA: University of Massachusetts.

- Felder, R. M. (1996). Matters of style. *ASEE Prism*, 6(4), 18-23.
- Felder, R. M., & Brent, R. (1996). Navigating the bumpy road to student-centered instruction. *College Teaching*, 44, 43-47.
- Fichten, C., Barile, M., & Asuncion, J. (1999). *Learning technologies: Students with disabilities in postsecondary education – Final report to the Office of Learning Technologies*, pp. 9-12; 171-174. Montreal: Adaptech Project, Dawson College.
- Fichten, C. S., Goodrick, G., Tagalakis, V., Amsel, R., & Libman, E. (1990). Getting along in college: Recommendations for college students with disabilities and their professors. *Rehabilitation Counseling Bulletin*, 34(2), 103-125.
- Finn, L. L. (1997). *Critical support services for college students with learning disabilities*. (ERIC Document Reproduction Service No. ED412712)
- Finn, L. L. (1998). Students' perceptions of beneficial LD accommodations and services at the postsecondary level. *Journal of Postsecondary Education and Disability*, 13(1), 67.
- Fonosch, G. G. (1980). Three years later: The impact of Section 504 regulations on higher education. *Rehabilitation Literature*, 41(7-8), 162-168.
- Foster, S., Long, G., & Snell, K. (1999). Inclusive instruction and learning for deaf students in postsecondary education. *Journal of Deaf Studies and Deaf Education*, 4(3), 225-235.
- Freed, B. F. (1987). Exemptions from the foreign language requirement: A review of recent literature, problems, and policy. *ADFL Bulletin*, 18(2), 13-17.
- Ganschow, L., Sparks, R. L., Javorsky, J., Pohlman, J., & Bishop-Marbury, A. (1991). Identifying native language difficulties among foreign language learners in college: A "foreign" language learning disability? *Journal of Learning Disabilities*, 4(9), 530-541.
- Gentile, R. & Cox, L. (1994). The case for criterion-referenced grading in college-level courses for students with learning disabilities. *Research and Teaching in Developmental Education*, 11(1), 63-73.
- Gerber, P. J., & Reiff, H. B. (1994). *Learning disabilities in adulthood: Persisting problems and evolving issues*. Stoneham, MA: Butterworth-Hinemann.

- Gerber, P. J., Reiff, H. B., & Ginsberg, R. (1996). Reframing the learning disabilities experience. *Journal of Learning Disabilities*, 29(1), 98-101.
- Gordon, E. D., Minnes, P. M., & Holden, R. R. (1990). The structure of attitudes toward persons with a disability, when specific disability and context are considered. *Rehabilitation Psychology*, 35, 79-90.
- Gourgey, A., & Earisman, D. (Fall 1997). Getting students to think about their own thinking in an integrated verbal-mathematics course. *Research and Teaching in Developmental Education*, 14(1) 49-56.
- Greenbaum, B., Graham, S., & Scales, W. (1996). Adults with learning disabilities: Occupational and social status after college. *Journal of Learning Disabilities*, 29(2), 167-173
- Gregg, N. (1983). College learning disabled writer: Error patterns and instructional alternatives. *Journal of Learning Disabilities*, 16(6), 334-338.
- Hahn, H. (1985). Toward a politics of disability: Definitions, disciplines, and policies. *The Social Science Journal*, 22(4), 87-105.
- Hahn, H. (1988). The politics of physical difference: Disability and discrimination. *Journal of Social Issues*, 44 (1), 39-48.
- Hart, R. D., & Williams, D. E. (1995). Able-bodied instructors and students with physical disabilities: A relationship handicapped by communication. *Communication Education*, 44, 140-154.
- Hebel, S. (2001) How a landmark anti-bias law changed life for disabled students. *Chronicle of Higher Education*. [Electronic Version]. Available: <http://chronicle.merit.edu/free/v47/i20/20a02301.htm>
- Higbee, J. L. (1996). "Who Belongs?" versus "Who Gets to Stay?" *Research & Teaching in Developmental Education*, 12, 81-86.
- Higbee, J. L., Kalivoda, K. S., & Hunt P. A. (1993). Serving students with psychological disabilities. In P.A. Malinowski (Ed.), *Perspectives on practice in developmental education* (pp. 90-93). Canandaigna, NY: New York College Learning Skills Association.

