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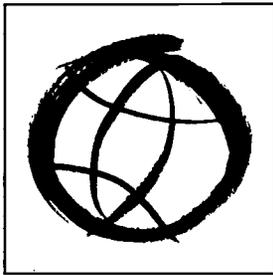
ABSTRACT

This publication contains 2 videotapes, written materials, handout templates, and overhead projection templates developed for those providing professional development to help faculty and administrators in postsecondary institutions become more aware of the rights, responsibilities, potential contributions, and needs of students with disabilities; the rights and responsibilities of postsecondary institutions; reasonable accommodations and instructional strategies for working with students who have disabilities; and campus resources that help provide equitable educational opportunities for all students. The materials are designed for use in departmental and campus-wide presentations to stimulate discussion and action. The presentation lengths vary from 20 minutes to several days and address the following topics: (1) accommodations strategies; (2) universal design of instruction; (3) effective communication; (4) information access; (5) access to computers; (6) making computer labs accessible to everyone; (7) universal design of Web pages; (8) making distance learning accessible to everyone; (9) science/math/engineering access; (10) accommodating students with learning disabilities; and (11) accommodating students with psychiatric disabilities. For each presentation option, a sample script is included to minimize the work that might otherwise be required to prepare a presentation. The

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presenter may use a script verbatim or extract ideas to customize a presentation. Along with the presentations, a synthesis of research, implementation and institutionalization strategies, presentation tips and case study examples, frequently asked questions, and a glossary of disability-related terms and a list of resources are included. The 2 videotapes included with this notebook can be used in specific presentations or broadcast on public television. Handout and overhead projection templates are provided in the "Presentation Tools" section of the notebook for easy duplication and use. A Web-based instructional option is also available for faculty and administrators (to access Web-based instruction, see <http://www.washington.edu/doit/Faculty/>). Also, a distance learning course that can be delivered via electronic mail to faculty and administrators on any campus is available online. (CR)

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DO-IT

Building the Team: Faculty, Staff, and Students Working Together

ED 481 022

PRESENTATION AND RESOURCE MATERIALS

Sheryl Burgstahler, Ph.D., Editor

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PRESENTATION AND RESOURCE MATERIALS

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Dr. Burgstahler is Co-Director of the National Center on Accessible Information Technology in Education (AccessIT). This Center, funded by the National Institute on Rehabilitation Research of the U.S. Department of Education, coordinates a nationwide effort to assist educational institutions in making education-based information technology (IT) accessible to all students and employees, including those with disabilities.

Dr. Burgstahler has published dozens of articles and delivered presentations at national and international conferences that focus on the full inclusion of individuals with disabilities in postsecondary education, distance learning, work-based learning, and electronic communities. She is the author or co-author of six books on using the Internet with pre-college students. Dr. Burgstahler has extensive experience teaching at the pre-college, community college, and university levels. She is Assistant Director of Information Systems and Affiliate Associate Professor in Education at the University of Washington. More about Dr. Burgstahler can be found on her Web site at <http://staff.washington.edu/sherylb/>.



A team of professionals, representing postsecondary institutions from twenty-three states in the United States, met in two collaborative meetings and helped develop and test the professional development content and strategies included in these train-the-trainer materials. Their continuous involvement in this three-year project assured that project products have applicability nationwide.

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INTRODUCTION



Advancements in technology and increased job specialization have resulted in career opportunities in fields that were once considered unattainable for individuals who have disabilities. Many of these careers require knowledge and skills obtained through postsecondary education. Although the number of individuals with disabilities seeking postsecondary education continues to increase, these students experience lower success rates than their non-disabled peers. Individuals with disabilities continue to be underrepresented in many challenging academic and career fields.

Federal legislation mandates that academic accommodations be made to ensure that qualified postsecondary students with disabilities have educational opportunities that are equivalent to others. Studies show that faculty and staff members who have had interactions with students who have disabilities generally have more positive attitudes about working with these students. Further, those who are familiar with accommodation strategies are better prepared to make arrangements that will ensure that students with disabilities have equal opportunities to participate in their programs.

Since 1992, DO-IT (Disabilities, Opportunities, Internetworking, and Technology) at the University of Washington has promoted the success of individuals with disabilities in postsecondary education and employment through direct work with students who have disabilities, and through professional development for educators, service providers, and employers. DO-IT has been recognized for its efforts through many awards, including the 1995 National Information Infrastructure Award in Education; the 1997 Presidential Award for Excellence

in Science, Mathematics, and Engineering Mentoring; the 1999 Golden Apple Award for excellence in education; the 2001 exemplary program award from the Association for Higher Education and Disability (AHEAD); and a 2001 Bright Ideas Award from the Professional and Organizational Development Network.

The *DO-IT Prof* Model Demonstration Project applied lessons learned by DO-IT and other researchers and practitioners nationwide to create a comprehensive professional development program for college faculty and administrators. It was funded by a three-year grant from the Office of Postsecondary Education of the U.S. Department of Education (grant #P33A990042). *Prof* was selected as part of the project name to represent two project characteristics: *professional*, the quality of project materials and strategies, and *professor*, its primary target audience.

DO-IT Prof serves to increase the knowledge and skills of postsecondary faculty and administrators to ensure that students with disabilities have equal access to academic programs. Responding to the diverse content and scheduling needs of faculty and administrators, the *DO-IT Prof* project team created six models of professional development.

Model 1: A 20-30 minute overview to introduce participants to basic legal issues, accommodation strategies, and resources specific to their campus.

Model 2: A 1-2 hour presentation with special focus on providing accommodations to students with a variety of disabilities and introducing campus participants to legal issues and resources.



Model 3: Tailored workshops for in-depth training on specific topics.

Model 4: A televised instruction option using a series of videotapes for delivery on public television.

Model 5: A distance learning “anytime-anywhere” course that provides lessons and discussions delivered via electronic mail.

Model 6: Self-paced, Web-based instruction with expanded content of other models (<http://www.washington.edu/doi/Faculty/>).

The *DO-IT Prof* project team included faculty, disabled student services staff, and administrators at institutions of higher education in twenty-three states. The nationwide recruitment process was highly competitive, attracting more than one hundred applications. Project team members chose institutional partners in their states. Team members from four-year institutions chose community or technical colleges as partners; team members from community or technical colleges chose four-year schools. Participants represent schools with a wide range of demographics (e.g., racial/ethnic diversity, size, location). Project partners also include representatives from AHEAD, the National Center for the Study of Postsecondary Educational Supports (NCSPEs), and the Washington Association on Postsecondary Education and Disability (WAPED).

Project team members participated in two three-day collaborative meetings in Seattle. As part of a needs assessment, they conducted focus groups with students who have disabilities, teaching assistants, faculty, and administrators on their campuses. Representatives from team and partner schools delivered professional development programs, disseminated materials, and

explored strategies for providing technical assistance to faculty and administrators. Ongoing discussion and coordination of *DO-IT Prof* activities took place on an interactive Internet discussion list and during telephone conferences.

All project materials are offered in formats that are readily accessible to individuals with disabilities. Permission to copy and further distribute project products for educational nonprofit purposes is granted as long as the source is acknowledged.

DO-IT Prof activities help faculty and administrators fully include students with disabilities on their campuses and contribute to systemic change within postsecondary institutions across the nation. Ultimately, implementation of this and similar projects can lead to increased educational and career opportunities for individuals with disabilities.

I hope that you find these materials useful in your efforts to ensure that all students on your campus have equal opportunities to learn, explore interests, and express ideas.

Sheryl Burgstahler

Sheryl Burgstahler, Ph.D.
Director, DO-IT



University of Washington
College of Engineering
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The enclosed videotapes, written materials, and handout templates were developed for those providing professional development to help faculty and administrators in postsecondary institutions become more aware of:

- the rights, responsibilities, potential contributions, and needs of students with disabilities;
- the rights and responsibilities of postsecondary institutions;
- reasonable accommodations and instructional strategies for working with students who have disabilities; and
- campus resources that help provide equitable educational opportunities for all students.

These materials are for use in departmental and campus-wide presentations to stimulate discussion and action. Each presentation option can be tailored for meetings of administrators, departmental chairs, advisors, faculty, teaching assistants, and support staff. The presentations are intended for use in public and private, and large and small two-year, four-year, and technical postsecondary institutions. Presentation lengths vary from 20 minutes to several days. The materials were tested nationwide and refined based on faculty and staff evaluations.

Besides the presentations themselves, a synthesis of research, implementation and institutionalization strategies, presentation tips, frequently asked questions, and resources are included. The following paragraphs describe the content of this handbook.

Synthesis of Research

The content and presentation suggestions included in this notebook are based on research in a number of relevant areas. These include experiences of students with disabilities, reported postsecondary faculty training needs, adult learning, learning styles, types of learning, universal design of instruction, and systematic change. Read this section to understand the underlying theory and research that supports the practices suggested in these materials.

Institutionalization Strategies

Setting up one training session for a department is not difficult; however, developing strategies to institutionalize faculty and administrator training requires more thought and planning. This section provides suggestions that can result in long-term improvements on your campus. Implementing institutionalization strategies will help assure that students with disabilities have equal access to your academic programs and resources.

Presentation Tips

This section provides suggestions for making presentations to faculty, administrators, and staff engaging and informative. You will also find case studies to use in your presentations.

Presentations

Several presentation options are outlined in these materials:

- a 20-30 minute overview to introduce participants to basic legal issues, accommodation strategies, and resources specific to their campus;



- a 1-2 hour presentation with special focus on providing accommodations to students with a variety of disabilities and introducing participants to legal issues and campus resources; and
- ten tailored workshops for in-depth training on topics of special interest to faculty and administrators.

For each presentation option, a sample script is included to minimize the work that might otherwise be required to prepare a presentation. The presenter may use a script verbatim or extract ideas to customize a presentation.

The videotapes included in this notebook can be used in specific presentations or broadcast on public television. Handout and overhead projection templates are provided in the *Presentation Tools* section of this notebook for easy duplication and use.

A Web-based instructional option is also available for faculty and administrators. To access Web-based instruction, visit *The Faculty Room* at <http://www.washington.edu/doi/Faculty/>. A distance learning course that can be delivered via electronic mail to faculty and administrators on your campus can be found in *The Faculty Room* at <http://www.washington.edu/doi/Faculty/Presentations/Distance/Lessons/index.html>.

FAQs

Frequently asked questions (FAQs) and their answers provide a useful reference for presenters. Reviewed before delivering a presentation, the FAQs can help the speaker prepare responses to questions commonly asked by faculty and administrators.

Resources

A glossary of disability-related terms and a list of resources are included.

Presentation Tools

The presenter will find ready-to-use presentation tools included in this section.

■ Handout Templates

Reproducible, camera-ready handout templates for the presentations are inserted in the back pocket of the binder.

■ Overhead Projection Templates

Black and white templates that can be developed into transparencies are included for use in the presentations. There are many templates included to optimize custom presentations. In addition, PowerPoint™ transparency templates are provided on *The Faculty Room* Web site at <http://www.washington.edu/doi/Faculty/>.

■ Final Evaluation Tools

One of two evaluations can be selected for use with participants at the end of the session. They are found in the *Presentations* section of the binder.

■ Videotapes

Several videotaped presentations are collected on two videotapes. Their titles are:

- *Working Together: Faculty and Students with Disabilities*. Faculty members share their concerns about and strategies for working with students who have disabilities, and successful students tell about accommodations that contributed to their success.



Emphasis is on the importance of the faculty-student relationship (9 minutes).

- *Building the Team: Faculty, Staff, and Students Working Together.* This presentation emphasizes the importance of positive working relationships between students with disabilities, faculty, and the campus office that supports students with disabilities, and provides an overview of typical academic accommodations and procedures (16 minutes).
- *Real Connections: Making Distance Learning Accessible to Everyone.* This presentation provides strategies for making the materials and methods used in distance learning courses accessible to individuals with disabilities (12 minutes).
- *Computer Access: In Our Own Words.* Students with disabilities show and discuss, in their own words, the use of assistive technology and computer applications (10 minutes).
- *World Wide Access: Accessible Web Design.* This presentation shows how to make Web pages and other electronic resources accessible to people with disabilities (11 minutes).
- *Working Together: People with Disabilities and Computer Technology.* People with disabilities provide an overview of assistive technology and computer applications (14 minutes).
- *Equal Access: Computer Labs.* This presentation shows how to make computer labs accessible to students with disabilities (11 minutes).
- *Working Together: Science Teachers and Students with Disabilities.* Students and teachers suggest ways science activities can be made accessible to students with disabilities (13 minutes).
- *Working Together: Computers and People with Learning Disabilities.* Students with learning disabilities demonstrate computer-based tools and techniques that can assist learning (10 minutes).
- *Working Together: Computers and People with Sensory Impairments.* People with visual and hearing impairments demonstrate computer technology useful for school and work (11 minutes).
- *Working Together: Computers and People with Mobility Impairments.* People with mobility impairments demonstrate computer access technology (14 minutes).
- *Opening Doors: Mentoring on the Internet.* Demonstration of students developing supportive relationships with adult mentors on the Internet (15 minutes).

Permission is granted to reproduce any of these materials for noncommercial, educational purposes as long as proper credit is given to the source. The most current text of these materials can be obtained in electronic format at <http://www.washington.edu/doi/Faculty/Trainers/>.



The purpose of this section is to summarize research that relates to the professional development of faculty and administrators to assure equal access for students with disabilities in their courses. Selected research areas were developed through a literature review and collaboration with 23 *DO-IT Prof* project team members. The *Implications for Practice* section for each topic area shows how the specific body of research can be applied to create an effective professional development program.

The body of research shared in this section provides the foundation for the presentation content and delivery strategies included in other sections of this notebook. The suggestions in the sections entitled *Presentation Tips* and *Presentations* are also based on this body of knowledge. Professional development facilitators may find this foundation useful as they develop effective faculty and administrator training materials and programs.

Six subsections are organized around key questions that must be addressed in order to be fully informed when developing educational opportunities for postsecondary faculty and administrators. Key subsection topics and questions are listed below.

Professional Development: Need, Content, and Methods

- Why do faculty and administrators need professional development regarding teaching students with disabilities in their courses and programs?
- What do we know about the knowledge, experiences, and attitudes of faculty and administrators regarding students with

disabilities? What do faculty and administrators want and need to know about including students with disabilities in their classes? How do faculty and administrators want to gain this knowledge?

- What do students with disabilities think faculty members and administrators need to know about providing full academic access in their classes?

Adult Learning

- What do we know about adult learning that can be applied to the design and delivery of professional development for faculty and administrators regarding equal access of students with disabilities to courses and programs?

Learning Styles

- What do we know about learning styles that can guide the delivery and design of professional development for faculty and administrators regarding equal access of students with disabilities to courses and programs?

Types of Learning

- What do we know about types of learning that can guide the design and delivery of professional development for faculty and administrators regarding equal access of students with disabilities to courses and programs?

Universal Design of Instruction

- What do we know about universal design of instruction that can guide the design and delivery of professional development for faculty and



administrators regarding the equal access of students with disabilities in their courses and programs?

Systemic Change

- What do we know about systemic change that can guide the design and implementation of professional development for faculty and administrators regarding equal access for students with disabilities in their courses and programs?

- What do we know about sustaining faculty and administrator development activities for supporting students with disabilities?

In each topic area, research questions are followed by an overview of research and suggestions for applying the respective research in preparing and delivering presentations to faculty and administrators. A concluding section, *Application of Research Findings*, summarizes how each research area can be applied to the delivery of professional development presentations for faculty and administrators. Note that research in several different areas supports some of the same recommendations, thereby reinforcing essential characteristics of successful professional development programs.

Professional Development: Need, Content, & Methods



Research Questions

- Why do faculty and administrators need professional development about teaching students with disabilities in their courses and programs?
- What do we know about the knowledge, experiences, and attitudes of faculty and administrators regarding students with disabilities? What do faculty and administrators want and need to know about fully including students with disabilities in their classes? How do faculty and administrators want to gain this knowledge?
- What do students with disabilities think faculty members and administrators need to know about providing full academic access in their classes?

Overview of Research

As a result of federal legislation such as the Individuals with Disabilities Education Act (IDEA, 1997) and Section 504 of the Rehabilitation Act of 1973, young people with disabilities are being encouraged and better prepared to pursue higher education (Gajar, 1998; Henderson, 2001, Horn & Berktold, 1999; National Council on Disability, 2000). The number of students with disabilities enrolled in higher education continues to grow. Approximately 6% of people in postsecondary programs report a disability (Horn & Berktold, 1999). According to Henderson (2001), the majority of these students reported a learning disability (40.4%). Percentages of students with other disabilities include mobility and orthopedic impairments, 7.1%; health impairments, 15.4%; hearing impairments, 8.6%; blindness or partial sight, 16.1%; speech impairments, 2.9%; and other impairments, 16.9%.

Despite their increased percentage of college enrollment, individuals with disabilities are still underrepresented in postsecondary education when compared to their non-disabled peers (Blackorby & Wagner, 1996; Stodden & Dowrick, 2000). One study found that two years after high school, 63% of students with disabilities were enrolled in some form of postsecondary education compared to 72% of students without disabilities. Of those enrolled in postsecondary education, 42% of students with disabilities and 62% of those without disabilities were enrolled in four-year schools (Horn & Berktold, 1999).

Students with disabilities are less likely than their counterparts without disabilities to stay enrolled in postsecondary education or to earn a postsecondary degree or credential. Regarding degree attainment, Horn & Berktold (1999) found that after five years, 53% of students with disabilities and 64% of those without disabilities attained a degree or certificate or were still pursuing their degree. Of the students with disabilities, 16% earned a bachelor's degree and 25% earned an associate's degree or vocational certificate. These percentages are low compared to students without disabilities, where 27% attained a bachelor's degree and 25% earned an associate's degree or vocational certificate (Horn & Berktold, 1999). Clearly, postsecondary educational outcomes for students with disabilities are not as positive as they are for those without disabilities.

People with Disabilities and Employment

People with disabilities, as with other minority groups, face challenges in gaining employment. They are also negatively and disproportionately affected by changes in



general employment trends (Stodden & Dowrick, 2000; Trupin, Sebesta, Yelin, & LaPlante, 1997; Yelin & Katz, 1994a, 1994b; Zemsky & Odel, 1994).

The completion of some type of postsecondary education significantly improves the chances of men and women with disabilities to secure satisfactory and meaningful employment (Gilson, 1996; Reskin & Roos, 1990; Stodden, 1998; Stodden & Dowrick, 2000; Yelin & Katz, 1994a, 1994b). A postsecondary education is highly correlated with vocational options, financial success, and high quality adult life. In fact, for people with disabilities, there is a stronger positive correlation between level of education and rate of employment than there is for the general population (Stodden, 1998; Stodden & Dowrick 2000). The poor employment figures for people with disabilities coupled with the positive impact of postsecondary education makes increasing their postsecondary success an important goal (Benz, Doren, & Yovanoff, 1998; Blackorby & Wagner, 1996; Gajar, 1998; Gilson, 1996; National Council on Disability, 2000; Phelps & Hanley-Maxwell, 1997; Reis, Neu, & McGuire, 1997; Reskin & Roos, 1990; Stodden & Dowrick, 2000).

Professional Development Needs of Faculty and Administrators

Section 504 of the Rehabilitation Act of 1973 prohibits discrimination against individuals with disabilities in programs and services that receive federal funds. The Americans with Disabilities Act (ADA) of 1990 reinforces and extends the requirements of Section 504 to programs and services, regardless of whether or not they receive federal funds. These laws apply to postsecondary institutions. For qualified students who disclose their disabilities and present

appropriate documentation, postsecondary institutions must provide reasonable accommodations to assure equal access to program offerings (Frank & Wade, 1993; Heyward, 1998; McCusker, 1995; West, Kregel, Getzel, Zhu, Ipsen, & Martin, 1993).

Many factors impact the academic success of students with disabilities. They include physical access, campus support services, and faculty willingness to make accommodations. Although students are generally pleased with their accommodations (Hill, 1996) and negative experiences are not widespread, some students have difficulty acquiring accommodations, and some faculty members project negative attitudes toward students with disabilities (Anderson-Inman, Knox-Quinn & Szymanski, 1999; Blackhurst, Lahm, Harrison & Chandler, 1999; Burgstahler, Duclos, & Turcotte, 1999; Yucker, 1994). Faculty attitudes influence behavior toward students, which in turn influences student performance (Alexander & Strain, 1978). Prejudicial treatment, whether intentional or not, creates obstacles for students with disabilities in higher education that can be more disabling than the physical or cognitive impairments themselves (Fichten, 1995).

When considering accommodations for students with disabilities, faculty are often concerned about maintaining academic integrity (Nelson, Dodd & Smith, 1990).

Many support the integration of students with sensory and physical disabilities in higher education but are less supportive of integrating students with learning disabilities and psychiatric disabilities (Burgstahler et al., 1999; Hannah & Pliner, 1983; Leyser, 1989). There are also certain accommodations that faculty members are less willing to provide, such as alternative assignments,



copies of lecture notes, tape-recorded assignments, and proofreaders (Nelson, et al., 1990). Additionally, the willingness to provide accommodations varies by academic discipline. For example, education faculty have been found to be more willing to accommodate than business faculty, and business faculty have been found to be more willing to provide accommodations than science faculty (Leyser; Leyser, Vogel, Wyland & Brulle, 1998; Nelson, et al., 1990).

Some instructors feel uncomfortable talking to students with disabilities. Similarly, students with disabilities are sometimes reluctant to ask for accommodations. They express concern that instructors may have negative attitudes about them, and that they may not respect their privacy regarding their disabilities (Burgstahler, et al., 1999; Moore & Nye, 1986; National Center on the Study of Postsecondary Educational Supports, 2000). Faculty members with more knowledge about and experience with students who have disabilities have more positive attitudes about them than those with less experience and knowledge (Aksamit, Levenberger & Morris, 1987; Fichten, Amsel, Bourdon, & Creti, 1992; Fonosch & Schwab, 1981; Yucker, 1994).

Overall, despite ever-growing course loads, committee assignments, research responsibilities, and community work, professors are receptive to receiving training in teaching students with disabilities (Norman, Caseau, & Stefanich, 1998). College administrators also acknowledge the need to provide training for faculty regarding the capabilities and unique needs of students with disabilities (Nelson, et al., 1990). Both faculty and students have expressed the need for faculty development so that instructors can better understand their legal obligation to provide academic accommoda-

tions, learn about typical accommodation strategies, improve communication skills, and become aware of available resources (Burgstahler et al., 1999; Leyser et al., 1998; Vogel, et al., 1999). Faculty members and administrators report interest in multiple presentation delivery methods including short printed publications, on-line resources, and short presentations that include case studies or student panels (Burgstahler, et al., 1999). Including disability-related content in training programs and orientations for teaching assistants (TAs) is also important, since many TAs have primary teaching responsibilities (Burgstahler & Jirikowic, 2002).

Training opportunities regarding accommodating students with learning disabilities and psychiatric disabilities are of particular interest to postsecondary faculty (Henderson, 2001). These types of disabilities are especially challenging for instructors to understand and accommodate (Burgstahler, et al., 1999; Houck, Asselin, Troutman, & Arrington, 1992; Vogel et al., 1999). Since faculty members play a key role in the learning of all students, professional development for this audience has the potential to improve the postsecondary outcomes for students with disabilities (Burgstahler, 2003; Cafferella & Zinn, 1999).

Implications for Practice

Faculty members, teaching assistants, and administrators need information about legal issues, accommodation strategies, and resources for working with students who have disabilities. Training should be provided in multiple ways to address differences in schedules, interests, knowledge, experience, and information needs. Short printed publications, Internet-based resources, and both short and extended presentations should be considered. Follow-



up support to address specific needs should also be provided.

It is best to tailor professional development sessions to the needs of instructors in specific academic disciplines, giving examples of accommodations that are likely to be provided in each of those fields. Seek to educate instructors in academic disciplines that tend to be less willing to accommodate students with disabilities. Faculty members in academic areas where advancing technology increases opportunities for participation of students with disabilities should also be targeted for training in order to correct faulty assumptions about what students with disabilities can accomplish. For example, faculty members in information technology fields may not be aware of assistive technology that allows individuals with a wide range of disabilities to access computers. In addition, instructors of Internet-based learning courses may not be aware of the technical issues and legal obligations to design courses that are accessible to students with disabilities (Patrick, 1996).

Keep in mind that faculty members may feel uncomfortable when working with students who have disabilities. Their attitudes may be based on faulty assumptions and stereotypes. Use faculty training as opportunities to allow instructors to openly discuss fears and concerns, to dismiss incorrect assumptions and stereotypes, and to provide accurate information. Model an attitude of respect for the rights and responsibilities of the institution, students with disabilities, and instructors. Avoid generalizations about people with disabilities and highlight similarities instead of differences between students with and without disabilities. Emphasize that academic accommodations do not need to

be elaborate; creativity and common sense can lead to practical solutions for access problems.

When delivering training to faculty and administrators, assume your audience has varying levels of experience, knowledge, and a wide range of interests represented. Some faculty and administrators are eager to learn about disability-related issues; others are interested in only the minimum amount of information they need to perform their jobs. Leave time to discuss issues of special interest to audience members.

Based on a review of research, DO-IT (Disabilities, Opportunities, Internetworking, and Technology) developed six models of professional development for faculty and administrators that may be adapted for a wide range of schedules and interests. The presentation models include a short overview, a comprehensive workshop, tailor-made workshops on specific topics, self-paced Web instruction, and a distance learning course (Burgstahler, 2003). In addition to materials provided in this handbook, information can be found in *The Faculty Room* Web site at <http://www.washington.edu/doi/Faculty/>.

Conclusion

Professional development can help educators more fully include students with disabilities in their courses. Ultimately, increased knowledge and skills of faculty members and administrators regarding legal issues, accommodations, and resources can lead to more positive postsecondary and career outcomes for students with disabilities.



Research Question

What do we know about adult learning that can be applied to the design and delivery of professional development for faculty and administrators regarding equal access of students with disabilities to courses and programs?

Overview of Research

Knowles (1980) used the term “andragogy” instead of “pedagogy” to clarify differences between the curriculum development needs of adults and that of children. He identified the need for adults to be motivated to learn, to be active in the learning process, and to have their past experiences respected in the learning environment (Millis & Cottell, 1998). Much of the current knowledge in this field is based on Knowles’ ideas.

Transformative Learning

When adults participate in learning activities, they bring many years of experiences with them. They view new material through the lens of these experiences (Baird, Schneier, & Laird, 1983). As adults continue to acquire new knowledge and skills, they must integrate new learning with prior learning. When contradictions or dilemmas result, perceptions based on prior learning must be reexamined. Individuals can choose to reject the contradictory new information or revise their previous views. Transformative learning occurs when positive adjustments to prior learning are made (Cormick-Pilling, 1997; Cranton, 1996).

Self-Directed Learning

Adults often prefer to engage in self-directed learning, where the learner has some control over setting priorities and choosing content, materials, and methods. Self-directed learning can provide a founda-

tion for transformative learning. During the process, individuals use critical thinking to challenge previous assumptions.

The “Self-Directed Learning Process Model” (Cormick-Pilling, 1997) consists of three components: control factors, interactions between educator and student, and influences on those interactions. Four factors affect the amount of control participants can exercise in the learning process: social constraints, environmental characteristics, learner characteristics, and educator characteristics. Environmental characteristics include both physical and affective components of teaching and learning situations (Heimlich & Norland, 1994).

In Cormick-Pilling’s model of transformative learning, both the adult learner and the educator influence each other’s interactions. Learners may modify the educator’s facilitation style. Similarly, a presenter who supports self-directedness influences participant perspectives about their own learning (Cormick-Pilling, 1997). An important part of this process, for both the presenter and the participants, is reflection. What do participants want to learn? How will they go about learning it? Why is it important to learn this in the first place? Reflection becomes critical when it leads to the questioning of the validity of the learning itself. The ways in which learners reflect vary depending on the nature of the subject matter and the facilitation strategies used.

One approach to teaching adults in a self-directed format is to address problems together in a collaborative manner, “in which no one need apologize for being uncertain about the material, because uncertainty is understood to be an element of all human knowing” (Roth, Cracolice,



Goldstein, & Snyder, 1999, p. 51). In this type of learning environment, the presenter and the participants are open to ideas that will support learning from both mistakes and successes (Schon, 1987).

Relevant Learning

Learning is greatest when it can be applied to situations of interest to the learner and when there is an immediate benefit. If adults see the relevance of the material presented to their own situations, their motivation to learn increases and the instructor will have a more attentive audience. Motivation to learn originates from the adult learner's expectations of the usefulness of the content (Svinicki, 1996). When adults are forced to learn against their own inclinations and desires, the resulting resentment may become a barrier to meaningful learning (Brookfield, 1993). To maximize learning, the instructor must convince the audience that the material presented is important and useful to them.

Active Learning

Adults tend to prefer active learning where instructional experiences are related to their real life situations (Mezirow, 1981). Retention of information for adult learners can be maximized through activity (Thomas, 1991).

Presentation strategies that can assist in communicating necessary information about academic accommodations and faculty concerns include offering faculty practical strategies and meaningful discussion about disability issues and topics.

Implications for Practice

Some faculty members have had little or no contact with people who have disabilities. Others have already taught students with disabilities in their classes. For some, accommodating students with disabilities is consistent with their sense of justice and pedagogical beliefs; for others, providing special accommodations to some students implies unfairness to others. Some faculty members welcome new ideas; others reject change. Expect that your faculty audience will hold a range of such beliefs and attitudes.

When training is voluntary, you can assume that your audience is motivated. However, if your presentation is mandatory or a part of a program for a group gathered for another purpose, expect that some participants will be reluctant learners.

Consider the following suggestions as you prepare your presentation:

Transformative Learning

Present clear, situation-relevant learning objectives. Avoid abstractions, rhetoric, and theory with little immediate application. Adult learners may be impatient with hearing general information and find little use for isolated facts. Include concrete examples of accommodations, legal requirements, and campus resources.

To promote transformative learning, consider sharing myths or misconceptions related to disabilities and refute them with factual information. For example:

- Students with learning disabilities see things backwards. (Actually, there are many types of learning disabilities; "seeing things backwards" is a symptom of one type.)



- All students with hearing impairments use sign-language interpreters. (Actually, only 25% of individuals with a hearing loss use sign language.)
- Deaf students are good lip-readers. (Actually, not all deaf students lip-read. Those who do are guessing much of the time, since only 30% of speech can be read on the lips.)
- People who use wheelchairs cannot drive automobiles. (Actually, hand controls and other assistive technology allow operation of vehicles without using standard foot pedals.)
- Providing academic accommodations is always difficult, time consuming, and expensive. (Actually, most accommodations are simple and inexpensive.)
- Blind students read Braille. (Actually, only a small fraction of individuals who are blind read Braille.)
- People who are blind cannot use computers. (Actually, speech and Braille output systems provide blind computer users with full access to all text on a screen.)
- Students with learning disabilities are not very smart. (Actually, a diagnosis of a learning disability requires average or above average intelligence.)

Address each item in the list, correcting misconceptions and discussing experiences, resources, and procedures on your campus.

Respect audience members' expertise in their fields while at the same time, recognize that they may lack background and experience on the topic you are presenting. When

asking and responding to questions in presentations, be careful not to make participants feel wrong or ignorant if they are poorly informed (McLagan, 1978).

Openly acknowledge the difficulties that change can create and the extra time that might be required to accommodate a specific student with a disability. Be sure to balance the description of challenges that result from fully including students with disabilities in classes and programs with the positive outcomes that result from doing so. With a straightforward approach, resistant or defensive audience members are more likely to trust you and the information you present.

Relevant Learning

Make the content relevant to the work of the participants. Postsecondary educators have a wealth of knowledge and multiple responsibilities, all of which draw upon their time and energy. As with most adult learners, postsecondary educators are goal-oriented, generally appreciate outcomes more than process, have set habits and strong feelings, and have little time to waste.

When providing training for faculty and administrators, it is important to be sensitive to the different needs of participants. For example, faculty need information in order to provide academic accommodations in their specific classes. Administrators (e.g., departmental heads, and deans) need information in order to make policy decisions. Some participants may have a personal interest in the subject matter or enjoy learning the information simply for the sake of knowledge; many will prefer to receive only information that is relevant to their position.

Tap into the positive motivations of the audience to help them want to learn.



Consider why your audience is attending your presentation. If your presentation is part of a regularly scheduled faculty meeting, a brief introduction delivered by the dean or chair of the department can help emphasize the importance of the material you will present. To determine audience interests, consider making brief phone calls or conducting a survey prior to a presentation to gain information or ask participants to share their interests at the beginning of the presentation. Use the life/work experiences of those in the session to develop examples and to answer questions.

Active Learning

Audience participation can help keep your participants engaged as well as provide opportunities for you to reinforce key points. Ask your audience if they have taught students with disabilities, and encourage participants to share their experiences and concerns. Incorporate information the participants wish to learn into the training section. Allow participants to discuss examples and case studies to explore how the information presented can be applied. Videotapes or panels of students with disabilities can provide real-life examples to promote discussion; the visual images can help participants assimilate the content.

Approach each presentation with an attitude that everyone can contribute to the learning process. Develop an environment of trust and respect by ensuring the training is a safe place to discuss personal ideas without criticism. Invite faculty members who have worked with students who have disabilities to share their experiences and field questions from the audience. Let participants discuss challenges they currently face, or have faced in the past, and help lead them to solutions.

Conclusion

Keep concepts of adult learning theory in mind as you prepare and present professional development programs for faculty members and administrators to make them more effective. Actively engage participants in the learning process, make the content relevant to their jobs, and work to transform inaccurate assumptions into accurate perceptions. Ultimately, increased skills of faculty and administrators can result in more positive academic and career outcomes for students with disabilities.



Research Question

What do we know about learning styles that can guide the delivery and design of professional development for faculty and administrators regarding equal access of students with disabilities to courses and programs?

Overview of Research

How learners learn is as important to consider as the content being taught. Learner-centered education strives to make both content and methods appropriate for the learner (Conti, 1998). Although learning is an individual event, it often occurs in a group setting (Felder, 1996). In any group, the presenter can assume that participants have a variety of learning styles. Addressing learning style issues in the delivery of instruction can maximize its effectiveness.

“Learning style” refers to how an individual responds to the learning environment (Claxton & Ralston, 1978; Wooldridge, 1995). Dunn and Griggs (1998) describe learning style as the way an individual begins to concentrate on, process, internalize, and remember new information and skills. They report that learning style is an individual’s reaction to several factors that include:

- the environment, such as room temperature or lighting;
- emotions, such as motivation and persistence;
- sociological factors, such as individual or group learning; and
- physiological factors, such as sensory preferences and variable energy levels.

In addition to the learning styles of students, it is important for presenters to be aware of their own learning preferences. An instructor’s style may influence the

activities chosen within the learning environment. Students will respond based on their own personal preferences. A mismatch between the learning styles of students and their instructor can interfere with learning and raise the discomfort level of students. Alternatively, when the learning styles of students are similar to those of an instructor, they may exhibit greater achievement and personal satisfaction (Felder, 1996; University of Illinois Division of Instructional Development, 1999).



Sensory Preferences

Perhaps the most commonly used categories of learning styles are based on sensory preferences. Wooldridge (1995) describes learners with the following preferences.

Auditory Preferences

This category describes those who learn best by listening to verbal instruction such as a lecture, discussion, or recording. Coker (1996) describes this person as “the listener,” preferring to rely on sounds to learn.

Visual Preferences

These learners use vision for their primary perceptual preference and can remember most easily what they read or observe. They can close their eyes to recall what they have read or seen earlier. Ness (1995) includes a



separate category of "written word" in which the person has a preference for learning by reading as opposed to actually seeing objects or participating in activities in order to learn.

Tactile Preferences

Learners with tactile perceptual preferences often need to underline as they read, take notes when they listen, or keep their hands busy in other ways. Members of this group may never read the notes they write. Rather, the activity of writing is sufficient for the learning to occur (Ness, 1995).

Kinesthetic Preferences

For these learners, whole body movement and real life experiences are often needed to absorb and retain the material to be learned. They learn best when they are totally involved in an activity.



Experiential Learning

Another popular theoretical framework for learning styles is that of Kolb's "Experiential Learning" (Claxon & Ralston, 1978; Svinicki & Dixon, 1987). This theory explains how a person develops observations and reflections from a concrete experience. Abstract concepts are then formed which guide new behavior. Within this model, four specific learning styles emerge:

Converger

These learners work best when there is a simple and correct answer to a problem. Their dominant learning abilities are abstract conceptualization and active experimentation. These individuals prefer dealing with things rather than people and tend to excel in the physical sciences and engineering.

Diverger

These individuals learn best through concrete experience and reflective observation. A strength is their imaginative ability. They tend to be people-oriented, react with emotions, and excel in humanities and the liberal arts.

Assimilator

The dominant learning orientations of these people are abstract conceptualization and reflective observation. Abstract conceptualization activities include listening to lectures, writing papers, building models, completing projects, and developing analogies. Reflective observation activities include the use of logs, journals, discussion, brainstorming, thought questions, and rhetorical questions. Assimilators like to organize diverse items into an integrated whole. They are often interested in math and science fields.



Accommodator

Accommodators learn best through concrete experimentation. These activities include practicing in laboratories, collecting observations, reading primary text, participating in simulations and fieldwork, working problem sets, and studying examples and case studies. Accommodators like to have new experiences. They are intuitive and often use the trial-and-error strategy to solve problems. This type of learner often prefers technical or business fields.



Implications for Practice

Successful presenters employ a variety of teaching strategies in response to the diverse set of learning styles found within most groups. They also consider diversity in age, experience, intellect, and background. This is particularly important when teaching new material. Successful instructional techniques include the following (Felder, 1996).

- Teach theory by providing phenomena and problems that relate to the theory.
- Balance conceptual information with concrete information.
- Use a variety of sketches, plots, schematics, computer graphics, and physical

demonstrations in addition to oral and written explanations in lectures and handouts.

- Provide plenty of time for reflection and discussion. Provide time for learners to think about the material being presented and organize their thoughts.
- Promote active participation and respond to individual questions. Also encourage faculty participants to use a variety of teaching strategies with their own students in order to address the different learning styles in their classes (Goad, 1997).

Sensory Preferences

Experiment with new techniques and strategies that may not be part of your own style. Some individuals learn better through listening, some through discussing, others through reading or watching, and still others through doing. Engage participants in a variety of learning activities that use multiple senses. Provide key information in multiple ways. Consider using videotapes, group discussions, mini-lectures, case studies, questions and answers, panels, and role-playing.

Experiential Learning

One way that research about experiential learning styles for faculty training can be applied is to develop specific activities in response to common learning styles of particular faculty groups. For example, business instructors may prefer activities designed for the "accommodator;" history, political science, English, and psychology faculty may be more receptive to activities for the "diverger;" economics, mathematics, sociology, and science instructors may find activities for the "assimilator" to be more effective; and those in engineering may



prefer activities associated with the “converger.”

Conclusion

Create a learner-centered environment in training sessions for faculty and administrators. Expand your teaching style repertoire in order to accommodate all learners and encourage faculty to do the same to support the learning needs of their students. Use multiple instructional methods that engage different senses so that more learners, including those with disabilities, can learn effectively.



Research Question

What do we know about types of learning that can guide the design and delivery of professional development for faculty and administrators regarding equal access of students with disabilities to courses and programs?



Overview of Research

Learning has been categorized in many ways. Three are discussed below.

Bloom's Taxonomy

Psychologist Benjamin Bloom developed a classification scheme for types of learning which includes three overlapping domains: cognitive, psychomotor, and affective. Skills in the cognitive domain, the one most relevant to faculty and administrator training (Lee, 1999), include:

- **knowledge** (remembering information);
- **comprehension** (explaining the meaning of information);
- **application** (using abstractions in concrete situations);
- **analysis** (breaking down a whole into component parts); and
- **synthesis** (putting parts together to form a new and integrated whole).

For example, knowing that the Americans with Disabilities Act (ADA) was passed in 1990 is knowledge. Explaining what the law means is comprehension. Application is illustrated when someone knows how the law applies to higher education. Analysis is required to discuss the details of specific legal applications. Finally, synthesis is needed to develop policies and procedures for a postsecondary institution in response to the ADA.

Tennant's A.S.K.

Tennant (1995) categorized types of learning in a different way. The acronym A.S.K. stands for the three types of learning that occur in training:

- A** represents "attitude," also known as affective learning. An example of this type of learning is a shift in attitude toward the academic abilities of students with disabilities.
- S** represents "skills," often called psychomotor or manual learning. Learning to operate adaptive technology is an example of the development of skills.
- K** represents "knowledge." Cognitive learning is the formal term used for mental skills such as recall of information. An example of knowledge is information on available resources related to disability issues.

Gardner's Seven Knowledge Types

Howard Gardner (1983, 1999) breaks down knowledge into seven types. He developed a theory of multiple intelligences based upon



research in the biological sciences, logistical analysis, and psychology. These intelligences include:

1. **Logical-mathematical intelligence:** the ability to detect patterns, think logically, reason and analyze, and compute mathematical equations.
2. **Linguistic intelligence:** the mastery of oral and written language in self-expression and memory.
3. **Spatial intelligence:** the ability to recognize and manipulate patterns (large or small) in spatial relationships (e.g., pilots, sculptors, architects).
4. **Musical intelligence:** the ability to recognize and compose musical quality (pitches, tones), and content (rhythms, patterns) for production and performance.
5. **Kinesthetic intelligence:** the ability to use the body, or parts of the body to create products or solve problems (e.g., athletes, dancers, surgeons).
6. **Interpersonal intelligence:** the ability to recognize another's intentions, and feelings.
7. **Intrapersonal intelligence:** the ability to understand oneself and use the information to self-manage.

Gardner's theory purports that people use a type of intelligence according to the type of learning that is necessary, their personal strengths and abilities, and the environment in which the learning takes place.

Since different teaching strategies are best applied to certain types of learning, using a

wide variety of activities when teaching new material will maximize learning for everyone (Felder, 1996).



Implications for Practice

Carefully consider the context of the participants in the audience of your presentation. What knowledge do they need to perform their job more effectively? What skills need to be developed? How can you help participants synthesize critical content in order to develop appropriate institutional policies? How can you help them develop strategies for accommodating specific students with disabilities in specific activities? How can you model and promote a positive attitude about disability-related accommodations?

Often, learning occurs during periods of confusion, frustration, and struggle. For this reason, risk-taking on the part of the facilitator and the participants is necessary. Sharing personal experiences, posing questions, and presenting case studies can promote learning. In order to engage participants in critical thinking and facilitate problem-solving, consider the following suggestions (Brookfield, 1993):

- Value and respect participants through word and action.



- Listen attentively and provide support for efforts.
- Identify and challenge assumptions.
- Reflect back attitudes, rationalizations, and habitual behaviors.
- Imagine and explore alternatives.
- Practice reflective skepticism.
- Model critical thinking through clarity, consistency, openness, and accessibility.
- Teach theory by detailing phenomena and practical problems related to the theory.
- Balance conceptual with concrete information.
- Use a variety of sketches, plots, schematics, computer graphics, and physical demonstrations in addition to oral and written explanations in lectures and handouts.
- Provide time for participants to reflect upon the material being presented.
- Encourage active participation.

Vary your presentation methods and individualize your strategies. Address the three types of learning—attitude, skills, and knowledge. To address “attitudes” toward students with disabilities, consider having a panel of successful college students and graduates with disabilities share their experiences. To address “skills,” you could have participants role-play lectures using a sign-language interpreter while facing the audience.

Lastly, encourage use of different intelligences. Knowledge can be gained when information is given through multiple means including lectures, handouts, videotapes, analyzing case studies, sharing of personal experiences, and discussion. Logical-mathematical and linguistic intelligences are heavily used in traditional academic settings and responsible for high scores in academic achievement tests. It is reasonable to expect faculty and administrators to heavily rely upon these types of intelligence.



Conclusion

Participants will use multiple types of learning processes during your presentation. When you use different modes of presentation (e.g., lecture, case study analysis, role playing, and discussion) and encourage active participation, you will more effectively facilitate optimal learning.



Research Question

What do we know about universal design of instruction that can guide the design and delivery of professional development for faculty and administrators regarding the equal access of students with disabilities to their courses and programs?

Overview of Research

The term “universal design” refers to the practice of designing and delivering products and services that are usable by people with the widest range of functional capabilities. Universal design is defined by the Center for Universal Design at North Carolina State University as “the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design” (<http://www.design.ncsu.edu/cud/ud/ud.html>). It is desirable that products and services are directly usable without requiring additional assistive technologies. If this is not possible, then they should be made more usable with commonly used assistive technologies.

The field of universal design can provide a framework for developing instruction to maximize the learning of all students, including multi-ethnic students, students with disabilities, and students for whom English is not their first language (Bowe, 2000). Faculty members “can apply this body of knowledge to create courses where lectures, discussions, visual aids, videotapes, printed materials, labs, and fieldwork are accessible to all students” (Burgstahler, 2000). Those presenting professional development programs can apply these principles to maximize the learning of the participants and to model universal design principles that participants can apply in their own instruction.

With the goal of providing guidance in the design of environments, communications, and products, a group of architects, product designers, engineers, and environmental design researchers collaborated to establish seven principles of universal design. They are as follows.

Equitable Use

The design is useful and marketable to people with diverse abilities.

- Provide the same means of use for all users: identical whenever possible; equivalent when not.
- Avoid segregating or stigmatizing any users.
- Make provisions for privacy, security, and safety equally available to all users.
- Make the design appealing to all users.

Flexibility in Use

The design accommodates a wide range of individual preferences and abilities.

- Provide choices in methods of use.
- Accommodate right- and left-handed access and use.
- Facilitate the user’s accuracy and precision.
- Adapt to the user’s pace.

Simple and Intuitive Use

Use of the design is easy to understand, regardless of the user’s experience, knowledge, language skills, or current concentration level.

- Eliminate unnecessary complexity.
- Be consistent with user expectations and intuition.
- Accommodate a wide range of literacy and language skills.
- Arrange information consistent with its importance.
- Provide effective prompting and feedback during and after task completion.



Perceptible Information

The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

- Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.
- Maximize legibility of essential information.
- Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).
- Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

Tolerance for Error

The design minimizes hazards and the adverse consequences of accidental or unintended action.

- Arrange elements to minimize hazards and errors.
- Provide warnings of hazards and errors.

Low Physical Effort

The design can be used efficiently and comfortably, and with a minimum of fatigue.

- Allow user to maintain a neutral body position.
- Use reasonable operating sources.
- Minimize repetitive actions.
- Minimize sustained physical effort.

Size and Space for Approach and Use

Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

- Provide a clear line of sight to important elements for any seated or standing user.
- Create easy reach to all components, comfortable for any seated or standing user.

- Accommodate variations in hand and grip size.
- Provide adequate space for the use of assistive devices or personal assistance (Bowe, 2000, pp. 23-62).

When designers apply universal design principles, their products and programs meet the needs of potential users with a wide variety of characteristics. Disability is just one of many characteristics that an individual might possess; others to consider in design of products, information, and services are age, gender, professional position, reading level, learning style, and socio-economic status.

When universal design principles are applied to teaching, an inclusive and equitable learning environment is created. Applying universal design concepts in course planning will assure full access to the content for most students and minimize the need for specific accommodations (Burgstahler, 2000).

Implications for Practice

Universal design principles in education can apply directly to lectures, classroom discussions, group work, handouts, Web-based instruction, labs, fieldwork, and other academic activities. Consider the following examples that faculty may apply to curricula (Burgstahler, 2000).

Inclusiveness

Create a learning environment that respects and values diversity. Put a statement on your syllabus inviting students to meet with you to discuss disability-related accommodations and other special learning needs. Avoid segregating or stigmatizing any student.



Physical Access

Assure that classrooms, labs, and fieldwork are accessible to individuals with a range of physical abilities and disabilities. Make sure equipment and activities minimize sustained physical effort, provide options for operation, and accommodate right- and left-handed students as well as those with limited physical abilities. Assure the safety of all students.

Delivery Methods

Alternate delivery methods, including lecture, discussion, hands-on activities, Internet-based interaction, and fieldwork. Make sure each is accessible to students with a wide range of abilities, disabilities, interests, and previous experience. Face the class and speak clearly in an environment that is comfortable and free from distractions. Provide printed materials that summarize content delivered orally.

Information Access

Use captioned videotapes. Provide printed materials in electronic format. Provide text descriptions of graphics presented on Web pages. Provide printed materials early to allow students to prepare for the topic to be presented. Create printed and Web-based materials in simple, easy-to-use, and consistent formats. Arrange content in order of importance.

Interaction

Encourage different ways for students to interact with each other and with you. These methods may include in-class questions and discussion, group work, and Internet-based communications. Strive to make them accessible to everyone, without accommodation.



Feedback

Provide effective prompting during an activity and feedback after the assignment is complete.

Demonstration of Knowledge

Provide multiple ways for students to demonstrate knowledge. For example, besides traditional tests and papers, consider group work, demonstrations, portfolios, and presentations as options for demonstrating knowledge.

When creating a presentation for faculty and administrators, universal design principles can be employed to make it an inclusive learning environment. For example, make the content simple, easy to understand, and easy to apply. Participants in your presentation should leave with a clear idea of what they need to do and where they can go for help. Make your presentation flexible; be willing to adjust to the needs and interests of your participants.

Customize your training options for specific audiences. Provide alternatives such as short and long presentations, interactive Internet-based instruction, printed materials, and Web-based resources.



Use videotapes with captioning. Demonstrate how you can verbalize the content of PowerPoint™ slides and overhead transparencies and verbally describe graphs and cartoons so that they are accessible to people who cannot see. Show alternative ways to operate a computer and/or access a Web site (e.g., speech input, speech output, alternative input devices).

Conclusion

Applying universal design principles in your presentation not only meets the accessibility needs for those attending, but also models for postsecondary faculty how accessible teaching can be delivered. Universal design of instruction in college courses maximizes the learning of all students and minimizes the need to provide individual accommodations for students with disabilities.



Research Questions

- What do we know about systemic change that can guide the design and implementation of professional development for faculty and administrators regarding the equal access for students with disabilities in their courses and programs?
- What do we know about sustaining faculty and administrator development activities for supporting students with disabilities?

Overview of Research

It has been said that you cannot change one thing without changing the whole thing (Price Waterhouse, 1995). If you redesign processes or change requirements on a college campus, you can expect that you will also need to change job descriptions, systems, and technologies and then train people to support them.

The participation of students with diverse abilities and disabilities has created the impetus and necessity to change some of the traditional structures and procedures of colleges and universities. Postsecondary institutional experiences in promoting diversity related to gender, ethnicity, race, and socioeconomic status have taught us that change does not occur quickly and without conflict. Creating a more inclusive environment for students with disabilities often requires system-wide, sustainable change. Successful change efforts are more often gradual than radical.

Although there is typically resistance to change, change is central to college and university cultures (Andresen, 1991). New laws, demographics, technologies, and educational theories and goals are part of their realities (Englert & Tarrant, 1995).

Competing theories about systemic change abound. However, success in implementing change is often more related to a specific context than to a general theory (Wilson, 1992). "The argument has been largely against skill-based approaches, ready-made models of good organizational practice, and reliance upon analyzing change as primarily the outcome-oriented pursuit of great and charismatic individuals. The arguments have, rather, favored the potency of organizational structures, of economic determinism, and of institutionalization within which the manager must operate" (Wilson, 1992, p. 122).

Change can be viewed from three perspectives: the reason for change, the process of change, and the content of change (Levy & Merry, 1986). First we will consider the reasons to change and then the process of change.

External and Internal Forces

Postsecondary institutions experience pressure to change from both external and internal sources (Yee, 1998). As change in the external environment accelerates, institutions must respond to these changes in order to thrive (Kozeracki, 1998). For example, one of the external factors promoting change is the worldwide transformation of the economy to a knowledge- and information-based system. The development of new technologies has caused faculty to re-examine the content and delivery of instruction (Travis, 1995). The incorporation of new computer electronic and information technologies over recent years provides an example of how rapidly new products and behaviors can be assimilated into campus life. Not long ago, cellular phones, fax machines, and e-mail were considered futuristic. Technology creates opportunities for



students with disabilities to access education in innovative ways. For example, students who are blind and use speech output systems can participate in standard Internet-based distance education courses as long as these courses are designed so that they are accessible using this technology. Technology also may provide access to students who cannot take courses because of schedule conflicts or geographic location. O'Banion (1997) proposes that an improved "learning college" may build its foundation on technology because technology is "ism-free" (e.g., racism, sexism, ageism). Some faculty members welcome these changes; some resist. Nevertheless, technology plays a significant role in systemic change.

Legislative and funding issues can also force institutions to change. For example, Section 504 of the Rehabilitation Act, the Americans with Disabilities Act, and state legislation require that institutions provide reasonable accommodations for qualified students with disabilities in programs and services. Due in part to such legislation, increasing numbers of students with disabilities are gaining access to programs, placing further pressure on institutions to become more inclusive.

Differences in the economy, government relations, and the demographics of the student body (e.g., more immigrants, high school dropouts, returning and displaced workers, welfare participants, and workers in need of skill upgrading) require responses from postsecondary institutions (Levin, 1998). Today's student body is diverse with respect to age, gender, ethnic and racial background, disability, and part-time student status (Yee, 1998). Changing populations call for increased multicultural awareness (Harris & Kayes, 1995; Rendon & Hope, 1996). Stereotyping, social isolation, and alienation are experienced by women,

students with disabilities, and adult learners as well as by students of ethnic diversity (Smith, 1989). Close to 6% of people in postsecondary programs have an identified disability (Horn & Berktold, 1999). The cumulative result is a demand for institutions to create more inclusive learning environments that are socially and culturally responsive. The way "tech-prep" and school-to-work movements have stimulated faculty to collaborate with high school staff and to incorporate more career-related skill-building into the curricula provides an example of how systemic change can occur as a result of external forces (Horan, 1995).

Forces internal to the institution can also promote or retard change. Academic values and attitudes about diversity can motivate faculty members and administrators to advocate for educational equity. Seeing students with disabilities as a minority group with civil rights to education instead of as a needy population deserving of charity has dramatically changed the service provision for students with disabilities in recent years (Oliver & Barnes, 1998; Shapiro, 1993). Diverse perspectives within organizations promotes sensitivity to pluralism.

Process of Change

A growing body of research reflects the importance of student involvement in an institution's change process. Over an extended period of time, students can help identify and prioritize problems and suggest potential solutions.

Frank and Rocks' (1996) model for effective transition and change involves conceptualization of the change parts, active reflection, and commitment. It requires engagement of leadership personnel and management of the systems undergoing change.



Institutions that are successful in integrating diverse groups of students tend to:

- focus on student success and provide tools for success,
- enhance coordination and articulation with other educational levels,
- dedicate resources to fostering acceptance,
- have access to good information on the institution and students, and
- have leaders in the faculty and administration who provide direction for these efforts.

Some postsecondary educators have responded to student diversity by modifying the organizational culture, infusing multicultural education into the curriculum, reflecting a diversity in values and norms in organizational policies and practices, and creating campus-wide action committees (Guy, Reiff, & Oliver, 1998; Harris & Kayes, 1995; Levy & Merry, 1986).

However, a fundamental and continuing conflict exists between diversity and quality in postsecondary education. Faculty may need to reform their understanding of academic quality and then modify standards, performance criteria, and assessment tools (Smith, 1989). Infusing multicultural education at an organizational level requires simultaneous changes in the organization's values and culture (Guy, et al., 1998). Strategies include the following.

- Build a powerful case for change. You can assume that people are not prepared for change and that you must convince them, using consensus building and

education, that change is both appropriate and needed. Practical and immediate action steps are most helpful to share in training sessions.

- Let the customer drive change. In postsecondary institutions, customers include both the students with disabilities attending programs and the faculty and staff delivering and supporting them.

Keep in mind that faculty members may be more open to new ideas when they are actively involved in the process (Kuveke, 1996). College faculty and staff at one school which had clear and open communication as the basis of their change process, effectively implemented change. "Inherent was a mutual respect for the other's background and talents, plus a genuine perception of their equality" (Hord, 1986, p. 22).

Faculty and administrators can benefit from keeping four questions in mind when starting change efforts (Bruce & Wyman, 1998):

- Who are the people involved in the change?
- What are the organization's abilities and resources?
- What is the climate for change?
- What are the mandates/objectives of the organization?

In order for systemic change to take place, there must be adequate motivation from the institution as well as a supportive social and cultural climate. Although faculty may be motivated to learn new skills and knowledge that will enhance student learning, a competing motivation may be to maintain their existing standards and methods of



teaching. They need practical examples of the benefits of change. Sometimes it is effective to apply the power of peer example by sharing the experiences of other faculty (Svinicki, 1996).

Supporting the process of change involves providing student and staff development opportunities and ensuring that policies support access to all postsecondary education programs and coursework for all qualified students. The content of professional development should include examples of academic accommodations for students with disabilities, legal issues, and campus resources. Emphasis should be placed on the importance of student involvement in the process and the relationship between the student and his instructors (Levy & Merry, 1986).

Change efforts should be multi-dimensional and system-wide. Transformation of the institution into a system that supports diversity means addressing a number of issues including faculty and staff diversity; institutional mission and values; diversity education; the quality of interaction between students, faculty, and the administration; and the perceived conflict between quality and diversity (Townsend & Twombly, 1998). Institutional changes should be reflected in policies, procedures, and job assignments to assure that if one person leaves a position, the program of change will not collapse abruptly.

Implications for Practice

To make improvements in teaching students with disabilities on a postsecondary campus, provide faculty and administrator professional development, assure that students are aware of resources, and provide adequate systems for students with disabilities and staff to access resources. The

content of professional development should include information about accommodations, rights and responsibilities, and campus resources.

When implementing systemic change, make efforts to consider the capabilities and limits of the institution and educators and encourage gradual, sustained changes that involve all parties and resources in the change process. For instance, annual departmental mini-in-services, new faculty and teaching assistant orientations, and mailings regarding universal design of instruction and accommodations for students with disabilities support systemic change more than a large one-time event.

Give students and faculty members an active role in designing and implementing changes since they have vested interests in the outcomes. Encourage reflective and solution-oriented communication. Solicit collaborative input from all stakeholders regarding materials, decisions, and publicity. Lasting improvements are more likely to occur when those who have a stake in the change are instrumental in making the changes.

Conclusion

In postsecondary institutions, long-lasting positive changes supporting equal access to academic learning requires systemic (institutional) change rather than isolated actions of individuals. Collaborative efforts of faculty, administrators, staff, and students should work toward the goal of educational equity.



A literature review was conducted to guide the selection of content and presentation modes for professional development for postsecondary faculty and administrators. The following paragraphs describe how research and theory can be applied as you implement a training program on your campus.

Professional Development: Need, Content and Methods

People with disabilities are less successful in college and careers than their non-disabled peers. Faculty members play a key role in the success of all of their students, yet have little knowledge regarding the inclusion of students with disabilities in their courses. They need to know more about legal issues, accommodation strategies, and resources. They have a special interest in learning to work with students who have learning and psychiatric disabilities. Their demanding schedules and diversity in interests and needs for information suggest that multiple modes of delivery should be offered, including short on-site presentations, programs tailored to specific audiences, short publications, and Internet-based resources.

Adult Learning

Faculty and administrators have a wealth of knowledge and experiences in their fields, but they may have little knowledge about the academic needs of students with disabilities and may have misconceptions about their abilities. Approaches that can maximize their motivation to learn and the likelihood that learning will be retained, include inviting them to share their experiences, to participate in learning activities, to self-direct their learning, and to discuss relevant cases.

Learning Styles

Most individuals have preferred styles of learning that relate to how they receive, process, and integrate information. Some individuals learn better through listening, some through reading or watching, and still others by doing. A commonly used classification of learning styles is auditory, visual, tactile, and kinesthetic. Styles of learning may also be characterized by how individuals best learn from experiences—they're either convergers, divergers, assimilators, or accommodators. In order to support all learning styles, presenters must use a variety of teaching strategies, verbal discussion, visuals, demonstration, and active experiences. Incorporating case studies and practical real-life situations for problem-solving can address all learning styles and promote optimal learning.

Types of Learning

Domains of learning include cognitive, psychomotor, and affective. In the cognitive domain, skills include knowledge, comprehension, application, analysis, and synthesis of information. Learning may also be viewed within the categories of knowledge and skill. Types of intelligence can be classified as logical-mathematical, linguistic, spatial, musical, kinesthetic, interpersonal, and intrapersonal. Since different teaching techniques are best used for different types of learning, analyze the learning that you want to occur and select an appropriate strategy to engage all learners. Consider the participants' existing attitudes, knowledge, and skills, and how they can best acquire the knowledge and skill to do their job more effectively. Vary presentation methods and individualize strategies to meet a variety of learning needs.



Universal Design of Instruction

Consider the wide variety of characteristics of presentation participants. They may vary in race, ethnicity, gender, socio-economic status, academic specialty, native language, and abilities and disabilities. To maximize the learning of all participants, respect diversity; ensure physical access for all people; and use a variety of delivery methods, such as lecture, small and large group discussion, case study, hands-on activities, Internet-based interaction, labs, and fieldwork; provide full access to information by using captioned videos, printed materials in electronic format, and accessible on-line information; offer effective and prompt feedback; and allow multiple means for participants to demonstrate competency. Modeling universal design approaches as you train faculty and administrators will encourage them to incorporate this approach in their own teaching. Universal design of instruction maximizes the learning of all students, and reduces the need for individual accommodations.

Systemic Change

Both internal and external forces can pressure postsecondary institutions to be more inclusive of students with disabilities. External forces of change include a global, technological, and information-based economy; legislation; and societal pressure toward a pluralistic society with equity for underrepresented groups. Internal forces include pressure from students with diverse characteristics (e.g., age, gender, ethnicity, culture, disability, part time status) and faculty who seek a more inclusive environment. Systemic change occurs when change is transformational and long lasting. This type of change occurs not with one, or even a few individuals, but reflects the entire

organization or system. Transformational change is more likely to occur when a powerful case is made for change, there is high-level support, and all stakeholders are involved in the decision-making process. To create a campus environment that provides equal educational opportunities for all students, including those with disabilities, it is important that administrators develop policies and procedures be developed in collaboration with faculty, student service providers, and students with disabilities.

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This section shares strategies for implementing faculty and administrator training for the purpose of creating academic programs and services that are accessible to all students. Ideas for promoting systemic change, as well as how to measure change and impact are included.

Introduction

Creating a climate that fosters equal access for students with disabilities may require systemic change on your campus. How to best institutionalize change depends on the characteristics of your school. Consider the size of the organization, programs offered, resources available, administrative structure, current availability of training and support for faculty and administrators, and mechanisms to monitor compliance. Review the policies in place that pertain to accessibility and how well they are articulated and enforced.

As you work toward making your campus more accessible, regularly remind yourself of the importance of your work. Human rights and quality of life issues are at stake. Your efforts can result in greater academic and career success for the students you serve even if changes are small and slow in coming. Keep your ultimate goal in mind and persist in reaching it.

No single solution will apply to all campuses. However, you can learn from the experiences of others. Included in this section are general guidelines, promising practices, and successful experiences from two-year and four-year postsecondary institutions nationwide. This advice is given by faculty and staff from institutions of higher education who are part of the *DO-IT Prof* team. The strategies are organized into six areas: needs assessment, teamwork,

administrative support, professional development, promotion, and evaluation. For details about a specific example, contact the appropriate *DO-IT Prof* team member listed in the *Acknowledgments* section at the beginning of this notebook.

Needs Assessment

Conduct a needs assessment. Administer surveys and/or conduct focus groups with students, administrators, and faculty members to determine problems and identify solutions regarding equal access to campus programs. A needs assessment can help you share knowledge, prioritize issues, develop goals, and brainstorm strategies. Faculty members can share their experiences and needs for resources and training. Administrators can provide insight into current policies and possible barriers to implementing change. Students can share their personal experiences and observations regarding gaps in support on your campus.

Following are examples of needs assessments conducted by institutions across the country.

Example: Focus Groups

Through the *DO-IT Prof* project, focus groups of faculty members, teaching assistants, staff members, and students with disabilities were conducted on eighteen campuses. The focus groups with faculty and staff examined their experiences working with students with disabilities, their knowledge and level of satisfaction with campus services, and their ideas about effective professional development methods and content. Students shared their experiences on campus and made recommendations for the delivery of professional development to faculty (Burgstahler, Duclos, &



Turcotte, 1999; Burgstahler & Doe, 2002). Focus group results guided the creation of the content and format of the faculty development materials described in this publication and available in *The Faculty Room* at <http://www.washington.edu/doi/Faculty/>.

Example: Focus Groups

Some campuses conducted focus groups with students without disabilities to gain insights into how the academic climate can be more inclusive for all students, including those with disabilities.

Example: Survey of Staff

The University of Kentucky conducted an on-line survey of university academic administrators, instructors, and auxiliary service personnel to assess activities, practices, and resources.

Example: Survey of Faculty

Some campuses designed their professional development program after determining faculty knowledge and interests through a campus-wide printed survey.

Example: Meetings

Some disability support staff met with groups of faculty, administrators, and/or students from a specific department to learn about needs, experiences, and problems unique to that department. In order to solicit the most honest responses, the three groups—faculty, administrators, and students with disabilities—met separately. Actions were taken in response to the needs identified.

Example: Response to Needs Identified by Students

At the University of Minnesota-Duluth students found that the only accessible path to a music classroom and practice hall located on the basement level required the use of a freight elevator. The pathway to the

classroom also required going through a performance theater, a dark hallway to the elevator, storage space, and another poorly lit area. With cooperation from the theater department, the storage space was cleared and a path through the area was created. Working with facilities management, the lighting and door pulls were improved. Staff of the music department instituted a practice to “walk” the accessible path to class each day to ensure that lights were on and pathways unblocked. While these temporary measures were instituted, students sought and received approval from the Chancellor to fund a passenger elevator that made the entire building more accessible.

Teamwork

Know your organization and stakeholders. Who are the leaders and policy makers on your campus? Who are other stakeholders? How can stakeholders become involved in activities and/or in advisory capacities? Who is (or should be) involved in the stages of planning disability-related awareness activities, training, support, policy and procedure development, implementation, compliance, and evaluation? How does policy get formed? Where does funding come from; who decides what it is used for? What are the barriers to change? Who promotes change? Who implements change?