- Hill, J. L. (1996). Speaking out: Perceptions of students with disabilities regarding the adequacy of services and willingness of faculty to make accommodations. *Journal of Postsecondary Education and Disability, 12*(1), 22-43.
- Hitchings, W. E., Luzzo, D. A., Retish, P., Horvath, M. & Ristow, R. S. (1998). Identifying the career development needs of college students with disabilities. *Journal of College Student Development, 39*, 23-32.
- Hodge, B., & Sabin-Preston, J. (1994). Your teaching experience and students with disabilities. *National Association for Developmental Education Conference Proceedings*, 16-17.
- Hodge, B. M., & Preston-Sabin, J. (1997). *Accommodations—Or just good teaching?* Westport, CT: Praeger.
- Holden, C. (1998). Leveling the playing field for scientists with disabilities. *Science, 282*, 36-37.
- Houck, C. K., Asselin, S. E., Troutman, G. G., & Arrington, J. M. (1992). Students with learning disabilities in the university environment: A study of faculty and student perceptions. *Journal of Learning Disabilities, 25*(10), 678-684.
- Hughes, C. A. (1991). Studying for and taking tests: Self-reported difficulties and strategies of university students with learning disabilities. *Learning Disabilities, 2*, 65-71.
- Hughes, C. A., & Suritsky, S. K. (1993). Notetaking skills and strategies for students with learning disabilities. *Preventing School Failure, 38*(1), 7-11.
- Ingstad, B., & Reynolds Whyte, S. (1995). (Eds.) *Disability and culture*. Los Angeles: University of California Press.
- Isom, J. *Web access for the blind: Freedom, frustrations, and fixes*. [Electronic Version]. Available: <http://www.webaim.org/articles/blind>
- Jarrow, J. E. (1997). *Higher education and the ADA: Issues and perspectives*. Columbus, OH: Disability Access Information and Support.
- Jarvis, K. (1997). *Leveling the playing field: A comparison of scores of college students with and without learning disabilities on classroom tests*. (ERIC Document Reproduction Service No. ED415261)

- Jay, C., & Blackerby, C. (2000). *Hope is not a method: How instructional strategies and technologies for the learning disabled can benefit traditional learners*. Houston, TX: North Harris Montgomery Community College District. (ERIC Document Reproduction Service No. ED 416919)
- Jones, G. C., Kalivoda, K. S., & Higbee, J. L. (1997). College students with Attention Deficit Disorder. *NASPA Journal, 34*, 262-274.
- Kalivoda, K. S., & Higbee, J. L. (1989). Students with disabilities in higher education: Redefining access. *Journal of Educational Opportunity 4*(1), 14-21.
- Kalivoda, K. S., & Higbee, J. L. (1994). Implementing the Americans with Disabilities Act. *Journal of Humanistic Education and Development, 32*, 133-137.
- Kalivoda, K. S., & Higbee, J. L. (1998). Influencing faculty attitudes toward accommodating students with disabilities: A theoretical approach. *The Learning Assistance Review, 3*(2), 12-25.
- Kalivoda, K. S., & Higbee, J. L. (1999). Serving college students with disabilities: Application of the theory of planned behavior. *Academic Exchange Quarterly, 3*(2), 6-16.
- Kalivoda, K. S., Higbee, J. L., & Brenner, D.C. (1997). Teaching students with hearing impairments. *Journal of Developmental Education, 20*(3), 10-12, 14, 16.
- Keim, J., McWhirter, J. J., & Bernstein, B. L. (1996). Academic success and university accommodation for learning disabilities: Is there a relationship? *Journal of College Student Development, 37*(5), 502-509.
- Kelly, K., & Ranundo, P. (1993). *You mean I'm not lazy, stupid or crazy?* NY: Scribner.
- Kerka, S. (1998). *Adults with learning disabilities*. ERIC Digest No. 189. (ERIC Document Reproduction Service No. ED414434)
- Kincaid, J., & Simon, J. (1994). *Issues in higher education and disability law*. Columbus, OH: Association on Higher Education and Disability.
- Knox, D. L., Higbee, J. L., Kalivoda, K. S., & Totty, M. C. (2000). Serving the diverse needs of students with disabilities through technology. *Journal of College Reading and Learning, 30*(2), 144-157.
- Koch, L. (1993). Writing for reasoning in mathematics. *Research and Teaching in Developmental Education, 9*(2), 87.

- Kriegsman, K. H., & Hershenson, D. B. (1987). A comparison of able-bodied and disabled college students on Erickson's ego stages and Maslow's needs levels. *Journal of College Student Personnel*, 28, 48-52.
- Kroeger, S., & Schuck, J. (1993). *Responding to disability issues in student affairs*. San Francisco: Jossey-Bass.
- Kurtz, P. D., & Hicks-Coolick, A. (1997). Preparing students with learning disabilities for success in postsecondary education: Needs and services. *Social Work in Education*, 19, 31-42.
- Lawall, G. (1997, June). *New approaches to learning languages: Development of pilot approaches to second language acquisition for learning disabled students*. Five College Workshop: Teaching and Learning at the Introductory Level. Five College Network, Inc. Northampton, MA: Smith College.
- Lazzaro, J. (1994). Adaptive computing and the internet: One step forward, two steps back? *Internet Research*, 4(4), 2-8.
- Lee, C., & Jackson, R. (1992). *Faking it: A look into the mind of a creative learner*. Portsmouth, NH: Boynton/Cook.
- Lewis, M. L. (1998). *Faculty attitudes towards persons with disabilities and faculty willingness to accommodate students with learning disabilities in the classroom*. Unpublished doctoral dissertation, Auburn University, Auburn, Alabama.
- Leyser, Y., Vogel, S., Wyland, S., & Brulle, A. (1998). Faculty attitudes and practices regarding students with disabilities: Two decades after implementation of Section 504. *Journal of Postsecondary Education and Disability*, 13(3), 5-19.
- Linton, S. (1998). *Claiming disability: Knowledge and identity*. New York: New York University Press.
- Long, J. D., Riddle, D., & Knight, C. S. (1999). The teaching-learning process: Special students' perceptions. *Journal of Developmental Education*, 22(3), 16-20.
- Lundberg, M., & Svien, K. (1988). Developing faculty understanding of college students with learning disabilities. *Journal of Learning Disabilities*, 21(5), 5-19.
- Marchant, G. J. (1990). Faculty questionnaires: A useful resource for LD support services. *Intervention in School and Clinic*, 26(2), 106-109.

- Mathematics and dyslexia. (1998). *Perspectives*. [Electronic Version]. Available: www.ldonline.org/ld_indepth/math_skills/ida_math_fall98.html
- McAlexander, P. J. (1991). A comment on "Learning disabilities: New doubts, new inquiries". *College English*, 53, 224-226.
- McAlexander, P. J., Dobbie, A. B., & Gregg, N (1992). *Beyond the "SP" label: Improving the spelling of learning disabled and basic writers*. Urbana, IL: National Council of Teachers of English.
- McAlexander, P. J., & Gregg, N (1989). The roles of English teachers and LD specialists in identifying learning disabled writers: Two case studies. *Journal of Basic Writing*, 8, 72-86.
- McCarthy, M., & Campbell, N. J. (1993). Serving disabled students: Faculty needs and attitudes. *NASPA Journal*, 30(2), 120-125.
- McCormick, K. (1991). Myth #14: All literacy problems are the result of learning disabilities. *The Literacy Beat*, 4(2), 1-4.
- McGuinness, K. (1993). Redesigning your campus for disabled students. *Planning for Higher Education*, 22, 23-27.
- McNead, A. O., & D'Avanzo, C. (1997). *Innovations in college science teaching*. Fort Worth, TX: Harcourt Brace.
- Michaels, C. (1986). Increasing faculty awareness and cooperation: Procedures for assisting college students with learning disabilities. *Proceedings of the 1989 AHSSPPE Conference*, 78-87. Columbus, OH: Association on Handicapped Student Service Programs in Postsecondary Education.
- Molella, A. (1999/2000, Winter). The future of design. *Smithsonian Lemelson Center News*, 4(2), 1.
- Moore, H. L. (1995). *Beyond architectural barriers: Accommodating college students with disabilities*. Unpublished doctoral dissertation, Seattle University, Seattle, WA.
- National Joint Committee on Learning Disabilities (1994). *Secondary to postsecondary education transition planning for students with learning disabilities. Collective perspectives on issues affecting learning disabilities*, pp. 97-104. Austin, TX: Pro-Ed. (ERIC Document Reproduction Service No. ED385079)