Include all stakeholders in developing campus and departmental action plans for improving the instructional climate and accessibility for students with disabilities. Consider the following as potential stakeholders on your campus when it comes to making facilities, programs, and services accessible to students with disabilities:

- students
- faculty



- administrators
- academic departments
- administrative units

It is easier to garner resources, face opposition, and maintain your enthusiasm and direction as part of a group. Look for allies everywhere. Some may be found in these places:

- disability services office
- faculty and staff development or training centers
- ADA compliance offices
- equity and diversity committees
- computing services
- teaching assistant organizations
- physical plant or facilities units
- disability services offices on nearby campuses
- community and governmental service providers
- disabled student organizations

Organize yourselves into a team. Put together a committee to design and implement professional development for faculty and administrators that will result in a more inclusive campus. Not only is there strength in numbers, but more partners and coalitions result in more ideas and more resources to implement plans. Work together as a team to consider and tailor the suggestions in this publication to the unique needs of your campus.

Example: ADA Task Force

When the Americans with Disabilities Act of 1990 (ADA) was passed, the University of Minnesota-Duluth (UMD) developed an ADA Task Force to ensure that UMD was in compliance. The Access Center (which provides disability-related services) worked with the Chancellor to identify a core group of people to assess the needs of the campus.

When the initial assessment of the ADA Task Force was complete, the value of supporting ongoing assessment and recommendations was recognized by both staff and students. Task force members now represent all units on campus from collegiate units and facilities management to students, information technology, and housing. Representatives are appointed by heads of departments. Access Center staff are ex-official members. The task force continues to identify and resolve access issues on campus.



Administrative Support

Garner support from faculty, departments, and service units campus-wide; create linkages and collaborations. Ensure that campus recruiters, admissions staff, financial aid, personnel, staff associations, academic counselors, computer labs, and other campus units are knowledgeable about campus resources available to faculty and to students with disabilities. Let student support units and student organizations know of services. Suggest ways they can contribute to your efforts. Ask to be included on regular meeting agendas. Inform these groups about legal issues, accommodation strategies, and campus resources. Meet with departmental and campus administrators to elicit suggestions regarding how to best reach tenured faculty, new faculty, teaching assistants, and part-time instructors.



Gain the attention and support of the administration. Let key administrators know about campus needs and your efforts and accomplishments. Encourage the administration to distribute written notices across campus that describe the policies, guidelines, and practices that enhance access and the education of students with disabilities.

Example: Evaluating Policies and Procedures

Southwest Missouri State University Disability Services carefully evaluated their system-wide policies and procedures regarding disability and discovered many inconsistencies. They began the process of working with Student Affairs, Academic Affairs, Administrative Services, and the President to streamline the university policies on disability. From these discussions, a few significant things happened:

- They gained tremendous support from upper administration for the disability support program. Once many of these individuals saw the positive impact and student numbers, they were open to looking at training programs and additional supports for faculty and staff.
- They rewrote their statement of commitment to students with disabilities and to diversity as a whole. Once again, this forced administrators to revisit related issues.
- Campus catalogs, departmental statements, and other campus publications were modified to include the new statement of commitment to students with disabilities.

Example: Web Publishing Policy

The University of Wisconsin-Madison developed a policy governing Web accessibility (<http://www.wisc.edu/wiscinfo/policy/>

www.wisc.edu/wiscinfo/policy/). The purpose of the UW-Madison policy is to ensure that individuals with disabilities have access to the increasing amount of Web-based material originating on campus. As part of the strategy to implement the policy, informative letters were sent to all faculty and staff by the Vice Chancellor for Legal and Executive Affairs and the University's Americans with Disabilities Act Coordinator.

Example: Funding and Cooperation

At the University of Minnesota-Duluth the Director of Information Technology Systems and Services (ITSS) sets aside a portion of the budget to ensure that computers and computer labs are accessible to students with disabilities. One staff person from the Access Center works with a representative from ITSS to plan for and purchase necessary adaptive software and hardware based on student needs. The director has found that much of the accessible software and hardware is beneficial to other students on campus. Screen enlargement software, for example, has helped many students avoid eye strain when working on computers. Following the model set up by ITSS, other departments are working with the Access Center to project funding requirements to assure accessibility.

Example: Securing Campus Support

Some campuses use the process of developing a campus policy and/or drafting materials to be distributed as a strategy for working with administrators without scaring them away by stressing meeting attendance.

Example: Departmental Support

The University of Wisconsin-Madison formed a partnership with Macromedia to develop accessible multi-media, specifically Flash™. Several department representatives have collaborated in this project which they will ultimately showcase nationwide



through the New Media Center Consortia. This same university group, "E-curb Cuts," has identified training needs for Web developers to retrofit inaccessible Web pages. The training was piloted with Web developers who support instructional Web pages. It is available for campus computer support staff using a "train-the-trainer" model. The trained support staff train others within their colleges, schools, and departments.

Example: Policy Development

The Educational Policy Committee (EPC) at the University of Minnesota-Duluth was established by the Chancellor to set academic policy. As one of their accomplishments, they developed a policy that listed the essential components for all syllabi on campus. The Access Center worked with the EPC to include a statement in the policy regarding academic accommodations for students with disabilities.

Example: Sharing Accomplishments with Administrators

The *DO-IT Prof* project director drafted a letter that was tailored to specific campuses and mailed to key administrators selected by team members. The letter emphasized that their selection as a member of the *DO-IT Prof* team recognized their knowledge, experience, mission, accomplishments, and motivation to address the issue of helping faculty more fully include students with disabilities in their classes. The importance of the project was also emphasized. Several administrators who received letters contacted the *DO-IT Prof* team member with supportive comments such as:

"Congratulations on being chosen as a member of the *DO-IT Prof* team sponsored by the folks at U-Washington Seattle. Great to be included!! As this moves further along, please see that you get on the cabinet

agenda to update the cabinet on what the program is up to and our contributions to it. As you know, the chancellor signed the letter to the President (of the United States) indicating that UW-Madison was supportive of his initiatives to provide more accessibility— and that as a university we did work in that direction. This is another way that we can demonstrate that work. Thanks."

Example: Campus Support

On some campuses, written notices are distributed yearly through the president's or provost's office. These notices describe the institution's commitment to diversity, including the full inclusion of students with disabilities in all programs and services. Opportunities for faculty training sessions to help them more effectively incorporate diversity topics into their courses are also announced.

Example: President's Support

The presidents of universities nationwide signed a letter to President Clinton, "Twenty-five Universities Pledge to Increase Research in Computing for the Disabled," which appeared in *The Chronicle of Higher Education* (<http://chronicle.com/>), on October 6, 2000.

Example: Shared Responsibility

At the University of Wisconsin-Madison the Faculty Senate affirmed that the accommodation of qualified students with disabilities in instructional programs is a shared faculty and student responsibility. To this end, each department has appointed an Access and Accommodation Resource Coordinator to help faculty, staff, and students address issues of access and accommodation in instructional settings (<http://www.wisc.edu/adac/aarc2.htm>). Collaborative disability-related awareness and training events are



coordinated through these department representatives on a regular basis.



Professional Development for Faculty and Administrators

Find out how your campus faculty members and administrators organize (e.g., unions, departments, senates) and arrange to be placed on meeting agendas. Let them know about your goals and activities in creating programs that are accessible to all students as well as how their organization can help. Meet with groups regularly to discuss issues and activities.

Format faculty and administrator professional development offerings to match the customs, organizational structure, and climate of your campus. Some institutions are well served by presentations at regular division or department meetings where the expectation is that all faculty members will attend. This approach brings faculty development regarding disability issues to a broad audience and requires a minimum amount of coordination on the part of the presenter.

Offer presentations and training tailored to specific audiences. Provide many options for faculty and teaching assistants to learn how to fully include students with disabilities in their classes. Options include:

- short orientations to legal issues, accommodation strategies, and campus resources at departmental faculty meetings.
- tailored presentations to address issues of special importance to a specific group.
- comprehensive workshops offered through centralized staff training programs.
- accessibility modules integrated into mainstream training sessions (e.g., accessibility guidelines incorporated into Web page development classes; universal design strategies integrated into instructional strategy presentations).
- resources tailored to faculty and administrators available on the World Wide Web.
- instructional videotapes presented on cable television.
- distance learning training options provided on the Internet.
- a short publication mailed periodically to faculty and administrators that highlights legal issues, accommodation strategies, and campus resources.

Example: Integrate Accessibility into Web Training

Many campuses offer workshops to faculty and staff on the development of Web pages. Some include a section on accessibility in each of the courses. The videotape and handout, *World Wide Access: Accessible Web Design*, included in this notebook can be used for this purpose.



Example: Computer Staff Training

On some campuses, staff who are knowledgeable about accessibility work with the staff at computer labs and support centers to assure that their facilities, software, Web sites, and hardware are accessible to students with disabilities. In addition, they make sure staff know what resources are available when special needs arise. Several videotapes and handouts included in this handbook can be used in this training. They include:

- *Working Together: Faculty and Students with Disabilities.*
- *Building the Team: Faculty, Staff, and Students Working Together.*
- *Real Connections: Making Distance Learning Accessible to Everyone.*
- *Computer Access: In Our Own Words.*
- *World Wide Access: Accessible Web Design.*
- *Working Together: People with Disabilities and Computer Technology.*
- *Equal Access: Computer Labs.*
- *Working Together: Science Teachers and Students with Disabilities.*
- *Working Together: Computers and People with Learning Disabilities.*
- *Working Together: Computers and People with Sensory Impairments.*
- *Working Together: Computers and People with Mobility Impairments.*
- *Opening Doors: Mentoring on the Internet.*

Example: Faculty and Staff Training

The Administrative Council at Southwest Missouri State University passed a mandatory six-hour training session for all faculty and staff regarding sexual harassment, diversity (including disability), and effective communication. A full-time trainer was hired to coordinate this effort.

Example: Orientation for New Faculty and Staff

The administration of Seattle Central Community College in Washington State requires new employees to attend a full-day orientation that includes a brief presentation by the Disability Support Services Office on the ADA and accommodation issues. Similar practices are implemented on many other campuses around the nation.

Example: Administrator Training

Some campuses provide disability awareness training for department heads. Sessions include legal issues, accommodation strategies, and campus resources. These trainings offer materials and speakers to deliver faculty training. Presenters provide suggestions for developing plans and institutionalizing practices in their departments.

Example: Academic Advisor Training

Southwest Missouri State University has a Master Advisor program to train campus advisors. Disability services staff deliver a presentation and participate in this one and a half-day training session.

Example: Training for Multiple Audiences

A two-credit course entitled "Issues in Group Leadership" was offered at the University of Rochester. Several sessions were devoted to disability awareness and strategies for improving access to cooperative learning groups for those with disabilities. Students in this course were undergraduate and graduate teaching assistants. A secondary audience included faculty members who were team-teaching the course. These instructors came from biology, biochemistry, computer science, and physics departments. The textbook for this workshop leader training course included a short chapter entitled "Students with Disabilities and the Workshop."



Example: Printed Resources

Campuses nationwide have sent printed copies of the brochure entitled *Working Together: Faculty and Students with Disabilities* (<http://www.washington.edu/doit/Brochures/Academics/teachers.html>) to faculty and instructional staff. This brochure can also be used at presentations for specific academic departments. The back panel includes space for tailoring the brochure to include campus resources. A template for this short handout is included in the back pouch of this notebook.

Example: Survey Faculty and Staff

A four-year college *DO-IT Prof* team member worked with her partner school, a community college, to put together a training session for the community college faculty and staff. All faculty and staff were required to attend. A questionnaire was sent out ahead of time to identify issues of concern, and these issues were addressed during the training.

Example: Publicize Accomplishments

Some organizations identify local papers, radio stations, and television channels and then send press releases that showcase their efforts to make their campuses more accessible to people with disabilities.

Example: Outreach to New Faculty

Some disability students service offices insert brochures in packets that are given to new faculty members and teaching assistants and deliver presentations at orientations for new faculty and teaching assistants.

Example: New Faculty Luncheon

The ADA Task Force at the University of Minnesota-Duluth invites new faculty to a luncheon at the beginning of the year to become acquainted with the Task Force

members and learn more about academic accommodations for students with disabilities on campus.

Example: Distribute Current Information

Every two years at the University of Washington, all faculty and administrators are sent the brochure *Working Together: Faculty and Students with Disabilities* (<http://www.washington.edu/doit/Brochures/Academics/teachers.html>), which summarizes legal issues, accommodation strategies, and campus resources.

Example: One-to-One Training

Providing individualized assistance to faculty and staff regarding questions on providing accommodations to students with disabilities (on an as-needed basis) has been proven to be very effective on many campuses. Sometimes, this one-to-one assistance is provided by faculty mentors who have received in-depth "train-the-trainer" instruction.



Training for Students

Consider ways to get disability-related topics into course offerings on your campus. Determine how new programs and courses are started at your school (e.g., gerontology, women's studies, ethnic studies) and work toward getting a course or program on



disability studies on your campus. Alternatively, locate existing courses on education, engineering, diversity, computing, or other topics where disability issues should be included but are not. Meet with instructors and offer suggestions, videotapes, printed publications, and speakers to help them integrate this topic into existing classes.

Example: Learning from One Another

Disabled student support staff at the University of Rochester were asked to provide a general disability awareness session for senior biomedical engineering students who were completing projects for children and adults with disabilities (e.g., designing a new tie-down system for wheelchair transportation). The primary audience for this presentation was the group of seniors, but an important secondary audience was the biomedical engineering faculty. One engineering faculty member sent the following e-mail to his students after a discussion about appropriate terminology for people with disabilities (e.g., “people” words first, disability words second): “I have updated the BME 392 Web pages to include links to the sites recommended by [speakers], and several that I have found. If you find particular sites that you think we should all know about, please let me know and I’ll try to get them on the page (or start a new page of Useful Links). I will keep you notified of further changes to the course page.”

Example: Disability-Related Engineering Project

The University of Washington DO-IT director gave advice to mechanical engineering students whose project was to design a fishing pole for someone with a mobility impairment. She shared several case studies of young people with disabilities who might want to go fishing. The students made their inventions usable by the people featured in the case studies.

Example: Teaching Assistants

Some *DO-IT Prof* team members work with teaching assistant (TA) training programs to ensure that a component on accessibility for students with disabilities is included. Various *DO-IT Prof* videotapes, brochures, and curriculum components included in this notebook can be easily used within TA training programs.

Example: Faculty Web Site

The Faculty Room, a resource-rich Web site (<http://www.washington.edu/doi/Faculty/>), is linked from many campus disability services and departmental Web sites to provide faculty with an overview of rights, responsibilities, and accommodation strategies as well as access to specialized instructional techniques.

Example: Summer Faculty Institutes

Some campuses provide summer institutes on various topics for faculty and administrators. A potential focus is working with students who have disabilities.

Example: Distribution List

Electronic distribution lists provide an excellent vehicle for sharing information, discussions, common concerns, and providing immediate feedback on ideas, opinions, or problems. Individual discussion groups can be set up for students with disabilities, departmental administrators, and faculty members.

Example: Disability Topics in Courses

Some disability advocates have helped instructors teach disability-related topics in existing courses. They offered videotapes, sample curricula, and handouts.

Example: Disability Studies Courses

At Southwestern State University, Disability Support Services, in conjunction with Aca-



demic Affairs, developed a senior capstone course called *Disability Issues in the 21st Century*, which deals with disability-related issues in society. All graduating seniors are required to take a capstone course. The course is offered each semester. At the University of Rochester, a disabilities studies project has been funded to develop courses in this area of study.

Example: Student Panels

The disability-related services staff at some postsecondary institutions regularly offers to bring a panel of students into classrooms to address disability issues. The panels have been well received by students and faculty alike. Students with disabilities who use Access Center services are recruited for these panels.

Example: Usability Testing

The University of Washington DO-IT program has developed a partnership with Microsoft and the departments of Technical Communication and Computer Science to incorporate accessibility testing into curricula, student projects, and research related to usability studies.

Promotion

Raise the visibility of campus disability support services. Create a publication and Web pages with procedures and services of the office that supports students with disabilities. Increase the number of disability-related presentations on campus. Work with your campus and community press to get the word out. Issue regular press releases about disability-related topics and events to campus newspapers. Make resources prominent on the campus World Wide Web home page. Develop the Web pages for the office of support services for students with disabilities to include a link to *The Faculty Room* at <http://www.washington.edu/doit/Faculty/>.

Encourage other campus departments to link to your site.

Example: Teaching Awards

Each year Seattle Central Community College nominates a faculty or staff member who has provided exceptional and creative accommodations to a student with a disability. Awardees share a traveling plaque engraved with their names on it. The award is presented at a Presidents' Day event where all faculty and staff are in attendance.

Example: Accessible Web Awards

Ohio State University gives awards to departments that produce the most accessible Web pages. Recipients are honored with plaques at a special reception.

Example: Marketing

At Southwest Missouri State University a marketing plan to promote disability awareness was developed with the help of the marketing department on campus. The plan included the following initiatives:

- Everything is centered around the theme "You Can," with a related logo.
- New faculty, staff, and student brochures and a new Web site were created.
- Signage was placed in each departmental office which included contact information for the support of students with disabilities.
- A display board utilizing the "You Can" theme was created and displayed at the New Student Festival, orientation sessions, and other activities.
- Departmental staff wore t-shirts with the "You Can" logo on numerous occasions.



- Staff purchased and distributed magnets, screen sweeps, and stress balls, all of which have the “You Can” logo.
- Staff are working with the organizational psychology department on campus to develop a high-energy 5 -7-minute “infomercial” about campus programs to support students with disabilities to show on the campus television station and in classes.

Example: On-Line Resources

University of Wisconsin-Madison’s Web site (http://www.wisc.edu/learntech/tech_access/index.htm) has been developed by the Division of Information Technology. These pages have become a major resource for the campus. In addition to campus policy resources, *DO-IT Prof* materials, frequently asked questions, examples of accessible Web pages, and on-line tutorials and resources are posted. A link is provided to *The Faculty Room* at <http://www.washington.edu/doit/Faculty>.

Example: Disability Awareness Day

The student group, “Access for All,” at the University of Minnesota-Duluth works with the Access Center to sponsor a yearly disability awareness program. Administrators, faculty, and students are invited. A bulletin board by the Learning and Resource Center also prominently displays disability-related information. The group is advised by a staff person from the Access Center.

Example: Model Web Page

The Access Center at the University of Minnesota-Duluth makes sure that its Web page is a model of accessible design. As other faculty and staff are learning to create accessible Web pages, the Access Center’s page is used as an example.

Create and promote disability-related events, and include people with disabilities in other events on campus. Bring music, dance, art, poetry, and speakers to your campus that celebrate and/or increase awareness of the wide range of abilities and disabilities in our society. Many campuses have funding for cultural events that increase awareness of under-represented groups; tap into these resources. Recruit speakers with disabilities to be part of regular campus programs. A presenter who happens to be blind sharing her research on climate trends as part of a campus lecture series may be more effective in changing attitudes about the capabilities of people with disabilities than a lecture on the topic.

Example: Disability-Related Events

Each semester, the University of Wisconsin-Madison holds an “Accessibility Series” as part of the Technology Accessibility Program. The series attracts faculty, administrators, and support staff. Follow-up resources are posted on a Web site. The Accessibility Series is a collaboration of several departments, including the Department of Learning Technology and Distance Education (LTDE), McBurney Disability Resource Center New Media Centers (NMC), Center for Biology Education (CBE), College of Letters and Science Learning Support Services (LSS), DoIT Media and Communications Technology (MCT), DoIT Platform and Operating Systems Technology (POST).

Example: Joint Campus Events

The University of Wisconsin-Madison and Madison Area Technical College jointly hosted a Spring collaborative “ADA Global Horizons Series,” which included a keynote speaker and focus on learning disabilities.



Example: Sports Events

The Access Center staff at the University of Minnesota-Duluth work with the Recreation Sports people on campus along with two nonprofit organizations, Courage Center and North County Independent Living, to sponsor a Disabled Sports Event. Teams and instructors for wheelchair basketball, wheelchair floor hockey, wheelchair rugby, and goal ball provide opportunities for people with and without disabilities to play. Plans are underway to create a sled hockey team and to sponsor a tennis tournament for participants with disabilities. The UMD student group, "Access for All," helps publicize these events.

Example: Interpreter Services

Some disability services offices work with campus drama departments to have at least one of each of their performances interpreted by sign language interpreters and to publicize these offerings in promotional materials.

Create electronic discussion lists to support dialog. Create a discussion list to develop awareness of legal issues, accommodation strategies, resources, or events. Each month start a new dialog (e.g., "Is your Web page accessible to people who are blind?"). Encourage staff from human resources, physical plant, admissions, disabled student services, and other campus services to join the list.

Example: Technology Issues Listserv

The University of Wisconsin-Madison, Division of Information Technology developed a discussion list to address a variety of technology issues. Accessibility issues quickly surfaced and generated lively discussions and information sharing.

Share expertise by presenting at conferences. Submit proposals to present at campus events and local, regional, and national conferences. *DO-IT Prof* videotapes, handouts and visuals included in this notebook can be used for your presentation.

Example: Conference Presentations

National conferences at which *DO-IT Prof* team members have presented include the Annual Conference on Distance Teaching and Learning (<http://www.uwex.edu/disted/conference/>), CSUN's conference on Assistive Technology, American Association of Higher Education and Disability (AAHE), National Association of Student Personnel Administrators (NASPA), American Association of Higher Education (AAHE), American Association of Community Colleges (AACCC), The Teaching in Higher Education (THE) Forum, and the American Society of Higher Education (ASHE). Examples of presentation titles include:

- Accessible Web Design.
- Making Distance Learning Courses Accessible to Everyone.
- Professional Development for Faculty on Including Students with Disabilities.
- Strategies for Making Programs Accessible.
- Accommodating Students with Learning Disabilities.
- Overview of Adaptive Technology for Students with Disabilities.
- Accommodating Students with Psychiatric Disabilities.
- Legal Issues Regarding Students with Disabilities.
- Helping Students with Disabilities Transition from 2-to 4-year Schools.



Example: Outreach to High School Students

Access Center staff at the University of Minnesota-Duluth have been regular participants and planners of a yearly transition fair for high school juniors and seniors called "Rocketing into the Future." They also sponsored their own workshop for college-bound high school juniors and seniors called "Try-It." The workshop featured opportunities to try out adaptive hardware and software available on campus as well as hear information about Access Center services.

Consider outside sources of funding. Check if there are general campus or external state funds available for building your program.

Example: Funding

The University of Wisconsin-Madison obtained funds by collaborating with UW-Eau Claire to develop a collaborative database of disability-related resources on all University of Wisconsin campuses (<http://www.uwec.edu/review/ua/UWCamp/>). Resources from *DO-IT Prof* are shared state-wide through this project.

Example: Mini Grants

Some campuses have obtained funds to develop mini-grant programs to provide assistance to faculty to develop accessible Web pages, employ principles of universal instructional design, and/or develop accessible on-line courses.

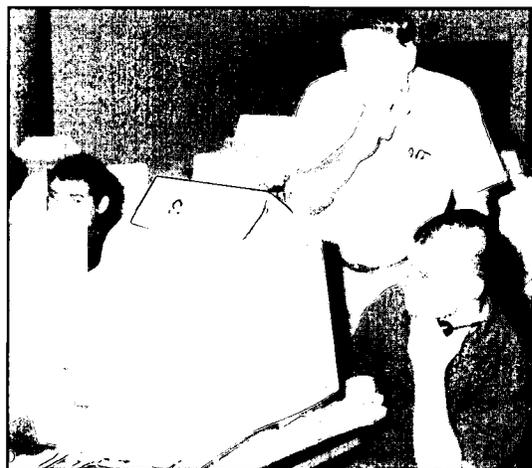
Example: Community Funds

The "Try-It" workshop sponsored by the Access Center at the University of Minnesota-Duluth was made possible by funding from a local community foundation. After submitting their final report, the Access Center was informed that the foundation was interested in funding additional projects that fit their guidelines.

Connect accessibility compliance with resources. Establish policy that requires faculty to comply with access issues to qualify for funding of special centrally-funded projects.

Example: Accessibility Requirements

On one campus, policies were adopted that require faculty members who receive special funds to develop distance learning courses to meet accessibility standards. As a result, all funded distance learning courses are accessible to students with disabilities and faculty participants learned to develop accessible Web pages.



Network with External Organizations

Develop a regional model with a set of consistent practices. Work collaboratively and individually with postsecondary institutions in your state to help each develop and employ appropriate training strategies, policies, and procedures. Utilize the Web and electronic discussion lists to promote communication between faculty and staff from postsecondary institutions across the state. Create a summary sheet of intake and documentation requirements for all state schools and standardize them if possible.



Example: Regional Support Group

The Access Center at the University of Minnesota-Duluth was instrumental in developing a network of postsecondary institutions from the northern part of Minnesota and Wisconsin called the Northern Bridge. The group meets 2-3 times a year with different colleges hosting the meeting. A planning committee helps set programs and agendas. The group has been a great resource for new service providers and a good network for those in continuing positions.

Example: State Distribution List

The University of Washington hosts the Internet-based distribution list for postsecondary offices that provide support to students with disabilities in Washington state (WAPED) and related organizations. List members share policies and procedures and discuss issues of common interest.

Evaluation

Measure the impact of your activities. Although it is difficult to come up with measures that show your efforts have resulted in greater course completion, higher grades, and more diplomas for students with disabilities, it is still worth the effort to collect statistical data and feedback from stakeholders. Participants in presentations can be surveyed, focus groups can be conducted, and yearly enrollment and graduation figures can be collected and compared.

Example: Document Services Provided

The Access Center at the University of Minnesota-Duluth has been involved in a quality review project sponsored by the Vice Chancellor of Academic Support and Student Life. As part of the project the Access Center has been keeping figures on daily activities with a "scoreboard" that is shared

with the other units under the Vice Chancellor. Through this process the Access Center has been better able to document the numbers of students they serve and the services that they provide.

Example: Training Evaluation

DO-IT Prof team members developed long and short evaluation forms titled "Presentation Evaluation." Feedback is used in preparing future presentations. These forms can be found at the end of the *Presentations* section (pages 191-193). Other campuses are welcome to use these forms to evaluate their presentations.

Example: Institutional Data Collection

DO-IT Prof team members collect data from their campuses annually. Yearly data is compared to show trends in enrollment and graduation. A sample "Institution Data Collection Form" can be found at the end of this section. Other campuses are welcome to use this form to collect data on enrollment and graduation.



DO-IT Prof Institution Data Collection Form

Name of Institution: _____

Check one:

DO-IT Prof Team Member Institution

DO-IT Prof Partner Institution

Contact information for person completing survey:

Name: _____

Title: _____

Address: _____

Phone: _____

E-mail Address: _____

Check each category that applies to this institution.

Four-year Two-year Other. Specify: _____

Public Private

Check the types of degrees your institution grants.

Associate

Bachelor's

Master's

Doctor's

First Professional

Enrollment

Check the term for which data is reported.

Fall 1999

Fall 2000

Fall 2001

Fall 2002

Write the total number of students (headcount) enrolled in credit-bearing classes at your institution for this term. _____

Write the number of students enrolled in credit-bearing classes who have identified themselves as belonging to each of the following groups.

_____ White, non-Hispanic (a person having origins in any of the original peoples of Europe, North Africa, or the Middle East)

_____ Black, non-Hispanic (a person having origins in any of the black racial groups in Africa)

_____ Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race)

_____ Asian or Pacific Islander (a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands)

_____ American Indian or Alaskan Native (a person having origins in any of the original peoples of North America and maintaining cultural identification through tribal affiliation or community recognition)

_____ Other or declined to state

Note: Because some students will check more than one race or ethnicity, this section may total more than the institution headcount.

_____ Male

_____ Female

_____ Having a disability

Write the number of students who have the following disabilities. Disability categories are those used by the U.S. Department of Education National Center for Education Statistics (NCES).

_____ Visual impairment

_____ Hearing impairment or deaf

_____ Speech impairment

_____ Orthopedic impairment

_____ Learning disability

_____ Other impairment or disability

Note: Because some students may report multiple disabilities, this section may total more than the total number of students reporting a disability.

Educational Attainment

Indicate the academic year for which data is reported.

_____ Fall 1998 through Summer 1999

_____ Fall 1999 through Summer 2000

_____ Fall 2000 through Summer 2001

_____ Fall 2001 through Summer 2002

Write the total number of the following attained by students at this institution during this time period.

_____ Vocational Certificates

_____ Associate Degrees

_____ Bachelor's Degrees

_____ Master's/Doctor's/First Professional Degrees

Write the total number of the following attained by students with disabilities at this institution during this time period.

_____ Vocational Certificates

_____ Associate Degrees

_____ Bachelor's Degrees

_____ Master's/Doctor's/First Professional Degrees



Later sections of these training materials provide options for delivering presentations that will help faculty fully include students with disabilities in their courses. Pages 67-78 of this section contain case studies to use during presentations. Once you select a presentation topic, consider incorporating some of the following suggestions to make your presentation more effective.

Prepare.

"The mind is a wonderful thing. It starts working the minute you're born and never stops working until you get up to speak in public." (Unknown source)

The quality of your presentation is most directly related to the quality of your preparation. Rarely will you have difficulties in your presentation due to being "overprepared."

- If you are responsible for promotion of your presentation, create an accurate, but inviting, description. Emphasize the relevance of the content to the audience.
- Include a statement in promotional materials on how participants with disabilities can obtain disability-related accommodations for the presentation. This statement will provide an example that may be adapted for participant use in their own publications.
- Believe in the importance of your message.
- Visualize yourself giving a great speech.
- Organize your material in a way that is most comfortable to you by using a script, outline, notes, or 3 x 5 cards. Number them.
- Proofread all printed materials.
- Practice, practice, practice—by yourself and/or with someone. During practice sessions you can work out the bugs and add polish to your presentation. (Note: a rehearsal usually will run about 20% shorter than a live presentation; adjust your content accordingly.)
- As participants enter, consider providing them with 3 x 5 cards and asking them to write at least one question they have about the topic of the presentation. Read them silently as people settle in. Address the questions throughout the presentation and/or at the closing.
- Have a backup plan for delivering the presentation if all of your audiovisual materials become "unavailable." Do not rely on technology to work.
- Test all audiovisual equipment. Practice using PowerPoint™ and other visual displays. If you are using a videotape, make sure it is set to the correct beginning point and at the appropriate volume.
- Check the lighting. If you need to adjust it during your presentation, practice the adjustments before you begin. Consider showing someone else how to make the adjustments for you.
- Have a glass of water available for yourself.
- Think about questions that might be asked and rehearse brief, clear answers to each.
- Memorize the first few minutes of your presentation.



- Review your main points.
- Dress for success.

Create a comfortable learning environment.

“The worst human fears are speaking in front of a group of people, dying, and speaking and dying in front of a group of people.” (Unknown source)

- It is important to create a learning environment that is comfortable and welcoming.
- Arrive early and get a feel for the room, including its temperature, size, and overall set-up. Re-arrange furniture as needed.
- Warmly welcome participants, use eye contact and a welcoming posture and thank participants for coming.
- For smaller groups, ask them to introduce themselves and indicate what they hope to learn. For larger groups, poll the audience, asking them to respond to questions related to your topic. For example, ask the audience, “How many of you have had a student with a learning disability in your class?” and then ask one individual to elaborate.
- Create a safe and nonthreatening environment where participants are not afraid to ask questions. Encourage them to share experiences and ask questions of you or other participants.
- Emphasize that everyone can contribute to the learning process.
- Clearly identify the objectives at the beginning of the session.

- Keep to the time schedule, but show that you value participant input by not rushing.
- Frame questions so that they are easy to understand.
- Do not criticize or allow audience members to criticize other participants.
- Maintain confidentiality and ask the audience to respect the privacy of other participants.

Manage your anxiety.

“There are two kinds of public speakers—those who admit to their nervousness and liars.” (Mark Twain)

Nervousness before a talk or workshop is healthy. It shows that your presentation is important to you and that you care about doing well. The best performers are nervous prior to stepping on stage. Below are suggestions for assuring that anxiety does not have a negative impact on your presentation.

- Use nervousness to your advantage—channel it into dynamic energy about the topic.
- Remind yourself that you and the audience have the same goal, and, therefore, they want you to succeed as much as you do.
- Speak about what you know. Keeping your presentation within the realm of your knowledge and experience will build confidence and minimize nervousness.
- Focus on delivering your message, not on how you feel.



- Smile. Be relaxed, poised, and at ease on the outside, regardless of how you feel internally. Acting relaxed can help make you relaxed.
- Keep presenting! Your anxieties decrease the more presentations you give.

Create a strong beginning.

“The greatest talent is meaningless without one other vital component: passion.”
(Selwyn Lager)

Most audiences give you only 30-120 seconds to convince them they want to listen to you. Keep your opening simple and exciting.

- Consider using a short icebreaker activity.
- A tasteful, humorous commentary can be effective if related to the topic.
- Explain the purpose of your presentation in one sentence that is free of professional jargon and emphasizes what participants will gain.
- Start off with a natural pace—not too fast and not too slow—to establish a strong, positive image. Make a strong ending statement that reinforces the objectives of the presentation.



Incorporate universal design principles.

“I have the simplest tastes. I am always satisfied with the best.” (Oscar Wilde)

Model accessible teaching methods that your participants can use. Incorporate universal design principles to address the needs of participants with a wide range of knowledge, abilities, disabilities, interests, and learning styles. Examples are listed below.

- Use large fonts. Make available copies of slides and other visuals.
- Be prepared to provide computer disk, Web page, audio cassette, and large print copies of slides and other visuals.
- Show captioned videotapes. If not available, provide a transcription of the content upon request.
- Arrange for a sign language interpreter if requested by a participant.
- Keep the environment barrier free.
- Use a clear, audible voice. Use a microphone as needed. Face the audience at all times.
- Make sure the room is well lit.
- Use multi-media in your presentation, such as videotapes, overhead transparencies, visual aids, props, and handouts.
- Demonstrate how to speak the content of overhead transparencies, PowerPoint™ slides, and other visuals. For example, verbally describe graphs and cartoons.



Create a dynamic presentation.

"It is the supreme art of the teacher to awaken joy in creative expression and knowledge." (Albert Einstein)

If your audience enjoys and remembers your information, it is because you presented it in a dynamic or compelling manner.

- Talk *to* your audience, not at them.
- Project enthusiasm for the topic without preaching. The majority of communication is nonverbal, so how you look and sound are vital.
- Present your material in a well-organized manner, yet be flexible to adjust to your audience. Let participants know if you wish to field questions during or after your presentation.
- Speak to the knowledge level of your audience. Define all terms they might not be familiar with.
- Choose your major points carefully and illustrate them with examples or stories.
- Incorporate real-life experiences into your presentations. Recruit students with disabilities or faculty to share their experiences. Ask audience members to share experiences and use these examples to illustrate key points or to answer questions.
- Role-play interactions between students and professors.
- Use natural gestures and voice inflection to add interest to your presentation.
- Address different learning styles by incorporating a variety of instructional methods that use a variety of senses (e.g., visual, auditory, kinesthetic).
- Repeat questions participants pose to ensure that the entire audience understands them.
- Redirect discussion that wanders from the topic at hand.
- Postpone questions related to resolving individual/specific problems to private discussions later. Do not get locked into an extended dialogue with one person; move on to questions from other participants and offer more time to talk after the presentation.
- If people ask questions that you cannot answer, say that you will locate the answer and get back to them (and then do!), suggest appropriate resources that will provide the answer, or ask for suggestions from members of the audience.
- Give demonstrations.
- Never apologize for your credentials or your material.
- Tailor your topic to audience interests.
- Never read your presentation.
- Talk clearly and in well-modulated tones. Avoid speaking too rapidly, softly or loudly. Make sure that the ends of your sentences don't "drop off."
- Maintain eye contact. It conveys confidence, openness, honesty, and interest. It also lets you know how the audience is responding to your presentation. In large groups, mentally divide up the room into sections, and then make eye contact with different people in each section on a rotational basis.



- Use hand gestures naturally, gracefully, and to emphasize points. When not gesturing, let your hands drop to your sides naturally. Keep them out of pockets, off your hips, or behind your back. Avoid fiddling with clothes, hair, or presentation materials.
- Maintain good posture, but do not be rigid.
- Occasionally move from one spot to another, stop, then continue to speak. Don't pace.
- Remember that adult learners:
 - have a wealth of experience;
 - are goal oriented and appreciate outcomes more than process;
 - have set habits, strong tastes, and little time to waste;
 - have strong feelings about learning situations;
 - are impatient in the pursuit of objectives, and appreciate getting to the point;
 - find little use for isolated facts, and prefer application of information; and
 - have multiple responsibilities, all of which draw upon their time and energy.



- Present an accommodation challenge and ask audience members how they would address the issue.
- Respectfully reflect back to people what you observe to be their attitudes, rationalizations, and habitual ways of thinking and acting.
- Allow plenty of time for questions. Address all questions within your presentation or direct participants to appropriate resources.
- Demonstrate or provide hands-on experiences with assistive technology.
- Give useful or entertaining prizes for responses from the audience or have a drawing for a prize (e.g., a videotape).
- If your audience is small, ask members to identify themselves and their experiences/interests related to the topic.
- Involve the audience in a learning activity. People remember more of what you teach them if they are able to learn it via an activity.
- Actively involve your audience throughout your session.

Make your presentation interactive.

"It is better to ask some questions than to know all the answers." (James Thurber)

Avoid simply lecturing to your audience. Engage your audience in active discussion.

- Listen attentively before responding to questions.
- Encourage interactions between audience members.



- Ask how they have used specific accommodations, or worked with students with specific disabilities. Ask questions like, "Has anyone done this? How did it work for you?"
- Stimulate group interaction and problem solving.
- Develop a discussion to help participants integrate themes and key points.

Include a group activity.

"Real prosperity can only come when everybody prospers." (Anna Eleanor Roosevelt)

Include a short activity that makes an important point and encourages participation and discussion. Here's one to try. Announce that you're going to have a five-minute activity, then ask your participants to choose someone sitting near to them to share with each other two things:

1. One thing you are very good at.
2. One thing you are not very good at.

Write and read aloud the instructions on an overhead projector, PowerPoint™ slide, or flip chart. Give them 3-4 minutes (*there will be a lot of laughter/lighthearted talk*), and then say you're not really interested in what they do well; ask people to share things that their partner does not do well. (*This usually ends up funny...they enjoy telling things like he can't do math, he hates public speaking, she's not good at fixing things around the house.*)

After the fun, make the point that, "You have experienced, in a small way, what a person with an obvious disability experiences all the time...that people notice FIRST something they are not particularly good at (e.g., walking, seeing, hearing) and don't

take the time to learn their strengths. A disability may impact 10% of his day/life, yet is considered his defining characteristic by others. We need to pay attention to what everyone, including those with disabilities, CAN do, rather than accentuating what they can't do." To emphasize the point ask them to reflect on how they felt when you said you weren't really interested in what they do well.

The benefits of this activity include that it is short, fun, and effective. It addresses the issue of attitudes, yet does not have some of the negative elements of traditional simulations that leave people feeling like having a disability is impossible to deal with. This activity is also good to use when talking about internal and external barriers to success for students with disabilities, which can include lack of self advocacy skills (internal barrier), and negative attitudes/low expectations on the part of individuals with whom they interact (external barrier).

Incorporate case studies.

"Adults remember 90% of what they say as they do a thing, 70% of what they say or write, 50% of what they hear *and* see, 30% of what they see, 20% of what they hear, and 10% of what they read." (Unknown source)

Have participants discuss case studies in small groups. At the end of this section are examples of case studies that can be used in your presentation. They are all based on real experiences at postsecondary institutions. Each case study is formatted as a handout that can be duplicated for small group discussion. On the back of each activity sheet is the full case description, including the solution actually employed. This version can be used for your information only or distributed to the group after the initial brainstorming has occurred. Participants



can compare their ideas with the resolution in the actual case.

Address key points.

“Enthusiasm is one of the most powerful engines of success. When you do a thing, do it with all your might. Put your whole soul into it. Stamp it with your own personality. Be active, be energetic, be enthusiastic, and faithful, and you will accomplish your objective. Nothing great was ever achieved without enthusiasm.” (Ralph Waldo Emerson)

Be sure that your presentation covers the most important content for your audience.

- Explain the legal requirements regarding accommodating students with disabilities in clear, simple terms. Make it clear that legislation, such as the ADA, provides broad statements about accessibility, but our judicial system ultimately decides what is legal or illegal in a specific situation.
- Explain the rights and responsibilities of students with disabilities, faculty, and the disabled student services office.
- Describe specific situations that have occurred on your campus, including what was successful and situations that could be improved, and how.
- Demonstrate low-tech and high-tech accommodations. Discuss and/or demonstrate adaptive computer technology.
- Explain how many accommodations that are useful to students with disabilities can benefit all learners.

- Provide information on campus-specific resources and procedures (e.g., providing a presentation outline).

Provide resources for participants to keep.

“The philosophers have only interpreted the world in various ways; the point, however, is to change it.” (Karl Marx)

Make sure that you provide your audience with information they can follow up on after your presentation.

- Provide written materials of key content for future reference.
- Provide contact information and invite participants to contact you with questions after the presentation. Distribute business cards.
- For further exploration refer participants to *The Faculty Room* at <http://www.washington.edu/doit/Faculty/>.



Conclude with a strong ending.

“The greatest good you can do for another is not just to share your riches but to reveal to him his own.” (Benjamin Disraeli)

The most important and remembered words you speak are the last ones.



- Summarize key points.
- Consider concluding with examples that show the importance of providing educational opportunities for students with disabilities, perhaps of a student with a disability at your campus who worked well with the disability services office and instruction, received the accommodations he needed, graduated with a degree, and went on to succeed in employment.
- Empower your audience to use information you presented to improve access for and education of all students with disabilities.

Improve each presentation.

"What I hear, I forget; what I see, I remember; but what I do, I understand."
(Confucius, 451 BC)

Take steps to gain feedback about your presentation that will lead to improvements.

- Practice your presentation with colleagues or friends and ask for their feedback.
- Videotape your presentation for self-analysis.
- Evaluate your presentation through an anonymous written survey. Two examples of evaluation instruments are included on the following pages.
- Incorporate improvements into subsequent presentations.

Conclusion

"When you can do the common things in life in an uncommon way, you will command the attention of the world."
(George Washington Carver)

In summary, to give effective presentations in which the participants gain needed information in a dynamic way, make sure to:

- prepare well in advance;
- incorporate universal design principles;
- facilitate interaction, sharing of experiences, and creative problem solving within the session; and
- promote a welcome and nonjudgmental learning environment.



Case Study #1 Discussion

Read the following real-life situation.

Background

My name is Caryn. I am an 18-year-old freshman entering a small private university. I am studying the visual arts and eventually plan to attend graduate school for a masters of fine arts.

Access Issue

Although I'm an art major, I have to take two English courses and four semesters of a second language that are required by the university. I have a language-learning disability which makes it difficult for me to understand and organize large amounts of verbal information. Writing was my most challenging academic area in high school. I was worried that I would not be able to keep up with the course workloads and failing a course my first semester was not an option.

1. Discuss potential solutions to the access issue described. There can be more than one good solution.
2. Discuss the advantages and disadvantages of each proposed solution.
3. Clarify the appropriate roles of the student, instructor, and campus support services in reaching a decision and providing accommodations if needed.
4. After you have completed your discussion, read the access solution that actually occurred in this case. It is printed on the back of this handout. Compare your proposed solutions with this solution. Discuss the conclusions listed and add at least one more.

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Case #1 Solution

Below is the solution that was actually employed in this case.

Initially, I did not want to disclose my learning disability. However, I was very worried about these course requirements, especially since it was my first semester of college. I contacted my advisor in the art department and mentioned my concerns. After an appointment with the disabled student services counselor where I presented documentation of my disability, we decided on the following solutions. I was able to substitute the foreign language course requirement for two courses in the social sciences. I also learned about the freshman writing lab. I set up a series of weekly private appointments with a writing tutor to review my English coursework. I also borrowed, from the disabled student services department, a computer equipped with a voice-to-text option. With this adaptive technology, I can speak into the computer and my speech is translated into text. Without this accommodation, my thoughts and writing can become easily disorganized or jumbled and I have a very difficult time completing assignments.

Conclusion

This case study illustrates that assistance from the campus disabled student services department can help a student with a disability:

1. obtain program adjustments to meet university coursework requirements;
2. gain access to adaptive computer technology to accommodate her disability; and
3. make use of campus services available to all students.

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Case #2 Discussion

Read the following real-life situation.

Background

My name is Scott. I am a 19-year-old engineering student with muscular dystrophy. I use a powered wheelchair for mobility. An important part of the first year of my engineering program involves work on computer-aided design programs in the engineering computer lab.

Access Issue

Although I can use one hand to control my wheelchair, I have limited strength and movement in my hands and fingers. I cannot use a standard mouse or keyboard to operate a computer. I also cannot physically access some lab computers due to the height of the table and the position of the computer equipment.

1. Discuss potential solutions to the access issue described. There can be more than one good solution.
2. Discuss the advantages and disadvantages of each proposed solution.
3. Clarify the appropriate roles of the student, instructor, and campus support services in reaching a decision and providing accommodations if needed.
4. After you have completed your discussion, read the access solution that actually occurred in this case. It is printed on the back of this handout. Compare your proposed solutions with this solution. Discuss the conclusions listed and add at least one more.

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Case #2 Solution

Below is the solution that was actually employed in this case.

I met with my course instructor and toured the computer lab prior to the first class. I found that I could not physically access the lab computers. An adaptive technology specialist within the university helped the lab acquire an adjustable computer table and set up the workspace at an appropriate height and location for me. I also got a trackball which eliminated the need to use a mouse. With the trackball, I can perform mouse functions and use a virtual, on-screen keyboard. These computer accommodations were in place by the first day of class. They provided me with the full access I needed to complete required laboratory coursework as part of the engineering program.

Conclusion

This case study illustrates the importance of:

1. accessible workspace design;
2. preplanning, site visits, and cooperation with computer lab staff, because adaptive computer equipment and furniture take time to order and set up; and
3. the availability of an adaptive technology specialist as a resource within the university setting.

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Case #3 Discussion

Read the following real-life situation.

Background

My name is Linda. I am 22 years old and an undergraduate student. I have Cerebral Palsy. I am applying for acceptance into the School of Social Work in the fall. I attend a large public university and the campus is spread over several miles. Due to my impaired leg movements and balance, I walk with a cane.

Access Issue

Before I can apply for admission to the School of Social Work, I need to take four prerequisite classes this quarter. Only twenty minutes of passing time are available between two of my classes and the buildings are 1/4 mile apart. No other scheduling options are available. I inquired about the campus bus system and learned that it has no direct route between these buildings. If I do not take both of these courses, I will need to delay my application for another year.

1. Discuss potential solutions to the access issue described. There can be more than one good solution.
2. Discuss the advantages and disadvantages of each proposed solution.
3. Clarify the appropriate roles of the student, instructor, and campus support services in reaching a decision and providing accommodations if needed.
4. After you have completed your discussion, read the access solution that actually occurred in this case. It is printed on the back of this handout. Compare your proposed solutions with this solution. Discuss the conclusions listed and add at least one more.

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Case #3 Solution

Below is the solution that was actually employed in this case.

I met with the university's disabled student services counselor to discuss my situation. I did not need any accommodations prior to this quarter. Together we developed a plan. The counselor contacted the campus transportation services and arranged transportation between my classes. I contacted the course instructor and he was informed of my transportation needs and the possibility of late arrivals on an occasional basis. The instructor and I also made arrangements with another student who had taken previous courses with me to share notes or announcements that I missed when I could not arrive on time.

Conclusion

This situation illustrates:

1. that some individuals with mobility impairments may be independent on campus in most situations but may need assistance in certain circumstances;
2. the importance of collaboration and communication between the student, disability student services, and the course instructor in order for accommodations to be successful; and
3. the student's responsibility to disclose her needs and request accommodations.

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Case #4 Discussion

Read the following real-life situation.

Background

A student, who uses a wheelchair and is majoring in a Special Education/ Mentally-Physically Handicapped program, needed to take a required course. The class, "Health and Physical Education for Elementary Schools," was to be held in an old building which was inaccessible to wheelchairs.

Access Issue

While the usual procedure was to move the location of the class to an accessible building, the professor initially requested that a temporary ramp be constructed for access. This idea was rejected by facilities management due to the prohibitive expense and time of building a ramp which would meet ADA (Americans with Disabilities Act) specifications. The building was slated for renovation in two years.

The class was relocated to a fieldhouse arena where three other gym classes were scheduled for the same time slot. This was unacceptable to the professor, who felt the teaching environment would be adversely affected because of excessive noise. Furthermore, since there was inadequate storage at the fieldhouse, equipment (including balance beams, assorted size balls, and other large items needed for the course) would need to be moved to the fieldhouse prior to each class session.

As a result, the professor requested the student be carried up the twenty-two cement stairs to the original classroom. This proposed solution was rejected due to student safety and institutional liability issues.

1. Discuss potential solutions to the access issue described. There can be more than one good solution.
2. Discuss the advantages and disadvantages of each proposed solution.
3. Clarify the appropriate roles of the student, instructor, and campus support services in reaching a decision and providing accommodations if needed.
4. After you have completed your discussion, read the access solution that actually occurred in this case. It is printed on the back of this handout. Compare your proposed solutions with this solution. Discuss the conclusions listed and add at least one more.

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Case #4 Solution

Below is the solution that was actually employed in this case.

The student, professor, and office for disabled student services jointly developed a satisfactory solution. An experienced telecommunications student was hired by the office for disabled student services to videotape the class sessions. The student using the wheelchair met with the professor after class to obtain the videotaped class session and written outline. The student reviewed the videotape and notes and had the opportunity to ask questions of the professor via electronic mail and telephone prior to each regular class.

The class was moved to the fieldhouse arena for one day when it was the student's assigned turn to teach a class. The student chose equipment in her lesson plan that did not require anything but the professor's jeep to transport it to the field house.

Conclusion

This case study illustrates that:

1. it is helpful to work as a triad with the professor, student, and office of disabled student services to resolve access issues; the process of problem solving together creates a solution acceptable to all parties involved; and
2. some accommodation strategies are recognized as imperfect and temporary, but provide access for a specific student in a specific course until more acceptable permanent solutions, such as renovating a facility, can be employed.

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Case #5 Discussion

Read the following real-life situation.

Background

My name is Imke and I am blind. As a first-year graduate student in atmospheric sciences at the University of Washington, I was required to enroll in a quarter-long credit/no credit synoptic meteorology lab. Most of the lab time was spent plotting meteorological data on weather maps, and drawing contours in the process of learning about the development and structure of mid-latitude weather systems.

Access Issue

I needed to find a way to participate in the class and learn the necessary material without having to draw and contour weather maps.

1. Discuss potential solutions to the access issue described. There can be more than one good solution.
2. Discuss the advantages and disadvantages of each proposed solution.
3. Clarify the appropriate roles of the student, instructor, and campus support services in reaching a decision and providing accommodations if needed.
4. After you have completed your discussion, read the access solution that actually occurred in this case. It is printed on the back of this handout. Compare your proposed solutions with this solution. Discuss the conclusions listed and add at least one more.

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Case #5 Solution

Below is the solution that was actually employed in this case.

I was unsure of the best way for me to participate in the class, so I approached the instructor of the course, who happened to be my Ph.D. advisor, and asked if he had any suggestions. It appeared that he had already thought about this issue. He immediately proposed that instead of attending the weekly classes, I visit his office once a week at a time convenient to both of us, so that he could explain the relevant concepts to me. I also received the instructor's class notes in an accessible format from the university's disabled student services office. This arrangement worked well. I was able to gain an understanding of mid-latitude weather systems without participating in the map drawing activities that were central to the course.

Conclusion

This situation illustrates that:

1. it is not always necessary for a student who is blind to directly access the visual material of a course;
2. in cases where it is impractical for the student to participate in a visually-oriented activity, it is often possible for the student to learn the accompanying concepts in another way; and
3. it is important for the student to take responsibility to approach the course instructor to plan workable accommodations.

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DO-IT



Case #6 Discussion

Read the following real-life situation.

Background

Dr. Sheryl Burgstahler was asked to teach a three-credit Internet-based distance learning course at the University of Washington. The topic of the course was issues and strategies regarding computing access for people with disabilities, content she had taught many times in a traditional class setting.

Access Issue

She anticipated that individuals with a wide range of disabilities would enroll in the course. Her goal was to employ universal design principles to make the course accessible to everyone, regardless of abilities and disabilities, language skills, and learning styles.

1. Discuss potential solutions to the access issue described. There can be more than one good solution.
2. Discuss the advantages and disadvantages of each proposed solution.
3. Clarify the appropriate roles of the student, instructor, and campus support services in reaching a decision and providing accommodations if needed.
4. After you have completed your discussion, read the access solution that actually occurred in this case. It is printed on the back of this handout. Compare your proposed solutions with this solution. Discuss the conclusions listed and add at least one more.

BEST COPY AVAILABLE

DO-IT



Case #6 Solution

Below is the solution that was actually employed in this case.

Dr. Burgstahler selected a textbook, making sure it was available on tape from Recordings for the Blind and Dyslexic. Students who are blind or who have learning disabilities that impact reading ability could order a copy of the text on tape, while other students use the standard printed copy.

To give the students examples of adaptive technology that provide access to computers for people with disabilities, she selected a series of videotapes produced by DO-IT (Disabilities, Opportunities, Internetworking, and Technology). These tapes are open captioned, making them accessible to students who are deaf and to students for whom English is a second language. They are also available in a form that has audio description, a feature that describes aurally the visual content in the tape. This version is used by students who are blind.

Lessons for the course and course discussions took place over e-mail: a fully-accessible medium. Assignments and the final exam were also submitted via e-mail. Course Web pages were designed using universal design principles, assuring access to all students.

As a prerequisite for the course, students were required to have access to electronic mail and the World Wide Web. As a result, the University did not need to provide computer equipment, including adaptive technology, for those with disabilities. The course could, however, be taken by using campus computers and adaptive technology as required by students with disabilities. The key is to offer to students with disabilities the same services offered to others.

The course has been taught for five years. Students from all over the world and with a variety of disabilities have enrolled. As there are no in-person meetings and the course is designed to be fully accessible, there is no way to know how many students with disabilities have completed the course. Some students with disabilities have disclosed their disabilities voluntarily, but no one has needed a special accommodation. Disabilities disclosed include learning disabilities, spinal cord injuries, Cerebral Palsy, and blindness.

Conclusion

This case demonstrates how:

1. universal design concepts can be incorporated into the design process to create an accessible distance learning course; and
2. employing access features in the design of a course can minimize the need for a student to disclose a disability and to request an accommodation.

PRESENTATIONS



This section provides a collection of stand-alone presentations on specific topics of interest to campuses nationwide. The presentations are designed for use with postsecondary faculty and administrators. They can be easily adapted to specific audience interests and program lengths. They can also be combined to create a series of presentations to a single group.

The presentation titles and the pages on which they begin are listed below.

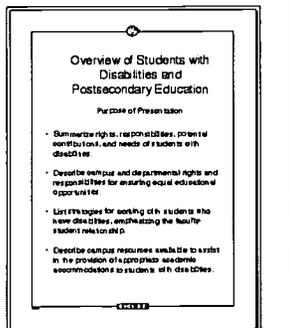
| | |
|--|-----|
| ■ Overview of Students with Disabilities and Postsecondary Education | 81 |
| ■ Accommodation Strategies | 85 |
| ■ Universal Design of Instruction | 101 |
| ■ Effective Communication with Students Who Have Communication Disorders | 111 |
| ■ Information Access | 125 |
| ■ Access to Computers | 133 |
| ■ Making Computer Labs Accessible to Everyone | 143 |
| ■ Universal Design of Web Pages | 151 |
| ■ Making Distance Learning Accessible to Everyone | 161 |
| ■ Science/Math/Engineering Access | 171 |
| ■ Accommodating Students with Learning Disabilities | 177 |
| ■ Accommodating Students with Psychiatric Disabilities | 183 |

These topics were selected after a thorough literature review which is summarized in the *Synthesis of Research* section of this publication. The 23 DO-IT Prof project team members helped develop the content. The suggestions in the sections entitled *Presentation Tips* and *Institutionalization Strategies* can be used in the process of developing an individual presentation and implementing professional development of faculty and administrators throughout the institution, respectively. After the last presentation module in this section, you will find one long and one short presentation evaluation form (pages 191-193) to give to your audience participants at the end of each presentation.

Overview of Students with Disabilities and Postsecondary Education



Show visual # 1.



Purpose

After this presentation, faculty and administrators will be able to:

- summarize rights, responsibilities, potential contributions, and needs of students with disabilities;
- describe campus departmental rights and responsibilities for ensuring equal educational opportunities;
- list strategies for working with students who have disabilities, emphasizing the faculty-student relationship; and
- describe campus resources available to assist in the provision of appropriate academic accommodations for students with disabilities.

Length

Approximately 20-30 minutes.

Presenter

Department chair, faculty, staff, teaching assistant, student, or other department member. Little experience working with students with disabilities is required to deliver this short presentation.

Preparation

- Select presenter(s).
- Develop presentation outline and activities using the *Sample Script* provided in this section and the ideas listed in the *Presentation Tips* section of this handbook.
- Create overhead transparencies from overhead transparency templates or use PowerPoint™ version of the visual aids.
- Add information about resources available to your campus to the overhead transparency or PowerPoint slide entitled “Resources” and to printed publications as appropriate.
- Photocopy handout templates, *Working Together: Faculty and Students with Disabilities* and *Meet the Speakers in the Videotape* and create alternative formats as necessary.
- Create and photocopy presentation evaluation instrument (see end of *Institutionalization Strategies* for examples).
- Link from your unit’s Web pages to *The Faculty Room* at <http://www.washington.edu/doit/Faculty/>.

Equipment and Tools

- VHS VCR and monitor
- visuals: overhead projector and transparencies or LCD projector, computer, and PowerPoint presentation; Internet connection (optional)



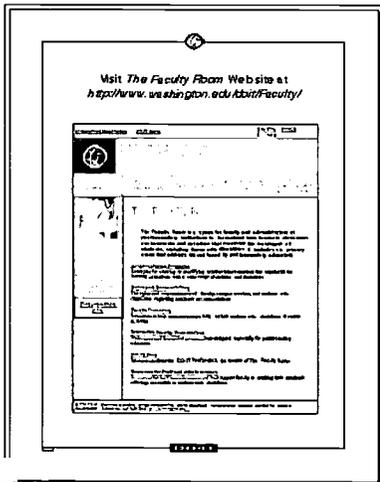
- videotape (*Working Together: Faculty and Students with Disabilities*)
- handouts (*Working Together: Faculty and Students with Disabilities* and *Meet the Speakers in the Videotape*)
- presentation evaluation instrument (pages 191-193)

Presentation Outline

1. Distribute handouts.
2. Introductions.
3. Begin presentation.
4. Introduce and play videotape.
5. Hold discussion on possible accommodations on your campus.
6. Discuss department/campus issues and campus resources.
7. Distribute and collect completed evaluation instruments.

Resources

For further preparation for this presentation, consult *The Faculty Room* at <http://www.washington.edu/doit/Faculty/>.





Overview of Students with Disabilities and Postsecondary Education: Sample Script

Today I will provide a short presentation about how you can effectively work with students who have disabilities and how to access campus resources for assistance.

Advancements in technology and increased job specialization have resulted in career opportunities in fields that were once considered unsuitable for individuals with disabilities. Many of these careers require knowledge and skills obtained through postsecondary education. Although the number of individuals with disabilities seeking postsecondary education has increased significantly in recent years, they are still underrepresented in many academic and career areas. Federal legislation mandates that, when needed, academic accommodations be made to ensure that otherwise qualified students with disabilities have educational opportunities equal to those of their non-disabled peers.

Studies show that faculty members, staff, and students who have had interactions with students with disabilities generally have more positive attitudes about working with these students. Further, those who are familiar with accommodation strategies are better prepared to make arrangements which will ensure that students with disabilities have an equal opportunity to participate in their programs.

Today we are going to view a videotape that will introduce you to several faculty members and successful students with disabilities who have worked well together.

In this videotape, faculty members share their concern about, and strategies for, working with students who have disabilities. In addition, successful students with disabilities tell us first hand about techniques and accommodations that have contributed to their success. The videotape emphasizes the importance of the faculty-student relationship.

Information about the speakers featured in the videotape is given in the handout *Meet the Speakers in the Videotape*. The handout, *Working Together: Faculty and Students with Disabilities*, provides an overview of faculty, staff, and student legal rights and responsibilities, examples of accommodation strategies, and a list of resources available on campus to assist us in our efforts to ensure equal educational opportunities for all students in our programs and courses.

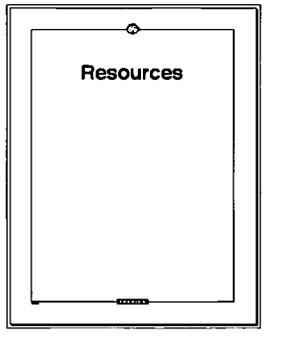
Show videotape, "Working Together: Faculty and Students with Disabilities" (9 minutes).

The people featured in this videotape have described some of the problems and solutions that surfaced in their academic experiences. We all encounter these issues and others in our programs. Accommodation strategies may be simple, yet, they may also require a bit of creativity and flexibility.



Resources

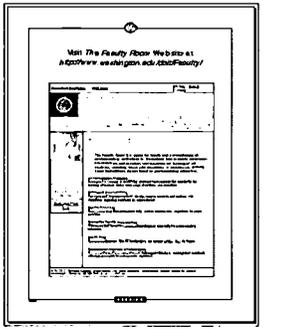
*Show visual
2 with your
campus
resources.*



Thank you for your time today and for your interest in finding ways to ensure that all of the students in our programs have equal opportunities to learn, explore interests, and express ideas.

Here are some resources that might be useful to you as you work to maximize participation and success of all students in your classes. (*Elaborate.*)

*Show visual
3.*



For comprehensive information on working with students with disabilities in postsecondary education including accommodations, a wide range of case studies, frequently asked questions, and general resources, visit *The Faculty Room* at <http://www.washington.edu/doit/Faculty/>. This resource was developed by DO-IT at the University of Washington as part of a nationwide project to provide resources to faculty and administrators so that they can make their courses and programs accessible to all students. You can link to this resource from ____ (*Arrange to make the link from your campus/departmental disabled student services home page before the presentation.*). Consider linking to this Web site from your departmental Web pages for faculty.



Purpose

After this presentation faculty and administrators will be able to:

- summarize rights, responsibilities, potential contributions, and needs of students with disabilities;
- describe departmental and individual legal rights and responsibilities for ensuring equal educational opportunities for all students in their programs;
- list strategies for working with students who have disabilities, emphasizing the relationship between instructor, student, and support staff;
- describe campus resources available to assist in the provision of appropriate academic accommodations to students with disabilities; and
- list actions that individuals and departments can take to ensure that students with disabilities have educational opportunities that are equal to those of their non-disabled peers.

Length

Approximately two hours; content can be covered over several meetings.

Presenter

Department chair, faculty, staff, teaching assistant, student, or other department member who has experience working with students with disabilities. This comprehensive presentation may be co-presented with, or presented by, a staff member of a campus unit responsible for providing academic accommodations for students with disabilities.

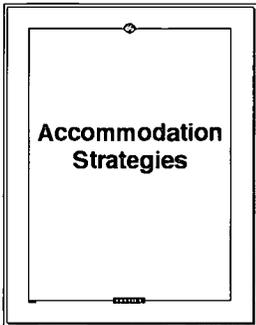
Preparation

- Select presenter(s).
- Develop presentation outline and activities using the *Sample Script* provided in this section and the ideas listed in the *Presentation Tips* section of this notebook.
- Create overhead transparencies from overhead transparency templates or use PowerPoint™ version of the visual aids.
- Add information about resources available to your campus to the overhead transparency or PowerPoint slide entitled "Resources" and to printed publications as appropriate.
- Add contact information for resources available on your campus to the back page of the handout template *Working Together: Faculty and Students with Disabilities*.
- Photocopy handout templates, *Working Together: Faculty and Students with Disabilities* and *Meet the Speakers in the Videotape* and create alternative formats as necessary.
- If presenting the optional content *An Accommodation Model*, photocopy handout templates titled *An Accommodation Model* and *Student Abilities Profile*.
- Create and photocopy presentation evaluation instrument (see end of *Institutionalization Strategies* for examples).
- Link from your unit's Web pages to *The Faculty Room* at <http://www.washington.edu/doit/Faculty/>.



Accommodation Strategies: Sample Script

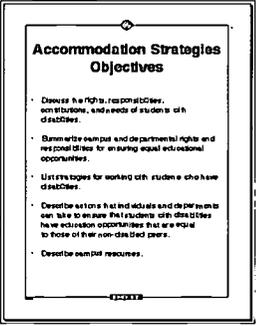
Show visual
4.



The slide shows the title "Accommodation Strategies" centered on a white background with a thin black border.

Today we will be discussing accommodation strategies that can be used to make your courses accessible to all of your students.

Show visual
5.

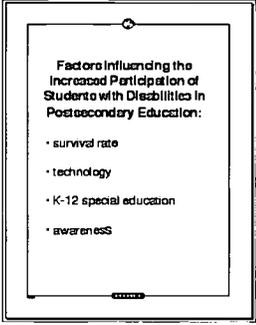


The slide lists the following objectives:

- Discuss the rights, responsibilities, contributions, and needs of students with disabilities.
- Demonstrate support and departmental rights and responsibilities for ensuring equal educational opportunities.
- List strategies for working with students who have disabilities.
- Describe actions that individuals and departments can take to ensure that students with disabilities have equal educational opportunities that are equal to those of their non-disabled peers.
- Describe campus resources.

The objectives of this presentation are...
(*Paraphrase objectives on visual.*)

Show visual
6.