- Nelson, J. R., Dodd, J. M., & Smith, D. J. (1990). Faculty willingness to accommodate students with learning disabilities: A comparison among academic divisions. *Journal of Learning Disabilities, 23*(9), 185-189.
- Norton, S. (1997). Examination accommodations for community college students with learning disabilities: How are they viewed by faculty and students? *Community College Journal of Research and Practice, 21*, 57-69.
- Pacifici, T., & McKinney, K. (1997). *Disability Support Services for Community College Students*. (ERIC Document Reproduction Service No. ED409972)
- Peltzman, R. (1998). A learning disabled student twenty years later. *Research and Teaching in Developmental Education, 14*(2), 101-102.
- Polloway, E. A., Schewel, R., & Patton, J. R. (1992). Learning disabilities in adulthood: Personal perspectives. *Journal of Learning Disabilities, 25*(8), 520-522.
- Prichard, K. W., & Sawyer, R. M. (Eds). (1994). *Handbook of college teaching*. Westport, CT: Greenwood.
- Quinsland, L., & Van Ginkel, A. (1990). Cognitive processing and the development of concepts by deaf students. *American Annals of the Deaf, 135*, 280-284.
- Reamer, A. (1997) *Transition to college*. [Electronic Version]. Available: http://www.ldonline.org/ld_indepth/postsecondary/reamer_trans.html
- Richards, A. (1985). College composition: Recognizing the learning disabled writer. *Journal of Basic Writing, 4*(2), 68-97.
- Riviere, A. (1996). *Assistive technology: Meeting the needs of adults with learning disabilities*. (ERIC Document Reproduction Service No. ED401686)
- Roessler, R. T., Brown, P. L., & Rumrill, P. D. (1998). Self-advocacy training: Preparing students with disabilities to request classroom accommodations. *Journal of Postsecondary Education and Disability, 13*(3), 20-31.
- Satcher, J. (1992). Community college faculty comfort with providing accommodations for students with learning disabilities. *College Student Journal, 26*(4), 518-524.

- Scheer, J., & Groce, N. (1988). Impairment as a human constant: Cross-cultural and historical perspectives on variation. *Journal of Social Issues, 44* (1), 23-37.
- Schriner, K. F., & Roessler, R. T. (1990). Employment concerns of college students with disabilities: Toward an agenda for policy and practice. *Journal of College Student Development, 31*, 306-312.
- Schwarz, R., & Terrill, L. (2000). *ESL instruction and adults with learning disabilities*. (ERIC Document Reproduction Service No. ED443298)
- Scott, S. S. (1991). A change in legal status: An overlooked dimension in the transition to higher education. *Journal of Learning Disabilities, 24*(8), 459-466.
- Selected software for developing and remediating difficulties in mathematics for adults with learning disabilities. (1995, Fall). *Latest Developments, 2-3*.
- Seymour, E., & Hunter, A. (1998). *Talking about disability: The education and work experiences of graduates and undergraduates with disabilities in science, mathematics, and engineering majors*. Boulder, CO: University of Colorado.
- Shapiro, J. P. (1993). *No pity: People with disabilities forging a new civil rights movement*. New York: Times Books.
- Silver, P., Bourke, A., & Strehorn, K. C. (1998). Universal Instructional Design in higher education: An approach for inclusion. *Equity and Excellence in Education, 31*(2), 47-51.
- Smith, C. M., & Wiener, J. (1999). Development and validation of Smith Learning Disabilities Screen. *Journal of College Reading and Learning, 30*(1), 62-83.
- Sparks, R., & Javorsky, J. (1999). Section 504 and the Americans with Disabilities Act: Accommodating the learning-disabled student in the foreign language curriculum. *ADFL Bulletin, 30*(3), 37-44.
- Sprague, C. A. (1999). *Accessible web design*. (ERIC Document Reproduction Service No. ED435384)
- Starr, R. M., & Milheim, W. D. (1996, September/October) Educational uses of the Internet: An exploratory survey. *Educational Technology, 19-28*.
- Swedorski, S. (2000). Accommodating special needs: making your web site viewable to all. *Boardwatch Magazine, 14*(4), 129.

- Thompson, A. R., Bethea, L., & Turner, J. (1997). Faculty knowledge of disability laws in higher education: A survey. *Rehabilitation Counseling Bulletin, 40*(3), 166-180.
- Thomson, R. G. (2000). The new disability studies: Inclusion or tolerance? *ADE Bulletin, 124*, 18-22.
- Tinklin, T. & Hall, J. (1999). Getting 'round obstacles: Disabled students' experiences in higher education in Scotland. *Studies in Higher Education, 24*, 183-194.
- U.S. Equal Employment Opportunity Commission. (2000). *Questions and answers on amending the interpretive guidance on Title I of the Americans with Disabilities Act*. Washington, D.C.: Author. [Electronic Version]. Available: www.eeoc.gov.
- Ward, M., & Newlands, D. (1998). Use of the Web in undergraduate teaching. *Computers & Education, 31*, 171-184.
- Web Accessibility in Mind (WebAIM). Acrobat and PowerPoint accessibility woes*. [Electronic Version]. Available: <http://www.webaim.org/articles/pdfandppt>
- Weber, M. C. (1999). Disability discrimination in higher education. *Journal of College and University Law, 26*(2), 351-377.
- West, M., Kregel, J., Getzel, E., & Zhu, M. (1993). Beyond section 504: Satisfaction and experiences of students with disabilities in higher education. *Exceptional Children, 59*(5), 456-467.
- Williams, W. M., & Ceci, S. J. (1999, August 6). Accommodating learning disabilities can bestow unfair advantages. *The Chronicle of Higher Education, B4-B5*.
- Winston, R. B., Vahala, M., Nichols, E., Gillis, M., Wintrow, M., & Rome, K. (1994). A measure of college classroom climates: The college classroom environment scales. *Journal of College Student Development, 35*, 11-18.

Web Sites

- Association on Higher Education and Disability (AHEAD). www.ahead.org
- Center for Applied Special Technology (CAST Website). www.cast.org
- Equal Access to Software and Information (EASI). www.rit.edu/~easi/

HEATH Resource Center. [www.acenet.edu/
about/programs/Access&Equity/
HEATH/home.html](http://www.acenet.edu/about/programs/Access&Equity/HEATH/home.html)

National Center to Improve the Tools for
Educators (NCITE). [http://
idea.uoregon.edu/~ncite/](http://idea.uoregon.edu/~ncite/)

LD Online: The Interactive Guide to
Learning Disabilities. www.ldonline.org

Cornucopia of Disability Information
(CODI). <http://codi.buffalo.edu/>

The National Information Center for
Children and Youth with Disabilities
(NICHCY). www.nichcy.org

National Center to Improve Practice in
Special Education Through Technology,
Media and Materials (NCIP).
www.edc.org/FSC/NCIP

Education Resources Information Center
(ERIC) Clearinghouse on Disabilities
and Gifted Education. <http://ericec.org>

About the Authors

Heidi Lasley Barajas earned her Masters degree from the University of Utah and her Ph.D. from the University of Minnesota in sociology. While a Ph.D. student, she was a National Science Foundation Fellow and was awarded funding for her dissertation research from the Society for the Study of Social Problems (SSSP). She is currently an Assistant Professor in the General College at the University of Minnesota. Dr. Barajas works with the Career and Community Learning Center, the Youth Literacy Initiative, and the Center for Applied Research and Educational Improvement (CAREI), as well as area schools.