The slide lists the following factors:

- survival rate
- technology
- K-12 special education
- awareness

Postsecondary Enrollment of Students with Disabilities

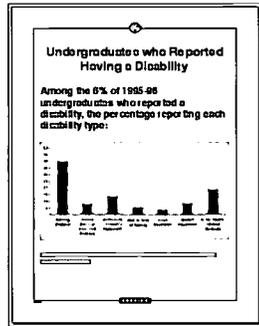
Recent advancements in technology and increased job specialization have resulted in career opportunities in fields that were once considered unsuitable for individuals with disabilities. Many of these careers require knowledge and skills obtained through postsecondary education.

The number of individuals with disabilities seeking postsecondary education has increased significantly in recent years. Reasons cited for this increase include:

- advances in medical technology and techniques resulting in greater numbers of people who survive traumatic accidents and problematic births;
- improvements in technology making it possible for more people with disabilities to live independently and have productive lives;
- the creation of federal and state mandates for pre-college academic support programs helping more students with disabilities complete high school and consider postsecondary education options; and
- publicity of federal disability-related legislation increasing awareness of rights to accommodation and equal opportunities in education and employment.



**Show visual
7.**



The probability that you will have a student with a disability in your class is quite high. According to the National Center for Educational Statistics, Postsecondary Education (1999), six percent of all undergraduates reported having a disability. In this group, 40% reported having a learning disability, 8% reported mental illness or emotional disability, 14% reported an orthopedic or mobility impairment, 6% reported being deaf or hard of hearing, 4% reported visual impairments, and 9% a speech impairment. In addition, one in five undergraduates with disabilities (19%) reported having another health-related disability or limitation.

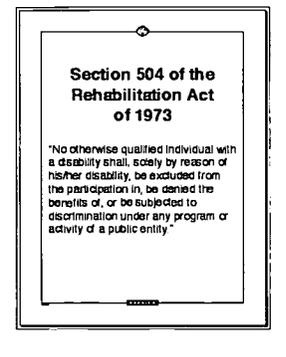
Studies show that faculty members and staff who have experience with people who have disabilities generally have more positive attitudes about working with students who have disabilities. Further, those who are familiar with accommodation strategies are better prepared to make arrangements which will ensure that students with disabilities have equal opportunities to participate in their programs.

Today we will go over our legal rights and responsibilities, examples of accommodation strategies, and resources available on our campus to help you work with students with disabilities. We'll also discuss the specific challenges in our department in working with students who have disabilities

and explore strategies for improving access. Your handout *Working Together: Faculty and Students with Disabilities* provides an overview of faculty, staff, and student legal rights and responsibilities; examples of accommodation strategies; and a list of resources available on campus to assist us in our efforts to ensure equal educational opportunities for all students in our programs and courses.

Disability Legislation

**Show visual
8.**



Let's begin with our legal obligations. According to Section 504 of the Rehabilitation Act of 1973, "no otherwise qualified individual with a disability shall, solely by reason of his or her disability, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity of a public entity." Federal legislation mandates that academic adjustments are made to ensure that otherwise qualified students with disabilities have access to educational opportunities.

Section 504 applies to all postsecondary institutions that receive federal funds, which includes almost every college campus. The Americans with Disabilities Act of 1990 (ADA) requires that public programs and services be accessible to individuals with



disabilities, regardless of whether or not the entity receives federal funds. The ADA covers all postsecondary institutions. Note that the law says, "otherwise qualified individual with a disability." What does "otherwise qualified" mean?

Show visual # 9.

"Otherwise qualified"

meets the academic and technical standards requisite to admission or participation

with or without

- reasonable modifications to rules, policies, or practices;
- removal of architectural, communication or transportation barriers; or
- provision of auxiliary aids and services

"Otherwise qualified," with respect to postsecondary educational services, means "a person who meets the academic and technical standards requisite to admission or participation in the educational program or activity, with or without reasonable modification to rules, policies or practices; the removal of architectural, communication or transportation barriers; or the provision of auxiliary aids and services." In other words, a person who has a disability is "otherwise qualified" if he can perform the essential tasks of a program or assignment when appropriate and reasonable accommodations are made.

Show visual # 10.

"Person with a disability" is any person who:

- has a physical or mental impairment which substantially limits one or more major life activities including walking, seeing, hearing, speaking, breathing, learning, and working;
- has a record of such an impairment; or
- is regarded as having such an impairment.

We should not assume that a person who has a disability could not successfully participate in our programs or courses simply because of the disability. Instead, if there is a concern that the student who has disclosed a disability may not be able to complete specific requirements, we should discuss with the student (as well as campus staff who have experience in providing academic accommodations) how he may be able to accomplish essential tasks required in the program or course, with or without reasonable accommodations.

So, what exactly does "person with a disability" mean? "Person with a disability" means "any person who has a physical or mental impairment which substantially limits one or more major life activities including walking, seeing, hearing, speaking, breathing, learning, and working; has a record of such an impairment; or is regarded as having such an impairment."

Show visual # 11.

Example of Disabilities

- Low Vision
- Blindness
- Hearing Impairments
- Mobility Impairments
- Mental Health/Psychiatric Impairments
- Health Impairments
- Learning Disabilities

Disabilities covered by legislation include, but are not limited to, spinal cord injuries, loss of limbs, Multiple Sclerosis, Muscular Dystrophy, Cerebral Palsy, hearing impairments, speech impairments, specific learning disabilities, head injuries, psychiatric disorders, Diabetes, Cancer, and AIDS. Some of these conditions are readily apparent; some are not. Additionally, some students who have conditions with the same



label may have very different abilities when it comes to performing specific tasks. For example, one student who has Cerebral Palsy may have difficulty walking. For another student, Cerebral Palsy may result in no functional use of her hands. For another, it may limit the use of his voice.

Ultimately, a student who has a disability requires accommodations only when faced with a task that requires a skill that her disability precludes. If a student informs an instructor that she has a disability and would like to arrange for academic accommodations, the instructor may ask which course or program requirements are expected to be problematic and which strategies and campus resources can eliminate or minimize the access problems. On most campuses, a disability service office is involved in this process. Sometimes an effective solution can be found by thinking creatively about how the learning environment can be modified. The student is the best source of information about her disability. Many accommodations are simple, creative alternatives for traditional ways of doing things.

In summary, federal legislation requires that we accept otherwise qualified students with disabilities into our academic programs. Additionally, we should work with students who have disclosed their disabilities to identify and implement reasonable academic accommodations in order to ensure that they have educational opportunities equal to those of their non-disabled peers while preserving the academic standards in courses. Few of us have the experience to identify the effects of all disabilities on the learning process. Work with the student and campus disabled student services office when determining and implementing appropriate academic accommodations.

Faculty and Students with Disabilities

Next we'll watch the videotape, *Building the Team: Faculty, Staff, and Students Working Together*. You'll learn about disabilities that impact students' participation in your class, examples of accommodations, and resources. Teamwork between the faculty member, the student, and the office that supports students with disabilities on our campus is key. The information covered is included in the handout entitled *Working Together: Faculty and Students with Disabilities*.

Show videotape, "Building the Team: Faculty, Staff, and Students Working Together" (16 minutes).

(If you feel that examples of accommodations presented in the videotape provide enough content in this area for the audience and/or if time is limited, skip to An Accommodation Model, Discussion Questions, or Case Study.)

Specific Disabilities and Accommodations

Now we will review how disabilities may affect some students' abilities to participate in specific academic activities. Then we'll discuss examples of academic accommodations. I emphasize that these are only examples, since disabilities and learning styles are unique to the individual. You, the student, and campus support staff may generate many other effective strategies that are appropriate for that student.



(Following are examples of accommodations. The lists are by no means comprehensive. You may wish to substitute or add strategies that are pertinent to your audience.)

Low Vision

Show visual # 12.

Accommodations for Low Vision

- Seating near front of class; good lighting
- Large print books, handouts, signs, and equipment labels
- TV monitor connected to microscope to enlarge images
- Assignments in electronic format
- Software to enlarge screen images
- Software to adjust screen colors

For some students who have low vision, standard written materials are too small to read and/or objects appear blurry. Others may only see objects within a specific field of vision. Still others may see an image with sections missing or blacked out. Learning via a visual medium may take longer and may be more fatiguing for people who have low vision than for people who have standard vision.

Examples of accommodations for students with low vision include seating near the front of the class; good lighting; and large print books, handouts, signs, and equipment labels. Since it may take weeks or months to procure class materials in large print or audiotape format, it is essential that instructors select and prepare their materials well before the materials are needed. Other examples of accommodations include reserved seating where the lighting is best, TV monitors connected to microscopes to enlarge images, class assignments made available in electronic formats, and computers equipped with screen enlargers.

Blindness

Show visual # 13.

Accommodations for Blindness

- Printed materials on computer disk, audio on a Web page, and e-mail
- Braille visual aids
- Audiocassette, Braille, or electronic notes, handouts, and lists
- Raised-line drawings and tactile models of graphic materials
- Braille lab signs, equipment labels, auditory lab course syllabus
- Adaptive equipment (e.g., talking thermometers and calculators; tactile string)
- Computer with speech synthesizer reader, voice output, Braille screen display printer output
- Increased time on tests

What are some examples of ways in which blindness may affect the ability to learn? Students who have no sight cannot refer to written materials. Students who have had no vision since birth may have difficulty understanding verbal descriptions of visual materials and abstract concepts. Consider the example, "This diagram of ancestral lineage looks like a tree." If one has never seen a tree, it may not be readily apparent that the structure of note has several lines of ancestry which can be traced back to one central family. Students who lost their vision later in life may find it easier to understand such verbal descriptions. Additionally, demonstrations based on color differences may be more difficult for students with blindness to participate in and understand than demonstrations which emphasize changes in shape, temperature, or texture.

Ready access to printed materials on computer disk, in an electronic mail message, or on a Web page can allow a blind person, who has the appropriate technology, to use computers to read the text aloud and/or produce it in Braille. Some materials may need to be transferred to audiotape. Since it may take weeks or even months to procure course materials in Braille or on audiotape, it is essential that instructors select and prepare their materials well

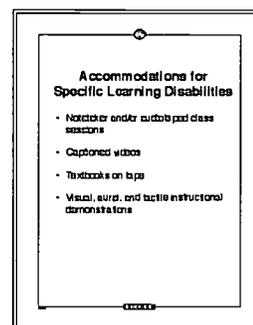


before the materials are needed. During lecture and demonstration, clear, concise narration of the basic points being represented in visual aids is helpful. Other examples of accommodations for blind students include tactile models and raised-line drawings of graphic materials; adaptive lab equipment such as talking thermometers, calculators, light probes, and tactile timers; and computers with optical character readers, voice output, Braille screen displays, and Braille printers.

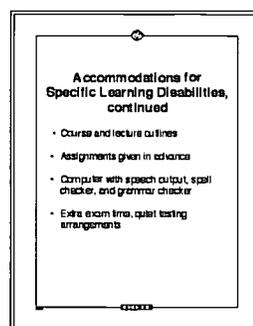
Specific Learning Disabilities

Students with specific learning disabilities have average to above average intelligence but may have difficulties demonstrating knowledge and understanding. For a student who has a learning disability, auditory, visual, or tactile information can become jumbled at any point when it is transmitted, received, processed, and/or retransmitted. It may take longer for some students who have learning disabilities to process written information, making lengthy reading or writing assignments or tests difficult to complete in a standard amount of time. Some students who have learning disabilities may find it difficult to process and digest oral instructions and lectures. Some students who have learning disabilities may be able to organize and communicate their thoughts in a one-to-one conversation, but may find it difficult to articulate those same ideas in a noisy classroom.

Show visual # 14.



Show visual # 15.



Examples of accommodations in the classroom for students who have learning disabilities include, yet are not limited to, note-takers, audiotaped class sessions, captioned videos, and textbooks on tape. Students with learning disabilities have better access to information when visual, aural, and tactile instructional activities are incorporated into instruction, and course and lecture outlines are made readily available. Exams typically require extended time in a quiet testing location. Computers with speech output and spelling and grammar checkers are helpful in class and for home study. Assignments given in advance ensure adequate review and preparation time.



Hearing Impairments

Show visual # 16.

Accommodations for Hearing Impairments

- Interpreter, real-time captioning, FM system, Notetaker
- Captioned videos
- Electronic mail
- Visual aids, visual warning system for lab emergencies
- Written assignments, lab instructions, demonstration summaries
- Repeat questions and statements from other students during class

Some students who have hearing impairments may hear only specific frequencies, sounds within a narrow volume range, or nothing at all. Students who are deaf from birth generally have more difficulty speaking and understanding English language structure than those who lose their hearing later in life.

Students who are deaf or hard of hearing may have difficulty following lectures in large halls, particularly if the speaker talks quietly, rapidly, or unclearly. Also, people who are deaf or hard of hearing may find it difficult to simultaneously watch demonstrations and follow verbal descriptions, particularly if they are watching a sign language interpreter, a “real-time” captioned screen, or a speaker’s lips. In-class discussion that is fast paced and unmoderated may be difficult to follow, since there is often a lag time between a speaker’s comments and interpretation.

Examples of accommodations for verbal students who are deaf or hard of hearing include using interpreters, sound amplification (FM) systems, note-takers, and real-time captioners. Real-time captioners transcribe lecture material digitally to a computer screen. It is also helpful for instructors to distribute written lecture

outlines, assignments, lab instructions, and demonstration summaries. Providing visual warning systems to alert for lab emergencies is a must. During presentations it is important to turn your face toward your audience when speaking and repeat discussion questions and statements made by other students. Video and other multimedia publications should be captioned. Students with hearing impairments benefit when electronic mail is used for faculty-student meetings and class discussions.

Mobility Impairments

Show visual # 17.

Accommodations for Mobility Impairments

- Notetaker/Lab Assistant, provide lab assignments
- Classroom, labs, and lecture in accessible locations
- Adjustable table, equipment located within reach
- Extra or non-linear, alternative seating arrangements
- Access to online research resources
- Class assignments and materials in electronic format
- Computer with special in lab device (e.g. speech in p11, Morse code, alternative keyboards)

Mobility impairments range from lower body impairments, which may require use of canes, walkers, or wheelchairs, to upper body impairments, which may result in limited or no use of the hands or upper extremities. It may take longer for students with mobility impairments to get from one class to another. For some students it may be difficult to get to fieldwork sites. It may also be difficult for some students to manipulate objects, turn pages, write with a pen or pencil, type at a keyboard, or retrieve research materials.



Examples of accommodations for students with mobility impairments include note takers, scribes, and lab assistants; group lab assignments, accessible locations for classrooms, labs, and field trips; adjustable tables; equipment located within reach; extended exam time or alternative testing arrangements; course materials available in electronic formats; computers with special devices such as voice or Morse code input and alternative keyboards; and access to research resources available on the Internet.

Speech Impairments

Show visual # 19.

Accommodations for Speech Impairments

- Listen carefully to what the person is saying; if you don't understand, ask student to repeat
- Relax and take as much time as necessary to communicate
- Ask questions that require short answers or a nod of the head when appropriate
- Written communication
- Electronic mail

Health Impairments

Show visual # 18.

Accommodations for Health Impairments

- Flexible attendance requirements
- Extra exam time, alternate testing arrangements
- Note takers and/or taped class sessions
- Assignments in electronic format
- Electronic mail
- Internet accessible services and/or resources

Speech impairments have a variety of origins which may or may not be related to other disabilities. Qualities of speech impairments range from mild to severe word pronunciation and articulation differences as well as variations in rate, tone, and volume. It often takes longer for a student with a speech impairment to speak and express himself. Helpful accommodations and communication strategies when working with a student who has a speech impairment include the following: Relax and allow ample time for communication and listen carefully to what the person is saying. Ask the student to repeat a word or statement that you don't understand. Ask questions that require short answers or a nod of the head when appropriate. Written communication through note-writing can be of assistance as well. Discussions and assignments in electronic mail can allow full expression of knowledge and ideas. Ask the student to repeat a word or statement that you don't understand.

Some health conditions and medications affect memory and/or energy levels. Additionally, some students who have health impairments may have difficulty attending classes full-time or on a daily basis.

Examples of accommodations for students who have health impairments include flexible attendance requirements; extra exam time or alternative testing arrangements; note takers and/or taped class sessions; assignments available in electronic format; Internet accessible services and/or resources; and electronic mail for faculty-student meetings, class discussions, and distribution of course materials and lecture notes.



Psychiatric Disabilities

Show visual # 20.

Accommodations for Psychiatric Disabilities

- Tape recorder, notetaker
- Preferential seating near door
- Tests, assignments in alternate formats
- Extended time for taking tests
- Separate, quiet room for testing
- Review academic and behavioral expectations in regular meetings with student

Increasing numbers of students with psychiatric disabilities are pursuing postsecondary education. The National Center for Educational Statistics (1999) reported that more than 400,000 students enrolled in postsecondary institutions report having a mental illness or emotional disturbance. These students are intelligent and capable of pursuing and succeeding in higher education once barriers to equal access are removed. Mood disturbance, cognitive changes and/or altered perceptions may result in functional difficulties related to anxiety, disorganization, or concentration difficulty.

Providing a consistent, yet flexible, approach and maintaining a positive attitude with high expectations encourages success. Specific accommodations of students with psychiatric disabilities include use of a tape recorder or note-taker during class; preferential seating near the door to allow for breaks as needed; tests and assignments in alternate formats; and extended time for test taking in a quiet, separate room. Structure and clear practical feedback regarding academic and behavioral expectations is helpful for self monitoring by students with psychiatric disabilities.

General Strategies to Increase Classroom Accessibility

Show visual # 21.

General Suggestions for Making Classes Accessible

- Add a statement to the syllabus inviting students who have disabilities to discuss their accommodation needs
- Select materials early
- Talk with the student about accommodation needs
- Have policies and procedures in place
- Make sure facility is accessible
- Provide materials in electronic format
- Provide clear signage in large print
- Use alternative methods of administering tests and testing

To conclude our discussion of accommodation examples, here are some general suggestions for making your classes accessible.

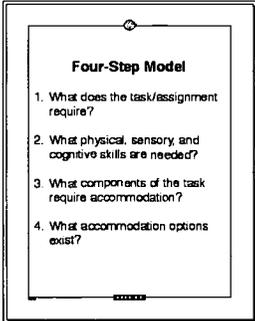
- Add a statement to the syllabus inviting students who have disabilities to discuss their needs and accommodation strategies with the instructor.
- Select materials early so that they can be procured in appropriate formats in a timely manner.
- Ask students about accommodations which have worked for them in the past.
- Have policies and procedures in place.
- Make sure the facility is wheelchair-accessible.
- Use materials which are available in electronic format.
- Provide clear signage in large print.
- Use alternative methods to administer tests and evaluating comprehension of a subject.



- Use the disability services available on our campus.

(The following optional section may be appropriate for some audiences. If not, skip to "Discussion Questions." This optional section requires two handouts, *An Accommodation Model* and *Student Abilities Profile*.)

Show visual #22.

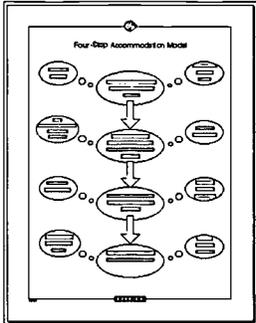


(Optional) An Accommodation Model

(Distribute the publications entitled, *An Accommodation Model* and *Student Abilities Profile*.)

Accommodations are unique to the individual, but it is helpful to have a process to work through when determining appropriate accommodations for a student who has disclosed his disability. DO-IT, a project at the University of Washington, has developed a model process and a *Student Abilities Profile* form that can be used to identify effective accommodations once a student has disclosed his disability.

Show visual #23.



Information about the process and a copy of the form is available in the handouts.

The *Accommodation Model* process is organized around the following four questions:

Step #1: What does the task or assignment require?

Break down the components of the experiment, assignment, or exercise. Educators often focus on the overall outcome of an activity. To accommodate a student with a disability, it's helpful to think about the specific settings, tools, skills, and tasks that are required at each step. Analyzing and evaluating the task thoroughly will help you determine how best to fully and effectively include a student with a specific disability.

Step #2: What physical, sensory, and cognitive skills are needed?

Match the tasks required to the physical, sensory, and cognitive skills needed to successfully complete the activity. It is easy to say, "If I had a physical, sensory, or cognitive disability, I would not be able to complete this assignment," without really determining what skills are needed for specific aspects of the project. We need to separate the "real" requirements of a



specific task from the “perceived” requirements of the project in total. It is impossible to place yourself in the shoes of the student with a disability. He may have learned many ways to solve a specific problem or task and work around the limitations imposed by the disability.

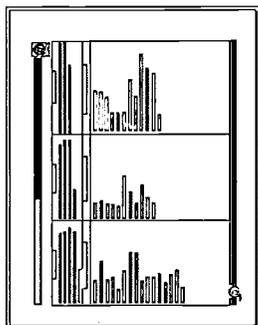
Step #3: What components of the task require accommodation?

Once the task has been analyzed and the needed skills are identified, determine what accommodations may be required or how the learning experience might be altered to make it more accessible to a specific student with a disability. Consult with the student to determine what he perceives he will require as an accommodation.

Step #4: What accommodation options exist?

Now that the tasks needing accommodation have been determined, identify what resources exist for providing the accommodation(s). The student may have some good ideas. This is a time when other professionals may have expertise in specific areas and should be called on to provide input. In some cases, having students work in groups where each person is assigned a task that he has the ability to complete provides a reasonable alternative.

Show visual # 24.

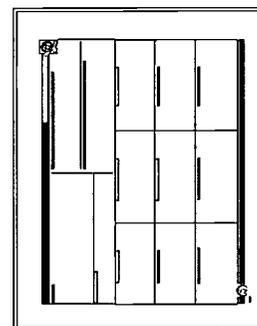


The *Student Abilities Profile* form is designed to guide you in determining a student’s skills and abilities as well as assist you in breaking down individual components of an assignment. The form asks you to briefly describe the student, the classroom or laboratory environment, equipment or supplies needed, available professional and external resources, possible effective accommodations, and the physical, sensory, and cognitive skills needed for the task. Let’s go through one example together and then, in small groups, you can create your own.

(Go through the process of filling out the form for a specific student and task on the overhead projector.)

Now use your blank form. Choose a classroom or lab activity and complete the *Student Abilities Profile* form for a student who has a specific set of disability-related challenges.

Show visual # 25.



(You can provide blank forms or distribute partially filled out forms if you want the activity to be more directed. Participants can work independently or together, and then share the results with the group.)



Discussion Questions

(Discuss some or all of the following questions.)

- Do we currently have students with disabilities in our department? What types of disabilities are represented?
- Have any of you worked with students who have disabilities before? Describe your experiences. What strategies did you find to be successful or unsuccessful?
- What can we as a department, and as individual instructors do to make our academic programs more accessible to students who have:

- visual impairments?
- hearing impairments?
- mobility impairments?
- learning disabilities?
- health impairments?

(Examples include publications in accessible formats such as Braille, large print, and electronic formats; advisor and staff awareness training; continuous evaluation of essential program course requirements; and classroom instructional improvements.)

- What actions can be taken to make our academic programs more accessible?

(Examples:

- *Invite someone from outside of our department to answer specific questions and give us advice regarding appropriate accommodations.*
- *Designate someone to find out if there are disability access activities currently in progress on campus that we can contribute to and/or learn from.*

- *Consider mailing the publication Working Together: Faculty and Students with Disabilities to all faculty members and teaching assistants each year!*
- How can we make our facilities (e.g., classrooms, offices, and computer/instructional labs) more accessible to individuals who have:
 - visual impairments?
 - hearing impairments?
 - mobility impairments?
 - learning disabilities?
 - health impairments?

(Consider the following examples of accessibility adjustments:

- *Visual impairments: Braille labels, signage, arrangement and procurement of lab equipment; adaptive technology in computer labs.*
- *Mobility impairments: Wheelchair access entrances clearly marked and notices posted at each non-accessible entrances regarding the location of accessible entrances; wheelchair-accessible entrances, if different than the main entrance; adaptive technology in computer labs.*
- *Visual, health, and mobility impairments: Hallways and classrooms kept clear of obstacles that could present a problem for an individual getting to class and/or safely negotiating the environment within class.)*
- What actions should be taken to make our facilities more accessible and who should coordinate them?



(Examples include:

- Survey facilities regarding accessibility; and/or
- Identify and begin the procedure to procure signage, lab equipment, and/or adaptive computer technologies.)

Case Study

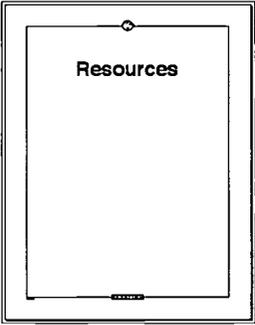
(Consider having participants discuss a case. Case #4 on page 73 in the Presentation Tips section of this notebook would be appropriate.)

Conclusion

Today we've discussed the rights and responsibilities of faculty, disabled student services staff, and students with disabilities. We've also considered typical accommodations for students with specific disabilities. Instructors, staff, and students should work together to develop the best accommodation strategies. The ultimate result can be improved postsecondary education and career outcomes for people with disabilities.

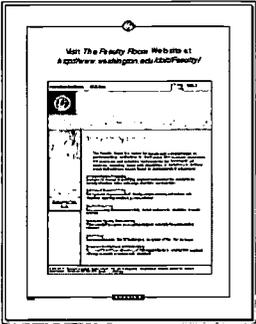
Resources

Show visual # 2 with your campus resources.



Here are some resources that might be useful to you as you work to maximize the participation of all students in your classes. (Elaborate.)

Show visual # 3.



For comprehensive information on accommodations, a wide range of case studies, frequently asked questions, and general resources, visit *The Faculty Room* at <http://www.washington.edu/doit/Faculty/>. This resource was developed at the University of Washington as part of a nationwide project to provide resources to faculty and administrators so that they can make their courses and programs accessible to all students. You can link to this resource from ____ (Arrange to make the link from your campus/departmental disabled student services home page before the presentation.). Consider linking to this Web site from your departmental Web pages for faculty.

Thank you for your time today and for your interest in finding ways to ensure that all of the students in our programs have equal opportunities to learn, explore interests, and express ideas.



Purpose

After completion of this lesson, participants will be able to:

- list at least three universal design principles;
- list three ways that universal design principles can be used to make a more inclusive classroom; and
- describe the difference between employing universal design principles to maximize access and providing accommodations for students with disabilities.

Length

Approximately 40-60 minutes.

Presenter

Department chair, faculty, staff, teaching assistant, student, or other department member who has experience working with students with disabilities. This presentation may be presented by, or co-presented with a staff member of a campus unit responsible for providing academic accommodations for students with disabilities.

Preparation

- Select presenter(s).
- Develop presentation outline and activities using the *Sample Script* provided in this section and the ideas listed in the *Presentation Tips* section of this notebook.
- Create overhead transparencies from the overhead transparency templates or use the PowerPoint™ version of the visual aids.

- Add contact information about resources available on your campus to the overhead transparency or PowerPoint slide entitled "Resources" and to printed publications as appropriate.
- Photocopy handout template, *Universal Design of Instruction*, and create alternative formats as necessary.
- Create and photocopy presentation evaluation instrument (see end of *Institutionalization Strategies* for examples).
- Link from your unit's Web page to *The Faculty Room* at <http://www.washington.edu/doit/Faculty/>.

Equipment and Tools

- VHS VCR and monitor
- visuals: overhead projector and transparencies or LCD projector, computer, and PowerPoint presentation; Internet connection (optional)
- videotape (open-captioned and audio described version of *Real Connections: Making Distance Learning Accessible to Everyone*)
- handouts (*Universal Design of Instruction*, *Real Connections: Making Distance Learning Accessible to Everyone* and *Working Together: Faculty and Students with Disabilities*)
- presentation evaluation instrument (pages 191-193)

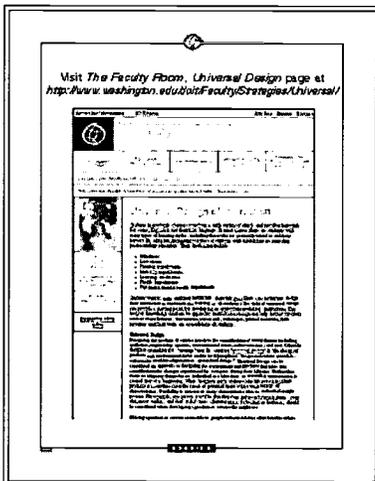


Presentation Outline

1. Distribute handouts.
2. Introductions.
3. Discuss universal design principles and examples.
4. Introduce and play videotape.
5. Discuss universal design of instruction examples and contrast with the provision of accommodations.
6. Discuss department/campus issues.
7. Distribute and collect completed evaluation instruments.

Resources

For further preparation for this presentation, consult *The Faculty Room* at <http://www.washington.edu/doi/Faculty/Strategies/Universal/>.





Universal Design of Instruction: Sample Script

Show visual # 26.

Universal Design of Instruction

Today we will be discussing principles of universal design of instruction and how to use these principles in your instruction for the benefit of all students, including those with disabilities.

Show visual # 27.

Universal Design of Instruction Objectives

1. Discuss the principles of universal design.
2. Apply principles of universal design of instruction to meet a wide range of student learning needs.
3. Explain the difference between applying universal design principles to maximize access and providing academic accommodations for students with disabilities.

The objectives of today's presentation are to... (*Paraphrase objectives on visual.*)

Diversity in Postsecondary Institutions

At our postsecondary institutions today, we attract a diverse student body.

Show visual # 28.

Diversity in Postsecondary Institutions

- Ethnic/racial minorities
- English as a second language
- Different learning styles
- People with disabilities

Students in your classes come from a wide variety of ethnic and racial backgrounds. For some, English is not their first language. There are many types of learning styles and strengths represented, including students who are primarily visual or auditory learners. In addition, increasing numbers of students with disabilities are pursuing postsecondary education.

Show visual # 7.

Undergraduates who Reported Having a Disability

Among the 6% of 1995-96 undergraduates who reported a disability, the percentage reporting each disability type:

| Disability Type | Percentage |
|--------------------------------------|------------|
| Learning disabilities | ~35% |
| Physical disabilities | ~15% |
| Emotional/psychological disabilities | ~10% |
| Other disabilities | ~40% |



Their disabilities may include spinal cord injuries, loss of limbs, Multiple Sclerosis, Muscular Dystrophy, Cerebral Palsy, hearing impairments, visual impairments, speech impairments, specific learning disabilities, head injuries, psychiatric disorders, Diabetes, Cancer, and AIDS.

The probability that you will have a student with a disability in one of your classes is high. According to the National Center for Educational Statistics, Postsecondary Education (1999), 6% of all undergraduates reported having a disability. Among these 6%, 40% reported having a learning disability, 8% reported mental illness or emotional disability, 14% reported orthopedic or mobility impairment, 6% reported being deaf or hard of hearing, 4% reported vision impairments, and 9% a speech impairment. In addition, one in five undergraduates with disabilities (19%) reported having another health-related disability or limitation.

You and your students share the goal of learning in your classroom. But, how can you design instruction to maximize the learning of all students? The field of universal design can provide a starting point for developing a model for inclusive instruction. This body of knowledge can then be applied to instructional design and help you create courses where lectures, discussions, visual aids, videotapes, printed materials, and fieldwork are accessible to all students.

Universal Design

Show visual # 29.

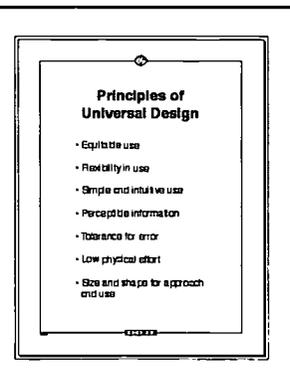


Designing any product or service involves the consideration of factors that may include aesthetics, engineering options, environmental issues, safety concerns, and cost. One issue that designers often overlook is that of "universal design."

Universal design is defined by the Center for Universal Design at North Carolina State University as "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design."

At this center, a group of architects, product designers, engineers and environmental design researchers collaborated to establish this set of principles of universal design to provide guidance in the design of environments, communications, and products.

Show visual # 30.





Let's discuss the meaning of each principle.

1. "Equitable" means that the design is useful and marketable to people with diverse abilities. For example, a Web site that is designed so that it is accessible to everyone, including people who are blind, employs this principle.
2. "Flexibility" in use means the design accommodates a wide range of individual preferences and abilities. An example is a museum that allows a visitor to choose to read or listen to the description of the contents of a display case.
3. "Simple and intuitive use" means that use of the product is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level. A microwave oven with control buttons that are clear and intuitive is an example of an application of this principle.
4. "Perceptible information" means the design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities. An example of this principle not being employed is when television programming is projected in noisy public areas like airports and restaurants without captioning.
5. "Tolerance for error" means that the design minimizes hazards and the adverse consequences of accidental or unintended actions. An example of a product applying this principle is a software program that provides guidance when the user makes an inappropriate selection.

6. "Low physical effort" means the design can be used efficiently and comfortably, and with minimal fatigue. Doors that are easy to open by people with a wide variety of physical characteristics demonstrate the application of this principle.
7. "Size and space for approach and use" means that an appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility. An example of applying this principle is positioning equipment in a computer lab so that it can be easily reached and operated by individuals with a wide variety of body sizes and physical abilities.

When designers apply these principles, their products and facilities meet the needs of potential users with a wide variety of characteristics. Disability is just one of many characteristics that an individual might possess. For example, one person could be five feet four inches tall, female, thirteen years old, a poor reader, and deaf. All of these characteristics, including her deafness, should be considered when developing a product she might use.

Making a product accessible to people with disabilities often benefits others. For example, sidewalk curb cuts, designed to make sidewalks and streets accessible to those using wheelchairs, are today more often used by kids on skateboards, parents with baby strollers, and delivery staff with rolling carts. When television displays in airports and restaurants are captioned, they benefit people without disabilities as well as those who are deaf.



(Discuss examples of things you would consider if you were designing a microwave oven, toaster, building, or other product that would be universally accessible.)

Universal Design of Instruction

Universal design principles can be applied to many products and services. In the case of classroom instruction or a distance learning class, a goal should be to create a learning environment that allows all students, including a person who happens to have a characteristic that is termed a "disability," to access the content of the course and fully participate in class activities. This topic is summarized in your handout entitled *Universal Design of Instruction*.

Show videotape, "Real Connections: Making Distance Learning Accessible to Everyone" (12 minutes).

In the short videotape that we will now watch, we will see an example of the application of universal design principles to distance learning instruction. The videotape itself is universally designed, including open captions and audio descriptions for viewers with hearing and visual impairments, respectively. Your handout, *Real Connections: Making Distance Learning Accessible to Everyone*, summarizes the content of the videotape.

As demonstrated in the videotape and handouts, considering universal design principles can lead us to a list of guidelines that can be applied as you develop on-line and on-site courses. They can apply to

lectures, classroom discussions, group work, handouts, Web-based instruction, fieldwork, and other academic activities.

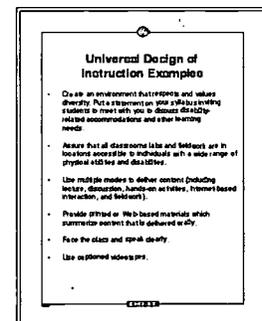
When universal design principles are applied to the design of Web pages, people using a wide range of adaptive technology can access them. For example, people who are blind often use speech output systems to access computers. These systems read aloud text that is presented on the screen; they do not read graphical images. Therefore, to provide access to Web sites for students who are blind, we must be sure to include text descriptions for content presented in graphical form, such as pictures, animated images, and image maps.

Let's create a list of examples of how principles of universal design apply to classroom or distance learning instruction. What are some of the diverse characteristics your students might have?

(Encourage discussion. Consider English as a second language, different cultures, blindness, no use of hands, etc.)

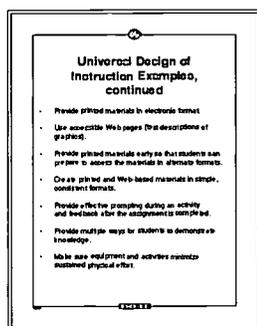
What are some examples of instructional methods that employ principles of universal design and make your course content accessible to people with a wide range of abilities and disabilities, language skills, and learning styles?

Show visual # 31.





Show visual # 32.

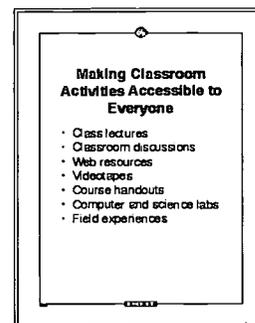


(Encourage participation and include all or some of the following examples. Make a list or create a transparency, PowerPoint slide, or flip chart. This activity could be conducted in small groups followed by group discussion.)

- Create a classroom environment that respects and values diversity. Put a statement on your syllabus inviting students to meet with you to discuss disability-related accommodations and other special learning needs.
- Assure that classrooms, labs, and fieldwork are in locations accessible to individuals with a wide range of physical abilities and disabilities.
- Use multiple modes to deliver content. Alternate delivery methods, including lecture, discussion, hands-on activities, Internet-based interaction, and fieldwork.
- Provide printed or Web-based materials that summarize content delivered orally.
- Face the class and speak clearly.
- Provide captioned videotapes.
- Provide printed materials in electronic format.
- Provide text descriptions of graphics presented on Web pages.

- Provide printed materials early. This allows students to prepare for the topic to be presented and access materials in alternative formats.
- Create printed and Web-based materials in simple, consistent formats. This practice is particularly helpful to students with learning disabilities and students for whom English is a second language.
- Provide effective prompting during an activity and feedback after the assignment is completed.
- Encourage different ways for students to interact with each other and with you. These methods may include in-class questions and discussion, group work, and Internet-based communications.
- Provide multiple ways for students to demonstrate knowledge. For example, besides traditional tests and papers, consider group work, demonstrations, portfolios, and presentations as options for demonstrating knowledge.
- Make sure equipment and activities minimize sustained physical effort.)

Show visual # 33.



Now, let's summarize how you might employ universal design principles to make



specific classroom activities accessible to all students. Consider the following activities: *(Encourage discussion and sharing of examples.)*

- class lectures,
- classroom discussions,
- Web resources,
- videotapes,
- course handouts,
- computer and science labs, and
- field experiences.

Universal Design vs. Accommodations

Does employing universal design principles in instruction eliminate the need for specific accommodations for students with disabilities? In a word, "no." There will always be the need for some specific accommodations, such as sign language interpreters for students who are deaf. However, using universal design principles in course planning will assure greater access to the content for most students and minimize the need for specific accommodations. For example, designing Web resources in accessible format as they are developed means that no redevelopment is necessary if a blind student enrolls in the class. Planning ahead can be less time-consuming in the long run.

Preserving Educational Standards

An instructor can preserve academic instructional integrity when employing universal design principles or when providing instructional accommodations for students with disabilities. Course content and evaluation standards are the purview of the instructor. Disability accommodations should not alter instructional content or evaluation standards. The student with a disability

should face the same intellectual challenges as other students.

To assure that the same content is presented to every student in the class, it is helpful to distinguish the academic content from the instructional methods used to deliver the information.

Show visual # 34.

Procedures and Outcomes

Instructional Procedures:

1. Students will use... to acquire the course content.
2. I will use... to present course content.

Instructional Content:

1. Students will describe...
2. Students will be able to list...
3. Students will demonstrate...

When instructional objectives and academic content are separated from the method of instructional content, it is easier for the instructor to think about how she can provide the information in a variety of modalities, which may benefit the entire class. The goal is to modify the methods and procedures for a student with a disability while preserving the educational content and evaluation standards of the course.

Show visual # 35.

Measuring Instructional Content Versus Procedures

1. Evaluation Content:

Students will demonstrate their understanding of ..

2. Testing Procedure:

Students will demonstrate their understanding by ..



Let's look at examples for separating essential instructional content in an academic class from the methods used to deliver and evaluate content.

(Ask participants to give examples from their classes.)

For example, testing objectives and content should be considered separately from testing method. Tests should be designed to measure the level of mastery in a subject area. For a student with a disability, you may need to use an alternate method that tests for the same level of mastery as is used for other students. In other words, you change the testing procedure to evaluate mastery of the same content as that expected of other students. To fail the student who knows the content but has difficulty with a type of testing methodology because of his disability, is as unfair as passing a student who does not know the material.

Benefits to All Students

Universal design of instruction can benefit all students. For example, captioning course videotapes, which provides access to deaf students, is also a benefit to students for whom English is a second language, to some students with learning disabilities, and to those watching the tape in a noisy environment. Delivering content with multiple modes of presentation can benefit students with a variety of learning styles.

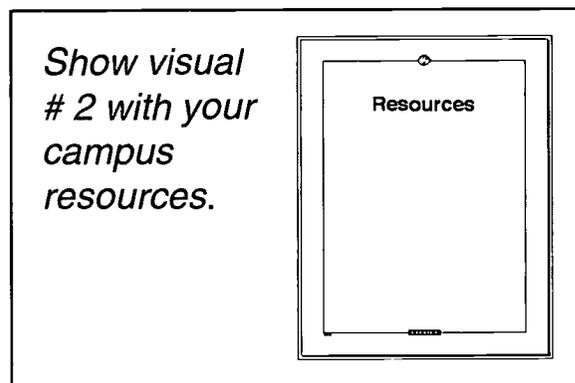
Case Study

(Consider having participants discuss a case. Case #6 on page 77 in the Presentation Tips section of this notebook would be appropriate.)

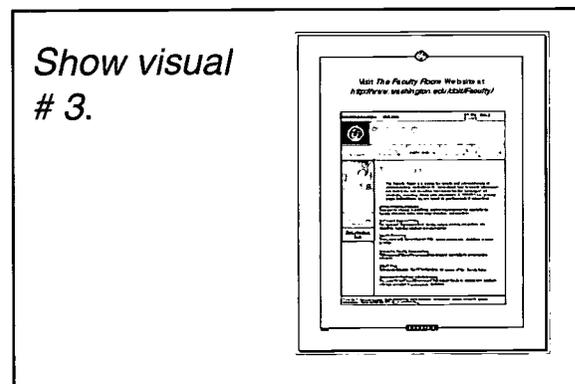
Conclusion

Employing universal design principles in everything we do provides information and access for all individuals regardless of learning style, language, or ability.

Resources



Here are some resources that might be useful to you as you work to maximize effective communication with all students in your classes. *(Elaborate.)*



For comprehensive information on accommodations, a wide range of case studies, frequently asked questions, and general resources, visit *The Faculty Room* at <http://www.washington.edu/doi/Faculty/>. This resource was developed at the University of Washington as part of a nationwide project to provide resources to faculty and administrators so that they can make their



courses and programs accessible to all students. You can link to this resource from ____ (*Arrange to make the link from your campus/departmental disabled student services home page before the presentation.*). Consider linking to this Web site from your departmental Web pages for faculty.

Thank you for your time today and for your interest in finding ways to ensure that all of the students in our programs have equal opportunities to learn, explore interests, and express ideas.

Effective Communication with Students Who Have Communication Disorders



Purpose

At the end of this presentation, participants will be able to:

- summarize the rights and responsibilities, potential contributions, and needs of students with disabilities;
- discuss departmental and individual legal rights and responsibilities for ensuring equal educational opportunities for all students in their programs;
- list a range of disabling conditions which can affect communication in courses;
- list strategies for communicating with students who have disabilities using technology, trained support staff, and instructor creativity; and
- describe campus resources available to assist in the provision of appropriate academic accommodations to students with disabilities.

Length

Approximately 60 to 90 minutes.

Presenter

A faculty member or teaching assistant who has successfully taught students with disabilities that affect oral and auditory communication or someone from the campus unit providing services for students with disabilities. It may be possible to arrange for a student to co-present. At an appropriate time during the presentation, the student could describe the impact of his disability on communication and effective communication strategies.

Preparation

- Select presenter(s).
- Develop presentation outline and activities using the *Sample Script* provided in this section and the ideas listed in the *Presentation Tips* section of this notebook.
- Create overhead transparencies from the overhead transparency templates or use the PowerPoint™ version of the visual aids.
- Add contact information about resources available to your campus to the overhead transparency or PowerPoint slide entitled “Resources” and to printed publications as appropriate.
- Photocopy handout, *Effective Communication: Faculty and Students with Disabilities*, and create alternative formats as necessary.
- Create and photocopy presentation evaluation instrument (see end of *Institutionalization Strategies* for examples).
- Link from your unit’s Web pages to *The Faculty Room* at <http://www.washington.edu/doi/Faculty/>.

Equipment and Tools

- visuals: overhead projector and transparencies or LCD projector, computer, and PowerPoint presentation; Internet connection (optional)
- handout (*Effective Communication: Faculty and Students with Disabilities*)



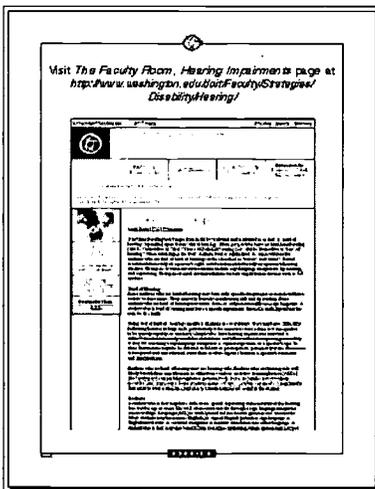
- presentation evaluation instrument (pages 191-193)

Presentation Outline

1. Distribute handout.
2. Introductions.
3. Begin presentation.
4. Discuss communication disabilities and accommodation strategies.
5. Discuss case examples and present resources.
6. Distribute and collect completed evaluation instruments.

Resources

For further preparation for this presentation, consult *The Faculty Room* at <http://www.washington.edu/doit/Faculty/Strategies/Disability/Hearing/>.

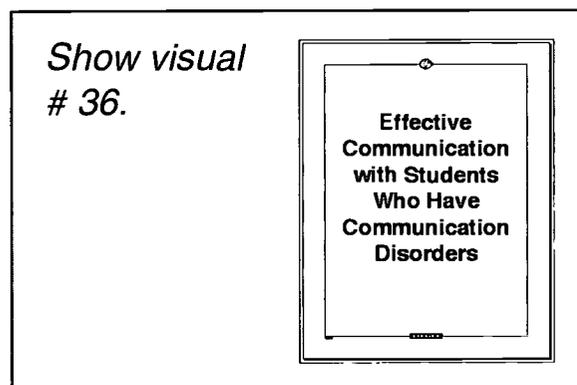


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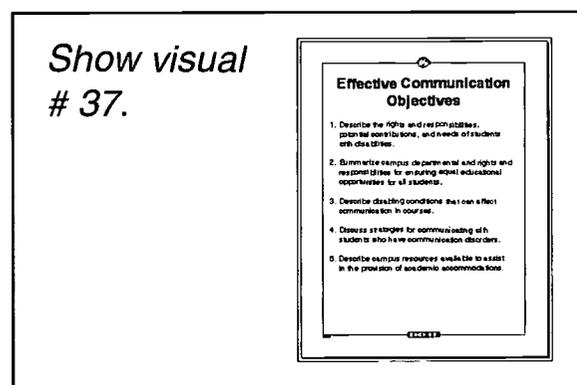
116



Effective Communication with Students Who Have Communication Disorders: Sample Script



Today we'll be discussing effective strategies for communicating with students who have disabilities.



The objectives for this presentation are...
(Paraphrase objectives on visual.).

Communication and Learning in Postsecondary Settings

The number of individuals with disabilities seeking postsecondary education has increased and the federal government has made it clear that institutions must provide reasonable accommodations to ensure that otherwise qualified students with disabilities have access to educational opportunities offered to other students. With advancements in technology, state and federal

mandates, and improved awareness about disability issues, students with a wide range of disabilities have better access to postsecondary educational programs. They are part of the student body in every institution of higher learning.

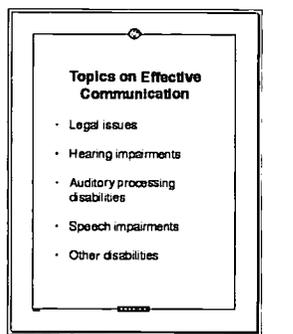
Postsecondary courses often use a traditional lecture format. Even distance education programs that have emerged in the last decade rely heavily on lectures (e.g., audiotaped or videotaped presentations) and discussion. Lectures and classroom interaction can present significant barriers to some students. Students who, for one reason or another, have difficulty listening, speaking, or understanding are at a disadvantage in academic courses. Without accommodations, it might be impossible for a student who cannot hear, speak, or understand spoken language to pursue an education. Developing an awareness of how communication can pose barriers to learning, as well as strategies that can help remove these barriers, may help to maximize learning opportunities in your classes.

Disabilities that affect communication include hearing impairments, auditory processing disabilities (typically resulting from brain injuries or specific learning disabilities), and speech impairments. These disabilities represent a significant part of the postsecondary student population. According to the National Center for Educational Statistics, Postsecondary Education (1999), 6% of all undergraduates report having a disability, and of these 6%, 40% report having a learning disability, 6% report being deaf or hard of hearing, and 9% report a speech impairment.



The information we'll cover today is included in your handout *Effective Communication: Faculty and Students with Disabilities*.

**Show visual
38.**



We'll review issues of legal rights and responsibilities. I'll provide information on hearing and speech disorders and other disabilities that can affect communication in courses. Examples of accommodation strategies and resources available on our campus and through the Internet will also be presented. The overall goal is to enhance your ability to communicate effectively with students who have disabilities that affect expressive or receptive communication.

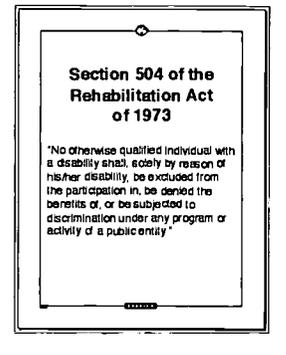
What are some of your experiences working with students who have disabilities? Have you worked with a student with a disability that affected his communication with you and/or fellow students? What strategies were successful? What didn't work?

(This interaction should encourage active participation and help you understand what participants know and don't know before you continue with the presentation. Try to use the ideas from participants in later discussions. Be sure to revisit their experiences by the end of the presentation.)

Legal Issues

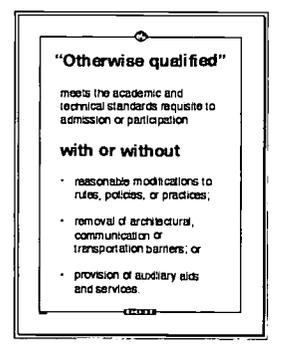
Let's talk about our legal obligations.

**Show visual
8.**



According to Section 504 of the Rehabilitation Act of 1973, "no otherwise qualified individual with a disability shall, solely by reason of his or her disability, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity of a public entity." All postsecondary institutions who receive federal funds (almost all of them!) are covered under Section 504. The Americans with Disabilities Act of 1990 reinforces and extends Section 504 requirements to all postsecondary institutions and other organizations that provide services to the public.

**Show visual
9.**

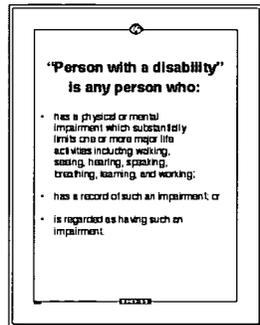


"Otherwise qualified," with respect to postsecondary educational services, means "a person who meets academic standards requisite to admission or participation in the



education program or activity, with or without reasonable modifications to rules, policies or practices; the removal of architectural, communication or transportation barriers; or the provision of auxiliary aids and services.”

Show visual
10.



“Person with a disability” means “any person who has a physical or mental impairment which substantially limits one or more major life activities including walking, seeing, hearing, speaking, breathing, learning, and working; has a record of such an impairment, or is regarded as having such an impairment.”

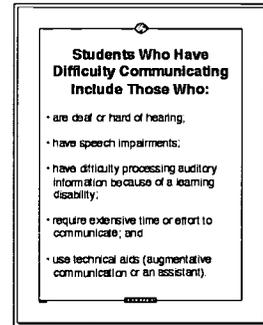
In summary, federal legislation requires that we accept otherwise qualified students with disabilities into academic programs. We must work with students who disclose disabilities to identify and implement reasonable accommodations that will assure equal access to educational opportunities we offer to other qualified students. Experienced staff in our campus office that supports students with disabilities can assist instructors in understanding the effects of disabilities on the learning process. The instructor, campus disabled student services staff, and the student with disabilities can work together to identify and implement appropriate accommodation strategies.

Communication Disabilities

I will discuss examples of how students with some disabilities communicate and learn. Then we will discuss academic accommodations that might be suitable in these situations. I emphasize that these are only examples. The combination of learning styles, abilities, and disabilities are unique to the individual.

Communication can be classified as “expressive” or “receptive.” Expressive communication is the ability to produce speech. Receptive communication is the ability to understand speech.

Show visual
39.



Students who have difficulty communicating in class include those who are deaf or hard of hearing, have speech impairments, have difficulty processing auditory information because of a learning disability, or have physical impairments which affect their speech or language. Often these students require extensive time or effort to communicate and use teaching aids, augmentative communication devices, and/or assistants. Although some of these conditions are obvious, many are not. A student with a mild hearing loss or a language processing disability does not appear different than other students.

Students with the same type of impairment or diagnosis may perform similar tasks with

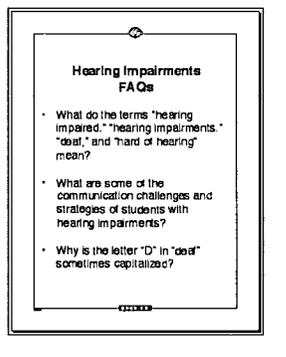


different degrees of success; they may require different accommodations in order to participate in classroom activities. For example, one deaf student might be much better at group discussion and participation than another deaf student who excels at written exams.

Because of the diverse impact similar disabilities have on each student, there are no standard strategies that work with everyone. Flexibility and creativity are key to providing accommodations. The goal is that each student has access to the course content and for you to be able to assess what the student has learned. The student may have developed successful coping strategies during high school or other previous learning environments. Discuss with the student what has worked or not worked in the past before deciding on the best accommodation strategies for your class or program.

Hearing Impairments

Show visual
40.



First, we'll discuss challenges and accommodations associated with students who are "deaf" or "hard of hearing." We'll answer the following questions.

- What do the terms "hearing impaired," "hard of hearing," and "deaf" mean?

- Why is the letter "D" in "deaf" sometimes capitalized?
- What are some of the communication challenges and strategies of students with hearing impairments?

(Teaching activity suggestion: For the first sentence below, speak normally. Gradually, speak quieter. During the last sentence, just move your mouth without using sounds. After the audience is silent or wondering for a moment, restate using normal volume. Discuss reactions with the audience.)

"Hearing impairment" is a generic term that includes the entire range of hearing loss, from mild to profound. Hearing loss is generally measured by an audiogram, which determines the loudness (decibel level) and frequency (hertz) at which a person can and cannot hear. A student with a measured level of hearing loss could be categorized as hearing impaired, but this term does little to describe the specific level of hearing loss.

People who are "hard of residual hearing" rely a great deal on their residual ability to hear. Most hard of hearing students can follow one-to-one conversations but have a more difficult time communicating in groups or understanding lectures. Hard of hearing students might only be able to hear parts of audio or videotaped information. They usually wear hearing aids and use technology aids to amplify and clarify sounds. They may be able to connect their hearing aids to output devices. For example, a computer usually has a place to attach earphones, as do some videotape and audiotape players. Some students who are hard of hearing may prefer seeing printed text or using a sign language interpreter.



Some people who have a hearing loss use American Sign Language (ASL) as their primary communication method.

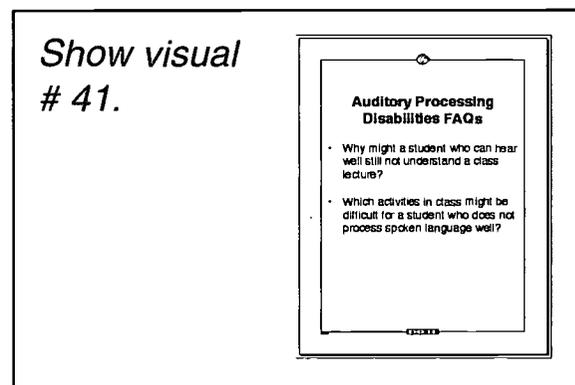
“Deaf” students have a very limited or no ability to understand sounds, even with amplification. Students who are deaf cannot hear audiotapes, film narration, sound effects, or environmental noises without assistance. Lectures and group communication may be especially difficult to follow. They generally depend on visual information to understand content. Visual information includes sign language, printed text, handwritten notes, captioning, a computer screen, and speech (lip) reading. Although some deaf students can speak, many do not use speech to express their ideas, especially if their primary communication method is sign language. Instead, they write, type, and/or use sign language to communicate with others.

Most students with hearing impairments experience fatigue as they watch intently or “listen hard.” Consequently, students who have hearing impairments may have difficulty with lectures or activities lasting more than two hours.

When the term “Deaf” is capitalized in literature, it ascribes a cultural identity to the group, much like an ethnicity. Those who choose to affiliate significantly with other ASL users as members of “Deaf culture,” have a sense of identity and pride in being a part of the ASL language community. This affiliation, however, does not necessarily mean that the person is profoundly deaf. Deaf students who have Deaf parents or who attended schools for individuals with hearing impairments are more likely to see themselves as part of the

Deaf community than deaf students with hearing parents or who have attended regular schools.

Auditory Processing Disabilities



Other types of disabilities, besides hearing impairments, affect communication with others. Next, we’ll discuss auditory processing disabilities.

A student who has a brain injury or a specific learning disability may speak and hear sounds quite well. However, if this student has an auditory processing disability, he might not readily or efficiently understand the meaning of the words spoken by an instructor. Accents, fast pace, and new terminology can further complicate processing of the information. This student may be able to read written text or understand visual information that is inaccessible to him aurally.

A student with difficulty processing auditory information may not be able to follow extensive verbal instructions or lectures, but may perform well on manual and written tasks. He may not be able to fully participate in a group discussion or question and answer session without appropriate accommodations.



Speech Impairments

Show visual #42.

Speech Impairments FAQs

- What are some examples of speech impairments?
- When a student cannot speak well, what does that mean about his or her ability to understand?
- What academic situations might create challenges for someone who has difficulty speaking?

Now let's discuss speech impairments and how they affect communication.

Although some students might hear and understand everything that is happening in your classroom, their contribution may be limited because they cannot participate through speech. For example, students who have Cerebral Palsy or certain types of brain injuries may experience difficulties making their ideas clear through speech. Sometimes only close friends and family members can understand their speech. There is still a great deal of stigma associated with speech disabilities related to a misconception that intelligence is somehow correlated with clarity of speech.

People who have speech impairments may choose not to use their own voices if they expect they will not be understood. Some use computer-based communication systems that allow them to communicate with a synthesized voice. With these devices students can complete oral exams, oral presentations, and participate in group discussions.

Other Communication Disabilities

Show visual #43.

Speech Impairments FAQs, continued

- If speech, hearing and auditory processing are normal, why else might a student have problems communicating in class?
- What situations could be difficult for a student with communication difficulty?

Although most of the origins of communication-related disabilities are speech, language, or hearing impairments, there are other reasons a student might have difficulty communicating.

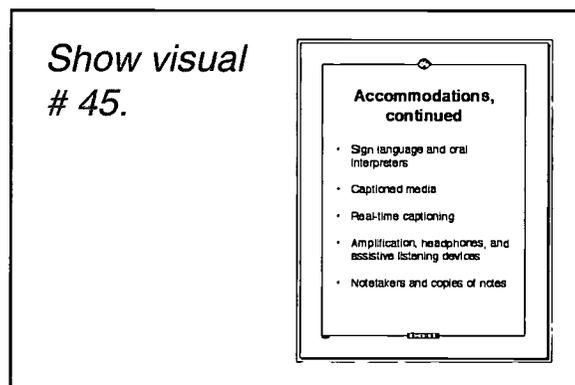
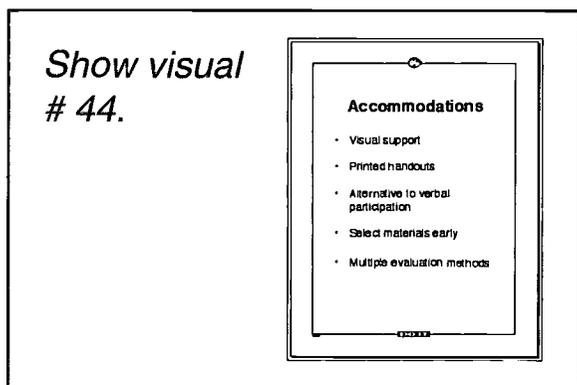
A student with a significant phobia or an anxiety disorder may take extended time to begin speaking in public. The same student might also experience a great deal of difficulty answering a question posed to him in a small group situation. Some students who have chronic medical conditions such as asthma or cancer may simply need extra time to express themselves verbally. Side effects of medications or difficulties breathing can also impact spontaneity in speaking. Even students without diagnosed disabilities may be shy or unwilling to participate verbally in class, even though they are paying attention and following all of the information presented verbally.

Accommodation Strategies

Communication in class can present minor or major barriers to students with a range of disabilities. Making classes more accessible to these students can also help other students learn as well. We'll discuss some general strategies that can facilitate classroom communication.



- Add a statement to your syllabus inviting students who have disabilities to discuss their needs and accommodation strategies with you. Read the statement out loud to the class as well.
- Ask a student who has identified himself as having a specific disability to share with you what strategies have worked and what accommodations will be useful to him in your class.
- Use the disability support services available on campus as a resource. The student should provide documentation of disabilities to this office. You may receive a letter from this office discussing reasonable accommodations for the student.
- If your classroom activities involve verbal participation, provide alternatives or support for students who have difficulty speaking. For example, the student could prepare the printed materials needed for a group presentation or project.
- Select course materials and media early so that if captioning or alternate formats are required, they can be procured in a timely manner.
- Use multiple or alternative methods for evaluating student achievement. Provide different ways to test learning and submit assignments (e.g., written or oral formats, projects, in-class participation).



Here are some specific strategies that can minimize the effect of a communication-related disability of a student in your class.

- If you plan to lecture or use primarily auditory delivery, ensure that you use adequate visual support such as overhead transparencies or a computer-based projection system.
- Provide printed handouts with key content before or at the beginning of class.

Sign Language and Oral Interpreters

Some students who have hearing impairments require the presence of an interpreter at the front of the classroom. A professional interpreter is trained to translate spoken English (and other languages) into sign language. If the student cannot speak, the interpreter will also "reverse interpret" or voice what the student signs. Sign language interpreters often work in pairs so that they can take turns to prevent physical and mental fatigue. The support services office for students with disabilities typically schedules sign language interpreters for students.



If the student does not know sign language but needs to be able to lip-read consistently, an oral interpreter is sometimes used. Oral interpreters are trained professionals who understand which words are visible on the lips and make spoken language more accessible to a lip-reading deaf student. Sometimes oral interpreters fingerspell and/or gesture to help the student follow conversations.

Interpreters are not allowed to add or change anything they interpret. However, they must sometimes ask the instructor for clarification or repetition of a word or phrase in order to provide the student with accurate and complete class content.

When a student who does not speak has a question, adequate time needs to be given so that he can sign the question to the interpreter. Time also needs to be taken following your answer to allow the student to seek further clarification.

Normal pacing of presented content is usually appropriate when an interpreter is used. However, speak slower when reading passages out loud and when using technical terms. Discuss options for training and orientation of interpreters (with the disabled student services office). It is also recommended that you take time before the presentation to discuss presentation content and other relevant issues with the interpreters. Sign language interpreters are there not only for the student, but also for the instructor and fellow students.

Captioned Media

When showing films or videos, it is important to use a captioned version that provides access to the audio content using text. Captioning, in contrast to a transcript, has the advantage of presenting both video

and text together so that individuals who are deaf or hard of hearing can follow the video. Research has also demonstrated that students who are learning English as a second language benefit from seeing the English subtitles while hearing the audio. If you are not able to get a captioned version of the media, it might be necessary to provide a transcript or printed summary of the spoken information, or to use a sign language interpreter during the presentation. Students who are deaf, hard of hearing, or have difficulty processing spoken language might need extra time to process this information as they cannot watch the video or film and read the text at the same time.

Real-Time Captioning

Court reporting techniques have been adapted to classroom use so that people who rely on text to communicate have instant access to spoken words. Real-time captioning requires a trained professional to enter what is spoken into computer-based equipment; the system presents text on a computer monitor for the student to read. Sometimes these systems also provide a note-taking service by giving the student an electronic or printed version of the presentation or group discussion. These systems are particularly useful for students who are deaf, yet for whom written English is a strength.

Amplification, Headphones, and Assistive Listening Devices

In large lecture halls a microphone and normal amplification might assist students who do not use personal listening devices. People who have difficulty processing sounds because of hearing loss or learning disabilities may benefit from using headphones, which directly transmit sound to the ears and block out environmental

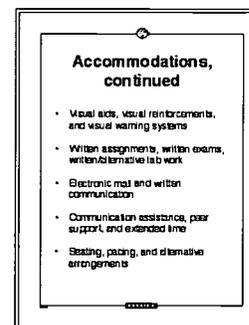


noise. People who are hard of hearing may benefit from assistive listening devices such as FM systems, Infrared transmissions, and loops. These devices are designed to bring sound directly to the ear or hearing aid from a transmitted location. Students using any type of headphone or hearing aid that is receiving from the microphone will not hear background noise. This would include comments from other students. Therefore, if any of these methods are used, it is important to repeat questions or comments directly into the microphone. Repeating questions, comments, and key points is beneficial for students with and without hearing impairments.

Note-Takers and Copies of Notes

For some students, listening requires all their energy. Intense concentration is needed to follow the sign language interpreter, to lip-read the instructor, or to process what is being heard. These students are often unable to write notes as well as maintain attention to the spoken information. It is important for these students to have access to notes and to classroom discussions. Providing accommodations such as a sign language interpreter or FM system does not replace the need for notes in the same class. Student note-takers are often recruited and trained to provide the student who has a disability with detailed notes. Sometimes instructors agree to give the student printed or electronic copies of lecture notes.

Show visual # 46.