Thomas Brothen received his B.A. in Psychology in 1967 and his Ph.D. in 1976 at the University of Minnesota with a specialization in Social Psychology. Dr. Brothen is currently a Morse-Alumni Distinguished Teaching Professor of Psychology and Social Sciences, General College, University of Minnesota. He has published two books and nine study guides related to the teaching of general psychology and over 50 journal articles and

chapters including 21 specifically related to teaching psychology with the Personalized System of Instruction in a computer-based environment.

Patrick Bruch received his Ph.D. from Wayne State University and is presently Assistant Professor of Writing Studies and Co-Director of the Writing Program in the General College at the University of Minnesota. He has published articles on the social dynamics of teaching writing in books and journals including *Rhetoric Review* and *Journal of Advanced Composition* and is co-editor of the writing textbook *Cities, Cultures, Conversations*. His current research explores the pedagogical implications of past and present theoretical struggles over literacy for equality.

Terry Collins received his B.A. in English in 1968, followed by his M.A. in English in 1971 and his Ph.D. in English in 1976 from the University of Minnesota, where his service has included Chair of Senate Committee on Disability Services for two terms and member of University Senate for

three terms. Dr. Collins served as Coordinator of the Basic Writing Programs in General College for 18 years. He is currently Director of Academic Affairs in General College. He has been the recipient of numerous grants and awards, including the Horace T. Morse Award for Undergraduate Teaching. Professor Collins served as Co-Principal Investigator for the Curriculum Transformation and Disability (CTAD) project.

Daley Connelly is a Senior Specialist with Disability Services at the University of Georgia. She has been with the department since 1993. Prior to being a Specialist, she served as the Reading and Testing Coordinator. As a senior staff member, Daley specializes in providing services for students with mobility impairments and chronic illnesses as well as working with a general caseload. She received her master's degree in Rehabilitation Counseling from UGA in 1995 and is certified by the Commission on Rehabilitation Counselor Certification. Daley served on the Athens-Clarke Committee on Employment for People with Disabilities and as the Vice President for Membership in the Georgia Association of Disability Service Providers in Higher Education.

Shevawn Eaton is the director of ACCESS, an academic services program, at Northern Illinois University, where she has served on the President's Commission for Students

with Disabilities. She has a Ph.D. in Higher Education Administration from Indiana University, and an M.S. and B.S. from Purdue University.

Judith A. Fox, Project Director for Curriculum Transformation and Disability, has had primary responsibility for the grant's administration and contributes to program development, research and evaluation, and dissemination. Previously, Fox taught in the writing program of General College. Prior to returning to graduate school at the University of Minnesota, where she received a Master's degree in English, Fox worked in the nonprofit arts administration sector for more than five years.

David Ghere received a B. S. in Education in 1972 and a M. Ed. in Social Studies in 1974 from the University of Illinois as well as an M. A. in 1981 and Ph.D. in 1988 in History from the University of Maine. He has served as Assistant Professor of History at Jefferson Community College in upstate New York (1985-1991) as well as Assistant and Associate Professor of History at General College, University of Minnesota (1991-present). Dr. Ghere has created and developed fifteen classroom simulations, has conducted teacher workshops in the use of classroom simulations and has nine publications about teaching and teaching methods.

Jay T. Hatch holds a B.A. (1971) and M. A. (1973) in Zoology from DePauw University and a Ph.D. (1982) in Zoology from the University of Minnesota. Currently he is Associate Professor of Biological Science and H. T. Morse-Alumni Distinguished Teaching Professor in the General College of the University of Minnesota, where he has been a faculty member for 19 years. He has received 5 awards for undergraduate teaching at the University of Minnesota and has published over 30 scientific, educational and popular works including articles on writing across the curriculum and technology enhanced education.

Jennifer Hatfield holds a Master's degree in Psychological/Educational Measurement from the University of Wisconsin-Milwaukee, and, in 1998, began a doctoral program in Educational/Psychological Measurement at the University of Minnesota. She began working in General College as a Graduate Research Assistant in 1998. Currently, in addition to pursuing her doctorate full time, she conducts institutional research projects to examine General College's effectiveness and to inform policy decisions. She is also the project evaluator for Curriculum Transformation and Disability.

Jeanne L. Higbee serves as Professor and Founding Chair of the Center for Research on Developmental Education and Urban Literacy (CRDEUL) in the University of

Minnesota General College. She earned her B.S. in Sociology from Iowa State University and her M.S. in Counseling and Guidance and Ph.D. in Educational Administration from the University of Wisconsin-Madison. She taught developmental education courses for 14 years at the University of Georgia. She has edited a total of 11 monographs for the National Association for Developmental Education (NADE), the National Resource Center for the First-Year Experience and Students in Transition, and CRDEUL, and is the author of more than 100 publications related to access and retention in higher education. Dr. Higbee was involved in curriculum development and dissemination for the Curriculum Transformation and Disability grant.

Rashné Jehangir received her B.A. in Psychology from Lawrence University and her in M.A. in Counseling and Student Personnel Psychology from the University of Minnesota. She is currently working on her doctorate in Educational Policy and Administration with a focus on Higher Education. Over the past eight years she has served as a Counselor Advocate in the TRIO Student Support Services program housed in the General College. She has also taught social science seminars on multicultural issues independently and within learning communities at the General College where her service has included Chair of Multicultural Concerns Committee for two

terms. Her current publications focus on cooperative learning, learning communities and social justice and access to higher education.

Katrina N. Jirik will graduate *summa cum laude* with a B.A. in Liberal Arts from the University of Minnesota in May 2003. She is a member of Phi Beta Kappa, and is presenting an excerpt of her Honors thesis, titled “As American as Apple Pie: Eugenics in American Culture,” at the 2003 National Conference on Undergraduate Research. She is planning on pursuing doctoral studies in either the History of Science and Technology or Political Science at the University of Minnesota, with a research focus on the interplay among science, public policy, and ethics.

Donna Johnson holds a Master’s degree in Counseling Psychology and a Master’s degree in Industrial Relations from the Carlson School of Management at the University of Minnesota, where she formerly served as assistant director of Disability Services. Johnson has presented at numerous national and international conferences, and has authored three training manuals, two book chapters, and several publications focusing on student development issues for college students with disabilities. Johnson served as Co-Principal Investigator of Curriculum Transformation and Disability.

Karen S. Kalivoda received her doctorate from the Institute of Higher Education at The University of Georgia (UGA) in 1991. She has served as Director of Disability Services at UGA since 1985. Under her leadership, Disability Services has experienced dramatic growth and now offers some of the most comprehensive services in the southeast. Dr. Kalivoda is published in regional and national journals regarding the legal ramifications of the Americans with Disabilities Act (ADA) and presents at the local, state, and national level.

Laura Smith Kinney received her B.A. in Mathematics from the University of Minnesota-Morris in 1985, followed by her M.S. in Mathematics from Iowa State University in 1988 and Ph.D. in Mathematics Education from the University of Minnesota in 1998. Her dissertation study documents the mathematical experiences, voice, and self-images of nontraditional women students in college developmental mathematics and statistics. Dr. Kinney joined the faculty of Northland College of Ashland, Wisconsin in 1998, where she currently teaches mathematics.

Patrick Kinney received his B.S. in Mathematics from the University of Wisconsin-Superior in 1984, followed by his Masters of Education-Professional Development from UW-Eau Claire in 1988 and Ph.D. in Mathematics Education from the University of Minnesota in 1997. Dr.

Kinney was an Assistant Professor in developmental mathematics in the General College at the University of Minnesota from 1998 to 2001. He currently teaches at Wisconsin Indianhead Technical College in Ashland, Wisconsin.

Jane Larson received her Bachelor of Science in Economics from Iowa State University. Ms. Larson has been director of the Office for Students with Disabilities at Minneapolis Community and Technical College since 1994. Jane has managed two federal grants, a cooperative education grant, “Staying on the Job,” to assist organizations in retention of persons with chronic and progressive disabilities, and a STAR (System of Technology for Achieving Results) grant. In addition to speaking to various groups about disability and postsecondary education, Ms. Larson has also made presentations to employers on disability in the workplace.