Visual Aids, Visual Reinforcements, and Visual Warning Systems

As well as benefiting most students, the use of visual information is a specific accommodation strategy for students with auditory processing difficulties. Visual examples, icons, diagrams, colored charts, and illustrations often reinforce information delivered verbally. Since, in most cases, a great deal of information is presented verbally, it is helpful for instructors to make references, images, or information available outside the class that reinforces what was taught verbally. These materials could include on-line resources as well as printed handouts. For some students speech is simply too difficult to follow and written or visual alternatives are required.

For students who cannot hear, it is also important that any auditory warning signals for fire, smoke, or other purposes be made available in a visual form (for example, using a strobe light). This is especially important for students working in isolated labs, study rooms, or audio video/computer work areas.

Written Assignments, Written Exams, Written/Alternative Lab Work

Most students with speech disabilities can complete required homework as assigned. When an accommodation is arranged, it is usually needed for the process of complet-



ing or delivering the assignment. For example, a student who was expected to make an oral presentation might be allowed to use an interpreter or hand in a written assignment. An exam that is normally given orally could be redesigned in written form. Work that is normally done using audio-tapes might be done in writing. Make sure that assignments and tests assess the students' abilities and knowledge, not their hearing and speech.

Electronic Mail and Written Communication

Classroom comments and student questions can be made via e-mail or handwritten notes if verbal communication in class is difficult. These options are especially useful if anxiety or voice production is a problem. They allow the student more time and avoids the problem of speaking out loud in public during class.

Communication Assistance, Peer Support, and Extended Time

A third party might be able to provide support to a person with a communication disability. This person might be someone trained to interpret a speech pattern, read the communication board of a non-speaker, or simply help a person make words more clear. Sometimes a student with a disability may benefit from a peer or fellow student providing this support. However, this strategy should only be used with prior agreement from both students. Never put students on the spot or breach confidentiality by identifying a student with a disability in need of support.

Extended time is often needed for communicating orally or in writing if devices are used. Extended time accommodations for assignments or exams should be arranged through the disabled student services office on campus.

Seating, Pacing, and Alternative Arrangements

Most students with hearing impairments will want to sit near the front of the room to lip-read an instructor, read real-time captioning, or watch an interpreter. In situations with circles or nontraditional seating arrangements, the student may have to sit across from the instructor with the interpreter or real-time captioner sitting in the middle. Students may also prefer to sit away from doors or windows that bring in outside noise. A student using an assistant will need an extra seat for this person. A student using technical aids may need to sit near power outlets or close to a specific piece of equipment.

If possible, arrange for a slower paced question and answer period or discussion within class time. Simply slowing the pace slightly can facilitate the participation of some people with communication disabilities. You could also provide alternatives such as smaller groups, seminars, or one-to-one opportunities so that the benefits of interaction are not lost for the student who cannot participate in large class discussions.

As you may have noticed, some accommodations require technology, others require trained professionals, but many simply require creativity and flexibility on the part of the instructor and the student.

Discussion Questions

(Discuss questions of interest to the audience. They may include the following:)

1. Based on what we have discussed today, is there anything you would do differently with the students with communication-related disabilities you have worked with previously?



2. What do you think could be done by the department or the individual instructor to make courses and programs more accessible to students with disabilities that involve communication?
3. Who should coordinate or implement these actions?

Case Study

(Consider having participants discuss a case. Case #1 on page 67 in the Presentation Tips section of this notebook would be appropriate.)

Conclusion

Communicating information is an essential part of learning in an academic setting. Creativity and flexibility can assure an equal experience for students who have communication disorders. The best accommodations occur when the student with a disability, his instructor, and support staff work together.

Resources

Show visual # 2 with your campus resources.

Resources

Here are some resources that might be useful to you as you work to maximize effective communication with all students in your classes. *(Elaborate.)*

Show visual # 3.

For comprehensive information on accommodations, a wide range of case studies, frequently asked questions, and general resources, visit *The Faculty Room* at <http://www.washington.edu/doi/Faculty/>. This resource was developed at the University of Washington as part of a nationwide project to provide resources to faculty and administrators so that they can make their courses and programs accessible to all students. You can link to this resource from ____ *(Arrange to make the link from your campus/departmental disabled student services home page before the presentation.)*. Consider linking to this Web site from your departmental Web pages for faculty.

Thank you for your time today and for your interest in finding ways to ensure that all of the students in our programs have equal opportunities to learn, explore interests, and express ideas.



Purpose

After the presentation, faculty and administrators will be able to:

- list typical ways that information is presented at postsecondary institutions (e.g., lectures, printed materials, Web pages, electronic mail, videotapes);
- describe the challenges each mode of information delivery creates for people with different types of disabilities; and
- list solutions to the barriers to obtaining information students with disabilities typically face in academic settings.

Length

Approximately 90 minutes.

Presenter

Department chair, faculty, staff, teaching assistant, student, or other department member who has experience working with technology and with students with disabilities. The program may be co-presented with a staff member of a campus unit responsible for providing academic and/or computing accommodations for students with disabilities.

Preparation

- Select presenter(s).
- Develop presentation outline and activities using the *Sample Script* provided in this section and the ideas listed in the *Presentation Tips* section of this notebook.
- Create overhead transparencies from the overhead transparency templates or use the PowerPoint™ version of the visual aids.

- Add contact information about resources available to your campus to the overhead transparency or PowerPoint slide entitled "Resources" and to printed publications as appropriate.
- Photocopy handout templates, *Working Together: People with Disabilities and Computer Technology* and *World Wide Access: Accessible Web Design*, and create alternative formats as necessary.
- Create and photocopy presentation evaluation instrument (see end of *Institutionalization Strategies* for examples).
- Link from your unit's Web page to *The Faculty Room* at <http://www.washington.edu/doit/Faculty/>.

Equipment and Tools

- VHS VCR and monitor
- visuals: overhead projector and transparencies or LCD projector, computer, and PowerPoint presentation; Internet connection (optional)
- videotapes (open captioned and audio described versions of *Computer Access: In Our Own Words* and *World Wide Access: Accessible Web Design*)
- handouts (*Working Together: People with Disabilities and Computer Technology* and *World Wide Access: Accessible Web Design*)
- presentation evaluation instrument (pages 191-193)

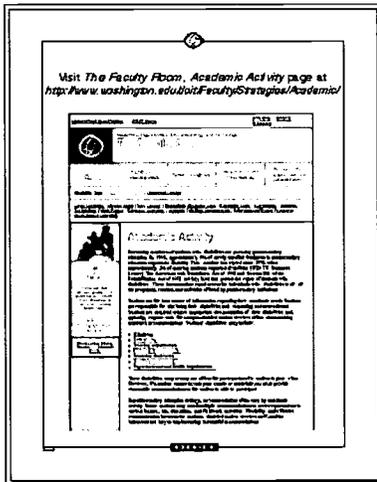


Presentation Outline

1. Distribute handouts.
2. Introductions.
3. Begin presentation.
4. Introduce and play videotapes.
5. Discuss possible accommodation strategies and department/campus issues.
6. Summarize resources.
7. Distribute and collect completed evaluation instruments.

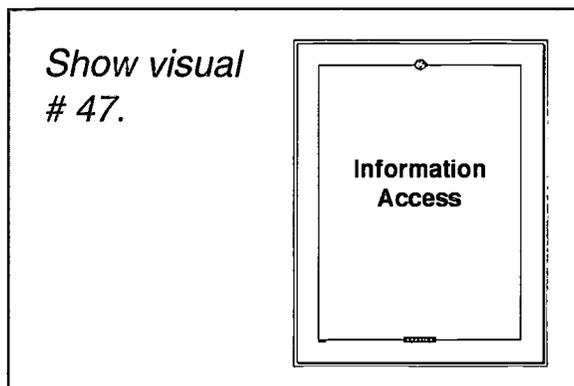
Resources

For further preparation for this presentation, consult *The Faculty Room* at <http://www.washington.edu/doit/Faculty/Strategies/Academic/>.

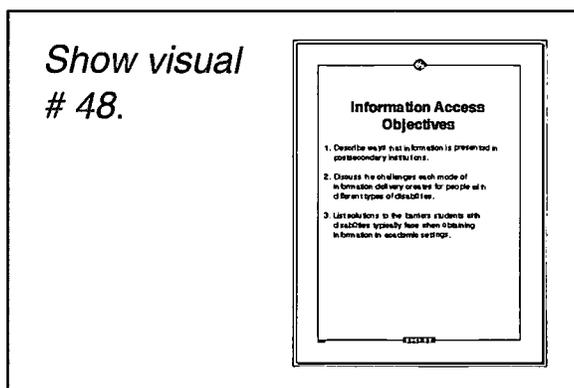




Information Access: Sample Script



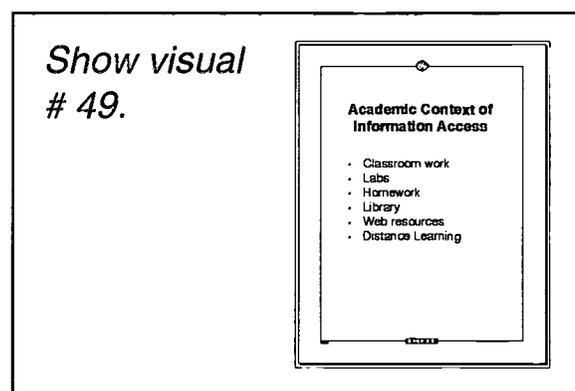
Today we'll be discussing the challenges that people with disabilities face in accessing the information we provide in postsecondary education institutions and the means of ensuring their full access to the content.



The objectives of this presentation are to...
(*Paraphrase objectives on visual.*)

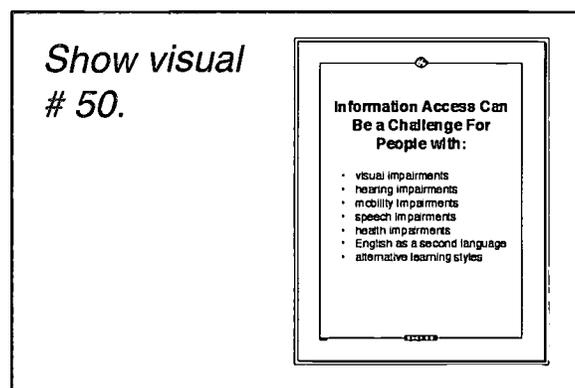
Presentation Modes

Colleges and universities are in the business of sharing information and we do it in many ways, including spoken, printed, video-taped, and Web-based forms.



In our academic programs, we share information through classroom work, labs, homework assignments, library resources, Web pages, and distance learning programs.

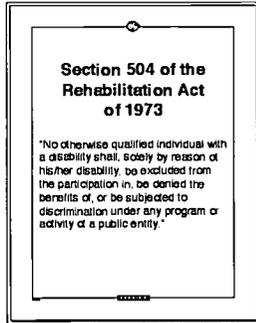
On our campus, the administration provides information to students through processes such as registration and records. We provide information to the public through our many publications and Web pages. How else do we provide information to our students and employees and to the public?
(*Solicit input from participants.*)



Specific methods that we use to impart information are not accessible to some people, particularly those with visual impairments, hearing impairments, mobility impairments, speech impairments, and health impairments. Those whose first language is not English or who have alternative learning styles also face difficulties in accessing some types of information.



**Show visual
8.**

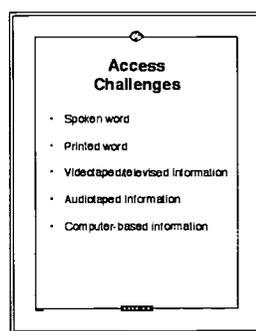


Besides being the right thing to do, in the case of people with disabilities, it is our legal obligation to provide access to all of the programs and services we offer. Section 504 of the Rehabilitation Act of 1973 requires that "no otherwise qualified individual with a disability shall, solely by reason of his/her disability, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity of a public entity."

Access Challenges

Let's look at some of the specific ways we impart information on our campus and the challenges these modes impose.

**Show visual
51.**



Spoken Word

Much information in our classes is presented via the spoken word. Which of our students might have difficulty accessing information in this way and how can we assure access?

(Solicit input from participants to make this portion interactive. Be sure to cover issues related to:

- *Low vision (e.g., enlarge the materials, reformat your electronic documents in large print, send the material in electronic form so that the student can reformat, books on tape).*
- *Blindness (e.g., describing visual aids, technology that can help students take notes, books on tape, electronic text).*
- *Deaf or hearing impaired (e.g., sign language interpretation, real-time captioning, lip-reading, printed information).*
- *Speech impairment (e.g., computer-based communication devices, printed input that allows students with speech impairments to ask questions and participate in discussions, conduct discussions electronically).*
- *Mobility impairment (e.g., group assignments, provide information electronically, preferential seating, books on tape).*
- *Health impairment (e.g., extra exam time, provide information electronically, conduct electronic discussions).*
- *Students with learning disabilities, students for whom English is a second language, and students who are visual learners (e.g., printed information, clear and well-organized information, visual cues, books on tape, electronic text).*



Printed Word

We also impart information to our students via printed word. What access challenges do we create when we deliver information in this way?

(Be sure to cover the following issues in the discussion:

- *Students with low vision will need enlarged text (e.g., use a photocopy machine to enlarge the materials, reformat your electronic documents in large print, or send the material in an electronic format).*
- *Blindness (e.g., providing information in electronic form so that the student can use a computer system with speech output or Braille output, or so that disabled student services can arrange to create the materials in Braille or on tapes).*
- *People with hearing impairments typically do not have challenges accessing the printed word.*
- *People with speech impairments typically do not have challenges accessing the printed word.*
- *Mobility impairment (e.g., benefit from having materials in electronic form if they are unable to manipulate printed materials).*
- *Health impairment (e.g., benefit from having materials in electronic form if they are unable to manipulate printed materials).*
- *Students with learning disabilities, students for whom English is a second language, and students who are visual learners (e.g., create printed information that is clear, well-organized, and includes visuals such as overheads, graphics, and diagrams).*

Videotaped/Televised Information

People with what types of characteristics might have difficulty accessing videotaped or televised information? *(You may want to put up the list of disability types again and go through the list to solicit input that may include learning disabilities and English as a second language, where captioning and transcription can be useful; and blindness, where audio description or having a person describe visual content might be appropriate.)*

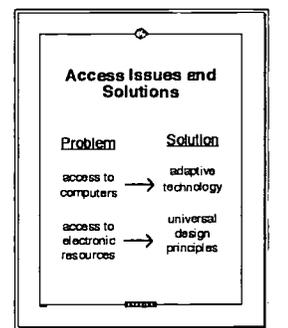
Audiotaped Information

For audiotaped information, a written transcript can be helpful for students with hearing impairments, with learning disabilities, or for whom English is a second language.

Computer-Based Information

For the rest of our time today we will focus on an increasingly common mode for delivering information, computer-based technology. We will discuss the access issues and solutions for specific individuals. There are two levels where access barriers can occur in this case.

Show visual # 52.



The first challenge is gaining access to the computer itself. The second is gaining access to the information delivered via computer. Let's discuss the first challenge. To cover this topic, we will view a videotape where individuals discuss the various ways that



they access computers, some using adaptive (or assistive) technology. Note that this video is captioned, which makes it more accessible to individuals who have hearing impairments, for whom English is a second language, and to those who have learning disabilities. This version of the videotaped presentation is also audio-described. You will notice an additional voice periodically that describes the visual materials for a viewer who is blind.

Show videotape, Computer Access: In Our Own Words (10 minutes).

(Solicit questions and comments from the audience.)

The adaptive technology demonstrated in the videotape provides access to the computer itself. However, the software, including World Wide Web pages, must be designed in such a way that they can be accessed by individuals who use this technology. Providing information on Web pages in accessible format is the right thing to do. The ADA also requires that we make the content of information accessible to individuals with disabilities. A Department of Justice ruling in 1996 clarified that the ADA also applies to information delivered over the Internet. Developing Web pages in an accessible format can also help us avoid expensive redesign at a later time if an individual with a disability needs access to the content.

Now we will view a short video that shows how World Wide Web pages can be designed in such a way that they are accessible to everyone, including people with disabilities and people for whom English is a second language.

Show videotape, "World Wide Access: Accessible Web Design" (11 minutes).

(Solicit questions and comments from the audience.)

Case Study

(Consider having participants discuss a case. Case #5 on page 75 in the Presentation Tips section of this notebook would be appropriate.)

Show visual # 29.

Universal Design =

"The design of products and environments to be usable by all people, without the need for adaptation or specialized design."

Conclusion

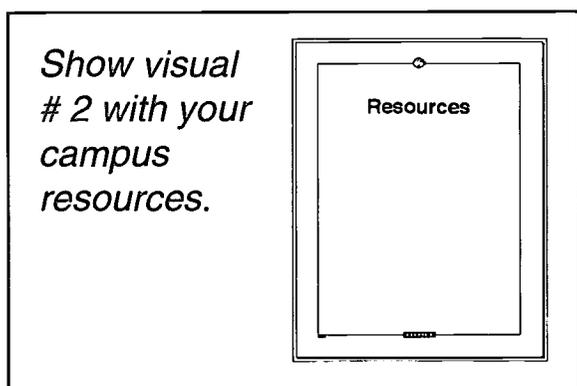
Today we have focused on how we can impart information in a way that makes it accessible to everyone. A good way to conceptualize this topic is to think about it as an application of the principles of "universal design."



Universal design means “the design of products and environments to be usable by all people, without the need for adaptation or specialized design.”

If, in every format used to present information, we think about the variety of characteristics of individuals with whom we want to share this information, we can assure that everyone can access the content.

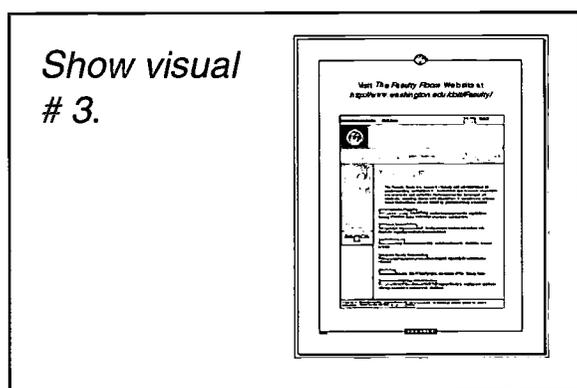
Resources



<http://www.washington.edu/doi/Faculty/>. This resource was developed at the University of Washington as part of a nationwide project to provide resources to faculty and administrators so that they can make their courses and programs accessible to all students. You can link to this resource from ____ (Arrange to make the link from your campus/departmental disabled student services home page before the presentation.). Consider linking to this Web site from your departmental Web pages for faculty.

Thank you for your time today and for your interest in finding ways to ensure that all of the students in our programs have equal opportunities to learn, explore interests, and express ideas.

Here are some resources that might be useful to you as you work to maximize effective communication with all students in your classes. (Elaborate.)



For comprehensive information on accommodations, a wide range of case studies, frequently asked questions, and general resources, visit *The Faculty Room* at



Purpose

After the presentation, faculty and administrators will be able to:

- summarize the legal rights of students with disabilities as they relate to computer access;
- discuss the issues, needs, and concerns of people with disabilities in accessing electronic resources;
- describe common types of adaptive technology for students with disabilities; and
- plan for the procurement of adaptive technology for campus computer workstations.

Modifications/Enhancements

This presentation can be modified or expanded to include more specific information about computer technology for students with sensory, learning, and/or mobility disabilities by using the videotapes and handouts entitled *Working Together: Computers and People with Sensory Impairments*, *Working Together: Computers and People with Learning Disabilities*, and/or *Working Together: Computers and People with Mobility Impairments*.

Length

45 minutes or longer with modifications or enhancements.

Presenter

Department chair, faculty, staff, teaching assistant, student, or other department member who has experience working with technology and students with disabilities. The program may be co-presented with a

staff member of a campus unit responsible for providing computer accommodations for students with disabilities.

Preparation

- Select presenter(s).
- Develop presentation outline and activities using the *Sample Script* provided in this section and the ideas listed in the *Presentation Tips* section of this notebook.
- Add information about resources available to your campus to the overhead transparency entitled "Resources" and to printed publications as appropriate.
- Create overhead transparencies from overhead transparency templates or use PowerPoint™ version of visual aids.
- Photocopy handout template, *Working Together: People with Disabilities and Computer Technology*, *Opening Doors: Mentoring on the Internet* (optional), (and/or those listed under *Modifications/Enhancements* above). Create alternative formats as necessary.
- Create and photocopy presentation evaluation instrument (see *Institutionalization Strategies* for examples).
- Link from your unit's Web page to *The Faculty Room* at <http://www.washington.edu/doit/Faculty/>.



Equipment and Tools

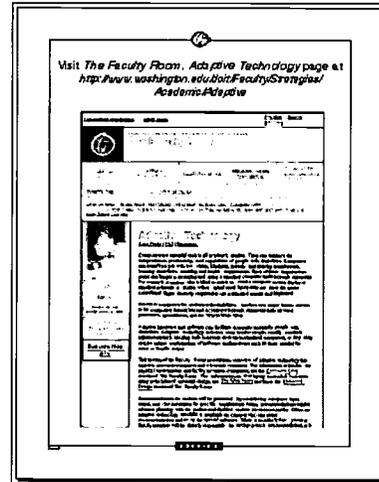
- VHS VCR and monitor
- visuals: overhead projector and transparencies or LCD projector, computer, and PowerPoint presentation; Internet connection (optional)
- videotapes (*Working Together: People with Disabilities and Computer Technology*, *Opening Doors: Mentoring on the Internet* (optional), and/or those listed under *Modifications/Enhancements*)
- handout (*Working Together: People with Disabilities and Computer Technology*, *Opening Doors: Mentoring on the Internet* (optional), and/or those listed under *Modifications/Enhancements*)
- presentation evaluation instrument (pages 191-193)

Presentation Outline

1. Distribute handout.
2. Introductions.
3. Begin presentation.
4. Introduce and play videotape(s) as noted in script.
5. Discuss possible accommodation strategies.
6. Discuss department/campus issues.
7. Summarize resources.
8. Distribute and collect evaluation instrument.

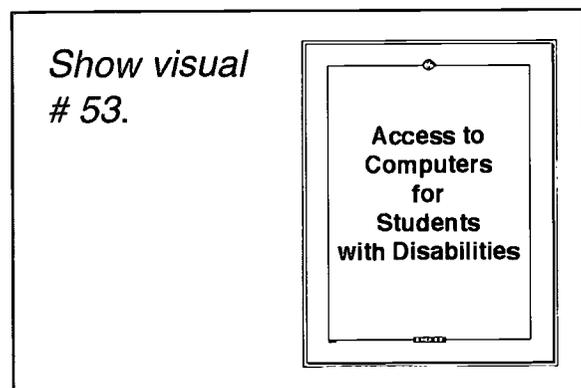
Resources

For further preparation for this presentation, consult *The Faculty Room* at <http://www.washington.edu/doi/Faculty/Strategies/Academic/Adaptive/>.

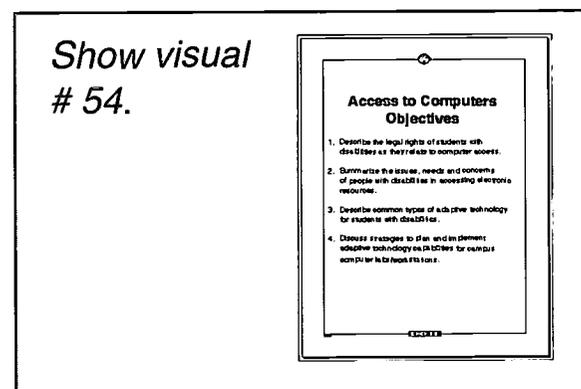




Access to Computers: Sample Script



Today we will be discussing computer access and adaptive (or assistive) technology for students with different types of disabilities.



The objectives in this session include...
(Paraphrase objectives on visual.)

Computer Technology in Postsecondary Education

Computers are essential tools in academic studies and employment. It's difficult to imagine a state-of-the-art university without thinking of computer databases, electronic mail, interactive Web sites, and Internet-based distance learning. Recent advances in assistive technology, greater reliance on computers in many fields, and increased availability and networking of electronic

information resources have resulted in life-changing opportunities for many people with disabilities. In combination, these technologies provide people with disabilities better access to education, careers, and other life experiences that were not available to them in the past. Faculty and administrators can play important roles in assuring access to these empowering tools for students with disabilities.

What are some of the computing resources currently used in your classes or by your department?

(Solicit audience input such as CD-ROM encyclopedias and indexes, on-line catalogs, WWW pages, word processors, spreadsheets, and full-text databases. List items on overhead transparency, blackboard or flip chart.)

The information covered in this presentation will provide you with tools and insights that will help ensure that these resources are accessible to students with disabilities. Today, I will share some success stories that provide examples of the impact that adaptive technology for computers has had for people with disabilities. Then we will consider the most important legislative directives that apply to computer access and look at some statistics about people with disabilities. With that background, a videotape presentation will provide an overview of how people with disabilities use computers.

Today's presentation will help you understand the impact of computer-based technologies for people with disabilities and give you ideas about improving access in your course or department. Much of the information presented today is provided in your handout entitled *Working Together: People with Disabilities and Computer Technology.*



Access to Computers: Case Examples

Show visual # 55.

A graphic titled "Success Stories" listing six individuals and their disabilities:

- Nhi low vision
- Justin blind
- Katie hearing impairment
- Crystal learning disability
- Jeffrey mobility & speech impairment
- Oscar mobility impairment

I'm going to start out today by sharing with you a few stories of people with disabilities who are able to access electronic resources, thanks to the availability of adaptive technology and accessible resources. You'll meet them in the videotape we'll view shortly.

- Nhi has low vision. She uses a computer that has a large screen, as well as a speech output system that reads whatever is on the screen. When she uses her computer she can research a term paper easily and quickly.
- Justin is blind. He uses a portable Braille display and printout system. He is able to type his notes for his college classes using the Braille display and then print them out for his teachers.
- Katie is deaf. She often uses a sign language interpreter. On the Internet, however, Katie communicates with the reference librarian quickly and easily through electronic mail.
- Crystal has a learning disability which makes it difficult for her to read. She uses a speech output system to read the computer screen to her. This helps her

read and understand books for her classes more quickly.

- Jeffrey has a mobility impairment. He uses a keyboard where the keys are enlarged and widely spaced to avoid hitting more than one key at a time.
- Oscar has a mobility impairment. He uses a voice activated system that replaces his keyboard. It allows his computer to write what he says as he speaks into the microphone, allowing him to write his papers on his own. Having this adaptive technology makes him feel more independent; he doesn't have to rely on someone else as much.

Show visual # 56.

A graphic titled "Computers Asslet People with:" listing various disabilities:

- low vision
- blindness
- hearing impairments
- speech impairments
- specific learning disabilities
- mobility impairments
- health impairments

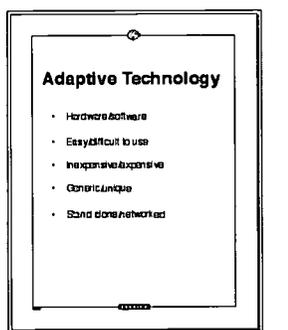
These stories provide examples of students with disabilities who can successfully access computers and electronic resources. You will see more examples in the following videotape presentation. This presentation and the accompanying handout are both entitled *Working Together: People with Disabilities and Computer Technology*. The handout gives an overview of computer access problems and solutions. The video highlights the educational opportunities that access to computers, adaptive technology, software, and the Internet provide to people with specific disabilities.



*Show videotape,
"Working Together: People
with Disabilities and
Computer Technology"
(14 minutes).*

As the individuals in the videotape demonstrate, computers help reduce many barriers faced by people with disabilities. The students in the presentation demonstrate various technologies that make it possible to access computing resources. These are only a few examples, since abilities, disabilities, and learning styles are unique to individuals.

*Show visual
57.*



Adaptive technology can be hardware or software, easy or difficult to use, inexpensive or expensive, generic or unique to an individual, and stand alone or networked. *(Give example of each.)*

(Note: You can modify or expand this presentation to focus on specific disability types by using the videotapes and handouts entitled Working Together: Computers and People with Sensory Impairments, Working Together: Computers and People with Learning Disabilities, and Working Together: Computers and People with Mobility Impairments.)

Example: Mentoring (optional)

Next we will consider an example of an application of computer and Internet technologies that benefits people with disabilities—mentoring. We will view a videotape presentation and review the accompanying handout, both entitled *Opening Doors: Mentoring on the Internet*. The handout gives an overview of the benefits of mentoring on the Internet and of how technology overcomes barriers to the more traditional in-person mentoring. The video highlights how students develop supportive relationships with adult mentors on the Internet.

*Show videotape,
"Opening Doors:
Mentoring on the Internet"
(15 minutes).*

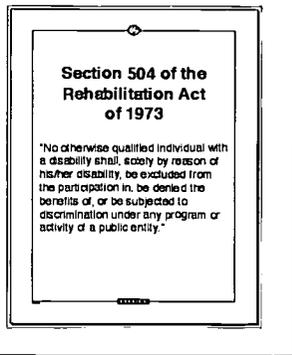
Legal Issues

We'll continue this presentation by talking about legal issues, universal design, and planning for computer access.

Assuring that individuals with disabilities have access to computing resources can be argued on ethical grounds. Some simply consider it to be the right thing to do. Others are more responsive to legal mandates. The Americans with Disabilities Act (ADA) of 1990 requires that people with disabilities be given the same access to public programs and services, including educational programs, that are offered to people without disabilities.

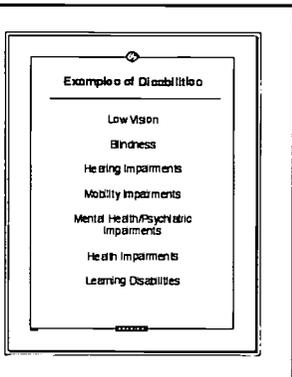


**Show visual
8.**



The ADA is federal civil rights legislation that reinforces and extends Section 504 requirements to all postsecondary institutions. Section 504 of the Rehabilitation Act of 1973 states: "no otherwise qualified individuals with disabilities shall, solely by reason of their disabilities, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination in any program or activity of a public entity." When people think of the ADA they often think of elevators in buildings, reserved spaces in parking lots, and lifts on busses. However, the ADA accessibility requirements apply to people with all types of disabilities and to all programs and resources offered at our institutions, including those offered using computers and the Internet.

**Show visual
11.**



Disabilities covered by legislation include, but are not limited to, spinal cord injuries, loss of limbs, Multiple Sclerosis, Muscular

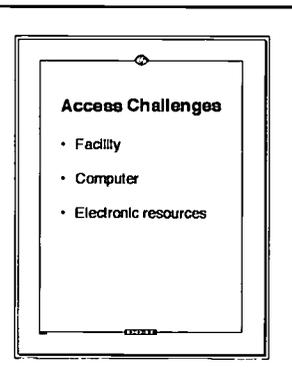
Dystrophy, Cerebral Palsy, hearing impairments, visual impairments, speech impairments, specific learning disabilities, head injuries, psychiatric disorders, Diabetes, Cancer, and AIDS. The conditions listed may limit people's abilities to perform specific tasks. Some of these conditions are readily apparent; some are invisible. Some affect computer use; some do not.

Additionally, some students who have conditions with the same label may have very different abilities when it comes to performing specific tasks. For example, one student who has Cerebral Palsy may have difficulty walking. For another student, Cerebral Palsy may result in no functional use of his hands or voice. Ultimately, a student who has a disability requires accommodations only when faced with a task that requires a skill that his disability precludes. This may include computer access.

Universal Design (optional)

(Include the following content if appropriate for your audience.)

**Show visual
58.**

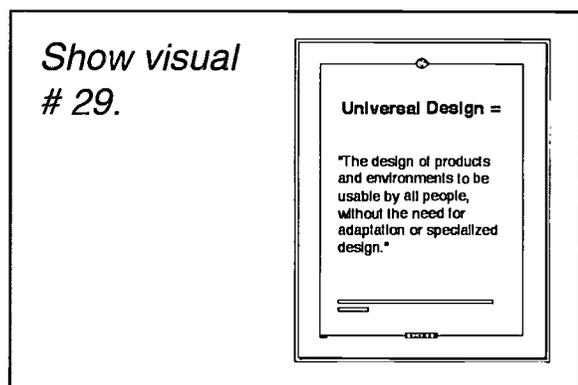


When it comes to using computer resources, individuals with disabilities face access issues in one or more of three areas. The first is access to the computing facility itself. Users must be able to get to the facility and maneuver within it. Secondly, users must be



able to access the computers. When the needed accessibility features are not built into commercial products a wide variety of special hardware and software (called adaptive or assistive technology) provides solutions. For example, people who are blind can equip their computers with software and hardware that will read aloud all text that appears on the screen.

Once computer access barriers are removed, electronic resources such as applications software and World Wide Web pages may present access challenges for some people with disabilities. This problem can be avoided if software and Web page developers employ principles of universal design when they develop their products.



Designing a product or service involves the consideration of myriad factors that include aesthetics, engineering options, environmental issues, safety concerns, and cost. One issue that designers often overlook is that of universal design. In general, universal design refers to designing products and services that can be used by people with a range of characteristics, abilities, and disabilities.

Universal design is defined by the Center for Universal Design at North Carolina State University as "the design of products and

environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design." At this center a group of architects, product designers, engineers, and environmental design researchers collaborated to establish a set of principles of universal design to provide guidance in the design of environments, communications, and products.

General principles of universal design include the design is useful and marketable to people with diverse abilities; the design accommodates a wide range of individual preferences and abilities; the design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities; the design can be used efficiently and comfortably, and with a minimum of fatigue; and appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

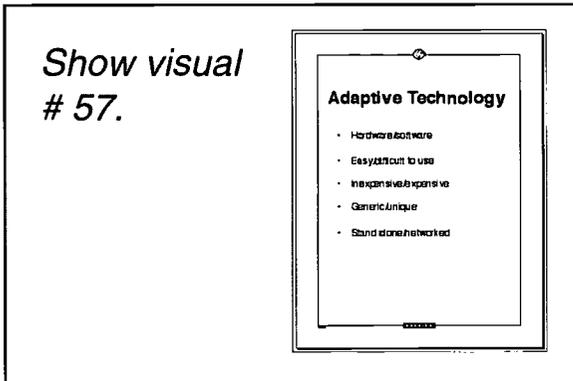
When designers apply these principles, their products meet the needs of potential users with a wide variety of characteristics. Disability is just one of these characteristics. For example, one person could be male, tall, fifteen years old, a poor reader, and blind. All of these characteristics, including his blindness, should be considered when developing a product he might use. In the case of computer design, people with disabilities benefit when computers and software are designed with universal access in mind. Then they can access the computer using built in features or, in some cases, with the addition of standard adaptive technology.



Planning for Computer Access (optional)

(This section is optional; include if appropriate for your audience.)

Computer and network technologies can play a key role in increasing the independence, productivity, and participation of students with disabilities. Now that we've considered various types of adaptive technology, let's think generally about some of the characteristics of adaptive technology to consider as you plan to incorporate such technology into your department.



Adaptive technology comes in many forms with many different characteristics. It comes as hardware, software, or a combination of the two. What examples of hardware and software did you see in the videotape presentation? *(Examples: Jeffrey has a mobility impairment. He uses a keyboard where the keys are enlarged and widely spaced to avoid hitting more than one key at a time. Oscar has a mobility impairment as well, and he uses a voice activated system that replaces his keyboard. It allows his computer to write what he says as he speaks into the microphone, allowing him to write his papers on his own.)*

Adaptive technology can be easy to install or can require long-range planning, analysis of needs and options, and funding for implementation. For example, a trackball is

inexpensive and can be easily added to a workstation, assisting people who have difficulty using a standard mouse. On the other hand, a blind student may use hardware that includes a personal computer, screen reading software, and Braille printer. Setup and support of such a system requires extensive training to use effectively. Adaptive technology can be generic or unique to the individual. For example, screen enlargement software serves people with a variety of visual and learning impairments. On the other hand, a speech input system needs to be trained by an individual user. Each user must train the system to recognize his or her voice.

Adaptive technology software solutions, such as screen enlargement programs, can be installed on one machine or networked so that they are available from more than one computer workstation. Solutions which incorporate hardware are often most appropriate on stand-alone stations. However, if these are stored near computer workstations, they can be easily moved to the particular station a person is using.

Given these characteristics of adaptive technology, multiple approaches should be considered when providing accommodations. Some solutions can be implemented quickly and easily. These solutions will provide quick rewards which will provide the necessary motivation and support for the longer processes required to install more complex equipment and software.

Remember, you don't have to do everything at once. A department can start small and add to their collection of adaptive technology as they receive requests and as staff gain skills in providing training and services for them.



Discussion Questions

(Discuss these and other questions of interest to the audience.)

1. What are the ethical and legal issues related to providing students with disabilities access to computing resources?
2. How would you respond to administrative concerns related to the added costs involved in making campus computing resources accessible to people with disabilities?
3. In our institution, who should be responsible for assuring that computing resources are accessible to individuals with disabilities?
4. What procedures do we have/should we have for responding to accommodation requests from students with disabilities?
5. When should we be proactive and when should we be reactive regarding provision of equipment and software that makes computers accessible to students with disabilities?

Case Study

(Consider having participants discuss a case. Case #2 on page 69 in the Presentation Tips section of this notebook would be appropriate.)

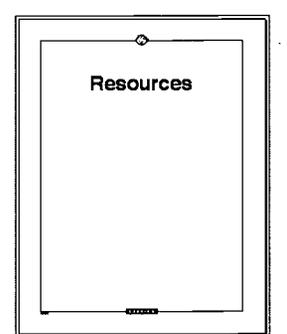
Conclusion

This presentation addressed issues related to adaptive technology. You viewed a videotape and reviewed materials that showed how adaptive technology can assist people with low vision, blindness, hearing impairments, speech impairments, specific learning disabilities, mobility impairments, and health impairments. But remember,

there are two other parts to the access equation—assuring that campus computer facilities are accessible to students with disabilities and using universal design principles to ensure that electronic resources at your school are accessible. Only when all facilities, computers, and electronic resources are accessible can students with disabilities compete for success in academics and careers on a level playing field.

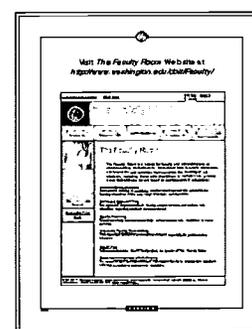
Resources

Show visual # 2 with your campus resources.



Here are some resources that might be useful to you as you work to maximize effective communication with all students in your classes. *(Elaborate.)*

Show visual # 3.



For comprehensive information on accommodations, a wide range of case studies, frequently asked questions, and general resources, visit *The Faculty Room* at <http://www.washington.edu/doit/Faculty/>. This



resource was developed by the University of Washington as part of a nationwide project to provide resources to faculty and administrators so that they can make their courses and programs accessible to all students. You can link to this resource from ____ (*Arrange to make the link from your campus/departmental disabled student services home page before the presentation.*). Consider linking to this Web site from your departmental Web pages for faculty.

Thank you for your time today and for your interest in finding ways to ensure that all of the students in our programs have equal opportunities to learn, explore interests, and express ideas.



Purpose

After the presentation, participants will be able to:

- summarize the legal rights of students with disabilities with regard to computer access;
- plan for making computer services accessible to a wide range of users by applying universal design principles; and
- list steps that can be taken to ensure that students with disabilities have access to campus computer labs.

Length

Approximately 45-60 minutes.

Presenter

Department chair, faculty, staff, teaching assistant, student, or other department member who has experience working with computer facilities and students with disabilities. The program may be co-presented with a staff member of a campus unit responsible for providing computer accommodations for students with disabilities.

Preparation

- Select presenter(s).
- Develop presentation outline and activities using the *Sample Script* provided in this section and the ideas listed in the *Presentation Tips* section of this notebook.
- Create overhead transparencies from overhead transparency templates or use PowerPoint™ version of the visual aids.

- Add information about resources available to your campus to the overhead transparency or PowerPoint slide entitled "Resources" and to printed publications as appropriate.
- Photocopy handout template, *Equal Access: Computer Labs* and create alternative formats as necessary.
- Create and photocopy presentation evaluation instrument (see end of *Institutionalization Strategies* for examples).
- Link from your unit's Web page to *The Faculty Room* at <http://www.washington.edu/doi/Faculty/>.

Equipment and Tools

- VHS VCR and monitor
- visuals: overhead projector and transparencies or LCD projector, computer, and PowerPoint presentation; Internet connection (optional)
- videotape (*Equal Access: Computer Labs*)
Optional videotape (*Access to Computers: In Our Own Words*)
- handout (*Equal Access: Computer Labs*)
- presentation evaluation instrument (pages 191-193)

Presentation Outline

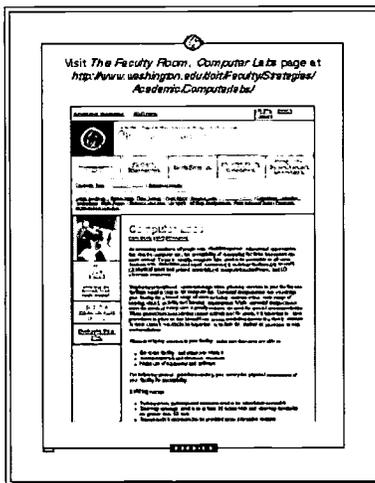
1. Distribute handout.
2. Introductions.
3. Begin presentation.



4. Introduce and play videotape as noted in script.
5. Discuss possible accommodation strategies.
6. Discuss department/campus issues.
7. Summarize resources.
8. Distribute and collect evaluation instruments.

Resources

For further preparation for this presentation, consult *The Faculty Room* at <http://www.washington.edu/doit/Faculty/Strategies/Academic/Computerlabs/>.



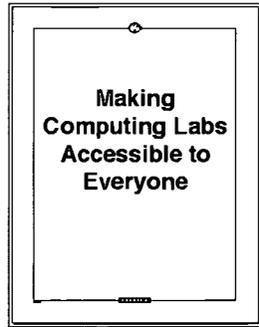
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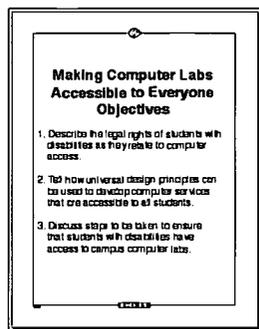
Making Computer Labs Accessible: Sample Script

Show visual
59.



Today we'll be discussing how to make computer labs accessible to all students, no matter what abilities or disabilities they have.

Show visual
60.



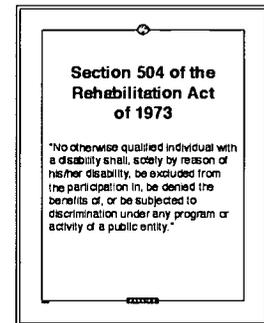
The objectives for this presentation are to...
(Paraphrase objectives on visual.)

Everyone who needs to use your computer lab should be able to do so comfortably. As increasing numbers of people with disabilities pursue educational opportunities that require computer use, access to computing facilities becomes even more critical. The key is to provide equal access.

Legal Issues

Assuring that individuals with disabilities have access to computing resources can be argued on ethical grounds. Some simply consider it to be the right thing to do. Others are more responsive to legal mandates. The Americans with Disabilities Act (ADA) of 1990 requires that people with disabilities be given the same access to public programs and services, including educational programs, that are offered to people without disabilities.

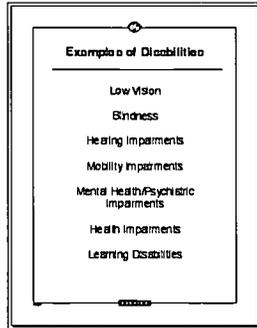
Show visual
8.



The ADA is civil rights legislation that reinforces and extends to all postsecondary institutions the requirements of Section 504 of the Rehabilitation Act of 1973 which states: "no otherwise qualified individuals with disabilities shall, solely by reason of their disabilities, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination in any program or activity of a public entity." When people think of the ADA they often think of elevators in buildings, reserved spaces in parking lots, and lifts on busses. However, the ADA accessibility requirements apply to people with all types of disabilities and to all programs and resources offered at our institutions, including those offered using computers and the Internet.



Show visual # 11.



Disabilities covered by legislation include, but are not limited to spinal cord injuries, loss of limbs, Multiple Sclerosis, Muscular Dystrophy, Cerebral Palsy, hearing impairments, visual impairments, speech impairments, specific learning disabilities, head injuries, psychiatric disorders, Diabetes, Cancer, and AIDS. The conditions listed may limit people's abilities to perform specific tasks. Some of these conditions are readily apparent; some are invisible. Some affect computer use; some do not.

Additionally, some students who have conditions with the same label may have very different abilities when it comes to performing specific tasks. For example, one student who has Cerebral Palsy may have difficulty walking. For another student, Cerebral Palsy may result in no functional use of his hands or voice. Ultimately, a student who has a disability requires accommodations only when faced with a task that requires a skill that his disability precludes. This may include computer access.

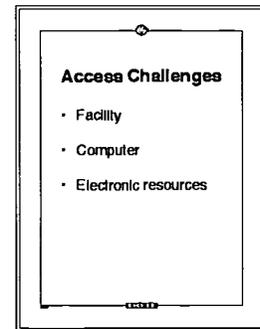
In summary, federal legislation requires that we accept otherwise qualified students with disabilities into our academic programs. Additionally, we should work with students to identify and implement academic accommodations which will ensure that they have educational opportunities equal

to those of their peers without disabilities. Ensuring access to computers and information technology is also an important step in leveling the playing field for students with disabilities in postsecondary institutions.

The rest of today's presentation will help you develop an understanding of access challenges, universal design principles, and strategies to create accessible computer labs for all students.

Access Challenges

Show visual # 58.



When it comes to using computer resources, students with some disabilities face access issues in one or more of three areas. The first is access to the computing facility itself. Students must be able to get to the facility and maneuver within it. Secondly, they must be able to access the computer. When the needed accessibility features are not built into commercial products, a wide variety of special hardware and software, "adaptive" (or "assistive") technology, provides solutions. For example, people who are blind can equip their computers with software and hardware that will read aloud all text that appears on the screen.

(If you would like your audience to gain an overview of ways individuals with disabilities access and use computer technology, show the videotape Access to Computers: In Our Own Words.)



Once computer access barriers are removed, electronic resources such as applications software and World Wide Web pages may present access challenges for some people with disabilities. This problem can be avoided if software and Web page developers employ principles of universal design when they develop their products. The first challenge, computer lab access, is the topic of our presentation today.

Universal Design

Show visual # 29.

Universal Design =

"The design of products and environments to be usable by all people, without the need for adaptation or specialized design."

We'll start by talking about principles of universal design. Designing a product or service involves the consideration of a myriad of factors that include aesthetics, engineering options, environmental issues, safety concerns, and cost. One issue that designers often overlook is "universal design." In general, universal design means designing products and services that can be used by people with a range of characteristics, abilities, and disabilities.

Universal design is defined by the Center for Universal Design at North Carolina State University as "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design." At this center, a group of architects, product designers, engineers, and environmental design researchers collaborated to establish

a set of principles of universal design to provide guidance in the design of environments, communications, and products.

General principles of universal design include the design is useful and marketable to people with diverse abilities; the design accommodates a wide range of individual preferences and abilities; the design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities; the design can be used by individuals with a wide variety of characteristics. Disability is just one of these characteristics. For example, one person could be male, tall, fifteen years old, a poor reader, and blind. All of these characteristics, including his blindness, should be considered when developing a product he might use. In the case of your computer lab, rather than design your facility for the average user, design it for people with a broad range of abilities. Keep in mind that individuals using your computing lab may have learning disabilities or visual, speech, hearing, and mobility impairments.

Accessible Computer Labs

Show visual # 61.

Make Sure Computer Lab Users Can:

- get to the facility and maneuver within it;
- access materials and electronic resources; and
- make use of equipment and software.

As you plan services in your computing facility, consider all of your potential users, including those with disabilities. Make sure lab users can:



- get to the facility and maneuver within it;
- access materials and electronic resources; and
- make use of equipment and software.

Also, make sure that staff are trained to support people with disabilities and have a plan in place to respond to specific requests in a timely manner. With these goals in mind, you can make your lab accessible to everyone. Let's watch a videotape presentation, *Equal Access: Computer Labs*, to learn about the challenges and solutions for designing an accessible facility. Then we'll review some of the guidelines listed in your handout with the same title.

Show videotape, "Equal Access Computer Labs" (11 minutes).

You can use the list of guidelines in the handout as a starting point for surveying your computer facility for accessibility. Designing an academic or work area that is accessible to everyone begins with the physical environment of the facility. Ask the following questions when determining how to make your facility more accessible (*have participants refer to handout*):

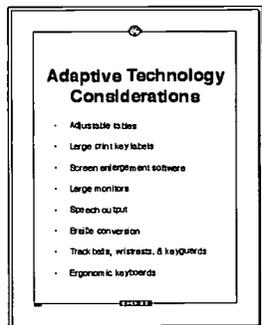
- Is the lab wheelchair accessible?
- Are doorway openings at least 32-inches wide and are doorway thresholds no higher than 1/2-inch vertically?
- Are aisles kept wide and clear for wheelchair users? Have protruding objects been removed or minimized for the safety of the users who are visually impaired?
- Are printed materials within reach from a variety of heights and not blocked by furniture?
- Are all levels of the computer facility connected? Are ramps and/or elevators provided as an alternative to stairs? Do elevators have both auditory and visual signals for designating floors? Are elevator controls marked in large print and Braille or raised letters? Can people seated in wheelchairs easily reach all of the elevator controls?
- Are wheelchair-accessible restrooms with well-marked signage available near the lab?
- Are service desks wheelchair accessible?
- Are there ample high-contrast, large print directional signs throughout the lab?
- Is equipment marked with large print and/or Braille labels?
- Are hearing protectors and quiet areas available for users who are distracted by noise and movement around them?
- Is at least one table for each type of computer adjustable so that a student or an employee who uses a wheelchair can type comfortably? Can users in wheelchairs reach the adjustment controls?
- Are wrist rests available for those who require extra wrist support while typing?
- Are document holders available to help position work papers so that they can be easily read?



- Is there a closed-circuit TV available to enlarge documents and user guides for lab users with low vision?

In a computer lab, it is desirable to provide options at a computer workstation that will address the needs of a variety of users. You should also have procedures in place to deal with specific needs that these general solutions cannot address. Include the students in discussions to come up with creative, simple solutions. For example, in the videotape presentation, you saw Mitch, whose health impairment required him to lay on his side for a month. Staff turned Mitch's monitor on its side and built a holder for his keyboard so that he could use it independently.

Show visual # 62.



Remember, you don't have to do everything at once. Start small and add to your collection of adaptive technology as you receive requests and as computer lab staff gain skills in providing training and services. Here is a sample of the adaptive technology you might want to purchase in order to get started right now. As you review this sample list, describe the types of adaptive technology, if any, currently available in your facility. This list is also in your handout. Include:

- at least one adjustable table for each type of electronic resource provides access to patrons who use wheelchairs;
- large-print key labels assist patrons with low vision;
- software to enlarge screen images provides access to patrons with low vision and learning disabilities;
- large monitors of at least 17-inches assist patrons with low vision and learning disabilities;
- a speech output system can be used by patrons with low vision, blindness, and learning disabilities;
- Braille conversion software and a Braille printer can provide Braille output for patrons who are blind;
- trackballs provide an alternative for those who have difficulty controlling a mouse. Wrist rests and keyguards assist patrons with limited fine motor skills; and
- different types of ergonomic keyboards are available to assist those with a variety of needs. Compact keyboards are available for those with limited range of motion.

(Encourage participants to share their ideas.)

Discussion Questions

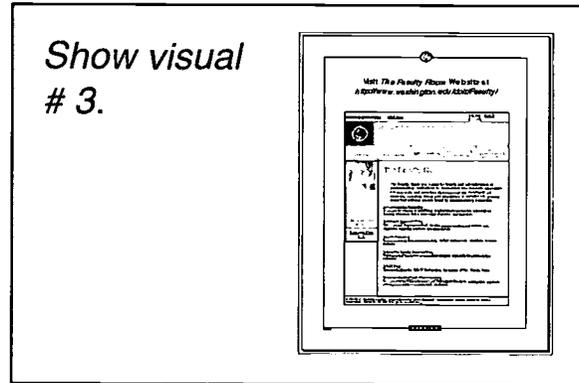
(Discuss the following and other appropriate questions with the group.)

1. What are the ethical and legal issues related to providing students with disabilities access to resources in our computer labs?
2. How would you respond to administrative concerns related to the added costs involved in making computer labs accessible to people with disabilities?



3. In our institution, who should be responsible for assuring that computing resources are accessible to individuals with disabilities?
4. What procedures do we have/should we have for responding to accommodation requests from students with disabilities?
5. What changes can we make now so that our computer labs are more accessible to students with disabilities?

Here are some resources that might be useful to you as you work to maximize effective communication with all students in your classes. (*Elaborate.*)



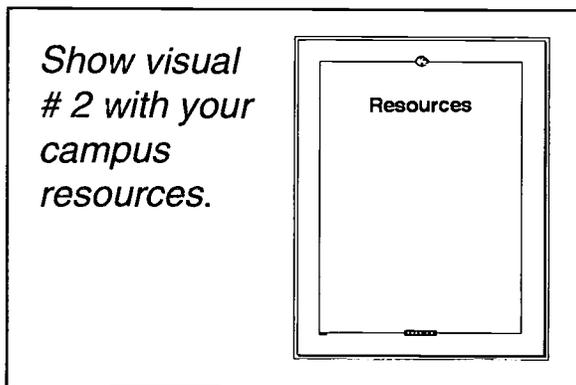
Case Study

(Consider having participants discuss a case. Case #2 study on page 69 in the Presentation Tips section of the notebook would be appropriate.)

Conclusion

Making your computing resources accessible to all students, including those with disabilities, is a legal requirement and the right thing to do. Employing universal design principles as you plan for users with a broad range of abilities and disabilities will reduce the need for special accommodations as people with disabilities access your facility.

Resources



For comprehensive information on accommodations, a wide range of case studies, frequently asked questions, and general resources, visit *The Faculty Room* at <http://www.washington.edu/doi/Faculty/>. This resource was developed at the University of Washington as part of a nationwide project to provide resources to faculty and administrators so that they can make their courses and programs accessible to all students. You can link to this resource from ____ (*Arrange to make the link from your campus/departmental disabled student services home page before the presentation.*). Consider linking to this Web site from your departmental Web pages for faculty.

Thank you for your time today and for your interest in finding ways to ensure that all of the students in our programs have equal opportunities to learn, explore interests, and express ideas.



Purpose

During this presentation, faculty and administrators will become more aware of:

- potential barriers to access information on World Wide Web pages for students with disabilities;
- their institutions legal responsibilities for ensuring equal access to information presented on Web pages;
- universal design guidelines for developing accessible Web pages; and
- universal design principles for developing World Wide Web pages and other electronic resources.

Length

Approximately 45-60 minutes.

Presenter

Department chair, faculty, staff, teaching assistant, student, or other department member who has an understanding of technology used by students who have disabilities and of key elements of accessible Web page design. This presentation may be presented or co-presented by a staff member of a campus unit responsible for providing academic accommodations for students with disabilities and a Web page developer.

Preparation

- Select presenter(s).
- Develop presentation outline and activities using the *Sample Script* provided in this section and the ideas listed in the *Presentation Tips* section of this notebook.

- Create overhead transparencies from the overhead transparency templates or use the PowerPoint™ version of the visual aids.
- Add contact information about resources available to your campus to the overhead transparency or PowerPoint slide entitled "Resources" and to printed publications as appropriate.
- Photocopy handout template, *World Wide Access: Accessible Web Design*, and create alternative formats as necessary.
- Create and photocopy presentation evaluation instrument (see end of *Institutionalization Strategies* for examples).
- Link from your unit's Web page to *The Faculty Room* at <http://www.washington.edu/doi/Faculty/>.

Equipment and Tools

- VHS VCR and monitor
- visuals: overhead projector and transparencies or LCD projector, computer, and PowerPoint presentation; Internet connection (optional)
- videotapes (*Computer Access: In Our Own Words* and *World Wide Access: Accessible Web Design*)
- handouts (*Working Together: People with Disabilities and Computer Technology* and *World Wide Access: Accessible Web Design*)
- presentation evaluation instrument (pages 191-193)

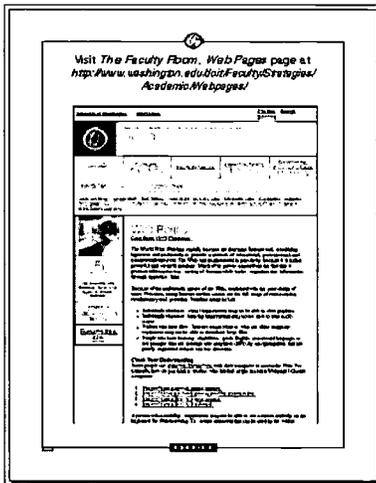


Presentation Outline

1. Distribute handouts.
2. Introductions.
3. Begin presentation.
4. Introduce and play videotape as noted in the script.
5. Discuss department/campus issues.
6. Summarize resources.
7. Distribute and collect evaluation instruments.

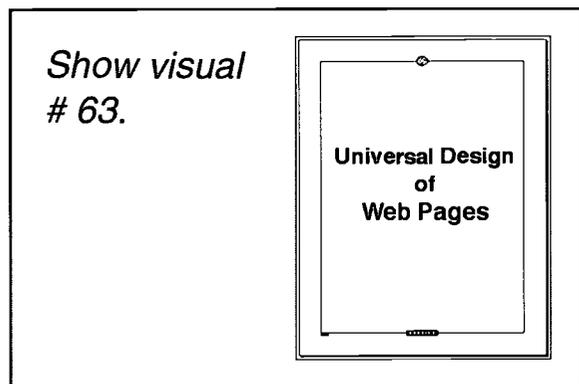
Resources

For further preparation for this presentation, consult *The Faculty Room* at <http://www.washington.edu/doi/Faculty/Strategies/Academic/Webpages/>.

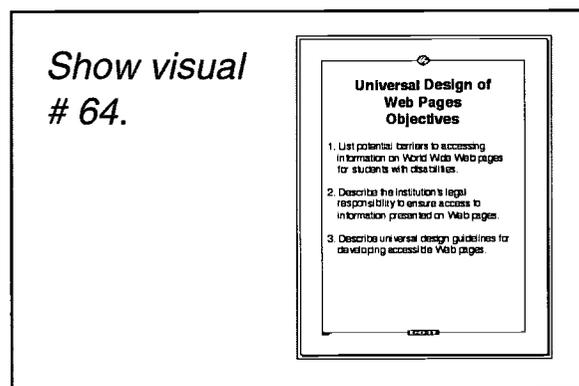




Universal Design of Web Pages: Sample Script



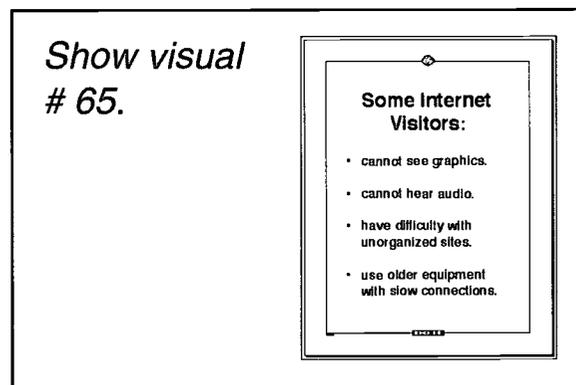
Today we'll be discussing the universal design of Web pages to allow access for all people regardless of their abilities or disabilities.



The objectives of today's presentation are to... (*Paraphrase objectives on visual.*)

The World Wide Web has rapidly become a popular tool for educators. On their Web pages, faculty members post syllabi and other course materials and provide links to useful resources for students. The Web has mushroomed in popularity because it is such a powerful and versatile medium. Much of its power comes from the fact that it presents information in a variety of formats while also organizing that information through hypertext links. Unfortunately, due to the multimedia nature of the Web

combined with the poor design of some Web sites, many students and other Web users cannot use the full range of resources this revolutionary tool provides.



For example, some visitors cannot see graphics because of their visual impairments or cannot hear audio because of hearing impairments. Some users have difficulty navigating sites that are poorly organized with unclear directions because they have learning disabilities, speak English as a second language, or are younger than the average user. Other visitors use older equipment or slow connections or modems that limit access to multimedia features.

Some students use "adaptive" (or "assistive") technology with their computer to access the Web. For example, a student who is blind may use a speech output system to read aloud text that is presented on the screen. This system may be composed of screen reading software and a voice synthesizer. A person with a mobility impairment may not be able to use a mouse and relies on the keyboard for Web browsing.

We will now view a videotape where individuals discuss various ways that they access computers, some using adaptive technology.



*Show videotape,
Computer Access: In Our
Own Words (10 minutes).*

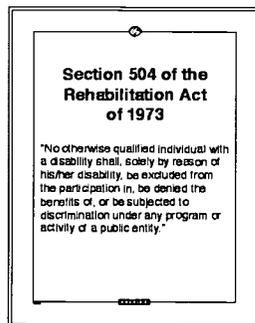
It is important to keep in mind that the people in this videotape might be accessing your Web site. To create resources that can be used by the widest spectrum of potential visitors rather than an idealized average, Web page designers should apply "universal design" principles. They should consider the special needs of individuals with disabilities, individuals older or younger than the average user, people for whom English is a second language, and those using outdated hardware and software.

Legal Issues

Assuring that individuals with disabilities have access to computing resources can be argued on ethical grounds. Some simply consider it to be the right thing to do. Others are more responsive to legal mandates.

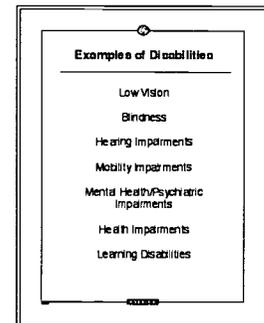
The Americans with Disabilities Act (ADA) of 1990 requires that people with disabilities be given the same access to public programs and services, including educational programs, that are offered to people without disabilities.

*Show visual
8.*



The ADA is civil rights legislation that reinforces and extends the requirement of Section 504 of the Rehabilitation Act of 1973 that "no otherwise qualified individuals with disabilities shall, solely by reason of their disabilities, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination in any program or activity of a public entity." When people think of the ADA they often think of elevators in buildings, reserved spaces in parking lots, and lifts on busses. However, the ADA accessibility requirements apply to people with all types of disabilities and to all programs and resources offered at our institutions, including those offered using computers and the Internet.

*Show visual
11.*

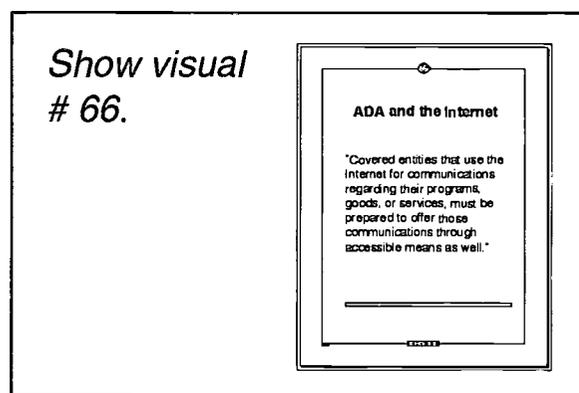


Disabilities covered by legislation include, but are not limited to, spinal cord injuries, loss of limbs, Multiple Sclerosis, Muscular Dystrophy, Cerebral Palsy, hearing impairments, visual impairments, speech impairments, specific learning disabilities, head injuries, psychiatric disorders, Diabetes, Cancer, and AIDS. The conditions listed may limit people's abilities to perform specific tasks. Some of these conditions are readily apparent; some are invisible. Some affect computer use; some do not.

Additionally, some students who have conditions with the same label may have



very different abilities when it comes to performing specific tasks. For example, one student who has Cerebral Palsy may have difficulty walking. For another student, Cerebral Palsy may result in no functional use of his hands or voice. Ultimately, a student who has a disability requires accommodations only when faced with a task that requires a skill that his disability precludes. This may include computer access.



The Department of Justice has clarified that the ADA applies to Internet resources in that, "covered entities that use the Internet for communications regarding their programs, goods, or services, must be prepared to offer those communications through accessible means as well."

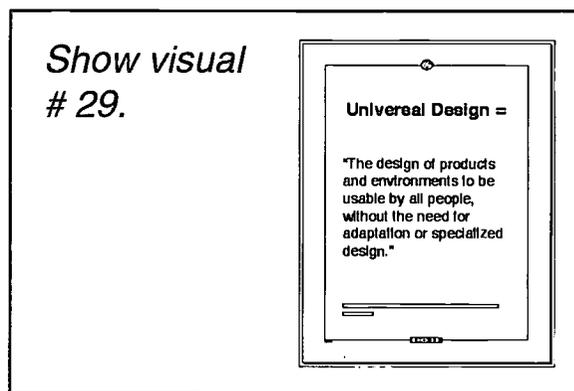
As more information is delivered using network technologies, postsecondary faculty and administrators play an increasingly important role in ensuring that everyone has access to resources provided via the World Wide Web.

A good place to begin discussing accessible Web design is with the principles of universal design.

Universal Design

Designing a product or service involves the consideration of myriad factors that include

aesthetics, engineering options, environmental issues, safety concerns, and cost. One issue that designers often overlook is that of universal design.



In general, universal design means designing products and services that can be used by people with a range of characteristics, abilities, and disabilities.

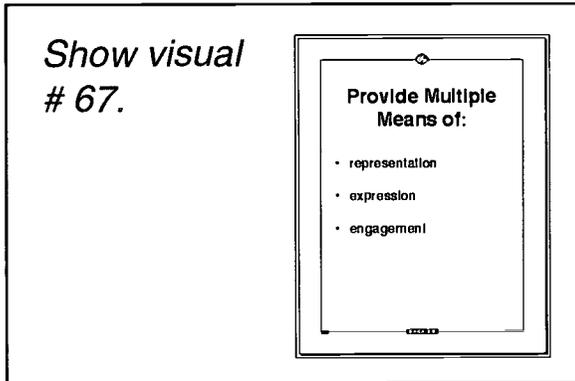
Universal design is defined by the Center for Universal Design at North Carolina State University as "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design." At this center, a group of architects, product designers, engineers, and environmental design researchers collaborated to establish a set of principles of universal design to provide guidance in the design of environments, communications, and products.

General principles of universal design include: the design is useful and marketable to people with diverse abilities; the design accommodates a wide range of individual preferences and abilities; the design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities; the design can be used efficiently and comfortably, and with a minimum of fatigue; and appropriate size and space is provided for



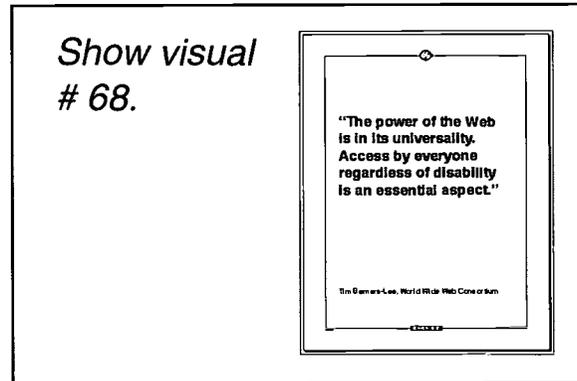
approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

Electronic resources that are universally designed provide multiple means of representation, expression, and engagement.



When designers apply these principles, their products meet the needs of potential users with a wide variety of characteristics. Disability is just one of these characteristics. For example, one person could be male, tall, fifteen years old, a poor reader, and blind. All of these characteristics, including blindness, should be considered when developing a product he might use. Universal design techniques can be applied in the design of packaging, software, appliances, transportation systems, and many other products and services. Examples of universal design in architecture are ramps, automatic door openers, and Braille labels on elevator control buttons. Following universal design principles in creating a Web site provides access to all users regardless of their abilities, their disabilities, or the limitations of their equipment and software.

Accessible Web Page Design



When universal design principles are applied to the design of Web pages, people using a wide range of adaptive technology can access them. The World Wide Web Consortium (W3C), an industry group founded in 1994 that develops common protocols which enhance interoperability and guide the evolution of the Web, has taken a leadership role in this area. The W3C is committed to promoting the full potential of the World Wide Web to assure a high degree of usability by people with disabilities.

As stated by Tim Berners-Lee, W3C Director and inventor of the World Wide Web, "The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect." The Web Accessibility Initiative (WAI) coordinates W3C's efforts with organizations worldwide to promote accessibility. Its *Web Content Accessibility Guidelines* tell how to design Web pages that are accessible to people with a wide variety of disabilities.

More recently, in response to Section 508 of the Rehabilitation Act, the Architectural and Transportation Barriers Compliance Board has established standards for the procurement, development, and use of technology by Federal agencies. One section establishes



standards for designing accessible Web pages. Although the legislation applies directly to Federal agencies, the standards are being used as guidelines by many institutions who want to assure that they are compliant with the ADA.

Now we'll watch a videotape presentation called *World Wide Access: Accessible Web Design*. This presentation shares access issues and solutions for people with disabilities. The content of this presentation is included in your handout entitled *World Wide Access: Accessible Web Design*.

Show videotape, "World Wide Access: Accessible Web Design" (11 minutes).

Show visual # 69.

Web Page Development Accessibility Options:

1. Avoid inaccessible data types and features.
2. Create alternative methods/formats.

To create pages that are accessible, Web page developers must either avoid certain types of data and features or create alternative methods for carrying out the functions or accessing the content that is provided using the inaccessible feature or format.

When it is not possible to use an accessible technology, an alternative version of the content should be provided. However, Web

page designers should resort to separate, accessible pages only when other solutions fail. Maintaining a separate page is time consuming. Alternative pages tend to be updated less frequently than "primary" pages and, therefore, often provide outdated information to the site visitors using them.

Besides practicing universal design guidelines in developing your Web pages, encourage feedback about accessibility from Web visitors.

Show visual # 70.

Example of a Web Accessibility Statement

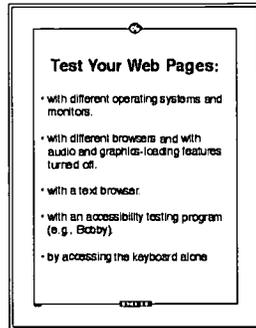
"The DO-IT pages form a living document and are regularly updated. We strive to make them universally accessible. You will notice that we minimize the use of graphics and photos, and provide descriptions of them when they are included. Video clips are open captioned, providing access to users who can't hear the audio. Suggestions for increasing accessibility of these pages are welcome."

Notify your Web site visitors that you are concerned about accessibility by including a statement about accessibility on your page. Encourage your users to notify you with their accessibility concerns. For example, the DO-IT home page at the University of Washington includes this statement:

"The DO-IT pages form a living document and are regularly updated. We strive to make them universally accessible. You will notice that we minimize the use of graphics and photos, and provide descriptions of them when they are included. Video clips are open captioned, providing access to users who can't hear the audio. Suggestions for increasing the accessibility of these pages are welcome."



Show visual # 71.



Test your Web page with as many Web browsers as you can, and always test your Web page with at least one text-based browser, such as Lynx, and with the audio-graphics-loading of a multi-media browser turned off. This way, you will see your Web resources from the perspectives of people with sensory impairments.

Testing your Web site with accessibility testing programs. These programs provide a report of accessibility barriers to your site. Several are referenced in your handout. Finally test your Web page using the keyboards alone to determine if you have full access to the information.

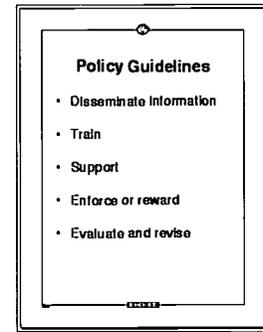
Benefits to Everyone

If universal design principles are employed in Web page development, other people besides individuals with disabilities will also benefit from the design. They include people working under environmental constraints such as noisy or noiseless environments; people whose hands or eyes are occupied with other activities; people for whom English is a second language; people using older, outdated equipment; and individuals using monochrome monitors.

The World Wide Web is just one example of an electronic resource that students with disabilities may need to access for their courses. When purchasing and designing

other electronic resources including applications software, on-line catalogs, encyclopedias, and indexes, consider whether these resources will be accessible to students utilizing adaptive technology.

Show visual # 72.



Policies and Procedures

Instructional and administrative Web pages should be developed with universal access as a goal. Accessibility guidelines should be incorporated into general campus Web page publication guidelines or standards.

The standards your campus adopts could be those developed by the Web Accessibility Initiative of the World Wide Web Consortium, those used by the Federal government in response to Section 508 legislation, or a list tailored to your campus. When choosing standards or guidelines it is best to gain high level support and include all key stakeholders (including students with disabilities, faculty, administrators, and Web designers) in the process.

A task force can then draft policy and select guidelines. They can develop dissemination plans and recommendations for the provision of training and support. They can also recommend how the policy might be enforced and/or how complaint sites will be rewarded. Policies and procedure should be evaluated and revised on a regular basis.



Discussion Questions

(Ask participants the following or similar questions for discussion.)

- What are the ethical and legal issues related to providing students with disabilities access to instructional Web pages?
- How would you respond to administrative concerns related to the added costs involved in making departmental Web pages accessible to people with disabilities?
- In our institution, who should be responsible for assuring that institutional, departmental, and faculty Web pages are accessible to individuals with disabilities?
- What are the advantages of developing Web pages that are accessible in design as compared to creating separate text-only pages of content for people who are blind?
- What are the benefits of employing universal design principles rather than focusing only on disability issues?

Case Study

(Consider discussing a case from the *Presentation Tips* section of this notebook. Case #6 on page 77 would be appropriate.)

Conclusion

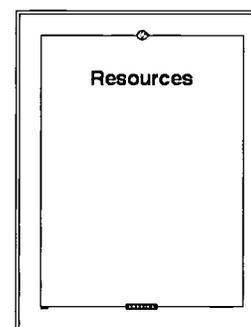
As our program comes to an end, I'd like to ask what was the most significant insight or question you had today? Please feel free to share a brief comment with the group.

I hope this program has given you a clear understanding of the impact that the

combination of computers, adaptive technology, and electronic resources can have on the lives of people with disabilities. Faculty and administrators have a legal responsibility to assure equitable access to resources and services. The information provided in this program should have given you tools to begin implementing universal design principles when developing and updating Web pages. Applying these guidelines will help level the playing field for people with disabilities.

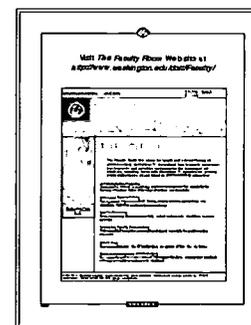
Resources

Show visual # 2 with your campus resources.



Here are some resources that might be useful to you as you work to maximize effective communication with all students in your classes. (Elaborate.)

Show visual # 3.



For comprehensive information on accommodations, a wide range of case general resources, visit *The Faculty Room* at



http://www.washington.edu/doi/Faculty/. This resource was developed at the University of Washington as part of a nationwide project to provide resources to faculty and administrators so that they can make their courses and programs accessible to all students. You can link to this resource from ____ (*Arrange to make the link from your campus/departmental disabled student services home page before the presentation.*). Consider linking to this Web site from your departmental Web pages for faculty.

Thank you for your time today and for your interest in finding ways to ensure that all of the students in our programs have equal opportunities to learn, explore interests, and express ideas.

Making Distance Learning Accessible to Everyone



Purpose

After this presentation, faculty and administrators will be able to:

- list potential barriers to distance learning courses for students with disabilities;
- summarize their institution's legal responsibilities for ensuring equal access to on-line courses; and
- discuss universal design guidelines for developing accessible distance learning courses.

Length

Approximately 60 minutes.

Presenter

Department chair, faculty, staff, teaching assistant, student, or other department member who has an understanding of technology used by students who have disabilities and of key elements of on-line courses. This presentation may be co-presented by a staff member of a campus unit responsible for providing academic accommodations for students with disabilities and a Web page developer.

Preparation

- Select presenter(s).
- Develop presentation outline and activities using the *Sample Script* provided in this section and the ideas listed in the *Presentation Tips* section of this notebook.

- Create overhead transparencies from the overhead transparency templates or use the PowerPoint™ version of the visual aids.
- Add contact information about resources available to your campus to the overhead transparency or PowerPoint slide entitled "Resources" and to printed publications as appropriate.
- Photocopy handout templates, *Real Connections: Making Distance Learning Accessible to Everyone* and *World Wide Access: Accessible Web Design* (optional), and create alternative formats as necessary.
- Create and photocopy presentation evaluation instrument (see end of *Institutionalization Strategies* for examples).
- Link from your unit's Web page to *The Faculty Room* at <http://www.washington.edu/doi/Faculty/>.

Equipment and Tools

- VHS VCR and monitor
- visuals: overhead projector and transparencies or LCD projector, computer, and PowerPoint presentation; Internet connection (optional)
- videotape (*captioned and audio-described version of Real Connections: Making Distance Learning Accessible to Everyone*)
- handout (*Real Connections: Making Distance Learning Accessible to Everyone*)



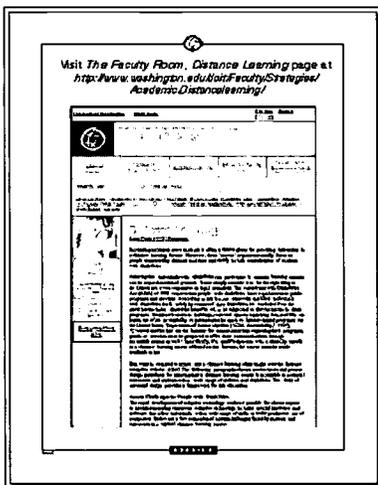
- optional videotape and handout (*World Wide Access: Accessible Web Design*)
- presentation evaluation instrument (pages 191-193)

Presentation Outline

1. Distribute handout.
2. Introductions.
3. Begin presentation.
4. Introduce and play videotape as noted in the script.
5. Discuss department/campus issues.
6. Summarize resources.
7. Distribute and collect evaluation instruments.

Resources

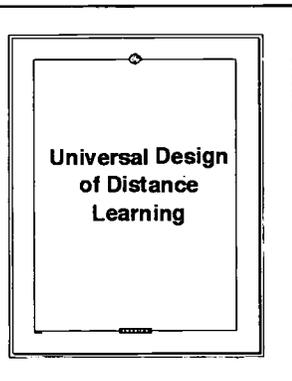
For further preparation for this presentation, consult *The Faculty Room* at <http://www.washington.edu/doit/Faculty/Strategies/Academic/Distancelearning/>.





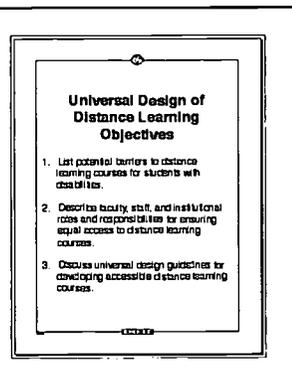
Making Distance Learning Accessible to Everyone: Sample Script

Show visual # 73.



Today we'll be discussing how to make distance learning accessible to everyone.

Show visual # 74.



The objectives of today's presentations are...
(Paraphrase objectives on visual.)

Increasing numbers of postsecondary courses are going on-line. Reaching out to larger audiences and offering anytime, anywhere learning options are common arguments for developing distance learning courses. However, rarely do these arguments explicitly address access issues for students with disabilities.

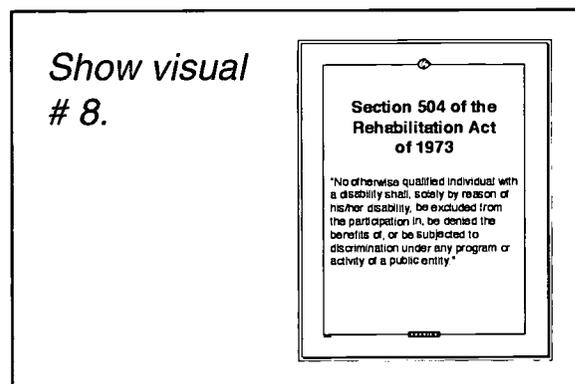
Legal Issues

Assuring that individuals with disabilities have access to computing resources can be

argued on ethical grounds. Some simply consider it to be the right thing to do; others are more responsive to legal mandates.

The Americans with Disabilities Act (ADA) of 1990 requires that people with disabilities be given the same access to public programs and services, including educational programs that are offered to people without disabilities.

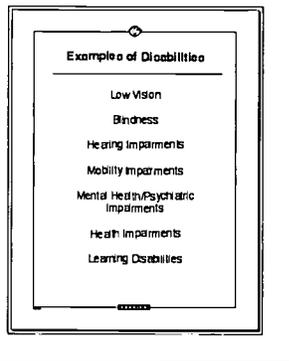
Show visual # 8.



The ADA is civil rights legislation that reinforces and extends the requirements of Section 504 of the Rehabilitation Act of 1973 that "no otherwise qualified individuals with disabilities shall, solely by reason of their disabilities, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination in any program or activity of a public entity." When people think of the ADA they often think of elevators in buildings, reserved spaces in parking lots, and lifts on busses. However, the ADA accessibility requirements apply to people with all types of disabilities and to all programs and resources offered at our institutions, including those offered using computers and the Internet.



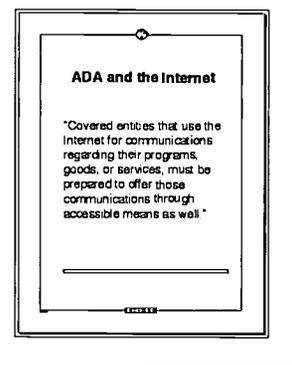
Show visual
11.



Disabilities covered by legislation include, but are not limited to, spinal cord injuries, loss of limbs, Multiple Sclerosis, Muscular Dystrophy, Cerebral Palsy, hearing impairments, visual impairments, speech impairments, specific learning disabilities, head injuries, psychiatric disorders, Diabetes, Cancer, and AIDS. The conditions listed may limit people's abilities to perform specific tasks. Some of these conditions are readily apparent; some are invisible. Some affect computer use; some do not.

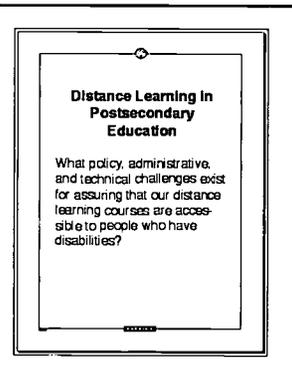
Additionally, some students who have conditions with the same label may have very different abilities when it comes to performing specific tasks. For example, one student who has Cerebral Palsy may have difficulty walking. For another student, Cerebral Palsy may result in no functional use of his hands or voice. Ultimately, a student who has a disability requires accommodations only when faced with a task that requires a skill that his disability precludes. This may include computer access.

Show visual
66.



The ADA accessibility requirements also apply to programs offered on the Internet. As the United States Department of Justice clarifies, "Covered entities that use the Internet for communications regarding their programs, goods, or services must be prepared to offer those communications through accessible means as well." Specifically, if a qualified person with a disability enrolls in a distance learning course offered via the Internet, the course must be made available to her.

Show visual
75.

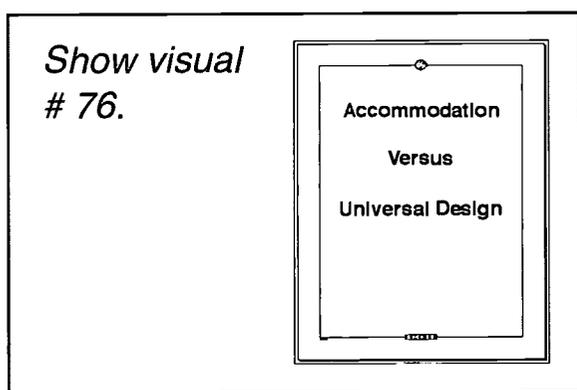


Some technical requirements for assuring that a distance learning class is accessible to people who have disabilities have already been resolved for many students before they enrolled in the course. Their own computer systems provide whatever accommodations they need in this area. E-mail communication between individual students and course administration staff, the instructor, and other students is accessible to all parties,



regardless of disability. E-mail can be used to deliver the syllabus, lessons, assignments, and reminders. "Guest speakers" with disabilities can also join the e-mail-based course discussions. Students can also turn in their assignments and tests using this accessible tool.

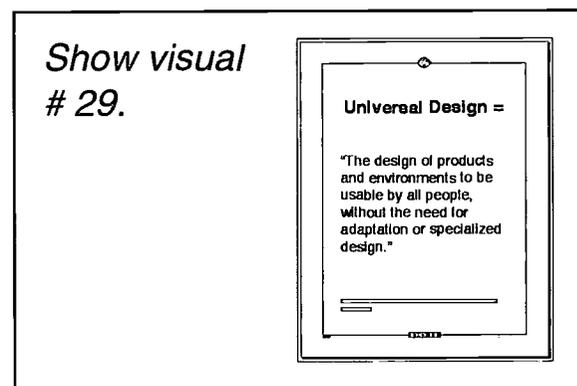
Accommodation vs. Universal Design



Usually, when we think of providing access to a service for a person with a disability, we think about providing appropriate accommodations. In contrast, "universal design" means that we consider the broad range of students who might enroll in a course at the design phase.

An example of an accommodation for a person who uses a wheelchair to open a door is to provide a wheelchair-height, large button for them to press in order to activate the automatic door opener; the solution does not work for a wheelchair user with no functional arm use; this solution is appropriate only for a narrow range of the population and is an "add on" to an existing product, the standard door. An example of a solution that employs the principles of universal design is a supermarket door that opens when it senses an individual in front of the door. A person can roll his wheelchair over the pad to open the door, regardless of

his ability to use his hands; so can a person using a walker; so can a person who walks over the mat; so can a small child or a large adult. It is the standard way to enter the building, not an add-on to the standard.



Universal design has been defined by the Center for Universal Design at North Carolina State University as "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design." At this center, a group of architects, product designers, engineers, and environmental design researchers collaborated to establish a set of principles of universal design to provide guidance in the design of environments, communications, and products.

When designers apply these principles, their products meet the needs of potential users with a wide variety of characteristics. Disability is just one of many characteristics that an individual might possess. Others include height, age, race, ethnicity, gender, and native language. All of these characteristics, including disability, should be considered when developing a distance learning course. A goal should be to create a learning environment that allows a person who happens to have a characteristic that is termed "disability" to access all content and fully participate in class activities.



When universal design principles are applied to the design of distance learning courses, students and instructors with a wide range of characteristics can fully participate. Now we'll watch a videotape that tells us how to design an accessible distance learning course.

Show videotape, "Real Connections: Making Distance Learning Accessible to Everyone" (12 minutes).

Let's discuss further some of the tools typically used in a distance learning course and discuss how they can be made universally accessible. These tools might include electronic mail, Web pages, real-time "chat," teleconferencing, printed materials, and videotapes.

Show visual # 77.

Distance Learning Tools

- Electronic Mail
- Real-time "Chat"
- Web Pages
- Teleconferencing
- Printed Materials
- Videotapes

Electronic Mail

If a prerequisite to the course is for students to have access to electronic mail, they can use any software that supports e-mail on the Internet. Therefore, any access issues that students with disabilities might face have already been resolved before enrolling in the course. Their own computer systems provide whatever accommodations they

need in this area. E-mail communication between individual students and course administration staff, the instructor, and other students is accessible to all parties, regardless of disability. E-mail can be used to deliver the syllabus, lessons, assignments, and reminders. "Guest speakers" with disabilities can also join the e-mail-based course discussions. Students can also turn in their assignments and tests using this accessible tool.

Real-Time "Chat"

Some distance learning courses employ real-time "chat" communication in their courses. In this case, students communicate synchronously (at the same time), as compared to asynchronously (not necessarily at the same time as in electronic mail). Besides providing scheduling challenges, synchronous communication is difficult or impossible for someone who cannot communicate quickly. For example, someone with a learning disability who takes a long time to compose her thoughts or someone with Cerebral Palsy whose input method is slow may not be fully included in the discussion. If you choose to use this type of tool, be sure to make it optional or to provide an alternate, equivalent assignment for those who cannot fully participate.

Web Pages

The most common tool used in distance learning classes is the World Wide Web.

(Optional: We will now watch a short videotape, World Wide Access: Accessible Web Design, which demonstrates the Web access challenges that people with disabilities face and solutions for meeting these challenges.)



Guidelines for making Web pages accessible to everyone are included in your handout, *World Wide Access: Accessible Web Design*.

Show videotape, "World Wide Access: Accessible Web Design" (11 minutes).

Your Web pages should be designed to be "device-independent." Device-independence means that a person may interact with Web pages using a wide variety of input and output devices (e.g., mouse, keyboard, voice). If, for example, a selection can only be made with a mouse or other pointing device, someone who is using speech input or a keyboard alone will not be able to activate the function. Following this guideline benefits people with a variety of system configurations.

Web pages for a distance learning class should be tested with a variety of monitors, computer platforms, and Web browsers. One of the test browsers should be text-only, such as Lynx, a Web browser developed at the University of Kansas. If a Web page makes sense with Lynx, then most people with sensory impairments can read it, too. Another good accessibility test is to determine if all functions at a Web site can be accessed using a keyboard alone. A Web site can also be tested for accessibility using the HTML validator programs listed in your handout.

If, in some cases, it is not possible to make a specific feature of your Web site accessible, be sure to develop an accommodation strategy. For example, provide text-only information for a student who is blind if a

particular part of your Web site cannot be made accessible to him. The key is to assure that the student has full access to the content of your course.

If universal design principles are employed in Web page development, people with characteristics other than disabilities will also benefit from the design. They include people working under environmental constraints such as in noisy or noiseless environments; people whose hands or eyes are occupied with other activities; people for whom English is a second language; people using older, outdated computer equipment; and individuals using monochrome monitors.

Teleconferencing

Sometimes, on-line courses include teleconferencing opportunities for students to communicate in small groups. This mode of communication creates scheduling and access challenges for everyone. It is also inaccessible to a student who is deaf. If you choose to use teleconferencing for small group discussion in your course, you might want to provide it as an option or give all students an alternative assignment if appropriate (for example, to conduct the discussion on-line.) Or, a student who is deaf can participate by using a relay system, where someone translates his printed input via TTY into speech. Consult with the student about the best option for him.

Printed Materials

Some distance learning courses use printed materials to support Internet-based instruction. Students who are blind or who have specific learning disabilities that affect their ability to read may require these materials in alternative formats. Making the text of printed materials available on-line may provide the best solution. You can also



contact the campus disabled student services office to discuss options for obtaining printed materials in alternative formats (*include campus-specific information here*).

Videotapes

Ideally, if a videotape is one of the course materials, captioning is available for those who have hearing impairments and audio description (which describes aurally the visual content) is provided for those who are blind. If the publisher does not make these access options available, the distance learning program should have a system in place to accommodate students who have sensory impairments. For example, the institution could hire someone to describe visual material to a blind student or sign audio material for a student who is deaf. Or you could work with the publisher to provide, in accessible format, a transcription of the content.

When universal design features are employed, you will minimize the number of special accommodations that will be needed by students with disabilities who enroll in your class.

Discussion Questions

(Ask participants the following or similar questions for discussion.)

1. What are the ethical and legal issues related to providing students with disabilities access to distance learning courses?
2. In our institution, who should be responsible for assuring that distance learning courses are accessible to individuals with disabilities?

3. What are the benefits of employing universal design principles in distance education rather than focusing only on disability issues?

Case Study

(Consider discussing a case from the Presentation Tips section of this notebook. Case #6 on page 77 would be appropriate.)

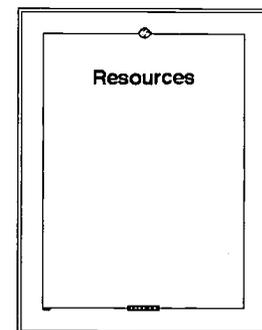
Conclusion

As our program comes to an end, I'd like to ask what was the most significant insight or question you had today? Please feel free to share a brief comment with the group.

I hope this program has given you a clear understanding of the impact that the combination of computers, adaptive technology, and electronic resources can have on the lives of people with disabilities. Faculty and administrators have a legal responsibility to assure equitable access to resources and services. The information provided in this program gave you tools to begin implementing universal design principles in developing and updating your distance learning courses. Applying these guidelines will help level the playing field for people with disabilities.

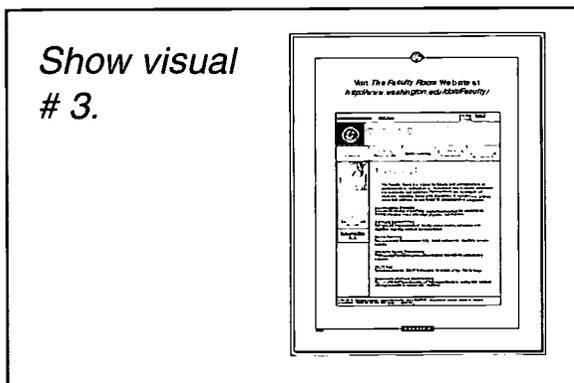
Resources

Show visual # 2 with your campus resources.





Here are some resources that might be useful to you as you work to maximize effective communication with all students in your classes. (*Elaborate.*)



For comprehensive information on accommodations, a wide range of case studies, frequently asked questions, and general resources, visit *The Faculty Room* at <http://www.washington.edu/doit/Faculty/>. This resource was developed at the University of Washington as part of a nationwide project to provide resources to faculty and administrators so that they can make their courses and programs accessible to all students. You can link to this resource from ____ (*Arrange to make the link from your campus/departmental disabled student services home page before the presentation.*). Consider linking to this Web site from your departmental Web pages for faculty.

Thank you for your time today and for your interest in finding ways to ensure that all of the students in our programs have equal opportunities to learn, explore interests, and express ideas.



Purpose

After this presentation, faculty and administrators will be able to:

- list challenges in gaining and demonstrating knowledge of students with disabilities in science, engineering, and mathematics classes;
- discuss accommodations for students with various types of disabilities in science, engineering, and mathematics courses; and
- describe a process for selecting appropriate accommodations.

Length

Approximately 45 minutes.

Presenter

The disabled student services coordinator/counselor would be responsible for setting up the overall presentation. This comprehensive presentation can be co-presented with a staff member or student on campus who has experience with people with disabilities in science, mathematics, and/or engineering areas.

Preparation

- Select presenter(s).
- Develop presentation outline and activities using the *Sample Script* provided in this section and the ideas listed in the *Presentation Tips* section of this notebook.
- Create overhead transparencies from the overhead transparency templates or use the PowerPoint™ version of the visual aids.

- Add contact information about resources available on your campus to the overhead transparency or PowerPoint slide entitled "Resources" and to printed publications as appropriate.
- Photocopy handout template *Working Together: Science Teachers and Students with Disabilities*, and create alternative formats as necessary.
- Create and photocopy presentation evaluation instrument (see end of *Institutionalization Strategies* for examples).
- Link from your unit's Web page to *The Faculty Room* at <http://www.washington.edu/doit/Faculty/>.

Equipment and Tools

- VHS VCR and monitor
- visuals: overhead projector and transparencies or LCD projector, computer, and PowerPoint presentation; Internet connection (optional)
- videotape (*Working Together: Science Teachers and Students with Disabilities*)
- handout (*Working Together: Science Teachers and Students with Disabilities*)
- presentation evaluation instrument (pages 191-193)

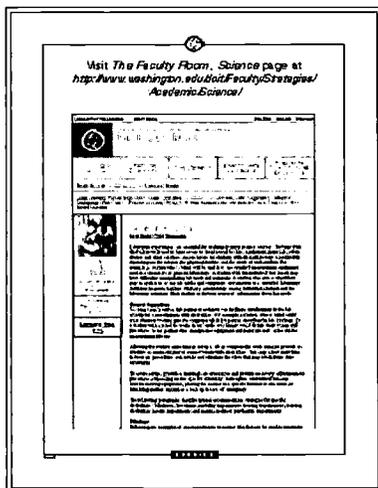


Presentation Outline

1. Distribute handout.
2. Introductions.
3. Begin presentation.
4. Introduce and play videotape.
5. Discuss possible accommodation strategies.
6. Discuss department/campus issues.
7. Distribute and collect evaluation instrument.

Resources

For further preparation for this presentation, consult *The Faculty Room* at <http://www.washington.edu/doi/Faculty/Strategies/Academic/Science/>.



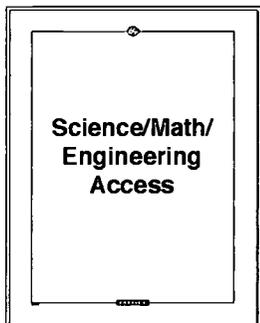
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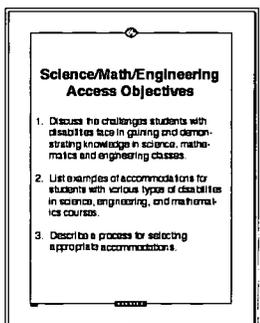
Science/Math/Engineering Access Sample Script

*Show visual
78.*



Today we will be discussing how to provide full access to science, math, and engineering classes to students with disabilities.

*Show visual
79.*



The objectives for today's session include...
(Paraphrase objectives on visual.)

As scientific fields make increasing use of technology, new opportunities emerge for people with a variety of abilities and disabilities. When students with disabilities and science teachers form learning partnerships, the possibilities for academic and career success multiply.

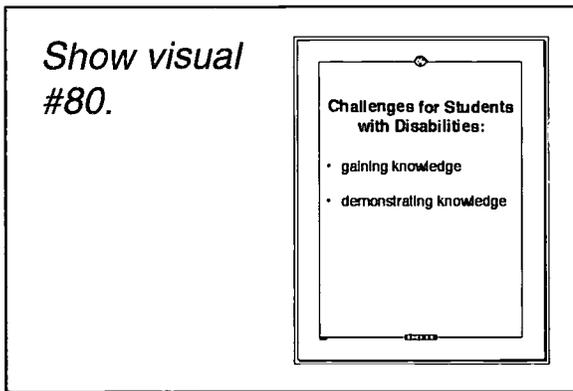
Some conditions of students with disabilities are visible; some are invisible. Since each person's situation is unique, the best solutions for maximizing participation come about when the student and teacher work together to develop creative alternatives to challenges faced by students with disabilities. Such challenges occur when gaining and demonstrating knowledge. In most cases, it takes just a little creativity, patience, and common sense to make it possible for everyone to participate and learn.

*Show videotape,
"Working Together:
Science Teachers and
Students with Disabilities"
(13 minutes).*

We will view a videotape where college-bound and postsecondary students with disabilities share their access challenges and accommodation needs in science courses.

The students in this presentation shared their experiences. Let's discuss some of their solutions. This information is summarized in your handout entitled *Working Together: Science Teachers and Students with Disabilities*. Imagine having these students enrolled in a freshman science course at our institution. Their challenges can be broken down into two areas: gaining knowledge and demonstrating knowledge.

(Discuss the access challenges and solutions listed below and in the handout. Encourage comments, suggestions, and experiences from the participants.)



Gaining Knowledge

Many students with disabilities face challenges gaining knowledge. Examples of specific challenges and accommodations follow:

- The student who has difficulty reading standard text or graphics due to visual impairment can benefit from materials in large print or Braille, on tape, or via computer, enlarged or tactile drawings; access to adaptive technology that provides enlarged, voice, and/or Braille output.
- The student who cannot see materials on a blackboard or overhead projector due to visual impairment can benefit from binoculars, verbalization of the content, and oral descriptions of all visually displayed materials.
- For a student who cannot read output from standard equipment because of a visual impairment, you can interface lab equipment with a computer and provide large print and/or speech output; utilize scientific equipment with Braille and large print markings.
- A student with difficulty hearing a presentation or instruction may use an FM system, interpreter, and printed materials. In addition, the instructor can face the student for lip-reading and use an overhead projector or blackboard.
- A student who cannot hear multimedia or videotaped presentations can be accommodated by captioned presentations or an interpreter.
- Students unable to participate in class discussions due to hearing or speech impairment can be accommodated with electronic communications (e.g., Internet); where the ability to hear or speak is required, a portable computer with speech output can be used.
- Visual, aural, and tactile demonstrations can be incorporated into instruction for students with trouble understanding concepts due to a specific learning disability.
- A student experiencing reading difficulties due to a learning disability may benefit from extra time and access to materials via a computer equipped with speech and large print output and Internet access.
- Students unable to take notes in class because of a mobility or visual impairment can benefit from in-class access to a computer with adaptive technology and a word processor.
- Some accommodations for students experiencing problems operating lab equipment and conducting lab experiments due to a mobility impairment may include accessible facility, adjustable-height tables, lab partner, scribe, computer-controlled lab equipment with alternative input devices (e.g., speech, Morse code,



alternative keyboard), and/or modified scientific equipment.

- A student who has difficulty seeing demonstrations or viewing lab experiments while seated in a wheelchair can benefit from adjustable height tables and flexible seating arrangements.
- Flexible scheduling arrangements may assist students with difficulties completing assignments or labs due to a health impairment.
- Information accessible on computers (i.e., disk, Internet) with adaptive technology can accommodate students who have problems doing research.

Demonstrating Knowledge

Some students with disabilities cannot demonstrate mastery of a subject by writing, speaking, or by working through a problem in a lab. Many of the accommodations for gaining knowledge can help the student demonstrate mastery of a subject as well. Examples of other accommodations follow:

- The student who has difficulty completing and submitting worksheets and tests because of a visual impairment and/or a specific learning disability can be accommodated by worksheets and tests in large print, Braille, on tape, or via the computer, access to adaptive technology that provides enlarged, voice, and/or Braille as well as standard print output is necessary.
- For students experiencing trouble completing a test or assignment because of a disability that affects the speed at which it can be completed, the instructor can schedule extra time or make alternative testing arrangements.

- In-class access to a computer with alternative input (e.g., Morse code, speech, alternative keyboard) devices can benefit students who cannot complete a test or assignment due to the inability to write.

Case Study

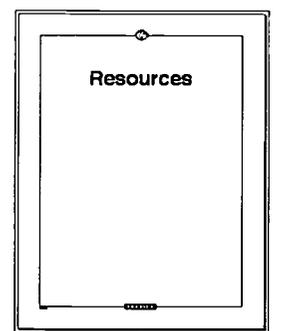
(Consider having participants discuss a case. Case #2 on page 69 in the Presentation Tips section of this notebook would be appropriate.)

Conclusion

Accommodations for students with disabilities can be complex and expensive. However, most accommodations are inexpensive and simply require creative problem solving on the part of the students, instructors, and services.

Resources

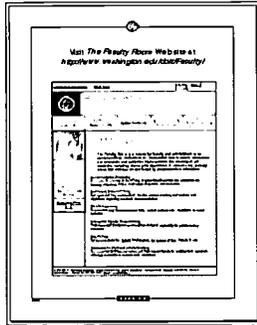
Show visual # 2 with your campus resources.



Here are some resources that might be useful to you as you work to maximize effective communication with all students in your classes. *(Elaborate.)*



Show visual
3.



For comprehensive information on accommodations, a wide range of case studies, frequently asked questions, and general resources, visit *The Faculty Room* at <http://www.washington.edu/doi/Faculty/>. This resource was developed at the University of Washington as part of a nationwide project to provide resources to faculty and administrators so that they can make their courses and programs accessible to all students. You can link to this resource from _____ (*Arrange to make the link from your campus/departmental disabled student services home page before the presentation.*). Consider linking to this Web site from your departmental Web pages for faculty.

Thank you for your time today and for your interest in finding ways to ensure that all of the students in our programs have equal opportunities to learn, explore interests, and express ideas.

Accommodating Students with Learning Disabilities



Purpose

During this presentation faculty and administrators will become more aware of:

- types of learning disabilities and how they impact learning, participation, and demonstration of knowledge in class;
- typical accommodation strategies for students with learning disabilities; and
- how technology can be used to help students with learning disabilities achieve academic and career success.

Length

Approximately one hour.

Presenter

The disabled student services coordinator/counselor would be responsible for setting up the overall presentation. This comprehensive presentation can be co-presented with a staff member who has experience with people with disabilities, or a student on campus with a learning disability.

Preparation

- Select presenter(s).
- Develop presentation outline and activities using the *Sample Script* provided in this section and the ideas listed in the *Presentation Tips* section of this notebook.
- Create overhead transparencies from overhead transparency templates or use the PowerPoint™ version of the visual aids.

- Add contact information about resources available on your campus to the overhead transparency or PowerPoint slide entitled “Resources” and to printed publications as appropriate.
- Photocopy handout template *Working Together: Computers and People with Learning Disabilities*, and create alternative formats as necessary.
- Create and photocopy presentation evaluation instrument (see end of *Institutionalization Strategies* for examples).
- Link from your unit’s Web page to *The Faculty Room* at <http://www.washington.edu/doit/Faculty/>.

Equipment and Tools

- VHS VCR and monitor
- visuals: overhead projector and transparencies or LCD projector, computer, and PowerPoint presentation; Internet connection (optional)
- videotape (*Working Together: Computers and People with Learning Disabilities*)
- handout (*Working Together: Computers and People with Learning Disabilities*)
- presentation evaluation instrument (pages 191-193)

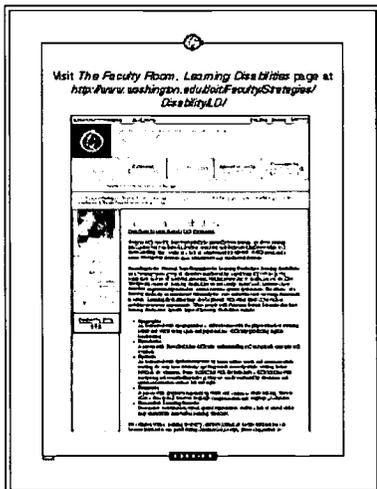


Presentation Outline

1. Distribute handout.
2. Introductions.
3. Begin presentation.
4. Introduce and play videotape.
5. Discuss accommodation strategies for students with specific learning disabilities.
6. Discuss department/campus issues.
7. Summarize resources.
8. Distribute and collect evaluation instrument.

Resources

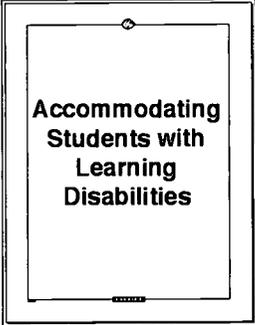
For further preparation for this presentation, consult *The Faculty Room* at <http://www.washington.edu/doit/Faculty/Strategies/Disability/LD/>.





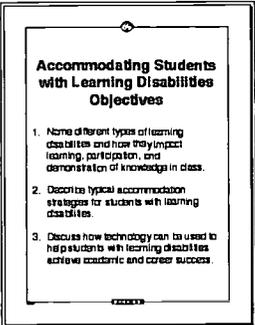
Accommodating Students with Learning Disabilities: Sample Script

Show visual # 81.



Today we will be discussing how to provide full access to college courses for students with learning disabilities.

Show visual # 82.

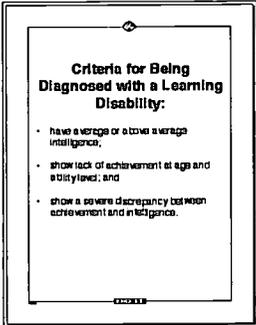


Objectives for today's session include...
(Paraphrase objectives on visual.)

What is a Learning Disability?

"Learning disabilities" refer to a group of disorders manifested by significant difficulties in listening, speaking, reading, writing, reasoning, or mathematical abilities. A specific learning disability in most situations is a "hidden disability." There are no outward signs of a disability such as a white cane or wheelchair. A learning disability is unique to the individual and impacts learning in a variety of ways.

Show visual # 83.

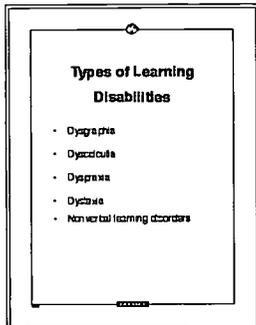


Generally speaking, someone may be diagnosed with a learning disability if he or she is of average or above-average intelligence and there is:

- a lack of achievement at age and ability level, and
- a severe discrepancy between achievement and his intellectual ability.

An untrained observer may conclude that a person with a learning disability is "lazy" or "just not trying hard enough." He may have a difficult time understanding the large discrepancy between reading comprehension and verbal skills. The observer sees only the input and output, not the processing of the information.

Show visual # 84.



Learning disabilities usually fall within four broad categories: spoken language, which affects listening and speaking; written



language, which affects reading, writing and spelling; arithmetic which affects calculation and concepts; and reasoning which impacts organization and integration of ideas and thoughts.

A person with a learning disability may have discrepancies in one or all of these categories. The effects of a learning disability range from mild to severe. Learning disabilities may also be present along with other disabilities such as mobility or sensory impairments. Often people with Attention Deficit Disorder/ Attention Deficit Hyperactive Disorder (ADD/ADHD), although usually not classified as a learning disability itself, also have learning disabilities.

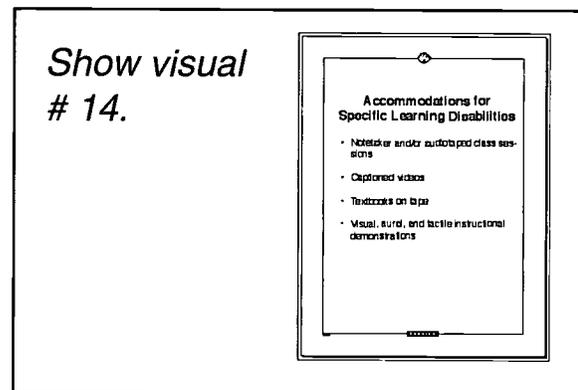
There are specific types of learning disabilities.

- An individual with **Dysgraphia** has a difficult time with the physical task of forming letters and words using a pen and paper and has difficulty producing legible handwriting.
- A person with **Dyscalculia** has difficulty understanding and using math concepts and symbols.
- Language comprehension of a person with **Dyspraxia** does not match language production. She may mix up words and sentences while talking.
- A **Nonverbal Learning Disorder** is demonstrated by below-average motor coordination, visual-spatial organization, and social skills.
- An individual with **Dyslexia** may mix up letters within words and words within sentences while reading. He may

also have difficulty spelling words correctly while writing; letter reversals are common. Some individuals with Dyslexia may also have a difficult time with navigating and route finding using right/left and/or compass directions.

Accommodations

Students with specific learning disabilities may have difficulties acquiring knowledge and/or demonstrating knowledge. For a student who has a learning disability, auditory, visual, or tactile information can become jumbled at any point when it is transmitted, received, processed, and/or retransmitted. It may take longer for some students who have learning disabilities to process written information, making lengthy reading or writing assignments or tests difficult to complete in a standard amount of time. Some students who have learning disabilities may find it difficult to process and digest oral instruction and lectures. Some students who have learning disabilities may be able to organize and communicate their thoughts in a one-to-one conversation, but may find it difficult to articulate those same ideas in a noisy classroom.



Examples of accommodations for students with learning disabilities include note-takers and scribes; visual, aural, and tactile demonstrations incorporated into



directions; computers with speech output, spell checker, and grammar checker; course and lecture outlines; and extra time or alternate testing arrangements.

Show visual # 15.

Accommodations for Specific Learning Disabilities, continued

- Course and lecture outlines
- Assignments given in advance
- Computer with speech output, spell checker, and grammar checker
- Extra exam time, quiet testing arrangements

Audiotaped class sessions, textbooks on tape, a tape recorder in class, and assignments in advance are also common accommodations for students with learning disabilities.

Technology and Learning Disabilities

Technology can play a role in helping people with learning disabilities find success in academics and careers. Technology tools do not “cure” a specific learning disability; they compensate rather than remedy. With appropriate strategies, the person with a learning disability can apply his intelligence and demonstrate his knowledge using computer and adaptive technology. Trial and error may be required to find a set of appropriate tools and techniques for a specific individual. The person with the disability should help to determine what works and what does not. Once basic tools and strategies are selected, they can be “test driven,” discarded, adapted, or refined.

Next we will view a short videotape in which high school and college students with learning disabilities discuss their challenges and how technology plays a role in their success in school. Your handout entitled *Working*

Together: Computers and People with Learning Disabilities summarizes the content of this videotaped presentation.

Show videotape, “Working Together: Computers and People with Learning Disabilities” (10 minutes).

Discussion

(Facilitate a discussion using the questions below and/or others.)

- Do any of you have examples of how you have effectively (or not effectively) worked with students with specific learning disabilities?
- What challenges did you encounter? What accommodation were successful/ unsuccessful?
- Are there any questions about accommodating students with learning disabilities on our campus?

Case Study

(Consider having participants discuss a case. Case #1 on page 67 in the Presentation Tips section of this notebook would be appropriate.)

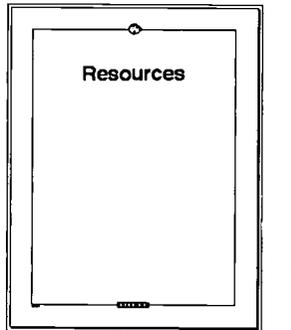
Conclusion

Most students with learning disabilities are bright and motivated to learn. However, academic failures can lead to low self-esteem and reduced motivation. Students, technology staff, and instructors can work together to develop appropriate accommodations, including the use of technology, that will lead to positive postsecondary and career outcomes for students with learning disabilities.



Resources

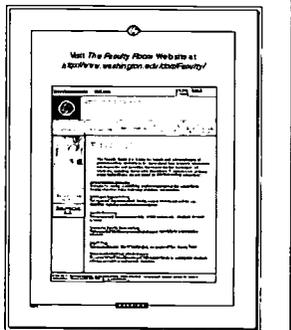
*Show visual
2 with your
campus
resources.*



Thank you for your time today and for your interest in finding ways to ensure that all of the students in our programs have equal opportunities to learn, explore interests, and express ideas.

Here are some resources that might be useful to you as you work to maximize effective communication with all students in your classes. (*Elaborate.*)

*Show visual
3.*



For comprehensive information on accommodations, a wide range of case studies, frequently asked questions, and general resources, visit *The Faculty Room* at <http://www.washington.edu/doit/Faculty/>. This resource was developed at the University of Washington as part of a nationwide project to provide resources to faculty and administrators so that they can make their courses and programs accessible to all students. You can link to this resource from ____ (*Arrange to make the link from your campus/departmental disabled student services home page before the presentation.*). Consider linking to this Web site from your departmental Web pages for faculty.



Purpose

After this presentation faculty and administrators will be able to:

- list types of psychiatric disabilities and how they affect learning;
- discuss functional limitations resulting from psychiatric disabilities; and
- list typical accommodations for students who have a psychiatric disability.

Length

Approximately 45 minutes.

Presenter

The disabled student services coordinator or other staff member who has experience with individuals with psychiatric disabilities; a student with a psychiatric disability could deliver some of the presentation or participate in discussions.

Preparation

- Select presenter(s).
- Develop presentation outline and activities using the *Sample Script* provided in this section and the ideas listed in the *Presentation Tips* section of this notebook.
- Create overhead transparencies from the overhead transparency templates or use the PowerPoint™ version of the visual aids.
- Add contact information about resources available to your campus to the overhead transparency or PowerPoint slide entitled "Resources" and to printed publications as appropriate.

- Photocopy handout template *Accommodating Students with Psychiatric Disabilities*, and create alternative formats as necessary.
- Create and photocopy presentation evaluation instrument (see end of *Institutionalization Strategies* for examples).
- Link from your unit's Web page to *The Faculty Room* at <http://www.washington.edu/doit/Faculty/>.

Equipment and Tools

- VHS VCR and monitor
- visuals: overhead projector and transparencies or LCD projector, computer, and PowerPoint presentation; Internet connection (optional)
- handout (*Academic Accommodations for Students with Psychiatric Disabilities*)
- presentation evaluation instrument (pages 191-193)

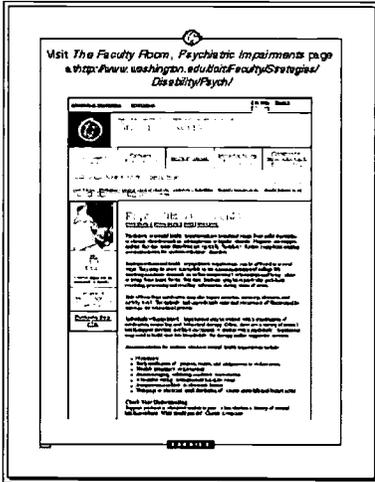
Presentation Outline

1. Distribute handouts.
2. Introductions.
3. Begin Presentation.
4. Discuss possible accommodation strategies.
5. Discuss department/campus issues.
6. Distribute and collect evaluation instrument.



Resources

For further preparation for this presentation, consult *The Faculty Room* at <http://www.washington.edu/doit/Faculty/Strategies/Disability/Psych/>.



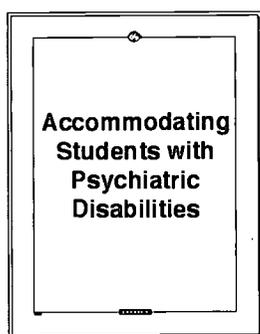
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185



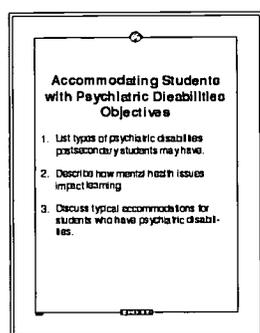
Accommodating Students with Psychiatric Disabilities: Sample Script

Show visual
85.



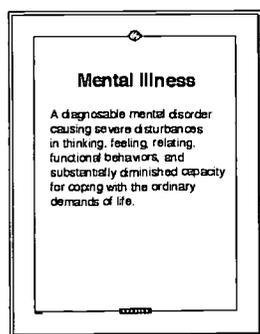
Today we will be discussing how to accommodate students with psychiatric disabilities for full inclusion in your courses.

Show visual
86.



Objectives for today's session include...
(Paraphrase objectives on visual.)

Show visual
87.



What is a Psychiatric Disability?

A person with a "psychiatric disability" has a diagnosable mental illness causing severe disturbances in thinking, feeling, relating, and/or functional behaviors that results in a substantially diminished capacity to cope with the demands of daily life demands.

According to the National Center for Educational Statistics (1999), more than 400,000 students enrolled in postsecondary institutions report having a mental illness or emotional disturbance. A mental illness may result in a psychiatric disability.

A psychiatric disability is a hidden disability; it is typically not apparent to others. However, students with psychiatric disabilities may experience symptoms that interfere with their educational goals, which may include, yet are not limited to:

- heightened anxieties, fears, suspicions, or blaming others;
- marked personality change over time;
- confused or disorganized thinking; strange or grandiose ideas;
- difficulty concentrating, making decisions, or remembering things;
- extreme highs and/or lows in mood;
- denial of obvious problems and/or a strong resistance to offers of help; and
- thinking or talking about suicide.



Psychiatric Diagnosis

Show visual # 88.

Psychiatric Disabilities

- Depression
- Bipolar Affective Disorder (previously called Manic Depression)
- Borderline Personality Disorder
- Schizophrenia
- Anxiety Disorders

These diagnoses are defined by the American Psychiatric Association.

Depression

This is a mood disorder that can begin at any age. Major depression may be characterized by a depressed mood most of each day, a lack of pleasure in previously enjoyed activities, thoughts of suicide, insomnia, and consistent feelings of worthlessness or guilt.

Bipolar Affective Disorder (BAD, previously called Manic Depressive Disorder)

BAD is a mood disorder with revolving periods of mania and depression. In the manic phase, a person might experience inflated self-esteem, high work and creative productivity, and decreased need to sleep. In the depressed phase, the person experiences the symptoms of depression (see above).

Borderline Personality Disorder (BPD)

BPD is a personality disorder which includes both mood disorder and thought disorder symptoms. This diagnosis has both biological and environmental determinants. Individuals diagnosed with BPD may have experienced childhood abuse and family dysfunction. They may experience mood fluctuations, insecurities and mistrust, distortion of perceptions, dissociations, and difficulty with interpersonal relationships and limited coping skills.

Schizophrenia

This is a thought disorder that can cause a person to experience delusions, hallucinations and paranoia. Schizophrenic individuals typically demonstrate concrete thought processing and appreciate structure and routines.

Anxiety Disorders

These are mood disorders in which the individual responds to thoughts, situations, environments and/or people with fear and anxiety. Anxiety symptoms can disrupt a person's ability to concentrate and focus on tasks at hand. Symptoms may be in response to real or imagined fears. Specific anxiety disorders include Generalized Anxiety Disorder, Obsessive-Compulsive Disorder, Panic Disorder, Social and Specific Phobias, and Post Traumatic Stress Disorder.

Functional Limitations

Show visual # 89.

Functional Limitations May Affect Academic Performance When Students Have Difficulty:

- with medication side effects.
- screening out environmental stimuli.
- sustaining concentration.
- maintaining stamina.
- handling time pressure and multiple tasks.
- interacting with others.
- responding to constructive feedback.
- responding to change.
- long-term under stressful situations.

These functional limitations related to psychiatric disabilities may affect academic performance and may require accommodations (Center for Psychiatric Rehabilitation, 1997).

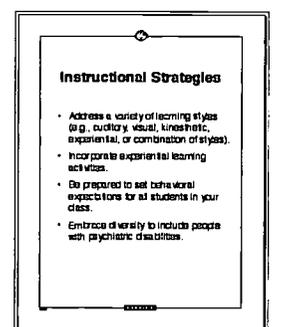
- **Difficulty with medication side effects:** side effects of psychiatric medications that may affect academic performance include drowsiness, fatigue, dry mouth, thirst, blurred vision, hand tremors, slowed response time, and difficulty initiating interpersonal contact.



- **Screening out environmental stimuli:** an inability to block out sounds, sights, or odors that interfere with focusing on tasks. Limited ability to tolerate noise and crowds.
- **Sustaining concentration:** restlessness, shortened attention span, distraction, and difficulty understanding or remembering verbal directions.
- **Maintaining stamina:** difficulty sustaining enough energy to attend a whole day of classes on campus; combating drowsiness due to medications.
- **Handling time pressures and multiple tasks:** difficulty managing assignments, prioritizing tasks, and meeting deadlines. Inability to multi-task work.
- **Interacting with others:** difficulty getting along, fitting in, contributing to group work, and reading social cues.
- **Fear of authority figures:** difficulty approaching instructors or teaching assistants.
- **Responding to negative feedback:** difficulty understanding and correctly interpreting criticism or poor grades. May not be able to separate person from task (personalization or defensiveness due to low self-esteem).
- **Responding to change:** difficulty coping with unexpected changes in coursework, such as changes in the assignments, due dates or instructors. Limited ability to tolerate interruptions.
- **Severe test anxiety:** anxiety to the extent that the individual is rendered emotionally and physically unable to take the exam.

Instructional Strategies

Show visual # 90.

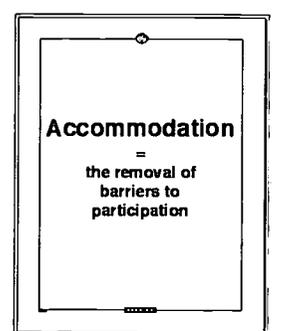


Students with a history of psychiatric disabilities can be intelligent, sensitive, creative, and interesting. You can employ strategies that will promote their success in your class. For example:

- Address a variety of learning styles (e.g., auditory, visual, kinesthetic, experiential, or combination of styles).
- Incorporate experiential learning activities.
- Be prepared to set behavioral expectations for all students in your class.
- Embrace diversity to include people with psychiatric disabilities.

Reasonable Accommodations

Show visual # 91.





Some students with psychiatric disabilities may require accommodations to allow them equal access to classes, programs, and coursework. An accommodation is the removal of a barrier to full participation and learning. The emphasis is on access, not on outcome. This is done by providing the student with a disability *equal access* to the content and activities of a course, but not assuring success.

Each student with a disability is encouraged to register with the office that supports students with disabilities in order to receive accommodations. Personnel from this office typically send instructors a letter documenting specific accommodations required for the student with the disability. It is the responsibility of the instructor to provide the accommodations. It is the student's responsibility to fulfill the academic requirements of the course. The best solutions result when the instructor, student, and disability support service professional work cooperatively. Meeting as a group may facilitate problem-solving alternatives. Respecting the privacy of the student by not discussing his/her disability or accommodations with others outside of this meeting is essential. Review accommodations periodically with the student to assess effectiveness and adjust to changing needs.

Classroom Accommodations

Show visual # 92.

Possible Classroom Accommodations

- Preferential seating (e.g., near the door to allow leaving class for breaks).
- Prearranged or frequent breaks.
- Permit beverages in class.
- Use of tape recorder.
- Assign a classmate to be a volunteer scribe.
- Note-taker or photocopy of student's notes.
- Display and use tools & available aids.
- Textbooks and other course materials available in alternative formats.
- Personal and private feedback on academic performance.

Typical classroom, exam, and assignment accommodations that may be recommended by the disabled student service professional for a student with a psychiatric disability include:

- preferential seating, especially near the door to allow the student to leave class for breaks;
- prearranged or frequent breaks;
- beverages permitted in class;
- tape recorder use;
- assigned classmate as volunteer assistant;
- note-taker or photocopy of another's notes;
- early availability of syllabus and text books;
- availability of course materials (lectures, handouts) in alternative formats; and
- private feedback on academic performance.

Examination Accommodations

Show visual # 93.

Possible Examination Accommodations

- Written exams alternate to oral, dictated, scripted or taped exams in alternative format (e.g., portfolio, demonstration, presentation, role play, multiple choice to name).
- Permit use of computer software programs.
- Extended time for test taking.
- Exams individually proctored, including in the hospital.
- Exam in a separate, quiet and non-disturbing room.
- Increased frequency of exams.

Typical accommodations for students with psychiatric disabilities taking exams include:



- exams in alternative format (e.g., from multiple choice to essay; oral, presentation, role-play, or portfolio);
- use of adaptive computer software (e.g. Optical Character Recognition, allowing scanned text to be read aloud by the computer's sound card; or speech recognition for converting the spoken word to printed word on the computer screen);
- extended time for test taking;
- exams individually proctored, including in the hospital;
- exam in a separate, quiet and non-distracting room; and
- increased frequency of exams.
- Written assignments in lieu of oral presentations, or vice versa;
- assignments completed in dramatic formats (e.g. demonstration, role-play, and sculpture);
- assignment assistance during hospitalization; and
- extended time to complete assignments.

Assignment Accommodations

Show visual # 94.

Typical assignment accommodations for students with disabilities include:

- substitute assignments in specific circumstances;
- advance notice of assignments;
- permission to submit assignments handwritten rather than typed (if possible);

Show visual # 95.

Not all requested accommodations are "reasonable." An accommodation is **not** reasonable if providing it would:

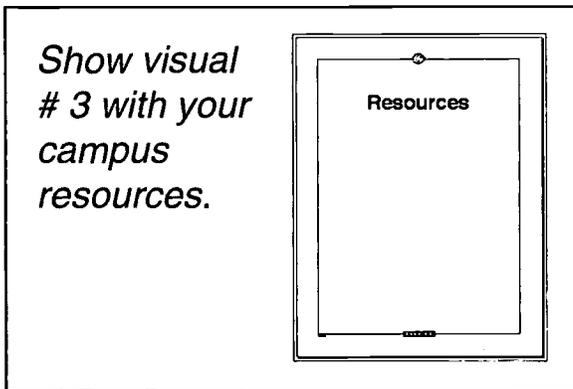
- pose a direct threat to the health or safety of others;
- result in substantial change in an essential element of the curriculum;
- require a substantial alteration in the manner in which educational opportunities are provided, such that the course objectives are altered; or
- pose an undue financial or administrative burden to the institution.



Conclusion

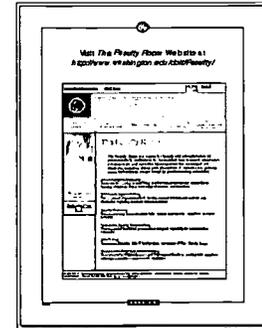
On most campuses, a student with a disability must register with the disabled student services office in order to receive accommodations. Personnel from this office typically send instructors a letter documenting specific accommodations required for the student. It is best when the instructor works cooperatively with the student and disabled student services office. It is often helpful to schedule a three-way meeting. Review accommodations periodically with the student to assess effectiveness and adjust to changing needs. Respect the privacy of the student by not discussing his/her disability or accommodations with others. It is important that the instructor provides the accommodations required; it is the student's responsibility to fulfill the academic requirements of the course.

Resources



Here are some resources that might be useful to you as you work to maximize effective communication with all students in your classes. (*Elaborate.*)

Show visual # 2.



For comprehensive information on accommodations, a wide range of case studies, frequently asked questions, and general resources, visit *The Faculty Room* at <http://www.washington.edu/doit/Faculty/>. This resource was developed at the University of Washington as part of a nationwide project to provide resources to faculty and administrators so that they can make their courses and programs accessible to all students. You can link to this resource from ____ (*Arrange to make the link from your campus/departmental disabled student services home page before the presentation.*). Consider linking to this Web site from your departmental Web pages for faculty.

Thank you for your time today and for your interest in finding ways to ensure that all of the students in our programs have equal opportunities to learn, explore interests, and express ideas.



Presentation Evaluation

Part One: Help us know what you learned as a result of this presentation. Please indicate your agreement or disagreement with these statements where 1= Strongly Disagree and 5= Strongly Agree. N/A = Not Applicable.

| | <u>Strongly</u> <u>Disagree</u> | | | | <u>Strongly</u> <u>Agree</u> | |
|--|------------------------------------|---|---|---|---------------------------------|-----|
| 1. I am better able to find resources on my campus to accommodate students with disabilities. | 1 | 2 | 3 | 4 | 5 | N/A |
| 2. I gained knowledge about legal obligations relating to students with disabilities. | 1 | 2 | 3 | 4 | 5 | N/A |
| 3. I gained knowledge about specific accommodations for students with disabilities. | 1 | 2 | 3 | 4 | 5 | N/A |
| 4. I gained knowledge about technology available to support students with disabilities. | 1 | 2 | 3 | 4 | 5 | N/A |
| 5. Please answer the following questions with responses based on today's presentation (as opposed to what you already knew). Describe one thing you learned today about each of the following: | | | | | | |
| a. Legal issues affecting students with disabilities: | | | | | | |
| b. Campus services for students with disabilities: | | | | | | |
| c. Accommodations that can be used for students with disabilities in classes or labs: | | | | | | |
| 6. Describe additional information you would like to have in order to more fully include students with disabilities in your courses. | | | | | | |



Presentation Evaluation

1. Please indicate your agreement or disagreement with these statements where 1= Strongly Disagree and 5= Strongly Agree. N/A = Not Applicable.

| | <u>Strongly Disagree</u> | | | <u>Strongly Agree</u> | | |
|--|--------------------------|---|---|-----------------------|---|-----|
| • I am better able to find resources on my campus to accommodate students with disabilities. | 1 | 2 | 3 | 4 | 5 | N/A |
| • I gained knowledge about legal obligations relating to students with disabilities. | 1 | 2 | 3 | 4 | 5 | N/A |
| • I gained knowledge about specific accommodations for students with disabilities. | 1 | 2 | 3 | 4 | 5 | N/A |
| • I gained knowledge about technology available to support students with disabilities. | 1 | 2 | 3 | 4 | 5 | N/A |
| • The presenter(s) was (were) well prepared. | 1 | 2 | 3 | 4 | 5 | |
| • Overall, the information presented was useful. | 1 | 2 | 3 | 4 | 5 | |
| • The handouts will be useful. | 1 | 2 | 3 | 4 | 5 | N/A |

2. The length of the presentation was: ___ about right ___ too short ___ too long
3. The amount of material was: ___ about right ___ not enough ___ too much
4. Please tell us about yourself: ___ Male ___ Female
- ___ Faculty ___ Administrator ___ Teaching Assistant ___ Other

Please make specific comments about this presentation on the back of this form.