Patricia J. McAlexander has received three degrees in English: a B.A. from the University of New York at Albany, an M.A. from Columbia University, and a Ph.D. from the University of Wisconsin. She is currently an Associate Professor in the Division of Academic Enhancement at the University of Georgia. She has co-authored a book, *Beyond the “SP” Label: Improving the Spelling of Learning Disabled and Basic Writers* (Urbana, IL: National Council of

Teachers of English, 1992), and authored or co-authored a number of articles on learning disabilities.

Karen Miksch received her B.S. from the University of California, Los Angeles in 1986 and her Juris Doctorate (J.D.) from the University of California, Hastings College of the Law, in 1989. Prior to teaching at the undergraduate level, she was a civil rights attorney for six years and lectured nationally about poverty law issues. She is currently an Assistant Professor at the University of Minnesota General College, where she teaches social science courses focusing on social justice, including Law in Society. Her research in developmental education, education policy and social justice compliments her teaching mission.

Mark Pedelty earned his Ph.D. in Anthropology at University of California, Berkeley, in 1993. He taught at the University of Minnesota, Morris and Miami University’s (OH) School of Interdisciplinary Studies before joining the faculty at the University of Minnesota, where he is currently an Assistant Professor. Pedelty’s research involves intersections between education, mass media, music, performance, and politics in El Salvador, Mexico, and the United States.

Judy Schuck received both her Master’s degree and her Ph.D. in Educational Psychology from the University of

Minnesota and is currently employed as a private educational consultant and as a lead trainer for the Curriculum Transformation and Disability (CTAD) project at the University of Minnesota.

Dr. Schuck was formerly employed as the Dean of Students at Minneapolis Community and Technical College and has over 20 years of experience in working with students with disabilities and administering disability services programs in community colleges. Schuck is the co-editor (with Sue Kroeger) of *Responding to Disability Issues in Student Affairs*, a Jossey-Bass monograph.

Brian Shapiro received a B.A. in Ancient Near Eastern Studies and a B.A. in Latin from the University of Minnesota in 1981. He received his Ph.D. from the University of Minnesota in 1990. He was an accounting faculty member at the University of Arizona from 1991 until he returned to the University of Minnesota in 1997. Professor Shapiro currently teaches financial accounting and auditing. His research interests include economic and psychological perspectives on decision making in both individual and market contexts, as well as critical essays in the philosophy and sociology of financial accounting standard setting and assurance services.

Margaret Totty joined the staff of Disability Services at the University of Georgia in 1990 and became Assistant Director in 2000. She is responsible for supervising a staff of specialists who provide services to over 1,000 students who have disabilities. Margaret also specializes in serving students with acquired brain injuries. Prior to joining the staff at Disability Services, she worked as State Coordinator for United Cerebral Palsy of Florida and as Advocacy Specialist with the Office of Protection and Advocacy in Nevada. Margaret's experience in the field of disability-related services and rehabilitation counseling plays an important part in her ability to effectively network with the campus and community.

Kathleen B. Uzes received her BA in Psychology, MS in Educational Psychology, and Ed.D. in Education Psychology (Counseling in Colleges and Mental Health) from the University of Tennessee-Knoxville. She completed her internship at Illinois State University. She was employed at the University of Georgia Counseling and Testing Center for 22 years and served as Associate Director, as well as Training Director and Coordinator of Counseling Services. Dr. Uzes has been actively involved in professional organizations at the local, regional, and national levels. She is now employed as a Psychologist at the University Health Center, University of Georgia.

Cathrine Wambach earned a Ph.D. in Counseling Psychology, with a minor in Educational Psychology, from the University of Minnesota in 1981. She joined the faculty of the General College of the University of Minnesota in 1984, where she is currently an Associate Professor. Her research interests include the evaluation of developmental education programs and research on factors that affect student success in college. Dr. Wambach is Past President of the Minnesota Association for Developmental Education.

Martha E. Wisbey received her Ph.D. in Student Affairs Administration from the University of Georgia (UGA) in 1993. She is currently working as a professional academic advisor for the Franklin College of Arts and Sciences at UGA. In addition, she is working with Disability Services staff on grant work related to increasing technology access for students with disabilities at colleges in the southeast region of the U.S. Her research interests are women's identity and development, multicultural issues, and disability education.