In this section common questions asked by postsecondary faculty and administrators are presented along with answers to these questions. The content and organization is consistent with *The Faculty Room* Web site at www.washington.edu/doit/Faculty/.

LOW VISION

Q TERMINOLOGY: What are the differences between “low vision,” “visual impairment,” and “blindness?”

A Standard vision is measured as 20/20. A person is considered “visually impaired” if she can see no better than 20/70 with correction in her better eye. This means she can see at 20 feet what people with standard vision see at 70 feet. If an individual’s vision is no better than 20/200, she is considered legally blind. A person is also considered “legally blind” if his central vision is no greater than 12 degrees (i.e., he has limited peripheral vision and appears to be seeing things as if looking through a tube or straw). A person is typically referred to as “totally blind” or “black blind” if he has no usable sight. “Low vision” or “limited vision” usually refers to someone who has a visual impairment but is not totally blind.

Q TEXT ENLARGEMENT: How much do I need to enlarge handouts for someone with low vision?

A Ideal print size will depend upon the needs of the individual. The student is the best source of information regarding

preferred print size. However, large print is usually defined as 16- to 18-point bold type, depending on the typeface used. A standard Roman typeface, using upper and lower cases, is more readable than italicized, oblique, or condensed fonts. To enlarge print from standard 12-point text to 16- or 18-point, use a 150-165% enlargement setting on a photocopier. For documents in electronic form, enlarge the font size before printing.

Q TEXT: Other than enlarging the size, how should I adapt text for handouts to accommodate students with low vision?

A There are several ways:

- Use a Roman type standard serif or sans-serif font, size 16-point or 18-point. These fonts tend to have more space between letters (i.e., non-condensed).
- Print text using the highest contrast possible. Light or white letters printed on a dark background are usually more readable than dark letters on a white background. High contrast can be difficult to achieve with colored type on a colored background. It is important to check with the student to see what type of contrast he prefers.
- Allow extra line space between the lines of text. The spacing should be at least 25-30% of the point size. For example, when using a 16-point font, there should be at least four spaces between the lines of text.
- Extra-wide margins and the ability to open a printed document flat are helpful if the document is bound.



- Use paper with matte finish, which is easier to read than a glossy finish.

Remember, the student is the best source of information about preferred text characteristics.

Q LITERATURE SEARCHES : How does a student with low vision conduct a literature search and access the electronic and library resources in preparation for a writing assignment?

A Many students with low vision are able to access library catalogs and other databases on the Internet to search for relevant articles and books as long as computers are equipped to enlarge text on the screen and/or read the screen with speech output software. Students may also work with library staff or the disability services office to request a library assistant.

Q LIBRARY MATERIALS: What are strategies that can be used by students with low vision to access printed library materials?

A Pages can be enlarged with a photocopier for a student able to read large print. An article can be scanned and accessed by a computer with speech and/or large-print output. A closed-circuit television (CCTV) can enlarge the printed material for the student. A reader may read the article aloud to the student. The disabled student services office may be asked to prepare printed articles in an alternate format or provide a reader.

BLINDNESS

Q TEST TAKING: Does a student who is blind require extended time on tests?

A A student who is blind or who has low vision may require up to double the time that is allotted sighted peers due to extended time necessary to utilize accommodations.

Q VIDEOTAPES: How can a student who is blind follow a video?

A If all essential information contained in the video is provided verbally and if another person watching the video describes important visual content, the student who is blind can benefit from the video. Ideally, videotapes are available with audio description, which includes extra spoken content.

Q How can a student who has a visual impairment participate in labs that require computer graphing?

A A student who has low vision may be able to use graphing software if the text and graphics on the screen can be enlarged using either features built into the operating system or adaptive software. A student who is completely blind can work with a partner who can describe the graphs.

Q FOREIGN TRAVEL: How can a student who is blind navigate in a foreign place?

A That depends on the student, the nature and length of the trip, and the destination. When in doubt, it is best to ask the student how she plans to get around and



whether assistance will be needed. Traveling with a sighted partner is helpful but some students are comfortable navigating and asking for direction on their own. The student may enlist the support of the disabled student services office for resources and development of a plan. If the student is traveling in a group, other members of the group may be able to serve as sighted guides when necessary.

Q LITERATURE SEARCHES AND

ACCESS: How does a student who is blind conduct a literature search and access the literature in preparation for a writing assignment?

A Many students who are blind are able to access library catalogs and other databases on the Internet to search for relevant articles and books. They may then order the articles on-line or ask a librarian or another person for assistance. Alternative methods of reading the materials include:

- They may be enlarged with a photocopier (if they are able to read large print).
- A reader may read them aloud.
- Articles may be computer scanned and accessed by a computer with speech output.
- The university's disabled student services office may be asked to prepare the articles in an alternate format (e.g., audio tape).

Q CLASS DISCUSSIONS: Does a student who is blind need accommodations to benefit from class discussions?

A It is most helpful if all speakers identify themselves by name prior to responding to a question or making a discussion comment. Any demonstration or visual aides will also need to be verbally described.

DEAF OR HARD OF HEARING

Q COMMUNICATION: What is the best way to speak to a student with a hearing impairment?

A Face the student as you speak. Do not overemphasize words. Speak clearly and at a normal speed. Communicate in a quiet area if possible. Do not obstruct the student's view of your lips; keep your hands and other objects away from your face while you are speaking. Mustaches can make lip-reading more difficult.

Q LECTURES: What can I do to make sure a student who is hard of hearing can access spoken information in a large lecture?

A Do not turn your back to the group. Avoid lecturing against a window since the light through the window may throw a shadow over your mouth, making lip-reading difficult. Finally, avoid obscuring your mouth with books, hands, or other materials.

Q TELEPHONE: How do individuals with hearing impairments communicate by telephone?

A There are three different kinds of technology used for telephone communication.



1. The TTY, TDD, and TT acronyms are used interchangeably for the same mechanical teleprinter equipment. TTY means "TeleTYpe." TDD stands for "Telecommunications Device for the Deaf," and TT stands for "Text Telephone." A TTY is used by a person who does not have enough functional hearing to understand speech even with amplification. Users of this system communicate through typed text.

2. Amplification devices can be added to telephones to allow people who are hard of hearing to benefit from enhanced volume. Amplification can be provided through the handset, headset, in-line amplifier, portable amplifier, or a control on a telephone base. Cellular telephones can also be used with amplification devices.

3. A third method is through a relay system. A relay service is used when only the person with a hearing impairment has a TTY/TDD/TT. The person with a hearing impairment types her part of the conversation into a TTY and the message is read by a relay operator who also has a TTY. The relay operator reads the message to the hearing party. As this party responds orally, the relay operator types what is spoken into the TTY unit which is read by the person who has a hearing impairment.

Q TTY/TDD/TT: How does a TTY/TDD/TT work?

A A TTY, (TeleTYpe) TDD, (Telecommunications Device for the Deaf), or TT (Text Telephone) refers to one piece of equipment with a small keyboard and visual display. The person using the equipment types what they would like to say and

the text is shown on the display. TTYs use a coupler or modem to convert electric impulses into acoustic signals which are then transmitted to a telephone receiver. The signals are sent to the receiver's TTY and are converted into text messages. In order for a person to use a TTY, the individual at the other end of the conversation must also have one or they must use a relay service, whose operator has a TTY.

Q VIDEOS: I use several instructional videotapes in my courses; how can I make sure students with hearing impairments are able to access the content?

A Video or film information can be accessed by those who cannot hear the audio in three ways: a) captioning, b) sign-language interpreting, or c) transcribing. Closed captioning requires the use of a television decoder to view the captioning. Open captioning displays the text automatically during every viewing. No special equipment is needed to view open captioning. Ask the publisher for captioned versions of videotapes you use in class. If a captioned version of a videotape is not available, a sign language interpreter can translate verbal information from the video for a student who knows sign language. Transcription can be provided as a last resort. Ask the videotape publisher for a transcript of the tape. Be sure the student has time to read the transcript before the videotape is shown since she cannot read the script and watch visual content at the same time.

Q CAPTIONING: How do I caption videos that I create?



A Your videos can be captioned on your campus if the proper equipment and expertise is available, or they can be sent out to a captioning service for a fee. Check with your video production center or disabled student services office to find out if this service is provided on campus. Video productions presented on your Web site can be captioned using Magpie software from the National Center on Accessible Media at <http://ncam.wgbh.org/richmedia>.

Q ASSISTIVE LISTENING DEVICES (ALDs): What are ALDs?

A ALDs are Assistive Listening Devices. They consist of a microphone/transmitter positioned close to the speaker's mouth that sends the speaker's voice through the air or by cable to the receiver worn by the student. ALDs can provide clear sound over distances, eliminating echoes and reducing the distraction of surrounding noises, allowing the student to more easily attend to the instructor.

LEARNING DISABILITIES

Q TEACHING AND CLASSROOM ACCOMMODATION: How can I present information (e.g., written, oral, hands-on activities, demonstrations, and videotaped formats) adequately to teach students with learning disabilities in my class?

A Presenting content using multiple modes (e.g., written, oral, hands-on activities, demonstrations, and videotaped formats) benefits all students and may

reduce the need for specific accommodations for students with many types of disabilities. However, some students with learning disabilities will still require specific accommodations. Accommodations should be individualized and may change over time as a student's needs change or the course requires different types of work. Access is most easily addressed if the course content is clearly outlined and there is an ongoing dialog between faculty, the disability services office, and the student. Reasonable accommodations may include but are not limited to:

- enlarged visual aids and handouts;
- tape recording of sessions;
- extended time on assignments and during test taking;
- distraction-free testing environment;
- alternative evaluation options and formats (e.g., audio, portfolios);
- computers with speech input and/or output, spell checker and grammar checker;
- note-taker/scribe/reader; and
- textbooks provided on tape.

Q HANDOUTS AND TESTS: How can I adjust testing or handout materials to make them more "user-friendly" for students with a range of learning disabilities?

A When constructing test items, use a style consistent with that used during lectures and group related test questions to-



gether. This can help students retrieve information contained in their notes. Concise and well-organized handouts that highlight key points can also structure and reinforce content.

Q DIAGNOSIS: How do I know if a student has a specific learning disability?

A Learning disabilities are “hidden disabilities.” It is the student’s responsibility to disclose her disability and seek necessary accommodations. A student will usually provide documentation of her disability to the disabled student services office. The student and/or the disabled student services counselor will contact you and discuss accommodations as needed. During the first class session it may be helpful to encourage students who need accommodations to arrange a meeting with you. Also include a similar statement on your course syllabus. Some students choose not to disclose their disabilities and their privacy should be respected by not asking them about the possible presence of a disability.

Q COMPUTER ACCOMMODATIONS: Do all computer-based accommodations used by students with learning disabilities require special hardware or software applications?

A No. Many students benefit from standard word-processor features. Features such as spelling and grammar checkers can help students correct spelling and grammar errors. Word-processing programs that include tools for outlining and color coding text can help people with organization and sequencing difficulties sort their thoughts and ideas.

Q READING: How can a student with a reading disability be expected to keep up with the high level of reading content in my course?

A There are several options students can consider. Students can arrange to obtain their textbooks recorded on audiocassettes or placed on computer disks through agencies such as Recordings for the Blind and Dyslexic or the disabled student services office on campus. Some students may benefit from a computer-based reading system. These systems convert screen text (from disks, the Internet or e-mail) or scanned text (from textbooks, journals, etc.) to speech output. This requires the availability of an appropriate configuration of computer software and hardware.

Not every textbook is available on tape or in alternate format. Choose your textbooks well in advance, so students can order these books early and prepare the accommodations before the classes begin.

You can also assist students by offering handouts, tests, and other class materials in electronic format. Materials in electronic format are often easier and faster for the student to convert to alternate formats.

Q EXTENDING DEADLINES: Do I need to extend assignment deadlines for students who have learning disabilities that affect their writing or students who have limited use of their hands?

A An extended assignment deadline might be a reasonable accommodation for students with these types of disabilities as well as those with low vision, health,



or psychiatric impairments. The need for and length of an extended deadline depends upon the student's disability and the nature of the assignment. Consult the staff at your disabled student services office regarding the most appropriate accommodation for a specific student.

Q LOW-TECH: What are some "low-tech" strategies that students with learning disabilities use to achieve academic success?

A Some simple accommodations do not require computers. Low-tech solutions such as post-it notes, daily organizers, and highlighter pens may be helpful organizers and learning tools for students with learning disabilities.

SCIENCE LABS

Q MATHEMATICS NOTATION: How do I transcribe mathematical and scientific notation into Braille?

A Contact the disability student services office to help with the transcription process. Nemeth Code Braille is a special type of Braille used for math and science notations. Transcription can be done by a professional service or in-house if the proper hardware, software, and technical expertise are available.

Q SCANNING MATHEMATICS AND SCIENCE INFORMATION: Can mathematical or scientific information be converted to speech or Braille output for students with visual impairments by using a scanner?

A Text information can be readily scanned and converted by optical character recognition (OCR) to Braille or speech output with appropriate hardware and software. Current OCR technology does not always recognize scanned mathematical or scientific notations accurately. Proofreading is an essential part of the transcription process to ensure the accuracy of the material.

Q COMPUTER GRAPHS: How can a student who is blind participate in labs that require computer graphing?

A A student who has some usable sight may be able to use graphing software if the text and graphics on the screen can be enlarged using either features built into the operating system or adaptive software. A student who is blind can work with a partner who can verbally describe the graphs.

Q TACTILE DIAGRAMS: What are tactile diagrams?

A Tactile diagrams are raised line drawings (similar to Braille) that can be used to transmit visual information such as that found in graphs, chemical structures, and biological drawings. Tactile diagrams are created by using computer software files or a line drawings of images. Diagrams are transferred to tactile image paper and a thermal image enhancer "burns" the raised lines into the paper. Tactile drawings are typically used by individuals who are blind. Tactile diagrams can be accessed through a diagram library, or they can be created with the equipment just described. Your campus disability student services staff can help you procure tactile diagrams if a student needs them as an



accommodation in your course. A good source for information on tactile diagrams and a tactile diagram library can be found at Purdue University at <http://www.taevisonline.purdue.edu/>.

Q DEAF OR HARD OF HEARING: Do I need to make any special adjustments in a laboratory for a student who is deaf?

A Yes. Provide written instructions, captioned video instructions, and/or demonstrations prior to the lab. Safety procedures should also be reviewed with the students and visual lab warning signals (e.g., flashing lights) need to be in place. It may also be helpful to provide preferential seating so the student can easily view demonstrations and watch the instructor. It is important to remember that students who use a sign language interpreter or read lips may have difficulty simultaneously observing a demonstration while watching the interpreter or reading lips. Discuss lab activities with the student as he is the best source of information about his needs.

MOBILITY IMPAIRMENTS

Q LAB ACCESSIBILITY: Are there any standards for lab accessibility for students with mobility impairments?

A There are no overall standards for setting up science labs as needs vary considerably depending on the subject, the physical facility, and the physical abilities of each student. Specifications for wheelchair accessibility to the facility, however, do exist. For example, doors need to be 32-inches wide and thresholds should be no higher than 1/2-inch.

Ramps and/or elevators need to be provided as an alternative to stairs, and a wheelchair-accessible restroom needs to be close by. There are also general guidelines that can enhance access to the physical space and equipment in the laboratory. For example, aisles should be kept wide and clear. Lab tables, sinks, and other workspaces should allow wheelchair access and proper workspace height. At least one adjustable workstation is recommended. For students with limited use of their hands, a wide range of adaptive devices and/or computer technology can provide access to lab equipment that requires fine motor coordination, dexterity, and precision (e.g., clamps can be used to stabilize objects, or software can be used for measuring and graphing).

Q LAB ACCESS FOR WHEELCHAIR USERS: How can I improve the accessibility of my lab for a student who uses a wheelchair?

A Principles of universal design promote access for individuals with a wide range of abilities and disabilities and should be considered when planning and organizing the physical environment. Contact your campus disabled student services office for assistance. Examples of basic universal design guidelines you can readily implement include the following:

- Make sure all routes to the lab are wheelchair accessible.
- Keep aisles wide and clear.
- Place handouts and other documents within reach from a wheelchair. If some materials are inaccessible, provide a means to assist the student.



- Provide at least one adjustable table or work space.
- Make sure controls for computers and other equipment can be reached by someone sitting in a wheelchair.

Q EMERGENCY EVACUATION: In an emergency evacuation, what is my responsibility for a student who uses a wheelchair or who has another mobility impairment?

A Inform the student about emergency procedures. Work with the student and the disabled student services office on your campus to develop a clear evacuation plan.

Q EQUIPMENT COSTS: Who is responsible for ordering and paying for special lab equipment or making architectural modifications?

A It is the institution's responsibility to provide and pay for accommodations on campus, but the unit that pays for a specific product or modification depends upon campus policies and specific circumstances. Typically, the unit providing the program (e.g., a departmental computer lab) provides accommodations for that activity (e.g., adaptive computer technology). Your disabled student services office may be able to answer these questions and facilitate the acquisition process.

Q FIELDWORK: My course involves fieldwork experiences that require community travel that may pose some challenges for a student with a mobility impairment. How can I prepare?

A Consider transportation needs as well as accessibility at each site. Prior knowl-

edge will help you respond quickly when the need arises. If a wheelchair user enrolls in your class, discuss potential barriers and solutions. The campus disabled student services office may also have suggestions. If access to a field experience cannot be provided due to unavoidable barriers, develop alternative experiences or assignments.

Q HAND USE: How can a student with limited hand function participate in my science lab?

A You can structure the activities so that students work with lab partners. Be sure the student with a disability participates actively and is not just an observer. For example, a student could input data into a laptop computer, while her partner carries out the procedure. There are also a variety of ways to adapt lab equipment (e.g., enlarging tool handles, using "grippers") to make it accessible to someone with limited hand function. Using computer controlled lab equipment with alternative input devices (e.g., speech, Morse code, switches) is another possibility.

HEALTH IMPAIRMENTS

Q FIELDWORK: How can a student with a health impairment manage fieldwork requirements?

A Accommodations, if needed, can be negotiated between the instructor, the disabled student services office, and the student. Selecting a site that is close to the student's home to minimize the transportation requirements may be helpful. The student could also be given



priority in fieldwork selection to help accommodate his needs. Extending the length of the fieldwork to allow participation on a part-time basis could also be considered.

Q CLASS DISCUSSIONS: How can a student with a health impairment maintain participation in classroom discussions when he is frequently absent?

A There are several electronic options to consider. On-line discussions can facilitate discussion between students. Consider having students post their work on the Web and allow peer review and discussion of papers, assignments, and lab results. A few "ground rules" and participation requirements can be set to keep the discussion relevant and active. In addition, e-mail exchanges with professionals, students on other campuses, and community members can extend learning beyond your campus.

Q NOTE-TAKING SERVICES: What can I do to assist students with disabilities who need note-taking services but are reluctant to request and recruit a fellow classmate for copies of notes?

A Consider providing the course syllabus, instructor notes, and objectives on an accessible Web site.

Include a statement in your syllabus encouraging students with disabilities needing academic adjustments to contact the student disability resource center. Encourage students to meet with you to implement appropriate accommodations.

If a student requests your assistance for a note-taker, offer to make a general announcement in class. Have interested

student(s) meet with you after class or during office hours to make arrangements. Avoid specific references to the student with a disability. Rather, emphasize the campus commitment to provide equal access and accommodations for qualified students in support of learning.

Q ABSENCES: How do I accommodate a student whose disability causes her to miss classes?

A Determine to what extent class absences may fundamentally interfere with the student completing your course objectives and learning outcomes. In other words, consider if it is essential that all, most, or some classes be attended. The impact of absences depends upon the nature of the course; for example, missing classes in a science lab or an upper-division sociology course with regular group work may have a greater impact than missing classes in a lecture-only course. Consult with your campus disability resource office about note-taking services, exam accommodations (e.g., opportunities to reschedule missed exams), and if available, on-campus access assistance such as disabled parking and/or transportation (to reduce potential fatigue factors). It is important to note that you must not lower your academic expectations; ultimately, the student is responsible for gaining the knowledge and skills required in the class.

WRITING ASSIGNMENTS

Q GRAMMAR: How do I grade written essays when syntax and grammatical errors are evident for students who have



a hearing loss and use American Sign Language (ASL)?

- A English is a second language for many people who are deaf, and therefore, presents unique challenges for the student and professor when written assignments are evaluated. For students who rely on American Sign Language, transferring thoughts to a written form is difficult because ASL does not have verb tenses. As a student who is deaf explained, "I cannot hear the tenses in phrases such as 'I have been doing,' because American Sign Language uses symbols."

You must provide a reasonable accommodation for a disability, but should not lower your academic standards. Correct his grammar and syntax and assist the student in developing his English skills. You may wish to refer him to a tutor or writing lab.

You may suggest that the student submit two copies of each written assignment. This provides the opportunity to comment and grade an essay for content and then to note or grade grammatical errors on the duplicate essay, as applicable to the course criteria. The student can rewrite the essay incorporating grammatical feedback, and place the corrected copy in a "personal grammar journal" to use as a reference in future writing.

- Q BLINDNESS:** In what format can a student who is blind turn in written assignments?
- A In most cases, a student who is blind will type written assignments using a computer that is equipped with speech output. The assignments can then be

submitted in print form, via electronic mail, or on computer diskette, depending on the preferences of the instructor. At times, students may also choose to dictate short answers to a reader who will handwrite responses. The reader is typically provided by the campus disabled student services office.

INTERNATIONAL/TRAVEL PROGRAMS

- Q BLINDNESS:** How can a student who is blind navigate in a foreign place?
- A That depends on the student, the nature and length of the trip, and the destination. When in doubt, it is best to ask the student what, if any, assistance will be needed. Traveling with a sighted partner is helpful but some students are comfortable navigating and asking for direction on their own. If accommodations are needed, the student can work with your campus disabled student services office to locate resources and develop a plan. When traveling in a group, other members of the group may volunteer to serve as sighted guides when necessary.
- Q INTERNATIONAL ACCESS BARRIERS:** What access barriers do students with disabilities face when traveling internationally?
- A Academic and daily life in a foreign country can introduce new challenges that may require different accommodations and compromises. Accommodations and needs will vary greatly depending on the student and the travel



destination. During the planning process, research the access issues in the country to which the student will travel. Provide the student with essential information to build realistic expectations for a successful experience.

Q INTERNATIONAL TRAVEL ACCOMMODATIONS: What accommodations do students with disabilities need when traveling abroad?

A Students who study abroad will generally require similar academic accommodations that they have used on their home campuses. However, the following areas will require additional consideration: a) architectural barriers (many countries do not have the same architectural accessibility requirements as the United States), b) transportation barriers, c) technology access, and d) socio-cultural differences. The student, the disability services counselor, and an international study/education abroad program advisor should plan the experience together to develop realistic goals and expectations.

Q CIVIL RIGHTS ABROAD: Are students studying abroad protected by the ADA?

A While the ADA has improved access to public transportation, travel accommodations, and other public and private facilities in the United States, these requirements are not consistent worldwide. The student who travels to a foreign country must be prepared to cope with potential barriers. Developing self-advocacy skills, making local contacts in the host country, as well as practicing and role-playing "what if" scenarios can

help prepare the student for potential problems.

Q ACCESSING EXCHANGE OPPORTUNITIES: How can students with disabilities be encouraged to access international exchange opportunities?

A A recent survey was done to find out what happens when people with disabilities contact an international exchange or disability organization in search of information on studying, interning, or volunteering overseas. The results suggested the following practices were most helpful in encouraging individuals with disabilities to participate in international exchange programs:

- brainstorming the international exchange possibilities with the individual to show that the organization was willing to work with them;
- use of a structured form or process addressing disability-related or international exchange-related questions;
- providing useful referrals (e.g., accurately describing the services and resources offered by Mobility International USA/National Clearinghouse on Disability and Exchange when referring the caller to MIUSA/NCDE); and
- following the TTY or relay service etiquette when receiving a call from a hard of hearing or deaf caller.

Source: National Clearinghouse on Disability and Exchange (NCDE); Mobility International USA <http://www.miusa.org/general/publications/frontline.html>.

RESOURCES



This *Resources* section contains two parts – *General References* and *Glossary*. The *General References* portion provides resources for general information pertaining to higher education and students with disabilities. The *Glossary* provides definitions of terms used in this manual.



General References



A-Prompt (Accessibility Prompt)

<http://aprompt.snow.utoronto.ca/>
Web accessibility verifier and tool kit.

Ability: Internet Index

<http://www.ability.org.uk/index.html>
On-line services and Internet index for individuals with disabilities.

Abledata

8630 Fenton Street, Ste. 930
Silver Springs, MD 20910
800-227-0216 (toll free voice)
301-608-8912 (TTY)
301-608-8958 (fax)
abledatta@macroint.com
<http://www.abledata.com/>
Information on assistive technology and disability issues in general. Sponsored by NIDRR and the U.S. Department of Education.

Access Board

1331 F St. NW Ste. 1000
Washington, DC 20004-1111
800-872-2253 (toll free voice)
800-993-2822 (toll free TTY)
202-272-0080 (voice)
202-272-5449 (TTY)
202-272-0081 (fax)
info@access-board.gov
<http://www.access-board.gov/>
Federal agency that enforces requirements for access to Federally-funded buildings and facilities, sets guidelines under the Americans with Disabilities Act, Section 508 of the Rehabilitation Act, and other federal laws, and provides technical assistance and information.

ADA-access

A discussion of physical access for people with disabilities as well as information on programs, services, and transportation. To subscribe, send a message with a blank subject line to listserv@listserv.aol.com. In the body of the message type "subscribe ada-access Firstname Lastname."

ADA-law

A discussion list on the Americans with Disabilities Act, other disability-related laws in the U.S., and similar laws in other countries. To subscribe, send a message with a blank subject line to listserv@vm1.nodak.edu. In the body of the message type "subscribe ada-law Firstname Lastname."

Adaptive Environments Center

374 Congress St. Ste. 301
Boston, MA 02210
617-695-1225 (voice/TTY)
617-482-8099 (fax)
adaptive@adaptenv.org
<http://www.adaptenv.org/>
Information on creating accessible environments.

Advocacy

Discussion list to promote self-advocacy by people with disabilities. To subscribe, send a message with a blank subject line to listserv@maelstrom.stjohns.edu. In the body of the message type "subscribe advocacy Firstname Lastname."

Alexander Graham Bell Association for the Deaf

3417 Volta Place NW
Washington, DC 20007-2778
202-337-5220 (voice)
202-337-5221 (TTY)
202-337-8314 (fax)
<http://www.agbell.org/>
Resources for people who are deaf.

**American Academy of Audiology**

8300 Greensboro Dr. Ste. 750
McLean, VA 22102
800-AAA-2336 (toll free voice)
703-790-8466 (voice)
703-790-8631 (fax)
<http://www.audiology.com/>
Audiology resources.

American Association of the Deaf-Blind (AADB)

814 Thayer Ave. Ste. 300
Silver Spring, MD 20910-4500
800-735-2258 (toll free voice)
301-588-6545 (TTY)
301-588-8705 (fax)
<http://www.tr.wou.edu/dblink/aadb2.htm>
A national consumer advocacy organization for people who have combined hearing and visual impairments.

American Council of the Blind (ACB)

1155 15th St. NW Ste. 1004
Washington, DC 20005
800-424-8666 (toll free voice)
202-467-5081 (voice)
202-467-5085 (fax)
<http://www.acb.org/>
An information referral and advocacy agency.

American Deafness and Rehabilitation Association (ADARA)

PO Box 727
Ludsbay, MD 20657
410-495-8440 (voice/TTY)
ADARAorgn@aol.com
<http://www.adara.org/>
A network of professionals who serve people who are deaf or hard of hearing.

American Diabetes Association

1701 N Beauregard St.
Alexandria, VA 22311
800-342-2383 (toll free voice)
customerservice@diabetes.org
<http://www.diabetes.org/>
General information on diabetes.

American Foundation for the Blind (AFB) Headquarters

11 Penn Plaza Ste. 300
New York, NY 10001
800-232-5463 (toll free voice)
212-502-7600(voice)
212-502-7662 (TTY)
212-502-7777 (fax)
afbinfo@afb.org
<http://www.afb.org/>
A national information and referral resource for people who are blind or visually impaired.

American Institute of Architects (AIA)

Library and Archives
1735 New York Ave. NW
Washington, DC 20006
800-365-ARCH (toll free voice)
202-626-7493 (voice)
sales@aiaonline.com
<http://www.e-architect.com/>
Information on barrier-free design.

American Printing House for the Blind, Inc. (APH)

PO Box 6085
Louisville, KY 40206-0085
800-233-1839 (toll free voice)
502-895-2405 (voice)
502-899-2274 (fax)
info@aph.org
<http://www.aph.org/>
An organization that creates educational, workplace, and lifestyle products and services for people with visual impairments.

**American Psychiatric Association**

1400 K St. NW
Washington, DC 20005
888-357-7924 (toll free voice)
202-682-6850 (fax)
apa@psychiatric.org
<http://www.psych.org/>

Information on the diagnosis and treatment of mental and emotional illness and disorders.

American Psychological Association

750 1st St. NE
Washington, DC 20002-4242
800-374-2721 (toll free voice)
202-336-5510 (voice)
202-336-6123 (TTY)
<http://www.apa.org/>

Information and resources for educators, parents, and students.

American Speech-Language-Hearing Association (ASHA)

10801 Rockville Pike
Rockville, MD 20852
800-498-2071 (Professional/Students toll free voice/TTY)
800-638-8255 (Public toll free voice/TTY)
301-571-0457 (fax)
actioncenter@asha.org
<http://www.asha.org/>

Information and resources on speech, language, and hearing disorders.

Americans with Disabilities Act (ADA) Home Page

U.S. Department of Justice
Civil Rights Division
Disability Rights Section - NY Ave
950 Pennsylvania Ave. NW
Washington, DC 20530-0001
800-514-0301 (toll free voice)
800-514-0383 (toll free TTY)
202-307-1198 (fax)
<http://www.usdoj.gov/crt/ada/adahom1.htm>
Information and technical assistance on the Americans with Disabilities Act (ADA).

Anxiety Disorders Association of America (ADAA)

8730 Georgia Ave. Ste. 600
Silver Spring, MD 20910
240-485-1001 (voice)
240-485-1035 (fax)
<http://www.adaa.org/>

Information on the prevention and treatment of anxiety disorders.

Applied Science and Engineering Labs

PO Box 269
Wilmington, DE 19899
302-651-6830 (voice)
302-651-6834 (TTY)
302-651-6895 (fax)
<http://www.asel.udel.edu/>

New technologies for people with disabilities.

The Arthritis Foundation

PO Box 7669
Atlanta, GA 30357-0069
800-283-7800 (toll free voice)
<http://www.arthritis.org/>
Information and resources on arthritis.



Association for the Education and Rehabilitation of the Blind and Visually Impaired (AER)

4600 Duke St. #430
PO Box 22397
Alexandria, VA 22304
703-832-9690 (voice)
703-823-9695 (fax)
<http://www.aerbvi.org/>

Support and assistance to professionals working with individuals who have visual impairments.

Association on Higher Education and Disability (AHEAD)

University of Massachusetts, Boston
100 Morrissey Blvd.
Boston, MA 02125-3393
617-287-3880 (voice)
617-287-3882 (TTY)
617-287-3881 (fax)
AHEAD@umb.edu
<http://www.ahead.org/>

An organization of higher education disability service providers that share information about research, accommodations, and legislation.

Barrier Free Education, Developing Accessible Science Experiments

Center for Assistive Technology and Environmental Access (CATEA)
Georgia Institute of Technology
404-894-4960 (voice/TTY)
404-894-9320 (fax)
<http://www.catea.org>
<http://barrier-free.arch.gatech.edu/Tools/calc.html>

Resource for gaining access to math and science education.

Better Hearing Institute

515 King St. Ste. 420
Alexandria, VA 22314
703-684-3391 (voice)
mail@betterhearing.org
<http://www.betterhearing.org/>
Information on hearing loss and hearing health care.

Blind Computer User Network

kelly@ripco.com
<http://www.city-net.com/vipace/friends/chicago/>
Adaptive technology, newsletter, and user groups for visually impaired computer users.

BlindAd

A forum for announcing new products of interest to people who are blind. To subscribe, send a message with a blank subject line to listserv@maelstrom.stjohns.edu. In the body of the message type "subscribe blindad Firstname Lastname."

Blind-etc

A discussion/support list for people who are visually impaired. To subscribe, send a message with a blank subject line to listserv@maelstrom.stjohns.edu. In the body of the message type "subscribe blind-etc Firstname Lastname."

Blind-Issues

A discussion list that deals with every day issues that affect the lives of people who are blind and visually impaired. To subscribe, send a message with a blank subject line to listserv@maelstrom.stjohns.edu. In the body of the message type "subscribe Blind-Issues Firstname Lastname."



Blindness Resource Center

New York Institute of Special Education
(NYISE)

Office of Development

999 Pelham Pkwy.

Bronx, NY 10469

718-519-7000, Ext. 315 (voice)

718-231-9314 (fax)

nyise@csi.com

<http://www.nyise.org/blind.htm>

Information on universal access and on-line resources for those who are visually impaired.

Blind-talk

A discussion of topics of interest to blind and visually impaired people. To subscribe, send a message with a blank subject line to *listserv@nfbnet.org*. In the body of the message type "subscribe blind-talk."

Bobby

Watchfire Group

1 Hines Rd.

Kanata, ON, Canada K2K3C7

800-282-5951 (toll free voice)

613 599-4661 (fax)

bobbysupport@watchfire.com

<http://bobby.watchfire.com/bobby/html/en/index.jsp>

An HTML validation program designed to assist with identifying and repairing barriers to Web page accessibility.

Brain Injury Association of America

105 North Alfred St.

Alexandria, VA 22314

703-236-6000 (voice)

703-236-6001 (fax)

<http://www.biausa.org/>

Information and resources on brain injury prevention, research, education, and advocacy.

Captioned Media Program

National Association of the Deaf

1447 E. Main St.

Spartanburg, SC 29307

800-237-6213 (toll free voice)

800-237-6819 (toll free TTY)

800-538-5636 (fax)

info@cfr.org

<http://www.cfv.org/>

Information on captioning films and videos for people who are deaf.

Center for Applied Special Technology (CAST)

39 Cross St.

Peabody, MA 01960

978-531-8555 (voice)

cast@cast.org

<http://www.cast.org/>

A not-for-profit organization expanding opportunities for individuals with disabilities through technology.

Center for Independent Living (CIL)

2539 Telegraph Ave.

Berkeley, CA 94704

510-841-4776 (voice)

510-848-3101 (TDD)

510-841-6168 (fax)

<http://www.cilberkeley.org/>

A national leader in helping people with disabilities live independently and become productive, fully participating members of society.

Center for Psychiatric Rehabilitation

940 Commonwealth Ave. W

Boston, MA 02215

617-353-3549 (voice)

617-353-7700 (fax)

<http://www.bu.edu/sarpsych/reasacom/educationtips.html>

An on-line resource for employers and educators on reasonable accommodations for people with psychiatric disabilities.



Center for Universal Design

North Carolina State University
College of Design
Campus Box 8613
50 Pullen Rd., Brooks Hall, Rm. 104
Raleigh, NC 27695-8613
800-647-6777 (toll free voice info line)
919-515-3082 (voice/TTY)
919-515-7330 (fax)
cud@ncsu.edu
<http://www.design.ncsu.edu/cud/>
Information and technical assistance for
universal design in facilities and products.

Center on Human Policy

Syracuse University
805 S Crouse Ave.
Syracuse, NY 13244-2280
800-894-0826 (toll free voice)
315-443-3851 (voice)
315-443-4355 (TTY)
315-443-4338 (fax)
thechp@sued.syr.edu
<http://soeweb.syr.edu/thechp/>
A policy, research, and advocacy organiza-
tion involved in the national movement to
ensure the rights of people with disabilities.

Children and Adults with Attention- Deficit/Hyperactivity Disorder (CHADD)

8181 Professional Pl. Ste. 201
Landover, MD 20785
800-233-4050 (toll free voice)
301-306-7070 (voice)
301-306-7090 (fax)
<http://www.chadd.org/>
Advocacy organization for those with AD/
HD.

Closed Captioning Web

<http://www.Captions.org/alphalinks2.cfm/>
Closed-captioned tools for people with
disabilities and links to information on jobs,
movies, resources, hardware, software, and
more.

Closing the Gap

PO Box 68
526 Main St.
Henderson, MN 56044
507-248-3294 (voice)
507-248-3810 (fax)
info@closingthegap.com
<http://www.closingthegap.com/>
Information on technology for people with
disabilities.

College and Career Programs for Deaf Students

<http://gri.gallaudet.edu/Publications/#PUB1>
Information about programs, special ser-
vices, and career areas for deaf and hard of
hearing students.

College Students with Disabilities: A Desk Reference Guide for Faculty

Mississippi State University
PO Box 9727
Mississippi State, MS 39762-5740
800-582-2233 (toll free TTY)
662-325-7917 (voice)
662-325-7919 (voice)
662-325-3263 (fax)
[http://www.educ.msstate.edu/PAACS/products/
fsg_guide.html](http://www.educ.msstate.edu/PAACS/products/fsg_guide.html)
Faculty guide for working with students
who have disabilities.

Crt-focus

A discussion of assistive technology for
people with disabilities. To subscribe, send a
message with a blank subject line to
listproc@smash.gatech.edu. In the body of the
message type "subscribe crt-focus Firstname
Lastname."



CSUN

Center on Disabilities
California State University, Northridge
18111 Nordhoff St.
Northridge, CA 91330-8340
818-677-2578 (voice)
818-677-4929 (fax)
ctrdis@csun.edu
<http://www.csun.edu/cod/>

Sponsors annual conferences, workshops and seminars related to computer use by people with disabilities.

DAteach

A discussion group for teachers with disabilities to share information about problems and solutions, to give and receive support, and to guide people with disabilities who wish to pursue a teaching career. To subscribe, send a message with a blank subject line to *listserv@listserv.montana.edu*. In the body of the message type "subscribe dateach."

Deaf-magazine

A weekly periodical. To subscribe, send a message with a blank subject line to *listserv@listserv.deaf-magazine.org*. In the body of the message type "subscribe deaf-magazine Firstname Lastname."

Deaf Resources Library

comments@deaflibrary.org
<http://www.deaflibrary.org/>
On-line collection of reference material and links to educate and inform people about Deaf culture.

Depression and Related Affective Disorder Association (DRADA)

Meyer 3-181, 600 N Wolfe St.
Baltimore, MD 21287-7381
410-955-4647 (Baltimore voice)
202-955-5800 (Washington DC voice)
Information on depressive and manic-depressive illnesses.

Depressive and Bipolar Support Alliance

730 N Franklin St. Ste. 501
Chicago, IL 60610-7204
800-826-3632 (toll free voice)
312-642-0049 (voice)
312-642-7243 (fax)
<http://www.ndmda.org/>
Serves to educate, foster self-help, and eliminate discrimination.

Descriptive Video Service/WGBH

125 Western Ave.
Boston, MA 02134
617-300-5400 (voice)
617-300-1026 (fax)
<http://www.wgbh.org/wgbh/access/dvs/>
Information on media access for people who are blind or have low vision.

Disabilities, Opportunities, Internetworking, and Technology (DO-IT)

University of Washington
Box 355670
Seattle, WA 98195-5670
888-972-DOIT (toll free voice/TTY) WA, outside Seattle
206-685-DOIT (voice/TTY)
509-328-9331 (voice/TTY) Spokane office
206-221-4171 (fax)
doit@u.washington.edu
<http://www.washington.edu/doit/>
Free and low cost educational publications and videotape presentations that help educators, students, and employers learn about technology access issues and solutions for people with disabilities; strategies and programs to help people with disabilities achieve high levels of independence, productivity, and participation in academic programs and careers.



Disabilities, Teaching Strategies, and Resources

<http://www.as.wvu.edu/~scidis/sitemap.html>

Inclusion of students with disabilities in science education.

Disability News Service

mail@disabilitynews.com

<http://www.disabilitynews.com/>

Disability-related news and information.

Disability-Related Resources on the Internet

<http://www.disabilityresources.org/index.html>

Links to disability-related Web sites and other electronic resources.

Disability-research

A discussion list for sharing news and ideas about research. To subscribe, send a message with a blank subject line to mailbase@mailbase.ac.uk. In the body of the message type "join disability-research Firstname Lastname."

Dis-Forum

A discussion list about concerns common to students with disabilities and academics. To subscribe, send a message with a blank subject line to mailbase@mailbase.ac.uk. In the body of the message type "join dis-forum Firstname Lastname."

Distance Education: Access Guidelines for Students with Disabilities

<http://www.htctu.fhda.edu/dlguidelines/final%20dl%20guidelines.htm>

Distance education access guidelines for California Community Colleges.

Doitsem

Doitsem (Disabilities, Opportunities, Inter-networking, and Technology in Science, Engineering, and Mathematics) is for those interested in increasing the representation of individuals with disabilities in these academic and career fields. To subscribe, send a message with a blank subject line to listproc@u.washington.edu. In the body of the message type "subscribe doitsem Firstname Lastname."

Easter Seal Society, National Office

230 West Monroe St. 1800

Chicago, IL 60606

312-726-6200 (voice)

312-726-4258 (TTY)

312-726-1494 (fax)

<http://www.easterseals.org/>

Provides a wide variety of services for people with disabilities and their families.

Education Equity Concepts Resource Center

114 E 32nd St. Ste. 701

New York, NY 10016

212-725-1803 (voice)

212-725-0947 (fax)

<http://www.edequity.org/welcome.htm>

Information about women with disabilities.

Edudeaf

Discussion about the education of people who are deaf. To subscribe, send a message with a blank subject line to listserv@lsv.uky.edu. In the body of the message type "subscribe edudeaf Firstname Lastname."



Electronic Text Center

Alderman Library
University of Virginia
Box 400148
Charlottesville, VA 22904
434-924-3230 (voice)
434-924-1431 (fax)
text@virginia.edu
http://etext.virginia.edu/
On-line archive of electronic texts and images (SGML and XML-encoded) and library services.

Engaging Differences Project

University of Kentucky
Project Director: William H. Berdine
606-257-8592 (voice)
berdine@pop.uky.edu
http://www.uk.edu/TLC/grants/uk_ed/
Develops postsecondary instructional tutorials to improve education for students with disabilities.

Epilepsy Foundation of America

4351 Garden City Dr.
Landover, MD 20785-7233
800-332-1000 (voice)
http://www.efa.org/
General information, research, and advocacy services for individuals with epilepsy.

Equal Access to Software and Information (EASI)

PO Box 18928
Rochester, NY 14618
716-244-9065 (voice)
http://www.rit.edu/~easi/
Promotes equal access through on-site and on-line workshops, courses, and presentations; a Web site, publications, and e-mail discussion lists; and an electronic journal.

Equity and Excellence in Higher Education

University of New Hampshire
Project Director: Jan Nisbet
800-238-2048 (toll free voice/TTY)
603-228-2084 (voice)
603-228-3270 (fax)
jan.nisbet@unh.edu
http://iod.unh.edu/EE/
Focuses on improving the educational outcomes of postsecondary students with disabilities.

The Faculty Room

http://www.washington.edu/doi/Faculty/
Professional development resources for postsecondary faculty and administrators.

Family Village - A Global Community of Disability-Related Resources

Waisman Center
University of Wisconsin - Madison
1500 Highland Ave.
Madison, WI 53705-2280
familyvillage@waisman.wisc.edu
http://www.familyvillage.wisc.edu/
Information on diagnoses, communications, adaptive technology and products, and education for individuals with disabilities, families, and professionals.

HEATH (Higher Education and Adult Training for People with Handicaps) Resource Center

George Washington University
2121 K St. NW Ste. 220
Washington, DC 20037
800-544-3284 (toll free voice/TTY)
202-973-0904 (voice/TTY)
202-973-0908 (fax)
askheath@heath.gwu.edu
http://www.heath-resource-center.org/
A clearinghouse on postsecondary education for individuals with disabilities.



Humanser

An organization of professionals who are blind and working, or aspiring to work, in the fields of social work, psychology, rehabilitation, and counseling. To subscribe, send a message with a blank subject line to listserv@nfbnet.org. In the body of the message type "subscribe humanser."

Independent Living Aids

220 Robbins Lane
Jericho, NY 11753
800-537-2118 (toll free voice)
516-937-3906 (fax)

can-do@independentliving.com

<http://www.independentliving.com/>

A catalog of products to help people with disabilities live independently.

International Dyslexia Association

8600 LaSalle Rd.
Chester Building Ste. 382
Baltimore, MD 21286-2044
410-296-0232 (voice)
410-321-5096 (fax)

<http://www.interdys.org/>

Promotes effective teaching approaches and related clinical educational intervention strategies for dyslexics.

Java Accessibility Resources. Sun Microsystems' Accessibility Program

<http://www.sun.com/access/>

Develops architectural strategies and solutions to benefit users with disabilities.

Job Accommodation Network (JAN)

PO Box 6080
Morgantown, WV 26506-6080
800-526-7234 (toll free voice/TTY)
800-ADA-WORK (toll free voice/TTY in the US)
304-293-7186 (voice/TTY worldwide)
304-293-5407 (fax)

jan@jan.icdi.wvu.edu

<http://www.janweb.icdi.wvu.edu/>

Resource regarding reasonable accommodations for people with disabilities in work settings.

LD OnLine

WETA
2775 South Quincy St.
Arlington, WA 22206
703-998-2600 (voice)
703-998-3401 (fax)

ldonline@weta.com

http://www.ldonline.org/ld_indepth/resource-guide.html

Interactive guide to learning disabilities.

LD Resources: Resources for People with Learning Disabilities

<http://www.ldresources.com/>

Information for people with specific learning disabilities.

League for the Hard of Hearing

71 W 23rd St.
New York, NY 10010-4162
917-305-7700 (voice)
917-305-7999 (TTY)
917-305-7888 (fax)

<http://www.lhh.org/>

A wide range of services and resources for people with hearing loss.



Learning Disabilities Association of America

4156 Library Rd.
Pittsburgh, PA 15234-1349
412-341-1515 (voice)
412-344-0224 (fax)
ldanat1@usaor.net
<http://www.ldanat1.org/>

Information and resources about learning disabilities.

Lighthouse International

111 East 59th St.
New York, NY 10022-1202
800-829-0500 (voice)
212-821-9713 (TTY)
info@lighthouse.org
<http://www.Lighthouse.org/>

Text resources for people with vision impairments.

Ltcare-1

A discussion list that seeks to identify, share, and discuss research findings relevant to public policy on disability, aging, and long-term care. To subscribe, send a message with a blank subject line to *listserv@list.nih.gov*. In the body of the message type "subscribe ltcare-1 Firstname Lastname."

Mathematics Accessible To Visually Impaired Students (MAVIS)

New Mexico State University
Math Department MSC 3MB
PO Box 30001
Las Cruces, NM 88003
505-646-2664 (voice)
505-646-1064 (fax)
chrweave@nmsu.edu
<http://www.nmsu.edu/~mavis/>

Strategies and resources for making mathematics accessible to visually impaired high school and university students.

Media Access Group

125 Western Ave
Boston, MA 02134
617-300-3400 (voice)
617-300-2489 (voice)
access@wgbh.org
<http://www.access.wgbh.org/>

Mobility International, USA (MIUSA)

PO Box 10767
Eugene, OR 97440
541-343-1284 (voice/TTY)
541-343-6812 (fax)
info@miusa.org
<http://www.miusa.org/>

Serves to integrate people with disabilities into international educational exchange programs and other travel.

Multiple Sclerosis Foundation, Inc. (MSF)

6350 N Andrews Ave.
Fort Lauderdale, FL 33309-2130
800-225-6495 (toll free voice)
954-776-6805 (voice)
954-938-8708 (fax)
admin@msfacts.org
<http://www.msfacts.org/>

Information on Multiple Sclerosis; mailing list options.

Muscular Dystrophy Association

3300 Sunrise Dr.
Tucson, AZ 85718
800-572-1717 (toll free voice)
mda@mdausa.org
<http://www.mdausa.org/mdahome.html>
Information on Muscular Dystrophy.

NABS-1

Sponsored by the National Alliance of Blind Students, NABS-1 fosters discussion of concerns common to students with visual impairments. To subscribe, send a message with a blank subject line to *listserv@nfbnet.org*. In the body of the message type "subscribe nabs-1".



National Alliance for Research on Schizophrenia and Depression (NARSAD)

60 Cutter Mill Rd. Ste. 404
Great Neck, NY 11021
800-829-8289 (toll free voice info line)
516-829-0091 (voice)
516-487-6930 (fax)
info@narsad.org
<http://www.narsad.org/>
Researches the causes, cures, treatments, and prevention of brain disorders, primarily schizophrenia, depression, and bipolar disorders.

National Alliance for the Mentally Ill (NAMI)

Colonial Place Three
2107 Wilson Blvd. Ste. 300
Arlington, VA 22201-3042
800-950-NAMI (6264) (toll free voice)
703-524-7600 (voice)
<http://www.nami.org/>
Support, education, advocacy, and research regarding severe mental illnesses.

National Alliance of Blind Students (NABS)

1155 15th St. NW Ste. 1004
Washington, DC 20005
800-424-8666 (toll free voice)
202-467-5081 (voice)
202-467-5085 (fax)
<http://www.health.gov/nhic/NHICScripts/Entry.cfm?HRCode=HR1462>
A national voice for students with visual impairments.

National Association for Visually Handicapped

3201 Balboa St.
San Francisco, CA 94121
415-221-3201 (voice)
415-221-8754 (fax)
22 W 21st St.
New York, NY 10010
212-255-2804 (voice)
212-727-2931 (fax)
<http://www.navh.org/>
Low vision aids and resources for people with visual impairments.

**National Association of Blind Students/
National Federation**

<http://www.nfb.org/students/studivis.htm>
Self-support network for blind students and a mechanism for collective action.

National Association of the Deaf (NAD)

814 Thayer Ave.
Silver Spring, MD 20910-4500
301-587-1788 (voice)
301-587-1789 (TTY)
301-587-1791 (fax)
nadinfo@nad.org
<http://www.nad.org/>
A consumer advocacy organization for people who are deaf or hard of hearing.

National Captioning Institute (NCI)

1900 Gallows Road Ste. 300
Vienna, VA 22182
703-917-7600 (voice/TTY)
703-917-9853 (fax)
mail@ncicap.org
<http://www.ncicap.org/>
Provides captioned programming and technology.

**National Center for Stuttering**

200 East 33rd St.
New York, NY 10016
800-221-2483 (toll free voice)
212-532-1460 (voice outside US and Canada)
<http://www.stuttering.com/>
Information, education, and resources
related to stuttering.

**The National Center for the Dissemination
of Disability Research**

211 E. 7th St. Rm. 400
Austin, TX 78701-3281
800-266-1832 (toll free voice/TTY)
512-476-6861 (voice/TTY)
512-476-2286 (fax)
<http://www.ncddr.org/>
Resource for disability-related research.

National Center for Learning Disabilities

381 Park Ave. S Ste. 1401
New York, NY 10016
888-575-7373 (toll free voice)
212-545-7510 (voice)
212-545-9665 (fax)
<http://www.nclld.org/>
Information, resources, and services regarding
learning disabilities

**National Center on Accessible Information
Technology in Education (AccessIT)**

University of Washington
Box 357920
Seattle, WA 98195-7920
866-968-2223 (toll free voice)
866-866-0162 (toll free TTY)
206-616-2223 (voice/TTY)
206-543-4719 (fax)
accessit@u.washington.edu
<http://www.washington.edu/accessit>

**National Center on the Study of Postsec-
ondary Educational Supports (NCSPEs)**

University of Hawaii
2444 Dole Street
Honolulu, HI 96822
808-956-8111 (voice)
<http://www.hawaii.edu/>

**National Clearinghouse for Rehabilitation
Training Materials**

Oklahoma State University
5202 Richmond Hill Dr.
Stillwater, OK 74078-4080
800-223-5219 (toll free voice)
405-624-7650 (voice)
405-624-0695 (fax)
<http://www.nchrtm.okstate.edu/>
Information on accommodating students
with disabilities.

National Council on Disability (NCD)

1331 F St. NW Ste. 850
Washington, DC 20004-1107
202-272-2004 (voice)
202-272-2074 (TTY)
202-272-2022 (fax)
mquigley@ncd.gov
<http://www.ncd.gov/>
An independent federal agency to address,
analyze, and make recommendations on
issues of public policy which affect people
with disabilities.

**National Deaf Education Network and
Clearinghouse**

Gallaudet University
800 Florida Ave NE
Washington, DC 2002-3695
202-651-5051 (voice/TTY)
202-651-5054 (fax)
clearinghouse.infotogo@gallaudet.edu
<http://www.clevccenter.gallaudet.edu/InfoToGo>
Resources for people with hearing impair-
ments.



National Federation of the Blind

1800 Johnson St.
Baltimore, MD 21230
410-659-9314 (voice)
nfb@nfb.org
<http://www.nfb.org/>

Information about blindness, referral services, scholarships, literature and publications, adaptive equipment, advocacy services, job opportunities, and support for people who are blind and their families.

National Institute of Mental Health

6001 Executive Blvd. Rm. 8184, MSC 9663
Bethesda, MD 20892-9663
301-443-4513 (voice)
301-443-4279 (fax)
<http://www.nimh.nih.gov/>

Strives to understand, treat, and prevent mental illness.

National Institute on Deafness and Other Communication Disorders (NIDCD)

31 Center Dr, MSC 2320
Bethesda, MD 20892-2320
800-241-1055 (toll free TTY)
800-241-1044 (toll free voice)
<http://www.nidcd.nih.gov/>

Facilitates and enhances the dissemination of information on hearing, balance, smell, taste, voice, speech, and language disorders.

National Institute on Disability & Rehabilitation Research (NIDRR)

400 Maryland Ave. SW
Washington, DC 20202-2572
202-205-8134 (voice)
202-205-9433 (TTY)
202-205-8189 (fax)
OSERS_NIDRR@ed.gov
<http://www.ed.gov/offices/OSERS/NIDRR/>

Current research, publications, disability, and rehabilitation resources.

National Library Service for the Blind and Physically Handicapped (NLS)

Library of Congress
Washington, DC 20542
202-707-5100 (voice)
202-707-0744 (TTY)
202-707-0712 (fax)
nls@loc.gov
<http://www.loc.gov/nls/>

A free library program of Braille and recorded materials.

National Mental Health Association

2001 N. Beauregard St., 12th Floor
Alexandria, VA 22311
800-969-NMHA (6642) (toll free voice info center)
800-433-5959 (TTY)
703-684-7722 (voice)
703-684-5968 (fax)
<http://www.nmha.org/>

National advocacy, education, research, and service for improvement of mental health.

National Multiple Sclerosis Society (NMSS)

733 Third Ave.
New York, NY 10017
800-344-4867 (toll free voice)
212-747-0004 (fax)
<http://www.nmss.org/>

Information, news, and educational programs related to Multiple Sclerosis.

National Organization on Disability (NOD)

910 Sixteenth St. NW Ste. 600
Washington, DC 20006
202-293-7999
202-293-5960
202-293-5968 (TTY)
<http://www.nod.org/>

Promotes the full participation of Americans with disabilities in all aspects of community life.



National Rehabilitation Information Center (NARIC)

4200 Forbes Blvd. Ste. 202
Lanham, MD 20706
800-346-2742 (toll free voice)
301-459-5900 (voice)
301-495-5626 (TTY)
301-562-2401 (fax)
naricinfo@he.techservices.com
<http://www.naric.com/>

Collects and disseminates the results of Federally funded research projects.

National Spinal Cord Injury Association

6701 Democracy Blvd. Ste. 300, #300-9
Bethesda, MD 20817
301-588-6959 (voice)
301-588-9414 (fax)
800-962-9629 (help-line)
resource@spinalcord.org
<http://www.spinalcord.org/>

Information, research, and resources regarding spinal cord injuries.

NFBCS

A list to discuss access to computers by users who are blind and issues specific to NFBCS. To subscribe, send a message with a blank subject line to *listserv@nfbnet.org*. In the body of the message type "subscribe nfbc."

Obsessive Compulsive Foundation

337 Notch Hill Rd.
North Branford, CT 06471
203-315-2190 (voice)
203-315-2196 (fax)
info@ocfoundation.org
<http://www.ocfoundation.org/>

Providing education, assistance, and support for obsessive compulsive disorder and related disorders.

PCA Listserv

For people with disabilities who use the services of Personal Care Assistants. To subscribe, send a message with a blank subject line to *listserv@maelstrom.stjohns.edu*. In the body of the message type "subscribe pca Firstname Lastname."

PEPnet Resource Center, The Postsecondary Educators Program Network

National Center on Deafness
18111 Nordhoff Street
Northridge, CA 91330-8267
888-684-4695 (toll free voice/TTY)
818-677-2611 (voice/TTY)
818-677-4899 (fax)
<http://www.pepnet.org/>

Helps postsecondary institutions attract and serve individuals who are deaf and hard of hearing.

Recording for the Blind & Dyslexic

20 Roszel Rd.
Princeton, NJ 08540
866-732-3585 (toll free voice)
800-221-4792 (toll free voice member services)
<http://www.rfbid.org/>

Provides taped educational books, free on loan, and books on diskette.

Regional Alliance for Science, Engineering, & Mathematics (RASEM)

New Mexico State University
PO Box 30001, Dept. 3 CE
Las Cruces, NM 88003
888-646-6051 (toll free voice)
505-646-1395 (voice)
505-646-8020 (TDD)
505-646-6049 (fax)
emisquez@nmsu.edu
<http://www.rasem.nmsu.edu/>

Programs that help students with disabilities overcome barriers to science, math, engineering, and technology careers.



Registry of Interpreters of the Deaf, Inc. (RID)

333 Commerce St.
Alexandria, VA 22314
703-838-0030 (voice)
703-838-0459 (TTY)
703-838-0454 (fax)
<http://www.rid.org/>

Organization which includes professional interpreters of American Sign Language and translators of English.

Rehabilitation Research and Training Center on Blindness and Low Vision

Mississippi State University
PO Drawer 6189
Mississippi State, MS 39762
662-325-2001 (voice)
662-325-8693 (TDD)
662-325-8989 (fax)
jemoore@ra.msstate.edu
<http://www.blind.msstate.edu/>

Information on research, training, and publications for blindness and low vision.

RESNA (Rehabilitation Engineering and Assistive Technology Society of North America)

1700 Moore St. Ste. 1540
Arlington, VA 22209-1903
703-524-6686 (voice)
703-524-6639 (TTY)
703-524-6630 (fax)
info@resna.org
<http://www.resna.org/>

Resources regarding technology for people with disabilities.

Science Access Project

Oregon State University
Department of Physics
301 Weniger Hall
Corvallis, OR 97331-6507
541-737-4631 (voice)
541-737-1683 (fax)
<http://www.dots.physics.orst.edu/>

A project to enhance the ability of people with print disabilities to read, write, and manipulate information, with a focus on math equations, information normally presented in tables and graphs, and information presented in diagrams and figures.

Section 504 of the Rehabilitation Act

<http://www.section508.gov/index.cfm?FuseAction=Content&ID=15>

Section 508 of the Rehabilitation Act

<http://www.access-board.gov/sec508/guide/act.htm>

Section 508 of the Rehabilitation Act - Final Rules

<http://www.access-board.gov/news/508-final.htm>
Information and guidelines for section 508 standards and compliance.

Self Help for Hard of Hearing People, Inc. (SHHH)

7910 Woodmont Ave. Ste. 1200
Bethesda, MD 20814
301-657-2248 (voice)
301-657-2249 (TTY)
301-913-9413 (fax)
National@shhh.org
<http://www.shhh.org/>

Provides information, education, advocacy, and support for individuals with hearing loss.



Spina Bifida Association

4590 MacArthur Blvd. NW Ste. 250
Washington, DC 20007-4226
800-621-3141 (toll free voice)
202-944-3285 (voice)
202-944-3295 (fax)
sbaa@sbaa.org
<http://www.sbaa.org/>
News and resources on Spina Bifida.

Teachable Moments Faculty Development Project

University of Wisconsin - Stout
715-232-2468 (voice)
hallyp@uwstout.edu
<http://www.uwstout.edu/stusrv/teachable/>
Project to improve faculty knowledge and skills for teaching students with disabilities.

Teaching Math to Visually Impaired Students

Texas School for the Blind and Visually Impaired
1100 W 45th St.
Austin, TX 78756
1-800-872-5273 (toll free recording)
512-206-9305 (voice)
512-206-9451 (TDD)
512-206-9450 (fax)
susanostermaus@tsbvi.edu
<http://www.tsbvi.edu/math/>
Strategies for teaching math to students with visual impairments.

Tech Act Resource Center in your State

1700 North Moore St. Ste. 1540
Arlington, VA 22209-1903
703-524-6686 (voice)
703-524-6639 (TTY)
703-524-6630 (fax)
resnaTA@resna.org
<http://www.resna.org/taproject/at/statecontacts.html>
Programs to promote the provision of technology-related assistance for people with disabilities.

Tourette Syndrome Association, Inc.

4240 Bell Blvd.
Bayside, NY 11361
718-224-2999 (voice)
718-224-9596 (fax)
<http://www.tsa-usa.org/>
Develops and disseminates educational materials, coordinates support services, and funds research.

Trace Research & Development Center

University of Wisconsin-Madison
5901 Research Park Blvd.
Madison, WI 53719-1252
608-262-6966 (voice)
608-263-5408 (TTY)
608-262-8848 (fax)
web@trace.wisc.edu
<http://www.trace.wisc.edu/>
An interdisciplinary research, development, and resource center to advance the ability of people with disabilities to achieve their life objectives through the use of communication, computer, and information technologies.

Uaccess-1 Listserv

For discussion of universal access to information systems. To subscribe, send a message with a blank subject line to *listproc@trace.wisc.edu*. In the body of the message type "subscribe uaccess-1 Firstname Lastname."

United Cerebral Palsy Association, Inc.

1660 L St. NW Ste. 700
Washington, DC 20036-5602
800-872-5827 (toll free voice)
202-973-7197 (TTY)
202-776-0414 (fax)
ucpnatl@ucpa.org
<http://www.ucpa.org/>
Information and resources regarding Cerebral Palsy.



U.S. Department of Health and Human Services (DHHS)

200 Independence Ave. SW
Washington, DC 20201
877-696-6775 (toll free voice)
202-619-0257 (voice)
hhsmail@hhs.gov
http://www.os.dhhs.gov/

The United States government's principal agency for protecting the health of all Americans and providing essential human services.

U.S. Department of Justice Disability Rights - A Guide to Disability Rights/Laws Section

PO Box 66738
Washington, DC 20035-6738
800-514-0301 (toll free voice)
800-514-0383 (toll free TTY)
http://www.usdoj.gov/crt/ada/cguide.htm

Overview of disability rights and legislation in the U.S.

Web ABLE

50 Franklin St.
Boston, MA 02110
webinfo@webable.com
http://www.webABLE.com/

Accessibility services to help make the Web easier to access for persons with disabilities.

Web Accessibility Initiative (WAI)

MIT/LCS Room NE43-355
200 Technology Square
Cambridge, MA 02139
617-253-2613 (voice)
http://www.w3.org/WAI/

An initiative of the World Wide Web Consortium that pursues accessibility of the Web for technology, guidelines, tools, education & outreach, research & development.

WebAIM

Web Accessibility In Mind (AIM)
Center for Persons with Disabilities
6800 Old Main Hill
Utah State University
Logan, UT 84322-6800
435-797-7138 (voice)
435-797-1981 (TTY)
435-797-3944 (fax)
cindi@cpd2.usu.edu
http://www.webaim.org/

Information about how to make Web pages accessible to people with disabilities.

Webwatch-1

A list for sharing information and advocacy regarding accessibility of the World Wide Web. To subscribe, send a message with a blank subject line to *majordomo@teleport.com*. In the body of the message type "subscribe webwatch-1."



Access barriers: Any obstruction that prevents people with disabilities from using standard facilities, equipment, and resources.

Accessible: In the case of a facility, readily usable by a particular individual; in the case of a program or activity, presented or provided in such a way that a particular individual can participate, with or without auxiliary aid(s); in the case of electronic resources, usable by everyone, with or without adaptive computer technology.

Accessible Web design: Creating World Wide Web pages according to universal design principles to eliminate or reduce barriers, including those that affect people with disabilities.

Accommodation: The removal of barriers to participation; an adjustment to make a program, facility, or resource accessible to a person with a disability.

Adaptive technology: Hardware or software products that provide access to a computer that is otherwise inaccessible to an individual with a disability.

ALT attribute: HTML code that works in combination with graphical tags to provide alternative text for graphical elements.

Alternative keyboard: A keyboard that is different from a standard computer keyboard in its size or layout of keys.

Americans with Disabilities Act of 1990 (ADA): A comprehensive federal law that prohibits discrimination on the basis of disability in employment, public services, public accommodations, and services operated by private entities and telecommunications.

American Standard Code for Information Interchange (ASCII): Standard for unformatted plain text which enables transfer of data between platforms and computer systems.

Anxiety Disorders: Mood disorders in which the individual responds to thoughts, situations, environments and/or people with fear and anxiety.

Applet: Computer program that runs from within another application.

Assistive Listening Devices (ALDs): Devices designed to amplify sound directly from a microphone/transmitter to a receiver/hearing aid. Examples include FM systems, infrared transmissions and induction loops.

Assistive technology: Special hardware and software used to assist a person with a disability that provides a solution to unaccessible features found in commercial products.

Attention Deficit Disorder/Attention Deficit Hyperactive Disorder (ADD/ADHD): Disorders which affect the ability to attend and concentrate.

Audio description: The addition of audio content to a video product to read titles, speaker names and scenery, object, and other vital information for the viewer who cannot see.

Auditory Processing Disorder: A type of learning disability that involves difficulty listening, attending to, discriminating and/or remembering aural information that is not due to a hearing loss.



Bipolar Affective Disorder (BAD): A mood disorder with revolving periods of mania and depression.

Borderline Personality Disorder (BPD): A personality disorder which includes both mood disorder and thought disorder symptoms.

Braille: System of embossed characters formed by using a Braille cell, a combination of six or eight dots. Each simple Braille character is formed by one or more of these dots and occupies a full cell.

Browser: Software designed to access and display content available on the World Wide Web. Browsers may be graphical or text-based. Text-only browsers cannot display images, sounds clips, video, and plug-in features that graphical browsers can.

Captioned film or videos: Transcription of the verbal portion of films or videos displayed on-screen to make them accessible to people who are deaf.

Captioning: Text that is included with video presentations or broadcasts that enables people with hearing impairments to have access to the audio portion of the material.

Cerebral Palsy: A condition that results from early, non-progressive damage to the brain, often impacting hand use, mobility, and/or speech.

Closed captions: Captions that appear only when special equipment, called decoders, are used.

Closed Circuit TV Magnifier (CCTV): Camera used to magnify books or other materials on a monitor.

Communication device: Hardware that allows a person who has difficulty using their voice clearly to use words or symbols for communication. May range in complexity from a simple picture board to complex electronic devices that allow personalized, unique construction of ideas.

Compensatory tools: Adaptive computing systems that allow people with disabilities to complete tasks that they would have difficulty doing without a computer, e.g., reading, writing, communicating, accessing information.

Concept mapping: Concept mapping software allows for visual representation of ideas and concepts. These representations are presented in a physical manner and can be connected with arrows to show the relationship between ideas.

Digital: Computer formatted data or information.

Disability: Physical or mental impairment that substantially limits one or more major life activities; a record of such an impairment; or being regarded as having such an impairment (Americans with Disabilities Act of 1990).

Discrimination: Act of making a difference in treatment or favor on a basis other than individual merit.

Diversity: Refers to all races, ethnicities, disabilities, genders, ages, and cultures.

Dyscalculia: A learning disability that makes it difficult for a person to understand and use math concepts and symbols.

Dysgraphia: A learning disability that makes it difficult to perform physical tasks



of forming letters and words using a pen and paper and producing legible handwriting.

Dyslexia: A learning disability that may cause an individual to mix up letters within words and words within sentences while reading. He may also have difficulty spelling words correctly while writing; letter reversals are common. Some individuals with Dyslexia also have a difficult time navigating and using right/left and/or compass directions.

Dyspraxia: Language comprehension of a person with Dyspraxia does not match language production. He may mix up words and sentences while talking.

Electronic information: Any digital data for use with computers or computer networks including disks, CD-ROMs, World Wide Web resources.

Facility: All or any portion of a physical complex, including buildings, structures, equipment, grounds, roads, and parking lots.

Fingerspelling: Method of sign language interpretation that uses a manual alphabet to spell a spoken word.

FM Sound Amplification System: Electronic amplification system consisting of three components: a microphone/transmitter, monaural FM receiver, and a combination charger/carrying case. It provides wireless FM broadcast from a speaker to a listener who has a hearing impairment.

Graphical User Interface (GUI): Program interface that presents digital information and software programs in an image-based format as compared to a character-based format.

Hardware: Physical equipment related to computers.

Hearing impairments: Complete or partial loss of ability to hear caused by a variety of injuries or diseases including congenital defects.

Helper: An external program that can be called up by a Web browser to display specially formatted material, such as word processed documents, spreadsheet documents, or video/sound pieces. The Helper program is launched by the Web browser as a separate application to view or play the file.

Hidden disability: Also known as an invisible disability, any disability that is not readily observable to others.

Host: Any computer which holds Internet resources for access by others, or the computer that maintains your Internet access and electronic mail account.

HTML validation: Process that analyzes HTML documents identifies HTML errors and non-standard codes.

Hyperlink, hypertext: Highlighted word or graphic on a Web page that when selected allows the user to jump to another part of the document or another Web page.

Hypertext Markup Language (HTML): Programming language or code used to create World Wide Web pages.

HyperText Transfer Protocol (HTTP): Communication protocol used by the World Wide Web to transfer text, graphics, audio, and video.



Image map: Picture or graphic on a Web page in which hyperlinks are embedded.

Input: Any method by which information is entered into a computer.

Internet: Computer network connecting government, education, commercial, other organization, and individual computer systems.

Interpreter: Professional person who assists a deaf person in communicating with hearing people.

Invisible disability: Also known as a hidden disability. Any disability that is not readily observable to others.

Java: Programming language used to create programs or applets that work with some World Wide Web browsers to include features with animation or other characteristics not available through standard HTML.

Joystick: A device consisting of a lever that allows a pointer to move up, right, left, or down and serves as an alternative to a mouse. It usually includes buttons to enable mouse clicks.

Keyboard emulation: A method of having an alternative device and/or software, such as a switch-based system, serve the role of a keyboard.

Keyguard: A plastic or metal shield that covers a keyboard with holes over the keys. It allows use of a keyboard without undesired activation of surrounding keys.

Large print books: Most ordinary print is six to ten points in height (about 1/16 to 1/8 of an inch). Large type is 14 to 18 points (about 1/8 to 1/4 of an inch) and sometimes

larger. The format of large print books is also proportionately larger (usually 8 1/2 x 11 inches).

LD (Learning Disabled): Difficulties with intake, processing, and/or output of information such that a large discrepancy exists between intelligence and achievement.

Learning Styles: Preferences toward processing and integrating information using different sensory abilities (e.g., auditory, visual, kinesthetic).

Lynx: Text-based World Wide Web browser.

Mainstreaming, inclusion: The inclusion of people with disabilities, with or without special accommodations, in programs, activities, and facilities with their non-disabled peers.

Major life activities: Functions such as caring for oneself, performing manual tasks, walking, seeing, hearing, speaking, breathing, learning, working, and participating in community activities (Americans with Disabilities Act of 1990).

Mental illness: A term that refers collectively to all diagnosable mental disorders causing severe disturbances in thinking, feeling, relating, and functional behaviors. These disorders result in substantially diminished capacity for coping with the ordinary demands of life.

Mobility impairment: Disability that affects movement ranging from gross motor skills such as walking to fine motor movement involving manipulation of objects by hand.

Mouse emulation: Using an alternative device and/or software, such as a switch-based system, to assume the role of a mouse.



Multimedia: Content which is presented through several formats including text, graphics, moving pictures, and sound.

Multi-tasking: Attending to, performing, and managing two or more tasks concurrently.

Non-verbal Learning Disorder: A learning disorder demonstrated by below-average motor coordination, visual-spatial organization, and social skills.

Off-line captioning: Captions that are developed once the video product has been created.

Onscreen keyboard: See *Virtual Keyboard*.

Open captioning: Captions that appear on the screen wherever the video product is presented.

Optical character recognition (OCR): Software that converts printed materials into electronic text once it scans and electronically reads the text.

Oral Interpreter: A professional who uses lip movements to make spoken language more accessible to individuals with hearing impairments who lipread.

Output: Any method of displaying or presenting electronic information to the user through a computer monitor or other device.

Personal Information Manager (PIM): Portable electronic management system such as a Palm Pilot.

Physical or Mental Impairment: Any physiological disorder or condition, cosmetic disfigurement, or anatomical loss affecting one or more of the following body

systems: neurological; musculoskeletal; special sense organs; respiratory, including speech organs; cardiovascular; reproductive; digestive; genito-urinary; hemic and lymphatic; skin; and endocrine; or any mental or psychological disorder, such as mental retardation, organic brain syndrome, emotional or mental illness, and specific learning disabilities (Americans with Disabilities Act of 1990).

Plug-in: Separate program written to be launched by a specific Web browser to display or run special elements in Web pages, such as animation, video, or audio.

Psychiatric disability: A diagnosable mental illness causing severe disturbances in thinking, feeling, relating, and/or functional behaviors that results in a substantially diminished capacity to cope with daily life demands.

Qualified individual with a disability: An individual with a disability who, with or without reasonable modification to rules, policies, or practices, the removal of architectural, communication, or transportation barriers, or the provision of auxiliary aids and services, meets the essential eligibility requirements for the receipt of services or the participation in programs or activities provided by a public entity (Americans with Disabilities Act of 1990).

Reader: Volunteer or employee of an individual with a disability (e.g., visual impairment, learning disability) who reads printed material in person or records to audiotape.

Reading system: Hardware and software designed to provide access to printed text for people with visual impairments, mobility impairments, or learning disabili-



ties. Character recognition software controls a scanner that takes an image of a printed page, converts it to computer text using recognition software, and then reads the text using a synthesized voice.

Real-time captions: Captions that are simultaneously created during a video program or meeting.

Reasonable accommodations: The removal of a barrier, alteration of an assignment, or the provision of auxiliary aids to allow the full access and participation of an individual with a disability, in learning, employment, or other activities.

Refreshable Braille Display: Hardware connected to a computer that echoes screen text on a box that has cells consisting of pins that move up and down to create Braille characters.

Reverse Interpreting: A method of communication used when a sign language interpreter voices what is expressed by a person who is deaf or hard of hearing who cannot speak.

Scanning input: A switch-based method of controlling a computer. Activations of a switch will, in order, bring up a control panel that upon subsequent switch activations, allow a user to focus in on a desired control or keystroke. Custom scanning layouts can be created for a variety of purposes and programs and may also be used in a communication device.

Schizophrenia: A thought disorder that can cause a person to experience difficulty with activities of daily living and may experience delusions, hallucinations and paranoia.

Screen enlargement: Hardware and/or software that increases the size of characters and text on a computer screen.

Screen reader: Software used to echo text on a computer screen to audio output, often used by people who are blind, with visual impairments, or with learning disabilities.

Screen resolution: Refers to the clarity or sharpness of an image. For computer monitors, this term indicates the number of dots on the screen used to create text and graphics. Higher resolution means more dots, indicating increased sharpness and potentially smaller text.

Section 508 of the Rehabilitation Act of 1973: Legislation that requires that the Federal government develop, procure, maintain and use electronic and information technology that is accessible to people with disabilities.

Section 713 of the Telecommunication Act of 1996: Legislation that resulted in many changes in the broadcast and cable television industries. Among other things it charged the Federal Communications Commission (FCC) to create mandates to increase the percentage of television programming that is captioned. It has published rules and set guidelines for increasing gradually the amount of captioned programs.

Sensory impairment: A disability that affects touch, sight, and/or hearing.

Server: Any computer that stores information that is available to other users, often over the Internet.

Side effects: Effects of medications that can interfere with functional performance.



Sign language: Manual communication commonly used by people who are deaf. The gestures or symbols in sign language are organized in a linguistic way. Each individual gesture is called a sign. Each sign has three distinct parts: the handshape, the position of the hands, and the movement of the hands. American Sign Language (ASL) is the most commonly used sign language in the United States. Deaf people from different countries speak different sign languages.

Specific Learning Disability: Disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in difficulties listening, thinking, speaking, reading, writing, spelling, or doing mathematical calculations.

Speech impairment: Problems in communication and related areas such as oral motor function, ranging from simple sound substitutions to the inability to understand or use language or use the oral-motor mechanism for functional speech.

Speech input: A method of controlling a computer and creating text by dictation, using speech input software and a microphone.

Speech recognition: Software that takes the spoken word via a microphone and converts it to machine-readable format.

Standard HTML: Version of HTML accessible by all browsers.

Strategy: System or plan to meet objectives or problem solve.

Streaming Multimedia: A method of transferring audio and/or video via a

network from a server to an end user's computer. During the transmission, the material is displayed or played on the target computer.

Switch input: A method of controlling a computer or communication device. It is most often used with Morse code or scanning methods, but may also be used for controlling household appliances and related controls. Switches are available in a nearly endless array of sizes, shapes, and activation methods.

Tag: HTML code that prescribes the structure and formatting of Web pages.

Telecommunications Device for the Deaf (TDD) or Teletypewriter (TTY): A device which enables someone who has a speech or hearing impairment to use a telephone when communicating with someone else who has a TDD/TTY. TDD/TTYs can be used with any telephone, and one needs only a basic typing ability to use them.

Television Decoder Circuitry Act of 1990: An Act that requires that television sets with screens thirteen inches or larger manufactured for sale in the United States must have built-in closed caption decoders.

Test anxiety: The experience of severe distress such that an individual is rendered emotionally and physically unable to take an exam.

Trackball: A mouse alternative that is basically an upside-down mouse. Useful for some people with mobility impairments because it isolates pointer movement from button clicking.

Traumatic Brain Injury (TBI): Open and closed head injuries resulting in impair-



ments in one or more areas, including cognition; language; memory; attention; reasoning; abstract thinking; judgment; problem-solving; sensory, perceptual, and motor abilities; psychosocial behavior; physical functions; information processing; and speech. The term does not apply to brain injuries that are congenital, degenerative, or induced by birth trauma.

Universal Design: Designing programs, services, tools, and facilities so that they are usable, without modification, by the widest range of users possible, taking into account a variety of abilities and disabilities.

Universal design on instruction: The design of instructional materials and activities that make learning achievable by individuals with a wide range of abilities and disabilities.

Universal Resource Locator (URL): Address used to locate a specific resource on the Internet. DO-IT's URL is *http://www.washington.edu/doi/*.

Virtual keyboard: Software used to emulate a keyboard. A picture of a keyboard is displayed on a computer screen and the user points and clicks on the pictures of keys to enter text.

Vision impairments: Complete or partial loss of ability to see, caused by a variety of injuries or diseases including congenital defects. Legal blindness is defined as visual acuity of 20/200 or less in the better eye with correcting lenses, or widest diameter of visual field subtending an angular distance no greater than 20 degrees.

Vocational Rehabilitation Act of 1973: Act prohibiting discrimination on the basis of disability which applies to any program that

receives federal financial support. Section 504 of the Act is aimed at making educational programs and facilities accessible to all students. Section 508 of the Act requires that electronic office equipment purchased through federal procurement meets disability access guidelines.

Word prediction: Software that reduces the number of keystrokes needed to type words and sentences. As characters are entered on either a standard, alternative, or virtual keyboard, suggested completions of the word that has been started are provided to the user.

World Wide Web (WWW, W3, or Web): Hypertext and multimedia gateway to the Internet.



Overview of Students with Disabilities and Postsecondary Education

Purpose of Presentation

- Summarize rights, responsibilities, potential contributions, and needs of students with disabilities.
- Describe campus and departmental rights and responsibilities for ensuring equal educational opportunities.
- List strategies for working with students who have disabilities, emphasizing the faculty-student relationship.
- Describe campus resources available to assist in the provision of appropriate academic accommodations to students with disabilities.



Resources



Visit *The Faculty Room* Web site at
<http://www.washington.edu/doit/Faculty/>

| | | | | | |
|---|---|---|---|---|------------------------|
| University of Washington | | DO-IT Home | | Site Map | Search |
| Glossary | |  <p>Disabilities, Opportunities, Internetworking, and Technology</p> <h2>The Faculty Room</h2> | | | |
| Accommodation Strategies | Rights and Responsibilities | Faculty Resources | Interactive Faculty Presentations | Resources for Trainers, Staff, and Administrators | |
|  | <h2>The Faculty Room</h2> <p>The Faculty Room is a space for faculty and administrators at postsecondary institutions to learn about how to create classroom environments and activities that maximize the learning of all students, including those with disabilities. It includes six primary areas that address issues faced by postsecondary educators:</p> <p><u>Accommodation Strategies</u> Strategies for creating or modifying academic environments that maximize the learning of students with a wide range of abilities and disabilities</p> <p><u>Rights and Responsibilities</u> The rights and responsibilities of faculty, campus services, and students with disabilities regarding academic accommodations</p> <p><u>Faculty Resources</u> Resources to help instructors more fully include students with disabilities in course activities</p> <p><u>Interactive Faculty Presentations</u> Videotapes and interactive presentations designed especially for postsecondary educators</p> <p><u>DO-IT Prof</u> Information about the DO-IT Prof project, the sponsor of The Faculty Room</p> <p><u>Resources for Staff and Administrators</u> Resources for staff and administrators who support faculty in making their academic offerings accessible to students with disabilities</p> | | | | |
| DO-IT Prof The Faculty Room sponsor | | | | | |
| Evaluate this site. | | | | | |
| <small>© 2001 DO-IT. Permission is granted to copy material in this site for educational, non-commercial purposes provided the source is acknowledged. Contact Us: 206-685-3943, doit@u.washington.edu</small> | | | | | |



Accommodation Strategies



Accommodation Strategies Objectives

- Discuss the rights, responsibilities, contributions, and needs of students with disabilities.
- Summarize campus and departmental rights and responsibilities for ensuring equal educational opportunities.
- List strategies for working with students who have disabilities.
- Describe actions that individuals and departments can take to ensure that students with disabilities have education opportunities that are equal to those of their non-disabled peers.
- Describe campus resources.



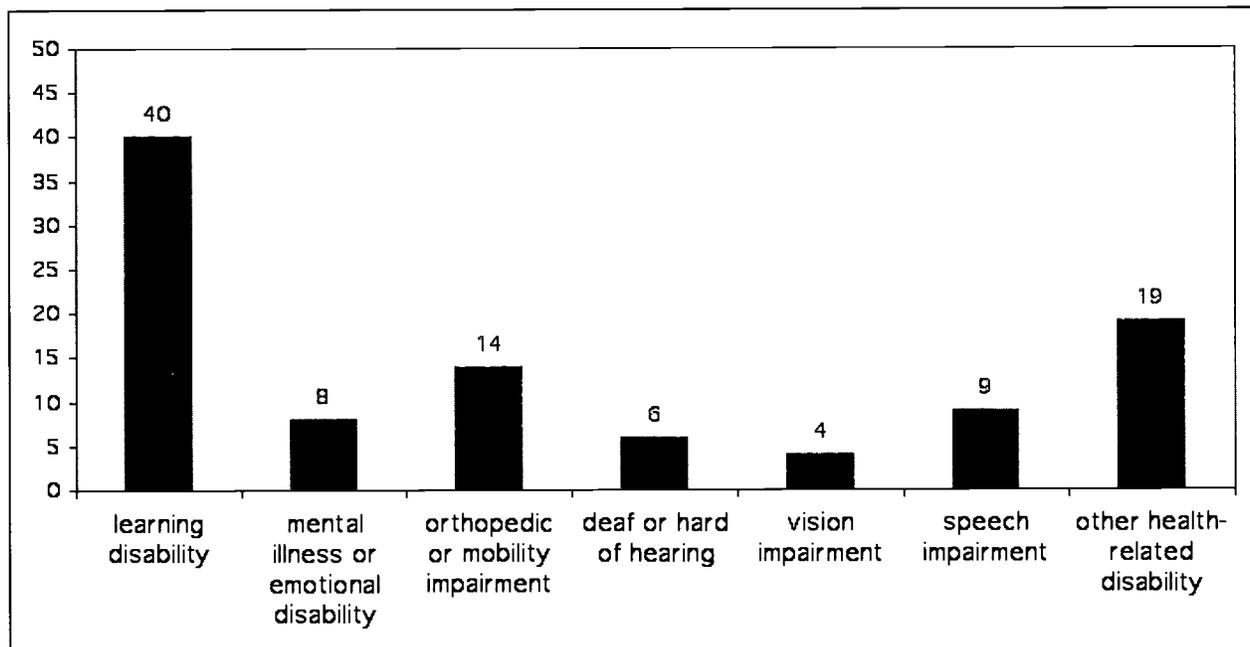
Factors Influencing the Increased Participation of Students with Disabilities in Postsecondary Education:

- survival rate
- technology
- K-12 special education
- awareness



Undergraduates who Reported Having a Disability

Among the 6% of 1995-96 undergraduates who reported a disability, the percentage reporting each disability type:



National Center for Educational Statistics, Postsecondary Education (1999)



Section 504 of the Rehabilitation Act of 1973

“No otherwise qualified individual with a disability shall, solely by reason of his/her disability, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity of a public entity.”



“Otherwise qualified”

meets the academic and technical standards requisite to admission or participation

with or without

- reasonable modifications to rules, policies, or practices;
- removal of architectural, communication or transportation barriers; or
- provision of auxiliary aids and services.



“Person with a disability” is any person who:

- has a physical or mental impairment which substantially limits one or more major life activities including walking, seeing, hearing, speaking, breathing, learning, and working;
- has a record of such an impairment; or
- is regarded as having such an impairment.



Examples of Disabilities

Low Vision

Blindness

Hearing Impairments

Mobility Impairments

Mental Health/Psychiatric
Impairments

Health Impairments

Learning Disabilities



Accommodations for Low Vision

- Seating near front of class; good lighting
- Large print books, handouts, signs, and equipment labels
- TV monitor connected to microscope to enlarge images
- Assignments in electronic format
- Software to enlarge screen images
- Software to adjust screen colors



Accommodations for Blindness

- Printed materials on computer disk, and/or on a Web page, and e-mail
- Describe visual aids
- Audiotaped, Braille, or electronic notes, handouts, and texts
- Raised-line drawings and tactile models of graphic materials
- Braille lab signs, equipment labels; auditory lab warning signals
- Adaptive equipment (e.g., talking thermometers and calculators; tactile timers)
- Computer with optical character reader, voice output, Braille screen display printer output
- Increased time on tests



Accommodations for Specific Learning Disabilities

- Note-taker and/or audiotaped class sessions
- Captioned videos
- Textbooks on tape
- Visual, aural, and tactile instructional demonstrations



Accommodations for Specific Learning Disabilities, continued

- Course and lecture outlines
- Assignments given in advance
- Computer with speech output, spell checker, and grammar checker
- Extra exam time, quiet testing arrangements



Accommodations for Hearing Impairments

- Interpreter, real-time captioning, FM system, Note-taker
- Captioned videos
- Electronic mail
- Visual aids, visual warning system for lab emergencies
- Written assignments, lab instructions, demonstration summaries
- Repeat questions and statements from other students during class



Accommodations for Mobility Impairments

- Note-taker/Lab Assistant; group lab assignments
- Classrooms, labs, and fieldtrips in accessible locations
- Adjustable table, equipment located within reach
- Extra exam time, alternative testing arrangements
- Access to on-line research resources
- Class assignments and materials in electronic format
- Computer with special input device (e.g., speech input, Morse code, alternative keyboards)



Accommodations for Health Impairments

- Flexible attendance requirements
- Extra exam time, alternate testing arrangements
- Note-takers and/or taped class sessions
- Assignments in electronic format
- Electronic mail
- Internet accessible services and/or resources



Accommodations for Speech Impairments

- Listen carefully to what the person is saying; if you don't understand, ask student to repeat
- Relax and take as much time as necessary to communicate
- Ask questions that require short answers or a nod of the head when appropriate
- Written communication
- Electronic mail



Accommodations for Psychiatric Disabilities

- Tape recorder, note-taker
- Preferential seating near door
- Tests, assignments in alternate formats
- Extended time for taking tests
- Separate, quiet room for testing
- Review academic and behavioral expectations in regular meetings with student



General Suggestions for Making Classes Accessible

- Add a statement to the syllabus inviting students who have disabilities to discuss their accommodation needs
- Select materials early
- Talk with the student about accommodation needs
- Have policies and procedures in place
- Make sure facility is accessible
- Provide materials in electronic formats
- Provide clear signage in large print
- Use alternative methods of administering tests and testing

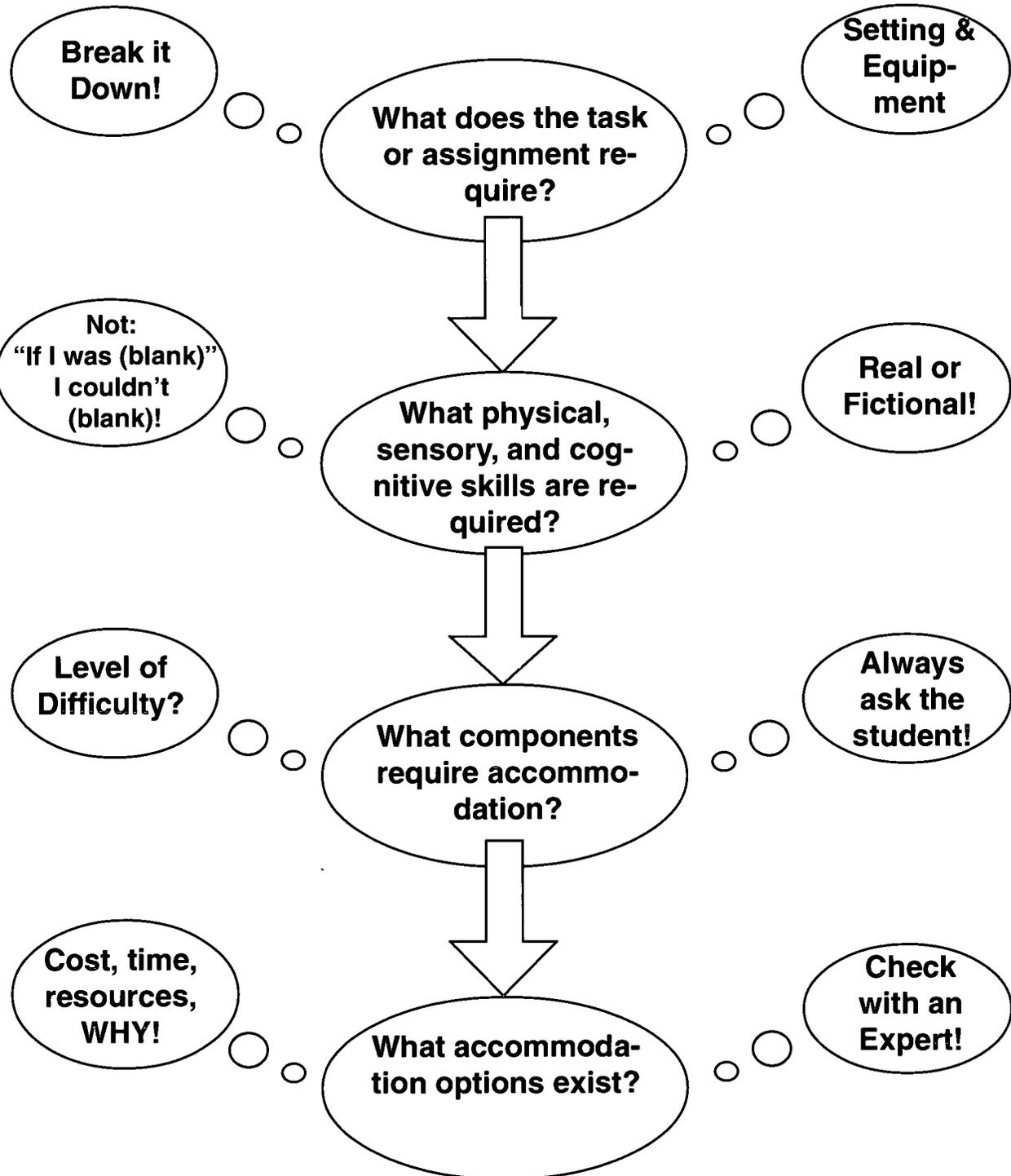


Four-Step Model

1. What does the task/assignment require?
2. What physical, sensory, and cognitive skills are needed?
3. What components of the task require accommodation?
4. What accommodation options exist?



Four-Step Accommodation Model



DO-IT

Physical, Sensory, & Cognitive Issues and Challenges



| <p>Physical Issues</p> <p>Think of the required physical aspects of the task. What will make the environment accessible, keep the student safe and allow him/her to be an active participant? What lab equipment must be manipulated?</p> | <p>Sensory Issues</p> <p>Think of room temperature, noise, fumes, dust, odors, allergies. Also consider the ability to speak and/or communicate, and the visual aspects of the task or assignment.</p> | <p>Cognitive Issues</p> <p>Is the assignment done with a group, partner or individually? What memory & communication skills are needed? What is the level of complexity of the task.</p> |
|---|--|--|
| <p>Physical Challenges</p> | <p>Sensory Challenges</p> | <p>Cognitive Challenges</p> |
| <ol style="list-style-type: none"> 1. lift / carry 2. stamina / endurance 3. push / pull 4. knee / squat 5. reach 6. repetitive tasks 7. fine motor: pinch / grasp 8. fine motor: manipulate / maneuver 9. gross motor 10. sit in chair 11. walk / stand 12. balance 13. bend / twist 14. stoop / crouch 15. other | <ol style="list-style-type: none"> 1. vision 2. hearing 3. touch 4. smell 5. taste 6. oral communication 7. temperature 8. fumes 9. external stimuli 10. lighting 11. other | <ol style="list-style-type: none"> 1. short term memory 2. long term memory 3. task complexity 4. reading 5. writing 6. spelling 7. string of numbers (math) 8. paying attention 9. visual, auditory, or kinesthetic learner. 10. self-esteem / advocacy issues 11. behavior issues / acting out 12. other |



STUDENT ABILITIES PROFILE



DO-IT

Narrative:

Equipment: (Lab equipment, protective clothing, chemicals)

Environment: (fumes, odors, dust, temperature, noise, group-work)

Task / Assignment:

Physical Challenges

Accommodations Needed

Options and Resources

Sensory Challenges

Accommodations Needed

Options and Resources

Cognitive Challenges

Accommodations Needed

Options and Resources





Universal Design of Instruction

DO·IT



Universal Design of Instruction Objectives

1. Discuss the principles of universal design.
2. Apply principles of universal design of instruction to meet a wide range of student learning needs.
3. Explain the difference between employing universal design principles to maximize access and providing academic accommodations for students with disabilities.



Diversity in Postsecondary Institutions

- Ethnic/racial minorities
- English as a second language
- Different learning styles
- People with disabilities



Universal Design =

“The design of products and environments to be usable by all people, without the need for adaptation or specialized design.”

Center for Universal Design at North Carolina State University



Principles of Universal Design

- Equitable use
- Flexibility in use
- Simple and intuitive use
- Perceptible information
- Tolerance for error
- Low physical effort
- Size and shape for approach and use



Universal Design of Instruction Examples

- Create an environment that respects and values diversity. Put a statement on your syllabus inviting students to meet with you to discuss disability-related accommodations and other learning needs.
- Assure that all classrooms labs and fieldwork are in locations accessible to individuals with a wide range of physical abilities and disabilities.
- Use multiple modes to deliver content (including lecture, discussion, hands-on activities, Internet-based interaction, and fieldwork).
- Provide printed or Web-based materials which summarize content that is delivered orally.
- Face the class and speak clearly.
- Use captioned videotapes.



Universal Design of Instruction Examples, continued

- Provide printed materials in electronic format.
- Use accessible Web pages (text descriptions of graphics).
- Provide printed materials early so that students can prepare to access the materials in alternate formats.
- Create printed and Web-based materials in simple, consistent formats.
- Provide effective prompting during an activity and feedback after the assignment is completed.
- Provide multiple ways for students to demonstrate knowledge.
- Make sure equipment and activities minimize sustained physical effort.



Making Classroom Activities Accessible to Everyone

- Class lectures
- Classroom discussions
- Web resources
- Videotapes
- Course handouts
- Computer and science labs
- Field experiences



Procedures and Outcomes

Instructional Procedures:

1. Students will use...
to acquire the course content.
2. I will use...
to present course content.

Instructional Content:

1. Students will describe...
2. Students will be able to list...
3. Students will demonstrate...



Measuring Instructional Content Versus Procedures

1. Evaluation Content:

Students will demonstrate their understanding of...

2. Testing Procedure:

Students will demonstrate their understanding by...



Effective Communication with Students Who Have Communication Disorders

DO·IT



Effective Communication Objectives

1. Describe the rights and responsibilities, potential contributions, and needs of students with disabilities.
2. Summarize campus departmental and rights and responsibilities for ensuring equal educational opportunities for all students.
3. Describe disabling conditions that can affect communication in courses.
4. Discuss strategies for communicating with students who have communication disorders.
5. Describe campus resources available to assist in the provision of academic accommodations.



Topics on Effective Communication

- Legal issues
- Hearing impairments
- Auditory processing disabilities
- Speech impairments
- Other disabilities



Students Who Have Difficulty Communicating Include Those Who:

- are deaf or hard of hearing;
- have speech impairments;
- have difficulty processing auditory information because of a learning disability;
- require extensive time or effort to communicate; and
- use technical aids (augmentative communication or an assistant).



Hearing Impairments FAQs

- What do the terms “hearing impaired,” “hearing impairments,” “deaf,” and “hard of hearing” mean?
- What are some of the communication challenges and strategies of students with hearing impairments?
- Why is the letter “D” in “deaf” sometimes capitalized?



Auditory Processing Disabilities FAQs

- Why might a student who can hear well still not understand a class lecture?
- Which activities in class might be difficult for a student who does not process spoken language well?



Speech Impairments FAQs

- What are some examples of speech impairments?
- When a student cannot speak well, what does that mean about his or her ability to understand?
- What academic situations might create challenges for someone who has difficulty speaking?



Speech Impairments FAQs, continued

- If speech, hearing and auditory processing are normal, why else might a student have problems communicating in class?
- What situations could be difficult for a student with communication difficulty?



Accommodations

- Visual support
- Printed handouts
- Alternative to verbal participation
- Select materials early
- Multiple evaluation methods



Accommodations, continued

- Sign language and oral interpreters
- Captioned media
- Real-time captioning
- Amplification, headphones, and assistive listening devices
- Note-takers and copies of notes



Accommodations, continued

- Visual aids, visual reinforcements, and visual warning systems
- Written assignments, written exams, written/alternative lab work
- Electronic mail and written communication
- Communication assistance, peer support, and extended time
- Seating, pacing, and alternative arrangements



Information Access

DO-IT

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Information Access Objectives

1. Describe ways that information is presented in postsecondary institutions.
2. Discuss the challenges each mode of information delivery creates for people with different types of disabilities.
3. List solutions to the barriers students with disabilities typically face when obtaining information in academic settings.



Academic Context of Information Access

- Classroom work
- Labs
- Homework
- Library
- Web resources
- Distance Learning



Information Access Can Be a Challenge For People with:

- visual impairments
- hearing impairments
- mobility Impairments
- speech impairments
- health impairments
- English as a second language
- alternative learning styles



Access Challenges

- Spoken word
- Printed word
- Videotaped/televised information
- Audiotaped information
- Computer-based information

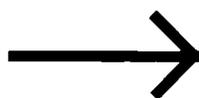


Access Issues and Solutions

Problem

Solution

access to
computers



adaptive
technology

access to
electronic
resources



universal
design
principles



Access to Computers for Students with Disabilities

DO·IT



Access to Computers Objectives

1. Describe the legal rights of students with disabilities as they relate to computer access.
2. Summarize the issues, needs and concerns of people with disabilities in accessing electronic resources.
3. Describe common types of adaptive technology for students with disabilities.
4. Discuss strategies to plan and implement adaptive technology capabilities for campus computer labs/workstations.



Success Stories

- **Nhi** low vision
- **Justin** blind
- **Katie** hearing impairment
- **Crystal** learning disability
- **Jeffrey** mobility & speech
impairment
- **Oscar** mobility impairment



Computers Assist People with:

- low vision
- blindness
- hearing impairments
- speech impairments
- specific learning disabilities
- mobility impairments
- health impairments



Adaptive Technology

- Hardware/software
- Easy/difficult to use
- Inexpensive/expensive
- Generic/unique
- Stand alone/networked



Access Challenges

- Facility
- Computer
- Electronic resources



Making Computing Labs Accessible to Everyone



Making Computer Labs Accessible to Everyone Objectives

1. Describe the legal rights of students with disabilities as they relate to computer access.
2. Tell how universal design principles can be used to develop computer services that are accessible to all students.
3. Discuss steps to be taken to ensure that students with disabilities have access to campus computer labs.



Make Sure Computer Lab Users Can:

- get to the facility and maneuver within it;
- access materials and electronic resources; and
- make use of equipment and software.



Adaptive Technology Considerations

- Adjustable tables
- Large print key labels
- Screen enlargement software
- Large monitors
- Speech output
- Braille conversion
- Trackballs, wristrests, & keyguards
- Ergonomic keyboards



Universal Design of Web Pages

DO·IT



Universal Design of Web Pages Objectives

1. List potential barriers to accessing information on World Wide Web pages for students with disabilities.
2. Describe the institution's legal responsibility to ensure access to information presented on Web pages.
3. Describe universal design guidelines for developing accessible Web pages.



Some Internet Visitors:

- cannot see graphics.
- cannot hear audio.
- have difficulty with unorganized sites.
- use older equipment with slow connections.



ADA and the Internet

“Covered entities that use the Internet for communications regarding their programs, goods, or services, must be prepared to offer those communications through accessible means as well.”

- United States Department of Justice (ADA Accessibility, 1997)



Provide Multiple Means of:

- representation
- expression
- engagement



**“The power of the Web
is in its universality.
Access by everyone
regardless of disability
is an essential aspect.”**

Tim Berners-Lee, World Wide Web Consortium



Web Page Development Accessibility Options:

1. Avoid inaccessible data types and features.
2. Create alternative methods/formats.



Example of a Web Accessibility Statement

“The DO-IT pages form a living document and are regularly updated.

We strive to make them universally accessible. You will notice that we minimize the use of graphics and photos, and provide descriptions of them when they are included. Video clips are open captioned, providing access to users who can't hear the audio. Suggestions for increasing accessibility of these pages are welcome.”



Test Your Web Pages:

- with different operating systems and monitors.
- with different browsers and with audio and graphics-loading features turned off.
- with a text browser.
- with an accessibility testing program (e.g., Bobby).
- by accessing the keyboard alone.



Policy Guidelines

- Disseminate information
- Train
- Support
- Enforce or reward
- Evaluate and revise



Universal Design of Distance Learning

DO·IT



Universal Design of Distance Learning Objectives

1. List potential barriers to distance learning courses for students with disabilities.
2. Describe faculty, staff, and institutional roles and responsibilities for ensuring equal access to distance learning courses.
3. Discuss universal design guidelines for developing accessible distance learning courses.



Distance Learning in Postsecondary Education

What policy, administrative, and technical challenges exist for assuring that our distance learning courses are accessible to people who have disabilities?



Accommodation

Versus

Universal Design



Distance Learning Tools

- Electronic Mail
- Real-time “Chat”
- Web Pages
- Teleconferencing
- Printed Materials
- Videotapes



Science/Math/ Engineering Access

DO·IT

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Science/Math/Engineering Access Objectives

1. Discuss the challenges students with disabilities face in gaining and demonstrating knowledge in science, mathematics and engineering classes.
2. List examples of accommodations for students with various types of disabilities in science, engineering, and mathematics courses.
3. Describe a process for selecting appropriate accommodations.



Challenges for Students with Disabilities:

- gaining knowledge
- demonstrating knowledge



Accommodating Students with Learning Disabilities

DO·IT



Accommodating Students with Learning Disabilities Objectives

1. Name different types of learning disabilities and how they impact learning, participation, and demonstration of knowledge in class.
2. Describe typical accommodation strategies for students with learning disabilities.
3. Discuss how technology can be used to help students with learning disabilities achieve academic and career success.



Criteria for Being Diagnosed with a Learning Disability:

- have average or above average intelligence;
- show lack of achievement at age and ability level; and
- show a severe discrepancy between achievement and intelligence.



Types of Learning Disabilities

- Dysgraphia
- Dyscalculia
- Dyspraxia
- Dyslexia
- Nonverbal learning disorders



Accommodating Students with Psychiatric Disabilities



Accommodating Students with Psychiatric Disabilities Objectives

1. List types of psychiatric disabilities postsecondary students may have.
2. Describe how mental health issues impact learning.
3. Discuss typical accommodations for students who have psychiatric disabilities.



Mental Illness

A diagnosable mental disorder causing severe disturbances in thinking, feeling, relating, functional behaviors, and substantially diminished capacity for coping with the ordinary demands of life.



Psychiatric Disabilities

- Depression
- Bipolar Affective Disorder
(previously called Manic Depression)
- Borderline Personality Disorder
- Schizophrenia
- Anxiety Disorders



Functional Limitations May Affect Academic Performance When Students Have Difficulty:

- with medication side effects.
- screening out environmental stimuli.
- sustaining concentration.
- maintaining stamina.
- handling time pressures and multiple tasks.
- interacting with others.
- responding to constructive feedback.
- responding to change.
- being calm under stressful situations.



Instructional Strategies

- Address a variety of learning styles (e.g., auditory, visual, kinesthetic, experiential, or combination of styles).
- Incorporate experiential learning activities.
- Be prepared to set behavioral expectations for all students in your class.
- Embrace diversity to include people with psychiatric disabilities.



Accommodation

=

**the removal of
barriers to
participation**

DO-IT



Possible Classroom Accommodations

- Preferential seating (e.g., near the door to allow leaving class for breaks).
- Prearranged or frequent breaks.
- Permit beverages in class.
- Use of tape recorder.
- Assign a classmate to be a volunteer assistant.
- Note-taker or photocopy of student's notes.
- Syllabus and text books available early.
- Textbooks and other course materials available in alternative formats.
- Personal and private feedback on academic performance.



Possible Examination Accommodations

- Written exams changed to oral, dictated, scripted or typed; exams in alternative format: (e.g., portfolio, demonstration, presentation, role-play); multiple choice to essay.
- Permit use of computer software programs.
- Extended time for test taking.
- Exams individually proctored, including in the hospital.
- Exam in a separate, quiet and non-distracting room.
- Increased frequency of exams.



Possible Assignment Accommodations

- Substitute assignments in specific circumstances.
- Advance notice of assignments.
- Allow assignments to be handwritten rather than typed (if possible).
- Written assignments in lieu of oral presentations, or vice versa.
- Assignments completed in dramatic formats (e.g., demonstration, role-play, sculpture).
- Assignment assistance during hospitalization.
- Extended time on assignments.



An accommodation for an individual is NOT “reasonable” if providing it would:

- pose a direct threat to the health or safety of others.
- result in a substantial change in an essential element of the curriculum.
- require a substantial alteration in (education opportunities) service provision.
- impose an undue financial or administrative action.



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Equal Access: Computer Labs

DO-IT

As increasing numbers of people with disabilities pursue educational opportunities that require computer use, accessibility of computing facilities becomes even more critical. The key is simply equal access. Everyone who needs to use your lab should be able to do so comfortably.

To make your lab accessible, employ principles of universal design. Universal design means that rather than design your facility for the average user, you design it for people with a broad range of abilities. Keep in mind that individuals using your lab may have learning disabilities or visual, speech, hearing, and mobility impairments.

As you plan services in your computing facility, consider all of your potential users, including those with disabilities. Make sure visitors can:

- Get to the facility and maneuver within it.
- Access materials and electronic resources.
- Make use of equipment and software.

Also make sure that staff are trained to support people with disabilities and have a plan in place to respond to specific requests in a timely manner. With these key issues in mind, you can make your lab accessible to everyone.

The following general access questions can help guide you in making your facility universally accessible.

Building Access

- Are parking areas, pathways, and entrances to the building wheelchair-accessible?
- Are doorway openings at least 32 inches wide and doorway thresholds no higher than 1/2 inch?
- Are ramps and/or elevators provided as alternatives to stairs?
- Are elevator controls accessible from a sitting position?

- Do the elevators have both auditory and visual signals for floors? Are elevator controls marked in large print and Braille or raised notation?
- Have protruding objects been removed or minimized for the safety of users who are visually impaired?
- Are wheelchair-accessible restrooms near the lab marked with high visibility signs?
- Are there ample high-contrast, large print directional signs to the lab?
- Are telecommunication devices for the deaf (TTYs) available?

Lab Staff

- Are staff members familiar with the adaptive technology and alternative document formats available in the lab?
- Are staff members aware of disability issues? (See Helpful Communication Hints)

Physical Space and Printed Materials

- Are large print, high-contrast signs used in the lab?
- Are computers labeled as accessible in large print and Braille?
- Are aisles kept wide and clear for wheelchair users?
- Is at least one table for each type of workstation adjustable so that a person in a wheelchair or a person of short stature can achieve a comfortable position? Can the adjustment controls be reached by wheelchair users?
- Are document holders available to help position documentation so that it can be easily read?
- Is all documentation available (or available in a timely manner) in alternative formats such as Braille, large text, audio, and electronic text? Are printed materials within easy reach from a variety of heights without furniture blocking access? Is a CCTV or



large magnifying glass available to enlarge printed materials?

- Are hearing protectors available for users who are distracted by noise in the facility?

Computers and Software

- Do some keyboards have large print key labels, Braille labels, or home-row key indicators to help users with visual impairments locate keys?
- Is screen enlargement software available for users with low vision? Are large monitors available so that a larger amount of screen can be viewed while magnified?
- Is speech screen output available for visually impaired and learning disabled users? Are headphones and volume adjustment available?
- Are mouse alternatives such as trackballs, keyboard control of the mouse, or other pointing devices available for those who have difficulty controlling a mouse?
- Are keyboard guards available to assist users with impairments that limit fine motor control?
- Are wrist rests available for those who require extra wrist support while typing?
- Is equipment marked with large print and Braille labels?
- Is software available to modify keyboard response such as sticky keys, repeat rate, and keystroke delay?
- Are alternative keyboards such as a mini-keyboards or extended keyboards available for users with mobility impairments?
- Are alternatives to keyboards such as a head pointing system, switch based interface, or voice dictation software available for users who cannot use keyboards?
- Is word prediction software available to reduce the number of keystrokes needed for text entry?
- Are one-handed keyboards or “keyboard layout” software available?
- Are audio warning signals available visually?

brochure titled *Working Together: People with Disabilities and Computer Technology*.

Electronic Resources

- Are text alternatives provided for graphic images?
- Is standard HTML used for Web resources so that they can be accessed with a text-based browser?
- Are electronic resources accessible to people using adaptive technology?

More information about universal design of electronic resources can be found in the DO-IT videotape and brochure titled *World Wide Access*.

First Steps

Although a lab cannot be expected to have specialized equipment for every type of disability on hand, staff should make equipment available that they anticipate will be used and/or is available at relatively low cost. Provide:

- Printed resources that can be reached by a wheelchair user.
- An adjustable table for each type of workstation in your lab.
- Keyguard and wrist rest.
- Trackball, joystick, or other mouse alternative.
- Signs with high contrast and large print.
- Large print keytop labels, screen enlargement software, and a large monitor.
- Screen reading software and speech synthesizer.
- Key documents available in formats accessible to those who have low vision or who are blind.
- In key lab documents a statement about your commitment to access and procedures for requesting disability-related accommodations.
- Lab resources on the World Wide Web that employ principles of universal design.

More information about adaptive technology can be found in the DO-IT videotape and

Once a lab is established or has greater requirements, consider adding:



- Scanner and Optical Character Recognition (OCR) software.
- CCTV.
- Braille printer and Braille translation software.
- Word prediction software.
- Alternative keyboards.
- Voice input software.

In addition, develop a procedure to assure a quick response to requests for adaptive technology that you do not currently have available.

Videotape

An 11-minute videotape, *Equal Access: Computer Labs*, demonstrates key points summarized in this handout. It may be ordered by sending a check for \$25 to DO-IT. Contact DO-IT for a list of over 20 other videotapes that may be of interest. Permission is granted to reproduce DO-IT videotapes for educational, non-commercial purposes as long as the source is acknowledged.

Internet Resources

Additional publications regarding the use of electronic and information technology by people with disabilities can be found at: <http://www.washington.edu/doit/Brochures/Technology/>. Select *Disability-Related Resources on the Internet* for a comprehensive list of discussion lists and Web sites. To locate technical assistance centers in your state or region, consult <http://www.resna.org/taproject/at/statecontacts.html> or <http://www.adata.org/dbtac.html>, respectively.

About DO-IT

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Helpful Communication Hints

There are no strict rules when it comes to relating to people with disabilities. However, here are some helpful hints.

General

- Treat people with disabilities with the same respect and consideration that you do with others.
- Ask a person with a disability if he/she needs help before helping.
- Talk directly to the person with a disability, not through the person's companion.
- Refer to a person's disability only if it is relevant to the conversation.
- Avoid negative descriptions of a person's disability. For example, "a person who uses a wheelchair" is more appropriate than "a person confined to a wheelchair."
- Refer to the person first and then the disability. "A man who is blind" is better than "a blind man" because it emphasizes the person first.

Visual Impairments

- Be descriptive for people with visual impairments. Say, "The computer is about three feet to your left," rather than, "The computer is over there."
- When guiding people with visual impairments, offer them your arm rather than grabbing or pushing them.
- Always ask permission before you interact with a person's guide or service dog.

Learning Disabilities

- If asked, read instructions to users with a specific learning disability.

Mobility Impairments

- Try sitting or crouching to the approximate height of people in wheelchairs when you interact.

Speech Impairments

- Listen carefully and ask people with speech impairments to repeat what they have said if you don't understand.

Hearing Impairments

- Face people with hearing impairments and speak clearly when you talk to them so they can see your lips.



Opening Doors: Mentoring on the Internet

DO-IT

Most of us can think of people in our lives, more experienced than ourselves, who have supplied information, offered advice, presented a challenge, initiated friendship, or simply expressed an interest in our development as a person. Without their intervention we may have remained on the same path, perhaps continuing a horizontal progression through our academic, career, or personal lives.

The term "mentor" has its origin in Homer's *Odyssey* when a man named Mentor was entrusted with the education of the son of Odysseus. "Protégé" refers to the person who is the focus of the mentor. Today, mentoring is associated with a variety of activities including teaching, counseling, sponsoring, role modeling, job shadowing, academic and career guidance, and networking.

DO-IT Mentors are valuable resources to their protégés in project DO-IT (Disabilities, Opportunities, Internetworking, and Technology). Most Mentors are college students, faculty, practicing engineers, scientists, or other professionals who have disabilities. Protégés are participants in the DO-IT Scholars, Pals, or Campers programs. These students are making plans for post-secondary education and employment. They all have disabilities, including vision, hearing, mobility, and health impairments, and specific learning disabilities. Frequent electronic communications and personal contacts bring DO-IT protégés and mentors together to facilitate academic, career, and personal achievements.

Introducing protégés to mentors with similar disabilities is a strength of the DO-IT program. As reported by one protégé, she had never met an adult with a hearing impairment like hers before getting involved in DO-IT: "But when I met him, I was so surprised how he had such a

normal life, and he had a family, and he worked with people who had normal hearing. So he made me feel a lot better about my future."

Participants learn strategies for success in academics and employment. Mentors provide direction and motivation, instill values, promote professionalism, and help protégés develop leadership skills. As one Scholar noted, "It feels so nice to know that there are adults with disabilities or who know a lot about disabilities, because I think that people who are about to go to college or start their adult life can learn a lot from mentors . . ." As participants move from high school to college and careers they too become mentors, sharing their experiences with younger participants.

There are probably as many mentoring styles as there are personality types and no one can be everything to one person. Each DO-IT participant benefits from contact with several mentors.

Most mentoring in DO-IT takes place via the Internet. Through electronic communications and projects using the Internet, mentors promote personal, academic, and career success. Electronic communication eliminates the challenges imposed by time, distance, and disability that are characteristic of in-person mentoring. For example, participants who have speech impairments or are deaf do not need special assistance to communicate via electronic mail. Those who cannot use the standard keyboard because of mobility impairments, use adaptive technology to operate their computer systems.

DO-IT encourages one-to-one communication between protégés and mentors via electronic mail. It also facilitates communication in small groups through the use of electronic discussion lists. For example, one group includes both mentors and protégés who are blind. They discuss common interests and concerns such as

DO-IT Mentors offer Protégés . . .

Information – Mentors share their knowledge and experiences with protégés.

Contacts – Mentors introduce their protégés to valuable academic, career, and personal contacts.

Challenges – Mentors stimulate curiosity and build confidence by offering new ideas and opportunities.

Support – Mentors encourage growth and achievement by providing an open and supportive environment.

Direction – Mentors help protégés discover their talents and interests and devise strategies to attain their goals.

Advice – Mentors make suggestions to help protégés reach their academic, career, and personal goals.

Role Modeling – Mentors accomplish many of these goals by letting their protégés know who they are.



independent living, speech and Braille output systems for computers, and options for displaying images and mathematical expressions.

While most communication occurs via electronic mail, some mentors meet their protégés during summer study programs at the University of Washington and at other DO-IT activities across the United States. In-person contact strengthens relationships formed on-line.

The DO-IT program received national recognition with The Presidential Award for Excellence in Mentoring "for embodying excellence in mentoring underrepresented students and encouraging their significant achievement in science, mathematics, and engineering." It was also showcased in the President's Summit on Volunteerism and received the National Information Infrastructure Award "for those whose achievements demonstrate what is possible when the powerful forces of human creativity and technologies are combined."

Research

DO-IT has been studying the nature and value of electronic mentoring since 1993. Thousands of electronic mail messages have been collected, coded, and analyzed; surveys were distributed to Scholars and Mentors; and focus groups were conducted.

Preliminary findings suggest that computer-mediated communication can be used to initiate and sustain both peer-peer and mentor-protege

relationships and alleviate barriers to traditional communications due to time and schedule limitations, physical distances, and disabilities of participants. Both young people and mentors in the study actively communicate on the Internet and report positive experiences in using the Internet as a communication tool. The Internet gives these young people support from peers and adults otherwise difficult to reach, connects them to a rich collection of resources, and provides opportunities to learn and contribute. Participants note benefits over other types of communication. They include the ability to communicate over great distances quickly, easily, conveniently, and inexpensively; the elimination of the barriers of distance and schedule; the ability to communicate with more than one person at one time; and the opportunity to meet people from all over the world. Many report the added value that people treat them equally because they are not immediately aware of their disabilities. Negative aspects include difficulties in clearly expressing ideas and feelings, high volumes of messages, occasional technical difficulties, and lack of in-person contact.

Preliminary findings of this study suggest that peer-peer and mentor-protégé relationships on the Internet perform similar functions in providing participants with psycho-social, academic, and career support. However, each type of relationship has its unique strengths. For example, peer-to-peer communication includes more personal information than exchanges between mentors and protégés.

It is often reported in the literature that peer and mentor support can help students with disabilities reach their social, academic, and career potential. However, constraints imposed by time, distance, and disability make such relationships difficult to initiate and sustain. This study suggests that practitioners and parents should consider using the Internet as a vehicle for developing and supporting positive peer and mentor relationships.

For more information about this study, contact the DO-IT office.

DO-IT Protégés offer Mentors . . .

Challenge – Mentors develop their own personal styles for sharing their skills and knowledge via electronic communication.

Opportunities to Help Set Goals – One Mentor explains, “I try to tell the DO-IT kids to listen to their hearts and think about what they really want to do. Don’t listen to people who say no, you can’t do this or that, or you should be thinking only about this kind of work; just think about what you really want to do, what turns you on, and go for it.”

A Chance to Share Strategies – Mentors pass on hard-earned experiences. As reported by one Mentor, “I’ve been through this thing. I had a stroke and so on. And I find it incredibly gratifying to be able to share that with someone, and to be able to help someone else who’s going through some of the same things.”

New Ideas – Mentors join an active community of talented students and professionals with a wide range of disabilities who are eager to share their own strategies for problem-solving and success.

Fun – Mentors share in the lives of motivated young people. Listening to them, hearing about their dreams, helping them along the road to success – it’s fun!

Getting Started

Following are a few suggestions for new DO-IT Mentors.

- Get to know each protégé. What are his/her personal interests? Academic interests? Career interests?
- Introduce yourself. Share your personal interests, hobbies, academic interests, career path.
- Explore interests with protégés by asking questions, promoting discussion, pointing to Internet and other resources.
- Encourage participation in DO-IT activities and try to attend activities when possible. Mentor-protégé relationships are strengthened through face-to-face contact!
- Facilitate contact between students and people with shared interests or resources (e.g., professors, professionals, service providers, friends).

DO-IT Electronic Resources

To contact staff, request publications or ask questions about the program, send electronic mail to doit@u.washington.edu

The doitsem discussion list covers issues pertaining to individuals with disabilities and their pursuit of science, mathematics, engineering, and technology academics and careers. To send a message to the group use the address doitsem@u.washington.edu.

For information related to DO-IT, disabilities, adaptive technology, science, engineering, mathematics, and postsecondary education, access the DO-IT World Wide Web page at <http://www.washington.edu/doit/>

Videotape

A 14 -minute videotape, *Opening Doors: Mentoring on the Internet*, may be ordered by sending a check for \$25 to DO-IT.

Grants and gifts fund DO-IT publications, videotapes, and programs to support the academic and career success of people with disabilities. Contribute today by sending a check to DO-IT, Box 355670, University of Washington, Seattle, WA 98195-5670.

Your gift is tax deductible as specified in IRS regulations. Pursuant to RCW 19.09, the University of Washington is registered as a charitable organization with the Secretary of State, State of Washington. For more information, call the Office of the Secretary of State, 800-322-4483.

About DO-IT

DO-IT (Disabilities, Opportunities, Internetworking, and Technology) serves to increase the successful participation of people with disabilities in challenging academic programs and careers. It is primarily funded by the National Science Foundation, the U.S. Department of Education, and the State of Washington. This material is based upon work supported by the National Science Foundation under Grant No. 9725110. Any questions, findings, and conclusions or recommendations expressed in this material are those of the author and do not necessarily reflect the views of the National Science Foundation. For more information, to be placed on the mailing list, or to request materials in an alternative format, contact:

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8/22/02



DO-IT

Working Together: Computers and People with Learning Disabilities

A specific learning disability (LD) is in most situations a “hidden disability.” Because there are no outward signs of a disability such as a white cane or wheelchair, people with an LD are often neglected when considering adaptive computer technology. However, many people with learning disabilities can benefit from mainstream and specialized hardware and software to operate a computer and further their academic and career goals.

Definitions and Terminology

A specific learning disability is unique to the individual and can appear in a variety of ways. It may be difficult to diagnose, to determine impact, and to accommodate.

Generally speaking, someone may be diagnosed with a learning disability if he/she is of average or above-average intelligence and there is a lack of achievement at age and ability level, or a large discrepancy between achievement and intellectual ability.

An untrained observer may conclude that a person with a learning disability is “lazy” or “just not trying hard enough.” He may have a difficult time understanding the large discrepancy between reading comprehension and proficiency in verbal ability. The observer sees only the input and output, not the processing of the information. Deficiencies in the processing of information make learning and expressing ideas difficult or impossible tasks. Learning disabilities usually fall within four broad categories:

- **Spoken language** - listening and speaking.
- **Written language** - reading, writing and spelling.
- **Arithmetic** - calculation and concepts.
- **Reasoning** - organization and integration of ideas and thoughts.

A person with a learning disability may have discrepancies in one or all of these categories. The

effects of an LD are manifested differently for different individuals and range from mild to severe. Learning disabilities may also be present along with other disabilities such as mobility or sensory impairments. Often people with Attention Deficit Disorder / Attention Deficit Hyperactive Disorder (ADD / ADHD) also have learning disabilities. Specific types of learning disabilities include:

- **Dysgraphia** - An individual with Dysgraphia has a difficult time with the physical task of forming letters and words using a pen and paper and has difficulty producing legible handwriting.
- **Dyscalculia** - A person with Dyscalculia has difficulty understanding and using math concepts and symbols.
- **Dyspraxia** - Language comprehension of a person with Dyspraxia does not match language production. She may mix up words and sentences while talking.
- **Non-verbal Learning Disorder** - A non-verbal Learning Disorder is demonstrated by below-average motor coordination, visual-spatial organization, and social skills.
- **Dyslexia** - An individual with Dyslexia may mix up letters within words and words within sentences while reading. He may also have difficulty spelling words correctly while writing; letter reversals are common. Some individuals with Dyslexia may also have a difficult time with navigating and route finding using right / left and / or compass directions.

Accommodations

Assistive and adaptive technology does not “cure” a specific learning disability. These tools compensate rather than remedy, allowing a person with an LD can demonstrate his intelli-



gence and knowledge. Adaptive technology for the person with an LD is a made-to-fit implementation. Trial and error may be required to find a set of appropriate tools and techniques for a specific individual. Ideally, a person with an LD plays a key role in selecting her technology. She should help to determine what works and what does not. Once basic tools and strategies are selected, they can be "test driven," discarded, adapted, and/or refined.

Following are descriptions of some computing tools that have been used effectively by individuals with specific learning disabilities. This list is not exhaustive and should not limit the person with an LD or the adaptive technology practitioner from trying something new. Today's experimental tinkering could lead to tomorrow's commonly used tool.

• **Word Processors**

Computer-based accommodations for Dyslexia may not require specialized hardware or software. For example, a person with Dyslexia can benefit from regularly using built-in word processor features such as:

- Spell checking.
- Grammar checking.
- Font size and color changes.

These built-in features are relatively low priced tools that, when used together, provide an alternative to handwritten expression. The use of spell checkers can allow the person with learning difficulties to remain focused on the task of communication rather than getting bogged down in the process of trying unsuccessfully to identify and correct spelling errors. Many word processing programs also include tools for outlining thoughts and providing alternative visual formats that may compensate for difficulty in organizing words and ideas. Additionally, color-coded text options and outline capabilities present in many word processing programs are useful tools for those with difficulty sorting and sequencing thoughts and ideas. Additionally, color-coded text options and outline capabilities present in many word processing programs are useful tools for those

with difficulty sorting and sequencing thoughts and ideas.

A word processor can also be used as a compensatory tool for a person with Dysgraphia. Use of a keyboard may be a viable alternative for an individual who has difficulty expressing his thoughts via handwriting.

• **Reading Systems**

An individual who can take in information through listening much better than by reading may benefit from using a reading system. These systems allow text on screen (document, Web page or e-mail) to be read aloud through the computer's sound card. A scanner and Optical Character Recognition (OCR) software (e.g., Freedom Scientific's WYNN or L&H's Kurzweil 3000) adds the feature of reading printed text. Hard copy text is placed on the scanner where it is converted into a digital image. This image is then converted to a text file, making the characters recognizable by the computer. The computer can then read the words back using a speech synthesizer and simultaneously present the words on screen.

Reading systems include options such as highlighting a word, sentence, or paragraph using contrasting colors. If desired, the reader may elect to have only one word at a time appear on the screen to improve her grasp of the material. Increasing the size of the text displayed on the screen as well as changing text color can increase reading comprehension for some people with specific learning disabilities.

• **Concept Mapping**

Some individuals have difficulty organizing and integrating thoughts and ideas while writing. Concept mapping software allows for visual representation of ideas and concepts. These representations are presented in a physical manner and can be connected with arrows to show the relationship between ideas. These graphically represented ideas can be linked, rearranged, color coded, and matched with a variety of icons to suit the need of the user. Concept mapping software can be used as a



structure for starting and organizing such diverse writing projects as poetry, term papers, resumes, schedules, or even computer programs.

- **Phonetic Spelling**

People with Dyslexia often spell phonetically, making use of word prediction or spell checking software less useful. Devices (e.g., Franklin Electronic Dictionary™) or software (YakYak™) that renders phonetic spelling into correctly spelled words may be useful tools.

- **Word Prediction**

Spelling words correctly while typing can be a challenge for some people with Dyslexia. Word prediction programs prompt the user with a list of most likely word choices based upon what has been typed so far. Rather than experiencing the frustration of remembering the spelling of a word, he can refer to the predictive list, choose the desired word and continue with the expression of thoughts and ideas.

- **Speech Recognition**

Speech recognition products provide appropriate tools for individuals with a wide range of learning disabilities. Speech recognition software takes the spoken word via a microphone and converts it to machine-readable format. The user speaks into a microphone either with pauses between words (discrete speech) or in a normal talking manner (continuous speech). The discrete product, although slower, is often the better choice for those with LDs because identifying errors can be done as they occur. Making corrections after the fact using continuous speech requires good reading skills. Speech recognition technology requires that the user have moderately good reading comprehension to correct the program's text output. Because many people with LDs have reading problems, speech recognition is not always an appropriate accommodation.

- **Organizational Software/Personal Information Managers (PIMs)**

Organizing schedules and information is difficult for some people with Dyslexia and/or Non-verbal Learning Disorder. Personal Information

Managers (PIMs) such as a Palm Pilot™ or Casio™ or organizational software such as Microsoft Outlook™ or Lotus Organizer™ can accommodate these disabilities. Such tools can be helpful to those with LDs by providing a centralized and portable means of organizing schedules and information. The cues provided by these tools can assist keeping on task and may help provide visual alternatives to represent what work needs to be done and what has been accomplished. However, they may also put early learners at a disadvantage by requiring yet another program and interface to learn and remember to use. Individuals may lack the discipline/attention skills to regularly check the application/device.

- **Talking Calculators**

A talking calculator is an appropriate tool for people with Dyscalculia. The synthesized voice output of a talking calculator provides feedback to the user that helps them identify any input errors. Additionally, hearing the calculated answer can provide a check against the transposition of numbers commonly reversed in reading by people with Dyslexia or Dyscalculia.

- **Low Tech Tools (Post-It Notes, Highlighters)**

Not all assistive technology for people with LDs is computer-based. The use of common office supplies such as Post-It Notes™ and highlighter pens provide elegantly simple means of sorting and prioritizing thoughts, ideas, and concepts. Often, tools of one's own making provide the most effective and comfortable accommodations for learning difficulties.

Videotape

A twelve-minute videotape, *Working Together: Computers and People with Learning Disabilities*, demonstrates key points summarized in this handout. It may be purchased by sending \$25 to DO-IT. Contact DO-IT for a list of more than 20 other videotapes that may be of interest. Permission is granted to reproduce DO-IT videotapes for educational, non-commercial purposes as long as the source is acknowledged.



Resources

For more information about Learning Disabilities and possible accommodations, consider the following Web sites.

- LD OnLine: <http://www.ldonline.org/>
- LD Resources: <http://www.ldresources.com/>
- International Dyslexia Association: <http://interdys.org/>
- National Center for Learning Disabilities: <http://www.nclld.org/>

Useful information about products that can assist an individual with an LD can be found at the following Web sites.

- Casio Personal Assistant: <http://www.casio.com/>
- Franklin Electronic Dictionary: <http://www.franklin.com/>
- Freedom Scientific WYNN: <http://www.freedomscientific.com/wynn/>
- Inspiration Software: <http://www.inspiration.com/>
- L&H Kurzweil 3000: <http://www.lhsl.com/>
- Lotus Organizer: <http://www.lotus.com/home.nsf/welcome/organizer/>
- Microsoft Outlook: <http://www.microsoft.com/outlook/>
- Palm Pilot: <http://www.palm.com/>
- Yak-Yak Software (for phonetic spelling): <http://www.yak-yak.com/>

Additional publications regarding the use of electronic and information technology use by people with disabilities can be found at <http://www.washington.edu/doit/Brochures/Technology/>. Select *Disability-Related Resources on the Internet* for a comprehensive list of discussion lists and Web sites.

To locate technical assistance centers in your state or region, consult <http://www.resna.org/taproject/at/statecontacts.html> or <http://www.adata.org/dbtac.html>, respectively.

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About DO-IT

The University of Washington helps individuals with disabilities transition to college and careers through DO-IT (Disabilities, Opportunities, Internetworking and Technology). Primary funding for the DO-IT project is provided by the National Science Foundation, the U.S. Department of Education, and the State of Washington. This material is based upon work supported by the National Science Foundation under Grant No. 9800324. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author and do not necessarily reflect the views of the National Science Foundation. For more information, to be placed on the mailing list, or to request materials in an alternative format, contact:

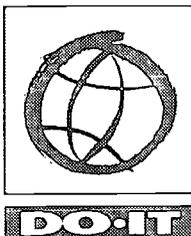
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Working Together: Computers and People With Mobility Impairments

An elevator or ramp provides access to spaces when a staircase is insurmountable for someone who uses a wheelchair. Similarly, specialized hardware and software, called assistive or adaptive technology, allows people with mobility impairments to use computers. These tools allow a person with limited, uncontrollable, or no hand or arm movement to successfully perform in school and job settings. Adaptive technology can allow a person with a mobility impairment to use all of the capabilities of a computer.

While some mobility impairments are obvious to the observer, others are less apparent. For example, individuals with repetitive stress injuries (RSI) may have no visible impairments yet require adaptive technology in order to use a computer without experiencing pain. However, people who use wheelchairs or crutches may require no special technology to access a computer. Although it may be helpful for adaptive technology practitioners to know details about specific disabilities such as Muscular Dystrophy, Cerebral Palsy, spinal cord injury, Multiple Sclerosis, or RSI, it is not essential to be an expert on these conditions. People with the same medical condition, such as Muscular Dystrophy, may require different adaptive technology. On the other hand, an accommodation for someone with Cerebral Palsy may also be used by someone with RSI. Also, learning, sensory, or other disabilities may co-exist with a mobility impairment and can create additional computer access challenges.

While it is helpful to recognize the specific limitations of an individual, it is more important to focus on the task to be completed and how his abilities, perhaps assisted

with technology, can be used to accomplish the goal or task. Work closely with the person with a mobility impairment to first determine what he needs or desires to accomplish by using a computer. Specific accommodations can then be explored that provide access to software or to a specific device such as a keyboard or mouse.

The specific need for adaptive technology is unique to the individual. Trial and error may be required to find a set of appropriate tools and techniques. The person with a mobility impairment should play a key role in determining her goals and needs when selecting her adaptive technology. Once basic tools and strategies are initially selected, she can test drive, discard, adapt, and/or refine. The end user of the technology should ultimately determine what works best.

Following are descriptions of several computing tools that have been effectively used by individuals with mobility impairments. This list is not exhaustive and should not limit the person with a mobility impairment or the adaptive technology practitioner from trying other approaches.

Facility Access

Before a person can use a computer, she needs to get within effective proximity of the workstation. Aisles, doorways, and building entrances must be wheelchair accessible. Other resources such as telephones, restrooms, and reference areas should be accessible as well. Don't overlook a simple barrier such as a single step or narrow doorway. Work with architectural accessibility experts to ensure physical accessibility.



Furniture

Proper seating and positioning is important for anyone using a computer, perhaps even more so for a person with a mobility impairment. Specialized computer technology is of little value if a person cannot physically activate these devices due to inappropriate positioning. A person for whom this is an issue should consult a specialist in seating and positioning – often an occupational therapist – to ensure that correct posture and successful control of devices can be achieved and maintained.

Flexibility in the positioning of keyboards, computer screens, and table height is important. As is true for any large group, people with mobility impairments come in all shapes and sizes. It is important that keyboards can be positioned at a comfortable height and monitors can be positioned for easy viewing. An adjustable table can be cranked higher or lower, either manually or with a power unit, to put the monitor at a proper height. Adjustable trays can move keyboards up and down and tilt them for maximum typing efficiency. Be sure to consider simple solutions to furniture access. For example, wood blocks can raise the height of a table and a cardboard box can be used to raise the height of a keyboard on a table.

Keyboard Access

The keyboard can be the biggest obstacle to computing for a person with a mobility impairment. Fortunately, those who lack the dexterity or range of motion necessary to operate a standard keyboard have a wide range of options from which to choose. Pointers can be held in the mouth or mounted to a hat or headgear and used to press keys on a standard keyboard. Repositioning the keyboard to the floor can allow someone to use his feet instead of his hands for typing.

Before purchasing a complex keyboard option, evaluate the accessibility features that are built-in to current popular operating systems. For instance, the Accessibility Options control panel in current versions of Microsoft Windows™ contains a variety of settings that can make a standard keyboard easier to use. For a person who has a single point of entry (a single finger or mouth-stick), use of StickyKeys allows keystrokes that are usually entered simultaneously, such as Ctrl-key shortcuts found in menus, to be entered sequentially. FilterKeys can eliminate repeated keystrokes for a person who tends to keep a key pressed down too long. Check the Settings for these features and experiment with different time delays for optimum effect. The Macintosh operating systems have similar features in the Easy Access control panel.

Consider using the features common in popular word processors, such as Microsoft Word™, to ease text entry. The AutoCorrect™ feature of Word allows sentences or blocks of text, such as an address, to be represented by unique and brief letter sequences. For example, entering “myaddr” could be set to automatically display one’s address in proper format. Long words can be abbreviated and entered into the AutoCorrect settings to increase typing speed and accuracy.

A keyguard is a plastic or metal shield that fits over a standard keyboard. Holes are drilled into the guard to help an individual with poor dexterity or hand control press only the desired key without inadvertently pressing other keys. Keyguards are available from a variety of manufacturers (e.g., Don Johnston, TechAble).

Alternative keyboards can be considered for a person who cannot effectively operate a



regular keyboard despite changing settings or using a keyguard. For people who have limited range of motion, a mini-keyboard (Tash) may be considered. If a person has good range of motion and poor dexterity, a keyboard with extra-large keys (e.g., IntelliTools) can offer a good solution. Several vendors offer an array of alternative keyboards, including those that are configured to relieve the effects of RSI (e.g., Infogrip).

When physically activating a keyboard – whether through changing the settings or switching to an alternative keyboard – is not possible, evaluate the utility of a virtual keyboard. A virtual keyboard appears on the computer screen as a picture of a keyboard. A mouse, trackball, or alternative pointing system activates the keys on the screen and inserts the appropriate keystrokes into the desired program. A person can enter text by clicking on specific keys on the keyboard image. Modifier keys such as **Ctrl** and **Alt** can also be accessed, as can the function keys. Some virtual keyboards incorporate word prediction (see below) to increase entry speed and may include alternate layouts in addition to the traditional “QWERTY” layout found on standard keyboards.

Word Prediction

Typing words correctly and quickly can be a challenge for some people with mobility impairments. Word prediction programs prompt the user with a list of likely word choices based upon words previously typed. Some word prediction software automatically collects new words as they are used, and consider a person’s common vocabulary when predicting in the future. Word prediction is often used with a virtual keyboard to increase accuracy and typing speed. For those who type much faster than 13-15 words per minute, however, use of word prediction can

actually decrease typing speed, because the user is required to look in two places – the keyboard and the screen.

Alternative Pointing Systems

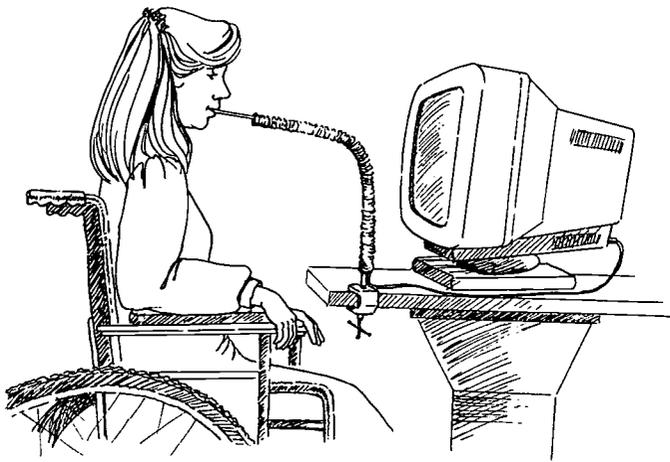
With the advent of graphically-oriented operating systems, it is vital to have access to a mouse or an alternative pointing device. For those who lack the coordination to use a standard mouse, there are many alternatives to consider. Trackballs are a good first choice; the control surface can be easier to manipulate and the buttons can be activated without affecting the pointer position. Some trackballs (e.g., Kensington) offer additional buttons that add functionality such as double-clicking, click and hold, and other commands, and can be programmed to a person’s specific needs. A simple accommodation for use of a pointer by someone who can’t use his hands but can move his feet is to place a standard mouse or trackball on the floor.

Other alternative pointers can be found in many mainstream computer stores and supply catalogs. External touchpads, similar to those built into many notebook computers, offer an ideal pointing system for some. Handheld pointing devices such as the ProPoint™ (Interlink Electronics) with a small control surface area may be useful for someone with very limited hand mobility. For people with mobility impairments who already use a joystick to drive a wheelchair, a device such as the Roller Joystick (Penny & Giles) may be an excellent choice.

A person with good head control who cannot control a mouse or alternative pointing device with any limb should consider using a head-controlled pointing system such as HeadMouse™ (Origin Instruments) or HeadMaster™ (Prentke Romich). These head-controlled pointing systems use infrared



detection and a transmitter or reflector that is worn on the user's head and translates head movements into mouse pointer movement on the computer screen. Use of an additional switch (see Switch Access below) replaces the mouse button. Combining a head pointing system with an on-screen keyboard allows full computer control to someone who cannot use a standard keyboard and mouse.



Switch Keyboard and Mouse Access Using Scanning or Morse Code

When a person's mobility impairment prevents the use of a standard keyboard or mouse, using a switch may be a possibility. Switches come in a nearly limitless array and can be controlled with nearly any body part. Switches can be activated with a kick, swipe of the hand, sip and puff by mouth, head movement, eyeblink, or touch. Even physical closeness can activate a proximity switch. These switches work in concert with a box or emulator that sends commands for the keyboard and/or mouse to the computer. While switch input may be slow, it allows for independent computer use for some people who could not otherwise access a computer.

There are a variety of input methods that rely on switches. Scanning and Morse code are two of the most popular. Upon activation of a

switch, scanning will bring up a main menu of options on the screen. Additional switch activations allow a drilling down of menu items to the desired keystroke, mouse, or menu action. Morse code is a more direct method of control than scanning and with practice can be a very efficient input method. Most learners quickly adapt to using Morse code and can achieve high entry speeds.

Switch systems should be mounted with the assistance of a knowledgeable professional, such as an occupational therapist. If mounted to a wheelchair, it is important that switch mounting does not interfere with wheelchair controls. Seating and positioning specialists can also help determine optimum placement for switches, reduce the time in discovering the best switch system, and maximize positive outcomes.

Speech Recognition

Speech recognition products may provide an appropriate input tool for individuals with a wide range of disabilities. Speech recognition software converts words spoken into a machine-readable format. The user speaks into the microphone either with pauses between words (discrete speech) or in a normal talking manner (continuous speech). The discrete speech system, although slower, allows the user to identify errors as they occur. In continuous speech systems, corrections are made after the fact. Speech recognition technology requires that the user have moderately good reading comprehension in order to correct the program's text output. Voice and breath stamina should also be a consideration when evaluating speech recognition as an input option.

Reading Systems

An individual who has a difficult time holding printed material or turning pages may benefit from a reading system. These



systems are typically made up of hardware (scanner, computer, monitor, and sound card), Optical Character Recognition (OCR) software, and a reading/filing program. The system provides an alternative to reading printed text. Hard copy text is placed on the scanner where it is converted into a digital image. The image is then converted to a text file, making the characters recognizable by the computer. The computer can then read the words back using a speech synthesizer and simultaneously present the words on screen. Use of such a system may require assistance, since a disability that limits manipulation of a book may also preclude independent use of a scanner.

Low-Tech Tools

Not all assistive technology for people with mobility impairments is computer-based. The use of such common items as adhesive Velcro to mount switches or power controls can provide elegantly simple solutions to computer access barriers. Often, tools of one's own making provide the most effective and comfortable accommodations for mobility impairments.

Videotape

A ten-minute videotape, *Working Together: Computers and People with Mobility Impairments*, demonstrates key points summarized in this handout. It may be purchased by sending \$25 to DO-IT. Contact DO-IT for a list of more than 20 other videotapes that may be of interest. Permission is granted to reproduce DO-IT videotapes for educational, non-commercial purposes as long as the source is acknowledged.

Resources

Useful information about products that can assist an individual with a mobility impairment can be found at the following Web sites.

- Don Johnston, Inc.: <http://www.donjohnston.com/>
- Infogrip: <http://www.infogrip.com/>
- IntelliTools: <http://www.intellitools.com/>
- Interlink Electronics: <http://www.interlinkelec.com/>
- Origin Instruments: <http://www.orin.com/>
- Penny & Giles: <http://www.pgcontrols.com/>
- Prentke Romich: <http://www.prentrom.com/>
- Kensington: <http://www.kensington.com/>
- TASH: <http://www.tashinc.com/>
- TechAble: <http://www.techable.com/>

Additional publications regarding the use of electronic and information on technology use by people with disabilities can be found at <http://www.washington.edu/doi/Brochures/Technology/>. Select *Disability-Related Resources on the Internet* for a comprehensive list of discussion lists and Web sites.

To locate technical assistance centers in your state or region, consult <http://www.resna.org/taproject/at/statecontacts.html> or <http://www.adata.org/dbtac.html>, respectively.



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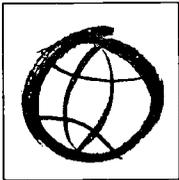
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Working Together: Computers and People with Sensory Impairments

DO-IT

The appearance of personal computers twenty years ago heralded new education and employment opportunities for people with disabilities, including those with sensory impairments. Because sound was rarely used, people with hearing impairments experienced few limitations in operating the early personal computers. Not long after the introduction of the personal computer, software and hardware systems for reading screen text out loud were developed for people with visual impairments.

As computers and operating systems have become increasingly sophisticated, adapting computers for use by people with sensory impairments has posed increasing challenges. The advent of graphical interfaces (e.g., Microsoft Windows™ and Macintosh OS™) complicates computer access for people who cannot see the screen, since their speech output systems are designed to read text. Multimedia output that uses audio is not accessible to those people who cannot hear. And people who cannot feel a keyboard cannot type effectively. Fortunately, specialized hardware and software can make computer systems usable by anyone with a sensory impairment.

A person with a sensory impairment has reduced ability or lack of ability in using one or more of three senses – vision, touch, and hearing. The effects of a sensory impairment can range from slight to complete loss of ability to use the sense. It may have a mild or severe impact on daily living. Sensory impairments may be present along with other disabilities such as mobility impairments or learning disabilities.

Visual impairments include low vision and blindness. Low vision is used to describe a

loss of visual acuity while retaining some vision. It may be combined with light sensitivity and can vary in its effect. Some people with visual impairments have uniform vision loss. Others might have visual field limitations that result in tunnel vision or alternating areas of total blindness and vision. Some people experience loss of color vision. “Blindness” usually refers to a complete lack of vision. People who are considered “legally blind” may have some useful vision.

Hearing impairments include partial or complete hearing loss. People who are deaf have no useful hearing ability.

Nerve damage associated with diabetes may result in Peripheral Neuropathy. This condition is manifested in numbness or a lack of sensitivity in limbs, including fingertips.

Sometimes it is obvious that a person has a sensory impairment – for example, a person who uses a guide dog. Other disabilities are less apparent. For example, someone who is deaf or who has Neuropathy may have no obvious impairment. Someone with a sensory impairment may not require any special technology, while others require significant enhancements to a standard computer in order to access all features.

It is useful for assistive technology practitioners to know about specific disabilities and how they might affect successful computer use, but it's not essential to be a disability expert. It is less important to know how a sensory impairment was acquired than it is to know what abilities a person has and what tasks he needs to perform.



While the use of assistive technology does not remove a sensory impairment, it can remediate its effects so that a person is able to use a computer with full or nearly full functionality. With appropriate computing tools and well-defined strategies for their use, the person with a sensory impairment is able to demonstrate and apply her knowledge.

The person with a sensory impairment should play a key role in determining her goals and needs in selecting her adaptive technology. Once basic tools and strategies are initially selected, they can be "test driven," discarded, adapted, and/or refined. The end user should ultimately determine what works best. The appropriateness of specific adaptive technology for a person with a sensory limitation is usually easy to determine after a brief trial period.

Following are descriptions of some computing tools that have been used effectively by individuals with sensory impairments. This list is not exhaustive; people with sensory impairments and the adaptive technology practitioners should consider other approaches as well. New hardware and software is constantly under development and promises to continually improve access options.

Visual Impairments

The most common accommodation for a computer user with a visual impairment is to enlarge the display of a monitor. This accommodation is accomplished using screen enlargement software. Various screen enlargement packages offer a variety of features. The most popular features enlarge the display from 2 to 16 times the normal view and invert screen colors for those who are sensitive to the usual display of white text on a black background. Some enlargers also incorporate speech output to reduce the strain

associated with reading large blocks of text. Commonly used enlargement software includes ZoomText Xtra™ (Ai Squared), Magnum™ (Artic), MAGic™ (Henter Joyce), and Lunar™ (Dolphin Access Systems). Freeware and shareware products are also available via the Screen Magnifiers homepage listed in the resources section.

Screen enlargement technology combined with a scanner can be used to magnify printed text. Once a page is scanned using a standard desktop scanner, the results are displayed in large print on the computer screen. Dedicated devices such as closed circuit TVs (CCTVs), also called video magnifiers, magnify printed materials, photographs, and other objects.

People who are blind access computer output with speech and/or Braille output systems. Speech output is the most popular form of access. A variety of products have been created for working with the Microsoft Windows™ operating system. Most people who are blind use a standard keyboard as an input device, since using a mouse pointer requires accurate eye-hand coordination. Screen reader software uses pre-defined key combinations for review and navigation of the computer screen and is usually compatible with most standard software, including word processing, Web browsing and electronic mail. Examples include, but are not limited to, HAL™ and SuperNova™ (Dolphin Access Systems), JAWS™ for Windows (Freedom Scientific), Window Bridge™ (SYNTHA-VOICE), outSPOKEN™ (Alva Access Group), and Window-Eyes™ (GW Micro). People who are blind using a Macintosh are limited to outSPOKEN™.

Refreshable Braille displays are devices that echo information from the screen to a panel with Braille cells. Within the cells are pins that move up or down based on the text transmit-



ted. Braille displays can provide very effective accommodations for users who require precise navigation and editing, such as when creating computer program code that isn't pronounced well with speech. Displays such as the BRAILLEX™ (Papenmeier) and Delphi™ (Alva Access Group) also provide navigation and orientation information to the computer user who is blind.

For novice screen reader users who need access to the World Wide Web, consider dedicated Web browsing software that incorporates speech and/or large print. These browsers ease the process of navigating complicated Web sites, and simplifies Web searching as well as reading of Web sites. Home Page Reader™ (IBM) and Connect Outloud™ (Freedom Scientific) are two of the many examples of this kind of software.

Hearing Impairments

There are few adaptations available (or necessary) for people with hearing impairments in using standard computer productivity software. Sound is used little in mainstream applications such as word processing or e-mail and, when it is used, there is often a visual alternative. Built-in operating system features found in the control panels of Windows software and the Macintosh computer provide visual displays for system-generated beeps.

The increasing use of streaming multimedia is a concern for those who can not hear. Content developers rarely include captioning in video presentations, nor do they transcribe the audio into text. Resources from the National Center for Accessible Media (NCAM) and Microsoft are available for content developers to add captioning to streaming video.

Limited Sensitivity

Loss of sensitivity in hands and/or fingers due to Peripheral Neuropathy or other causes can make it difficult or impossible to use a standard keyboard and mouse. People with this type of sensory impairment can benefit from the use of speech input software such as NaturallySpeaking™ (Dragon Systems) or Voice Xpress™ (Lernout & Hauspie) to control a computer and enter text. Because Neuropathy may be accompanied with vision loss, use of speech output may also be required. JawBone™ (Next Generation Technology) is middleware – software that serves as a go-between for two other programs, that allows JAWS screen reading software to work with Dragon NaturallySpeaking.

Videotape

A ten-minute videotape, *Working Together: Computers and People with Sensory Impairments*, demonstrates key points summarized in this handout. It may be purchased by sending \$25 to DO-IT. Contact DO-IT for a list of more than 20 other videotapes that may be of interest. Permission is granted to reproduce DO-IT videotapes for educational, non-commercial purposes as long as the source is acknowledged.

Resources

For more information about sensory impairments and possible computer accommodations, consider the following Web sites:

- Ai Squared: <http://www.aisquared.com/>
- Alva Access Group: <http://www.aagi.com/>
- Artic: <http://www.artictech.com/>
- Dolphin Access Systems:
<http://www.dolphinusa.com/>



- Dragon Systems:
<http://www.dragonsys.com/>
- Freedom Scientific:
<http://www.freedomscientific.com/>
- GW Micro: <http://www.gwmicro.com/>
- IBM: <http://www-3.ibm.com/able/>
- Lernout & Hauspie: <http://www.lhsl.com>
- Microsoft SAMI: http://www.msdn.microsoft.com/library/default.asp?url=/library/en-us/dnacc/html/atg_samiarticle.asp
- National Center for Accessible Media (NCAM): <http://ncam.wgbh.org/>
- Next Generation Technologies:
<http://www.ngtvoice.com/>
- Papenmeier: <http://www.papenmeier.de/>
- The Neuropathy Association:
<http://www.neuropathy.org/>
- The Screen Magnifiers Homepage:
<http://www.magnifiers.org/>

Additional publications regarding the use of electronic and information technology by people with disabilities can be found at <http://www.washington.edu/doi/Brochures/Technology/>. Select *Disability-Related Resources on the Internet* for a comprehensive list of discussion lists and Web sites.

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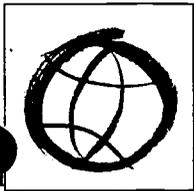
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Universal Design of Instruction

DO-IT

By Sheryl Burgstahler, Ph.D.

Precollege and college students come from a wide variety of ethnic and racial backgrounds. For some, English is not their first language. Represented in most classes are many types of learning styles, including visual or auditory learners. In addition, increasing numbers of students with disabilities are included in regular precollege and postsecondary education courses. Their disabilities include blindness, low vision, hearing impairments, mobility impairments, learning disabilities, and health impairments.

Students want to learn and instructors share this goal. How can you design instruction to maximize the learning of all students? The field of universal design can provide a starting point for developing an inclusive model for instruction. You can apply this body of knowledge to create courses where lectures, discussions, visual aids, videotapes, printed materials, labs, and fieldwork are accessible to all students.

Universal Design

Designing any product or service involves the consideration of many factors, including aesthetics, engineering options, environmental issues, safety concerns, and cost. Typically, products are to be designed to be most suitable for the average user. In contrast, universal design is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design (http://www.design.ncsu.edu/cud/univ_design/ud.html). For example, a standard door in a place of business is not accessible to everyone. If a large switch is installed, the door becomes accessible to more people, including some wheelchair users. However, applying universal design principles when a business facility is being designed could lead to the installations of sensors that would signal the door to open when anyone approaches it, making the

building accessible to everyone – a small child, a man whose arms are temporarily unavailable because he is carrying a large box, a frail elderly woman, a person using a walker or a wheelchair. When designers apply universal design principles, their products and services meet the needs of potential users with a wide variety of characteristics. Disability is just one of many characteristics that an individual might possess. For example, one person could be five feet four inches tall, female, forty years old, a poor reader, and deaf. All of these characteristics, including her deafness, should be considered when developing a product or service she might use.

Making a product accessible to people with disabilities often benefits others. For example, sidewalk curb cuts, designed to make sidewalks and streets accessible to those using wheelchairs, are today often used by kids on skateboards, parents with baby strollers, and delivery staff with rolling carts. When television displays in noisy areas of airports and restaurants are captioned, they are more accessible to people who are deaf and everyone else.

At the Center for Universal Design at North Carolina State University a group of architects, product designers, engineers, and environmental design researchers established the following set of principles of universal design to provide guidance in the design of environments, communications, and products (Connell, Jones, Mace, Mueller, Mullick, Ostroff, Sanford, Steinfeld, Story, & Vanderheiden, 1997). They can be applied to academic environments, communications, and products.

1. **Equitable Use.** The design is useful and marketable to people with diverse abilities. *For example, a Web site that is designed so that it is accessible to everyone, including people who are blind, employs this principle.*



2. **Flexibility in Use.** The design accommodates a wide range of individual preferences and abilities. *An example is a museum that allows a visitor to choose to read or listen to the description of the contents of a display case.*
3. **Simple and Intuitive Use.** Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level. *Science lab equipment with control buttons that are clear and intuitive is a good example of an application of this principle.*
4. **Perceptible Information.** The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities. *An example of this principle being employed is when television programming projected in noisy public areas like academic conference exhibits include captions.*
5. **Tolerance for Error.** The design minimizes hazards and the adverse consequences of accidental or unintended actions. *An example of a product applying this principle is an educational software program that provides guidance when the user makes an inappropriate selection.*
6. **Low Physical Effort.** The design can be used efficiently and comfortably, and with a minimum of fatigue. *Doors that are easy to open by people with a wide variety of physical characteristics demonstrate the application of this principle.*
7. **Size and Space for Approach and Use.** Appropriate size and space is provided for approach, reach, manipulation, and use regardless of the user's body size, posture, or mobility. *A flexible science lab work area designed for use by students with a wide variety of physical characteristics and abilities is an example of employing this principle.*

Universal Design of Instruction

Universal design principles can be applied to many products and services. Following is a definition of universal design of instruction:

In terms of learning, universal design means the design of instructional materials and activities that makes the learning goals achievable by individuals with wide differences in their abilities to see, hear, speak, move, read, write, understand English, attend, organize, engage, and remember. Universal design for learning is achieved by means of flexible curricular materials and activities that provide alternatives for students with differing abilities. These alternatives are built into the instructional design and operating systems of educational materials—they are not added on after-the-fact. (Council for Exceptional Children p. 2)

Universal design principles can apply to lectures, classroom discussions, group work, handouts, Web-based instruction, labs, field work, and other academic activities and materials. They give each student meaningful access to the curriculum by assuring access to the environment as well as multiple means of representation, expression, and engagement (<http://www.cast.org/>). Listed below are examples of instructional methods that employ principles of universal design. They make course content and activities accessible to people with a wide range of abilities, disabilities, ethnic backgrounds, language skills, and learning styles.

1. **Inclusiveness.** Create a classroom environment that respects and values diversity. Put a statement on your syllabus inviting students to meet with you to discuss disability-related accommodations and other special learning needs. Avoid segregating or stigmatizing any student. Respect the privacy of all students.
2. **Physical Access.** Assure that classrooms, labs, and field work are accessible to individuals with a wide range of physical abilities and disabilities. Make sure equipment and activities minimize sustained physical effort, provide options for operation, and accommodate right- and left-handed students as well as those with limited physical abilities. Assure the safety of all students.



3. **Delivery Methods.** Alternate delivery methods, including lecture, discussion, hands-on activities, Internet-based interaction, and field work. Make sure each is accessible to students with a wide range of abilities, disabilities, interests, and previous experiences. Face the class and speak clearly in an environment that is comfortable and free from distractions. Use multiple modes to deliver content. Provide printed materials that summarize content that is delivered orally.
4. **Information Access.** Use captioned videotapes. Make printed materials available in electronic format. Provide text descriptions of graphics presented on Web pages. Provide printed materials early to allow students to prepare for the topic to be presented. Create printed and Web-based materials in simple, intuitive, and consistent formats. Arrange content in order of importance.
5. **Interaction.** Encourage different ways for students to interact with each other and with you. These methods may include in-class questions and discussion, group work, and Internet-based communications. Strive to make them accessible to everyone, without accommodation.
6. **Feedback.** Provide effective prompting during an activity and feedback after the assignment is complete.
7. **Demonstration of Knowledge.** Provide multiple ways for students to demonstrate knowledge. For example, besides traditional tests and papers, consider group work, demonstrations, portfolios, and presentations as options for demonstrating knowledge.

Employing universal design principles in instruction does not eliminate the need for specific accommodations for students with disabilities. For example, you may need to provide a sign language interpreter for a student who is deaf. However, applying universal design concepts in course planning

will assure full access to the content for most students and minimize the need for special accommodations. For example, designing Web resources in accessible format as they are developed means that no redevelopment is necessary if a blind student enrolls in the class. Letting all students have access to your class notes and assignments on an accessible Web site can eliminate the need for providing material in alternative formats. Planning ahead saves time in the long run.

Universal design can also generate unanticipated benefits for others. For example, captioning course videotapes, which provides access to deaf students, is also a benefit to students for whom English is a second language, to some students with learning disabilities, and to those watching the tape in a noisy environment. Delivering content in redundant ways can improve instruction for everyone, including students with a variety of learning styles and central backgrounds. Employing universal design principles in everything we do makes a more accessible world for all of us. It minimizes the need to alter it for anyone.

Resources

If you work at a postsecondary institution, the office that provides support for students with disabilities may be of assistance in designing an accessible course. Human resources offices of large companies and agencies may also provide assistance. Explore regional and state resources as well. You may also find the following resources useful.

American with Disabilities Act of 1990, 104 STAT.327. Available at <http://www.usdoj.gov/crt/ada/statute.html>

Bar, L., & Galluzzo, J. (1999). The accessible school: Universal design for educational settings. Berkeley, CA: MIG Communications.

Bowe, F.G. (2000). Universal design in education. Westport, CT: Bergin & Garvey.

Center for Applied Special Technology (CAST)
<http://www.cast.org/udl/>



The Center for Universal Design
<http://www.design.ncsu.edu/cud/>

Connell, B.R., Jones, M., Mace, R., Mueller, J., Mullick, A., Ostroff, E., Sanford, J., Steinfeld, E., Story, M., & Vanderheiden, G. (1997). The principles of universal design. Raleigh, NC: North Carolina State University, Center for Universal Design. Available at http://www.design.ncsu.edu/cud/univ_design/princ_overview.htm

Council for Exceptional Children
<http://www.cec.sped.org/osep/udesign.html>

DO-IT
<http://www.washington.edu/doit/>

IDEA Center
<http://www.ap.buffalo.edu/~idea/BrightIDEA/>

The Lighthouse
<http://www.lighthouse.org/>

National Center for Accessible Media (NCAM)
<http://main.wgbh.org/wgbh/pages/ncam/>

National Center on Dissemination of Disability Research
<http://www.ncddr.org/rpp/emp/index.html>

Recordings for the Blind and Dyslexic
<http://www.rfbd.org/>

Trace Research and Development Center
<http://www.trace.wisc.edu/world/>

Vanderheiden, G.C. (1990). Thirty-something million: Should they be exceptions? Human Factors, 32(4), 383-396.
http://www.trace.wisc.edu/docs/30_some/30_some.htm

Web Accessibility Initiative, World Wide Web Consortium
<http://www.w3.org/WAI/>

WebABLE
<http://www.webable.com/>

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Effective Communication: Faculty and Students with Disabilities

DO-IT

Communication between faculty and students with disabilities can directly affect their level of success. If interactions are ineffective, student performance is hampered. There is still a great deal of stigma associated with speech disabilities and a misconception that intelligence is somehow correlated with clarity of speech.

Some students might hear and understand everything that's happening in your classroom, but their contribution is dramatically limited because they cannot participate through speech. For example, some students who have Cerebral Palsy or certain types of brain injuries, may experience difficulties in making their ideas clear through speech. Sometimes only close friends and family members can understand their speech. People who have speech impairments may choose not to use their own voices if they expect they will not be understood. Some individuals with speech impairments use computer-based communication systems that allow them to communicate with a synthesized voice. Oral exams, oral presentations, and group work may present difficulties if students are not accommodated properly.

Although most of the origins of communication-related disabilities are speech, language, or hearing impairments, there are other reasons a student might have difficulty communicating. A student with significant phobia or anxiety disorder may take an extended amount of time to begin speaking in public. The same student might also have a great deal of difficulty answering a question posed to him in a small group situation. Some students who have chronic medical conditions such as asthma or cancer may simply need extra time to express themselves verbally. Side effects of medication or difficulties breathing can impact spontaneity in speaking. Even students without diagnosed disabilities may be shy or unwilling to participate verbally in class even if they are paying attention and following all verbally-presented information. Accommodation strategies may be useful for students with different abilities and disabilities. Most accommo-

ation strategies can be integrated into how you design your courses but some are tailored to specifically meet an individual's needs.

Accommodation Strategies

It is important for instructors to be aware that all forms of communication in class may present minor or major barriers to students with a range of disabilities. Applying these strategies helps all students learn because it reinforces knowledge and skills using different methods. This section includes suggestions that facilitate general classroom communication.

Below are some general strategies that may minimize the effect of a communication-related disability of a student in your class. They are followed by details regarding specific accommodations.

- Add a statement to your syllabus inviting students who have disabilities to discuss their needs and accommodation strategies with you. Read the statement out loud in case students have problems with print format. Repeat the statement during the first two weeks.
- Ask a student who has identified himself as having a specific disability to share with you what strategies have worked and what accommodations will be useful to him in your class. Use the disability support services available on campus.
- If you plan to lecture or use primarily auditory delivery, ensure you use adequate visual support such as overhead transparencies or a computer-based projection system. Provide printed handouts with key content.
- Select course materials and media early so that if captioning or alternate formats are required, they can be procured in a timely manner.



- If your classroom activities involve verbal participation, ensure alternatives or support for students who have difficulty speaking. Examples are provided in the subsections below.
- Use multiple or alternative methods for evaluating student achievement. Allow for different ways of testing or assignment completion (written, projects, demonstrations, in-class participation).

Sign Language and Oral Interpreters

One of the most visible types of accommodations for a student with communication-related disability is the presence of an interpreter at the front of the classroom. A professional interpreter is trained to translate spoken English (and other languages) into sign language. If the student cannot speak, the interpreter will also reverse interpret or voice what the student signs. If the student does not know sign language but needs to be able to lipread consistently, an oral interpreter is used. Oral interpreters are trained professionals who understand which words are visible on the lips and can make spoken language more accessible to a lipreading deaf student. Sometimes oral interpreters also fingerspell or point to help the student follow conversations. Sign language interpreters often work in pairs so that they can take turns to prevent physical and mental fatigue. Interpreters are not allowed to add or change anything they interpret and sometimes must ask the instructor for clarification or repetition. Using unfamiliar jargon may often cause an interpreter to ask for information that the student (who is more familiar with the content) might not have asked. Be aware of the difference between the interpreter asking and the student asking for information. Normal pacing of presented materials can be challenging when passages are read out loud, the speaker speaks very quickly, or many technical terms are used. Discuss with the disabled student services office options for training and orientation using interpreters. It is also recommended to take time before the presentation to discuss issues with the interpreters themselves.

Captioning Media

When showing films or videos, it is important to use a captioned version that has subtitles which display all information presented verbally. If you are not able to get a captioned version of the media, it might be necessary to provide a transcript or to use a sign language interpreter during the presentation. Students who are deaf, hard of hearing, or who have difficulty processing spoken language might need extra time to process this information because they cannot watch the video/film and also read the text or follow the interpretation at the same time. Captioning has the advantage of presenting both video and text together. Students who are learning English because they have another first language also benefit from seeing the English subtitles while hearing the audio.

Real-time Captioning

Court reporting techniques have been adapted to classroom use so that people who rely on text to communicate have instant access to the spoken word. A trained professional sits with equipment to enter what is spoken and translates it to a computer monitor for the student. Sometimes these systems also provide a notetaking service by giving the student a diskette or electronic version of the presentation or group discussion. These systems are particularly useful for students who do not follow aurally but for whom reading printed English is a strength.

Amplification, Headphones, and Assistive Listening Devices

In large lecture halls a microphone and normal amplification might assist students who need louder sound but do not use personal listening devices. When any of these methods are used, it is important that the person with the hand-held or lapel microphone repeat or rephrase questions posed and comments made by people who are not using the microphone. If a student is using any type of headphone or hearing aid that is receiving sound from the microphone none of the room noise, including comments, will be accessible. People who have difficulty processing sounds, because of hearing loss or learning disabilities, may benefit from using headphones which



directly process sound to the ears and block out environmental noise.

People who already have hearing aids may benefit from assistive listening devices such as FM systems, Infrared transmissions, and loops. These devices are designed to bring sound to the hearing aid from a transmitted location directly. Instructors can help these students by repeating questions or comments from the audience to ensure full access to the discussion.

Notetakers and Copying Notes

For some students, listening requires all their energy. Intense concentration is needed to follow the sign language interpreter, to lipread the instructor, or to process what is being heard. These students may often be unable to write notes and still maintain attention to the spoken information. It is important for the student with disabilities to have access to notes as a means to learn in addition to access to classroom discussion. Providing accommodations such as a sign language interpreter or FM system will not replace the need for notes in the same class. Student notetakers are often recruited and trained to provide the student who has a disability with notes that reflect what was taught in class. If a student notetaker is not made available, sometimes copies of lecture notes can be made with the agreement of the instructor.

Visual Aids, Visual Reinforcements, and Visual Warning Systems

The use of visual information is a benefit to students with auditory processing difficulties. Visual examples, icons, diagrams, charts, and illustrations can reinforce information delivered verbally. Since, in most classes, a great deal of information is presented verbally, it is helpful for instructors to make references, images, or information available outside the class that reinforces what was taught verbally. This can be done with printed materials or on a Web page. For students who cannot hear, it is also important that any auditory warning signals for fire, smoke, or other purposes are available in a visual form (using a strobe light). This is especially important for students working in isolated locations, labs, study rooms, or audio video/computer work

Written Assignments, Written Exams, Alternative Lab Work

Most students with speech disabilities can complete required homework as assigned. When an accommodation is arranged, it usually adjusts how the homework is to be done and not "what" is to be done. Sometimes an assignment needs to be created or replaced if the original is not feasible for a student with a specific disability. For example, a student who was expected to make an oral presentation might be allowed to use an interpreter or submit a written assignment; an exam that is normally given orally could be arranged in writing; work that is normally done with headphones or in a lab situation might be done in writing or with technology or interpreter support. Make sure that assignments assess the students' abilities and knowledge, not their hearing and speech. All students should be assessed fairly.

Electronic Mail and Written Communication

Classroom comments and student questions can be done by e-mail or handwritten notes if verbal communication in class is difficult. This is especially useful if anxiety or voice production is a problem. The use of electronic mail allows the student more time and prevents the immediate problem of speaking out loud in public during class.

Communication Assistance, Peer Support, and Extended Time

A third party might be available or useful to provide support. This person might be someone trained to interpret a speech pattern, read a communication board, or help a person make words more clear. Sometimes a disabled student may benefit from a peer or fellow student providing this support, but only with prior agreement and coordination between both students. Never put students on the spot or breach confidentiality by identifying a disabled student in need of support.

Extended time is often needed for communicating orally or in writing with or without the aid of communication devices. Even using an interpreter may require more time due to a lag between the



reception of the original language and the translation to the output language. Extended time in class, for assignments or exams, should be arranged through the disabled students services on campus.

Seating, Pacing, and Alternative Arrangements

Most students who have a hearing impairment will want to sit close enough to lipread the instructors and close to interpreters or notetakers. This is usually, but not always, near the front of the room. In situations with circles or non-traditional seating arrangements, the student may have to sit across from the instructor and have the interpreter or real-time captioner sit in the middle. Students with other learning needs may prefer to sit near a door, away from windows that bring in outside noise, or near the instructor. A student using an assistant may need extra seating for the second person and a student using technical aids may need to sit near power outlets or close to a specific piece of equipment.

Consider also, the pacing of your sessions. Although it might be difficult to change the overall pacing of a course, consider the competition for providing quick answers in class. If possible, allow for quiet pauses, thinking, and slower paced answers within class time. Sometimes just slowing the pace slightly can facilitate the participation of a student with a communication disability. Alternatively, consider providing smaller groups, seminars, and one-to-one opportunities so that the benefits of interaction are not lost for the student who cannot participate in large classes. Following these guidelines will ensure that students with communication difficulties have equal access to information and self-expression.

Grants and gifts fund DO-IT publications, videotapes, and programs to support the academic and career success of people with disabilities. Contribute today by sending a check to DO-IT, Box 355670, University of Washington, Seattle, WA 98195-5670.

Your gift is tax deductible as specified in IRS regulations. Pursuant to RCW 19.09, the University of Washington is registered as a charitable organization with the Secretary of State, State of Washington. For more information, call the Office of the Secretary of State, 800-322-4483.

About DO-IT

DO-IT (Disabilities, Opportunities, Internetworking, and Technology) serves to increase the successful participation of individuals with disabilities in challenging academic programs and careers. Primary funding for DO-IT is provided by the National Science Foundation, the State of Washington, and U.S. Department of Education. For more information, to be placed on the DO-IT mailing list, or to request materials in an alternate format, contact:

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Real Connections: Making Distance Learning Accessible to Everyone

DO-IT

By Sheryl Burgstahler, Ph. D.

Distance learning has been around for a long time. For hundreds of years instructors have taught students across great distances via correspondence courses using printed materials. The early days of television witnessed the introduction of televised courses. Today, in a specially equipped facility, an instructor can teach several classrooms full of students brought together through interactive television. Early on-line courses using electronic mail were rapidly followed by Web-based instruction. Today, the lines are blurred between different types of distance learning courses as multiple modes of delivery are employed in a single course. For example, a class "library" could be a Web site; class discussions could take place using electronic mail; some course content could be delivered using printed materials and television; and the final activity could be a place-bound proctored exam.

Increasing access to more students is a common reason given for providing instruction in a distance learning format. However, these access arguments usually focus on people separated by distance and time and rarely include consideration of students with disabilities. In fact, the design of many distance learning courses erects barriers to the full participation of students and instructors with some types of disabilities.

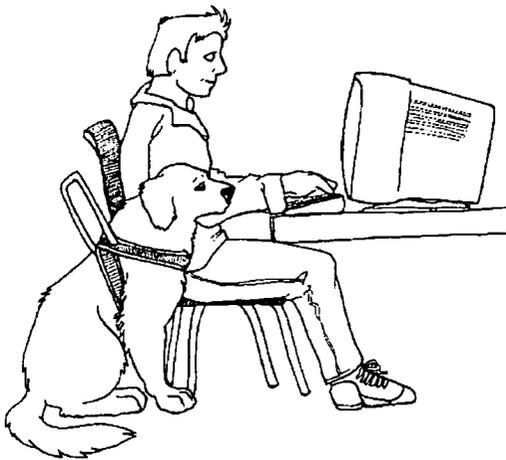
Assuring that individuals with disabilities can participate in distance learning courses can be argued on ethical grounds. Many people simply consider it to be the right thing to do. Others are more responsive to legal mandates. The Americans with Disabilities Act (ADA) of 1990 requires that people with disabilities

have equal access to public programs and services. According to this law, no otherwise qualified individuals shall, solely by reason of their disabilities, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination in these programs. The ADA does not specifically mention distance learning courses. However, the United States Department of Justice clarified that the ADA applies to Internet-based programs and services by stating, "Covered entities that use the Internet for communications regarding their programs, goods, or services must be prepared to offer those communications through accessible means as well" (ADA Accessibility, 1996). Clearly, distance learning programs must make their offerings available to qualified people with disabilities.

The following paragraphs discuss access issues and present design considerations for assuring that a course is accessible to potential instructors and students with a wide range of disabilities. The field of universal design provides a framework for this discussion.

Access Barriers

Thousands of specialized hardware and software products available today allow individuals with a wide range of abilities and disabilities to productively use computing and networking technologies (Closing the Gap, 2001). However, assistive technology alone does not remove all access barriers. Described below are examples of access challenges faced by students and instructors in typical distance learning courses.



Blindness

A student or instructor who is blind may use a computer equipped with screen reader software and a speech synthesizer. Basically, this system reads with a synthesized voice whatever text appears on the screen. He may use a Braille refreshable display that prints screen text line by line. He can use a text-only browser to navigate the World Wide Web or simply turn off the graphics-loading feature of a multimedia Web browser. He cannot interpret graphics (including photographs, drawing and image maps) unless text alternatives are provided. Printed materials, videotapes, televised presentations, overhead transparencies, and other visual materials also create access challenges for him. These barriers can be overcome with alternative media such as audiotapes, Braille printouts, electronic text, tactile drawings, and aural descriptions.

Other Visual Impairments

A student or instructor who has limited vision can use special software to enlarge screen images. He may see only a small portion of a Web page at a time. Consequently, he can easily become confused when Web pages are cluttered and when the page layout changes from page to page. Standard printed materials may also be inaccessible to him; he may require large print or electronic text. Individu-

als who are colorblind cannot successfully navigate Web pages or understand content when distinguishing between colors is required.

Specific Learning Disabilities

Some specific learning disabilities impact the ability to read, write, and process information. A student with a learning disability may use audiotaped books. To help her read text efficiently, she may also use a speech output and/or a screen enlargement system similar to those used by people with visual impairments. She may have difficulty understanding Web sites when the information is cluttered and when the screen layout changes from one page to the next.

Mobility Impairments

A student or instructor with a mobility impairment may not be able to move his hands; he may use an alternative keyboard and mouse or speech input to gain access to Internet-based course materials and communication tools. Another student or instructor may be able to use standard input devices, but lack the fine motor skills required to select small buttons on the screen. If his input method is slow, a person with a mobility impairment may not be able to effectively participate in real-time "chat" communications. If any place-bound meetings are required in a distance learning course, a participant with a mobility impairment may require that the location be wheelchair-accessible.

Hearing Impairments

Most Internet resources are accessible to people with hearing impairments because these resources do not require the ability to hear. However, when Web sites include audio output without providing text captioning or transcription, a student who is deaf is denied access to the information. Course videotapes



that are not captioned are also inaccessible to this student. He may also be unable to participate in a telephone conference or videoconference unless accommodations (e.g., sign language interpreters) are provided for that part of a distance learning course.

Speech Impairments

A student with a speech impairment may not be able to effectively participate in interactive telephone conferences or videoconferences. However, modes of participation that do not require the ability to speak, such as electronic mail, are fully accessible.

Seizure Disorders

Some attention-grabbing features of Web pages include flickers. Flickers at certain rates (often between 2 to 55 hertz) can induce seizures for people who are susceptible to them.



Universal Design

Visual, hearing, mobility, speech, and learning disabilities can impact the participation of potential students and instructors in a distance learning class. Planning for access as the course is being developed is much easier than creating accommodation strategies once a person with a disability enrolls in the course or applies to teach it. Simple steps can be

taken to assure that the course is accessible to participants with a wide range of abilities and disabilities. People without disabilities also benefit when universal design principles are applied as a course is being developed.

“Universal design” is defined by the Center for Universal Design at North Carolina State University as “the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.” (http://www.design.ncsu.edu/cud/univ_design/ud.htm) At this Center, a group of product developers, architects, environmental designers, and engineers established a set of principles of universal design to apply in the design of products, environments, and communication and other electronic systems. General principles include: the design is useful and marketable to people with diverse abilities; the design accommodates a wide range of individual preferences and abilities; the design communicates necessary information effectively to the user, regardless of ambient conditions or the user’s sensory abilities; the design can be used efficiently and comfortably, and with a minimum of fatigue; and appropriate size and space is provided for approach, reach, manipulation, and use regardless of user’s body size, posture, or mobility.

When designers apply these principles, their products meet the needs of potential users with a wide variety of characteristics. Disability is just one of many characteristics that an individual might possess. Others include height, age, race, native language, ethnicity, and gender. All of the potential characteristics of participants should be considered when developing a distance learning course. Just as architects design buildings used by everyone, including those who use wheelchairs, distance learning



designers should create learning environments that allow all potential students and instructors to access course content and fully participate in activities.

The next sections of this publication provide examples of strategies for making distance learning courses accessible to everyone. Be sure to include a statement on all program promotional materials about how to obtain materials in alternate format and how to obtain disability-related accommodations.



On-Site Instruction

The interactive video sessions, proctored examinations, and retreats for students in some distance learning courses require place-bound meetings. In these cases, the facility should be wheelchair accessible, the furniture should be flexible enough to accommodate wheelchair-users, and accessible restrooms and parking should be available nearby. Standard disability-related accommodations, such as sign language interpreters, should be provided when requested. Instructors should speak clearly; face students when speaking (to facilitate lipreading); and read aloud and describe text and other visual materials (for those who cannot see them).

Internet-based Communication

Some distance learning programs employ real-time chat communication in their courses.

In this case, students communicate synchronously (at the same time), as compared to asynchronously (not necessarily at the same time). Besides providing scheduling challenges, synchronous communication is difficult or impossible for someone who cannot communicate quickly. For example, someone with a learning disability who takes a long time to compose her thoughts or someone with Cerebral Palsy whose input method is slow may not be fully included in the discussion. Instructors who choose to use this type of tool should provide an alternate, equivalent method of communication (e.g., e-mail) for those who cannot fully participate using synchronous communication methods.

Text-based, asynchronous resources such as electronic mail, bulletin boards, and listserv distribution lists generally erect no special barriers for students with disabilities. If a prerequisite to a course is for students to have access to electronic mail, individuals with disabilities can choose an accessible e-mail program to use. A student who requires assistive technology to access e-mail will have resolved any basic system access issues before enrolling in the course. His own computer system will provide whatever accommodations he needs. E-mail communication between individual students, course administration staff, the instructor, guest speakers, and other students is accessible to all parties, regardless of disability.

Web Pages

Applying universal design principles to the design of Web pages makes them accessible to individuals with a wide range of disabilities. In 1999, guidelines for making Web pages accessible were developed by the Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3C). W3C, an industry group that was founded in 1994 to develop common protocols that enhance



interoperability and guide the evolution of the Web, is committed to assuring that the World Wide Web is fully accessible to people with disabilities. More recently, the United States Architectural and Transportation Barriers Compliance Board (Access Board) developed standards for Web pages of Federal agencies as mandated by Section 508 of the Rehabilitation Act Amendments of 1986. The standards provide a model for other organizations working to make their Web pages accessible to the broadest audience.

There are basically two approaches for making Web page content and navigation accessible. Certain types of inaccessible data and features need to be avoided or alternative methods need to be provided for carrying out the function or accessing the content provided through an inaccessible feature or format. For example, a distance learning designer can avoid using a graphic that is inaccessible to individuals who are blind, or he can create a text alternative for the content that is accessible to the screen readers used by those who are blind. Web pages for a distance learning class should be tested with a variety of monitors and computer platforms. They should also be tested using a variety of Web browsers, including a text-only browser, such as Lynx, or a standard browser with the graphics and sound-loading features turned off to simulate the experiences of people with sensory impairments. Testing to see if all functions at a Web site can be accessed using a keyboard alone is also a good accessibility test. Special programs (e.g., A-Prompt, Bobby, WAVE) are available to test Web pages for accessibility.

If you are using development tools, such as Blackboard or WebCT, be sure to use the accessibility features to design an accessible course.

Printed Materials

Students who are blind or who have specific learning disabilities that affect their ability to read may require that printed materials be converted into Braille, large print, audiotape, or electronic formats. Making the text of printed materials available on-line may provide the best solution for students who cannot read standard printed materials.

Video Presentations

Ideally, whenever a videotape or televised presentation is used in a distance learning course, captioning should be provided for those who have hearing impairments and audio description (that describes aurally the visual content) should be provided for those who are blind. If the publisher does not make these options available, the distance learning program should have a system in place to accommodate students who have sensory impairments. For example, the institution could hire someone local to the student to describe the visual material to a blind student or to sign audio material for a student who is deaf. Real-time captioning (developed at the time of the presentation) or sign language interpreting should be provided when requested by participants in videoconferences who are deaf.

Telephone Conferences

Sometimes, on-line courses include telephone conferencing opportunities for discussion in small groups. This mode of communication creates scheduling challenges for everyone. It is also inaccessible to a student who is deaf. Instructors who use telephone conferencing for small group discussions should allow alternative communication (e.g., e-mail) that is accessible to everyone in a specific group. Or, a student who is deaf might be able to participate in a telephone conference by using the Telecommunications Relay Service (TRS),



where an operator types what the speakers say for the deaf student to view on his text telephone (TTY) and translates his printed input into speech, however this system might be too slow to allow participation in lively conversations. Another accommodation involves setting up a private chat room on the Web. A transcriptionist types the conversation for the deaf student to view. The student can also type his contributions into the chat room and they can be voiced by someone in the group who is monitoring the chat room. Various options should be discussed with the student who has a need for an accommodation.

Benefits of Accessible Design for People without Disabilities

People without disabilities may have temporary and/or situational limitations that are similar to the limitations imposed by disabilities. For example, people who cannot access graphics due to computer system limitations are in a similar situation as students who are blind. A noisy environment that prohibits the use of audio features imposes constraints similar to those faced by students with hearing impairments. Those for whom English is a second language experience reading difficulties similar to those experienced by people with some types of learning disabilities. Individuals using monochrome monitors face limitations like those who are colorblind. People who need to operate a computer but whose hands are occupied with other activities face challenges similar to those who use a hands-free input method because of a disability.

Applying universal design principles assists both people with and people without disabilities. For example, using clear and simple language and navigational mechanisms on Web pages facilitates use by those whose native language is not the one in which

the course is taught as well as people with visual and learning disabilities. People who have turned off support for images on their browsers in order to maximize access speed benefit when multimedia features provide text alternatives for the content, as do people who are blind. Similarly, people who cannot view the screen because they must attend to other tasks benefit from speech output systems that are often used by people who are blind. Captions provided on videotapes and video clips assist people who work in noisy or noiseless surroundings and people for whom English is a second language along with people who have hearing impairments. Making sure that information conveyed with color is also available without color benefits those using monochrome monitors in addition to those who are colorblind. Providing multiple formats of information also addresses differences in learning styles.

Getting Started

Be proactive in making distance learning courses accessible. Don't wait until someone with a disability enrolls to address accessibility issues; consider them from the start!

- Think about the wide range of abilities and disabilities potential students might have.
- In promotional publications include information on how to request accommodations and publications in alternative format.
- Make sure media can be accessed using sight or hearing alone.
- Arrange accessible facilities for any on-site instruction.
- Be prepared to offer additional accommodations as requested.

Conclusion

Distance learning courses are designed to reach out to students from anywhere. If universal design principles are used in



creating these classes, they will be accessible to any students who enroll in them and any instructors who are hired to teach them. Designed correctly, distance learning options create learning opportunities for students with a broad range of abilities and disabilities. Designed poorly, they erect new barriers to equal participation in academics and careers. Employing universal design principles can bring us closer to making learning accessible to anyone, anywhere, at any time.

Resources

The following resources are useful to those who wish to research this topic further.

Americans with Disabilities Act of 1990
<http://www.usdoj.gov/crt/ada/adahom1.htm>

ADA accessibility requirements apply to Internet Web pages. (1996). *The Law Reporter*, 10(6), 1053-1084.

A-Prompt
<http://aprompt.snow.utoronto.ca/>

Blackboard
<http://www.blackboard.com/>

Bobby
<http://www.cast.org/bobby>

Captioned Media Program
<http://www.cfv.org/>

Center for Applied Special Technology (CAST)
<http://www.cast.org/udl/>

The Center for Universal Design
<http://www.design.ncsu.edu/cud/>

Closing the Gap 2001 Resource Directory
<http://www.closingthegap.com/>

DO-IT
<http://www.washington.edu/doi/>

EASI (Equal Access to Software and Information)
<http://www.rit.edu/~easi/>

International Center for Disability Resources on the Internet
<http://www.icdri.org/>

National Center for Accessible Media (NCAM)
<http://ncam.wgbh.org/>

Recordings for the Blind and Dyslexic
<http://www.rfbd.org/>

Section 508 Standards of the Access Board
<http://www.access-board.gov/sec508/508standards.htm>

Trace Research and Development Center
<http://www.trace.wisc.edu/world/>

Vanderheiden, G.C. (1990). Thirty-something million: Should they be exceptions? *Human Factors*, 32(4), 383-396.
http://www.trace.wisc.edu/docs/30_some/30_some.htm

WAVE (Web Accessibility Versatile Evaluator)
http://www.temple.edu/inst_disabilities/piat/wave/

Web Accessibility Initiative, World Wide Web Consortium
<http://www.w3.org/WAI/>

WebABLE
<http://www.webable.com/>

WebCT
<http://www.WebCT.com/>



To locate technical assistance centers in your state or region, consult <http://www.resna.org/taproject/at/statecontacts.html> or <http://www.adata.org/dbtac.html>, respectively.

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About DO-IT

The University of Washington helps individuals with disabilities transition to college and careers through DO-IT (Disabilities, Opportunities, Internetworking, and Technology).

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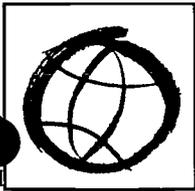
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World Wide Access: Accessible Web Design

DO-IT

By Dan Comden and Sheryl Burgstahler

The World Wide Web has rapidly become the dominant Internet tool, combining hypertext and multimedia to provide a network of educational, governmental, and commercial resources. Much of its power comes from the fact that it presents information in a variety of formats while it also organizes that information through hypertext links. Because of the multimedia nature of the Web combined with the poor design of some Web sites, many Internet surfers cannot access the full range of resources this revolutionary tool provides. Some visitors:

- Cannot see graphics because of visual impairments.
- Cannot hear audio because of hearing impairments.
- Use slow Internet connections and modems or equipment that cannot easily download large files.
- Have difficulty navigating sites that are poorly organized with unclear directions because they have learning disabilities, speak English as a second language, or are younger than the average user.

People use a variety of technologies to access the Web. For example, a person who is blind may use a speech output system that reads aloud text presented on the screen. A person with a mobility impairment may be unable to use a mouse and may rely on the keyboard for Web browsing. To create resources that can be used by the widest spectrum of potential visitors rather than an idealized "average," Web page designers should apply "universal design" principles. This requires that they consider the needs of individuals with disabilities, older persons, people for whom English is a second language, and those using outdated hardware and software.

The Americans with Disabilities Act (ADA) of 1990 requires that U.S. programs and services be accessible to individuals with disabilities. A 1996 Department of Justice ruling (<http://www.usdoj.gov/crt/foia/cltr204.txt>) makes it clear that ADA accessibility requirements apply to Internet resources.

Accessibility Guidelines

The World Wide Web Consortium (W3C) develops and maintains the protocols used on the Web to insure interoperability to promote universal access. The W3C's Web Accessibility Initiative (WAI) has proposed guidelines for all Web authors. As Tim Berners-Lee, Director of the W3C puts it:

"The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect."

In 2001 the U.S. Architectural and Transportation Barriers Compliance Board (Access Board) developed accessibility requirements for Web pages of federal agencies. The list of guidelines for accessibility provides a good model even for organizations that are not required to comply.

Many agencies and organizations have more than one person who develop Web content. Building Web content that is consistent, accessible, and usable can be a challenge for Web development teams. To ensure organization-wide development of accessible Web pages, consider adopting standards or guidelines that are useful and well explained. These may be as complex as constructing a set of guidelines from scratch, or as simple as referring to the W3C Web Content Accessibility Guidelines or Access Board standards.



Disseminate information about the standards to all Web page developers in the organization and provide resources, training, and technical support on an ongoing basis.

Getting Started

The following suggestions will help you get started designing accessible Web pages. They are based on the WAI guidelines and the Section 508 standards for Web content that can be located by referring to the resource section at the end of this publication.

General Page Design

Designing a well-organized Web site helps visitors navigate through the information presented.

- **Maintain a simple, consistent page layout throughout your site.**
A consistent design and look makes it easier for visitors to locate the specific information they seek. For example, a feature presented on every page, such as a standard navigation menu or logo for the site should always appear in the same place. A clear, consistent presentation will especially assist people with visual impairments or learning disabilities who have difficulty using disorganized navigation schemes.
- **Keep backgrounds simple. Make sure there is enough contrast.**
People with low vision or colorblindness, or those using black and white monitors, can have difficulty reading information at sites with busy backgrounds and dark colors. Some background images and colors obscure text and make reading difficult. Make sure that there is enough contrast between your text and the background of the page. Choose background, text, and link colors carefully, and always test your site by viewing it at

different resolutions and color depths. For example, you can change your monitor settings to a resolution of 640x480 and 16 colors for one test, and change to 1024x768 and 24-bit color for another.

- **Use standard HTML.**
Hypertext Markup Language (HTML) is the standard code used to create Web sites. HTML was designed to be a universal format outside the bounds of proprietary software and computer operating systems. The code works via tags that tell a Web browser where to find and how to display information. While nonstandard tags exist, using standard HTML as defined by the W3C will ensure that your content can be accessed by all browsers used by visitors to your site. Avoid tags, features, and plug-ins that are available to only one brand or version of a browser.
- **Caption video and transcribe other audio.**
Multimedia formats that include audio can present barriers to people with hearing impairments as well as to people with less sophisticated computer systems. Provide captions and transcriptions for these resources so visitors who cannot hear have an alternative method for accessing the information. MAGPie from the National Center for Accessible Media (NCAM) is a free tool that allows developers to add captioning to streaming content.
- **Make links descriptive so that they are understood out of context.**
Visitors who use screen reading software can adjust their software to read only the links on a page. For this reason, links should provide enough information when read out of context. Use a more descriptive phrase than "click here" as a link or next to a graphic used as a link. For example:



`Click here` for information about our company. will present "Click here" as the link.

However,

`Information about our company.` will display "Information about our company." displays descriptive text as the link.

- **Include a note about accessibility.** Notify site visitors that you are concerned about accessibility by including a Web access symbol on your page (see Resources list). Include a statement about accessibility and encourage them to notify you with their accessibility concerns. For example, the DO-IT home page includes the following statement:

The DO-IT pages form a living document and are regularly updated. We strive to make them universally accessible. You will notice that we minimize the use of graphics and photos, and provide descriptions of them when they are included. Video clips are open-captioned, providing access to users who can't hear the audio. Suggestions for increasing the accessibility of these pages are welcome.

Graphical and Audio Features

People who are blind cannot view the graphical features of your Web site. Many people with visual impairments use speech output programs with nonstandard browsers (such as IBM's Home Page Reader or Lynx) or graphical browsers with the feature that loads images turned off. Include text alternatives to make the content in graphical features accessible. Described below are guidelines for providing alternative text for various types of visual features.

- **Include appropriate ALT/LONGDESC attributes for graphical elements on your page.**

ALT attributes work with HTML image tags to give alternative text descriptive information for graphical elements of a Web page. The alternative text helps visitors understand what is on the page if they are not viewing the graphic. This could be because they are blind and using a text-based browser or a graphical browser with the image loading feature turned off. The bold text in the following example shows what an ALT attribute looks like in HTML:

```
<IMG SRC="/doitlogo.large.gif"
ALT="DO-IT LOGO">
```

When a sighted visitor views the page with a graphical browser, he will see a picture of the DO-IT logo. When someone who is blind visits, his voice output program will read DO-IT LOGO. This gives him a clear idea of what is on the page. In addition, any visitor coming to the site using a text-based browser will understand that there is a DO-IT logo there instead of the more ambiguous "image," the default result when no ALT attribute is used. ALT attributes should be short (less than 5 words) since browsers sometimes have difficulty displaying lengthy ALT text.

When using text to describe complex graphs or charts, or to transcribe sound files containing speech or lyrics, summarize the information next to the element, or consider using the LONGDESC attribute which provides for more detailed text than ALT. Lengthy descriptions can also be linked to an external document or immediately follow the graphic or sound element.

- **Use a NULL value for unimportant graphics.**



Some graphical elements may add no content to a page or are used for positioning and can be bypassed from viewing by using an ALT attribute with no text. By using just two quotation marks with no content, you can reduce the amount of distracting text when a page is viewed with graphics capabilities turned off or with a text-based browser. For example, the HTML for a divider bar could be:

```
<IMG SRC=“./purplebar.gif” ALT=“”>
```

Sighted visitors will see the divider bar, while those visiting via a text browser will see/hear nothing.

- Include descriptive captions or other options for making graphical features accessible.
Providing ALT text for an image is sufficient for logos and graphics that contain little information content. However, if the graphics provide more extensive information, adding captions is important for those who cannot see your page because they are using a text-based browser or have turned off the image display capability of their browser. This includes people who are blind. If you are not sure how critical a particular image is to the content of a page, temporarily remove it and consider the impact of its loss.

Some Web designers make an image accessible by placing a hyperlink “D” (for description) immediately before or after a complex image. This D-link connects to another page with a detailed description and a link back to the referring page. This method should be used with caution as it can add unnecessary navigational complexity to the site.

Some organizations with graphic-intensive Web pages provide a separate text version of their site to ensure accessibility. This approach adds maintenance time and complexity because two versions of the site must be updated. It also segregates site visitors according to the type of equipment they use to access the Web. As much as possible, design a single version of your site so that it is accessible to all visitors.

If you present information in an image format, such as a scanned-in image of a page of a manuscript, be sure to also provide a transcription of the manuscript in a straight-text format. This alternative is useful for many visitors, including those with visual impairments and those with learning disabilities who may have difficulty reading the original document.

- **Provide audio description and captions or transcripts of video.**
If your multimedia resources provided on your site include video, people who cannot see will be unable to use this information unless it is provided in an alternative format. A text transcription provided with the video will give a visitor who cannot see, or who doesn't have the appropriate viewing software, access to the information in your video clip. Captions and transcripts also provide access to the content for those who cannot hear.

Special Features

- **Use tables sparingly and consider alternatives.**
Some screen reader programs read from left to right, jumbling the meaning of information in frames. Some blind visitors can interpret frame-based information, but it is best to look for other ways to present the information to ensure that visitors with visual impairments can reach your data.



Evaluate whether frames are truly necessary at your site. When frames are used, ensure that frames are labeled with the TITLE attribute, provide a text alternative with NOFRAMES, and use the TARGET = "_top" attribute to ensure useful Uniform Resource Location (URL) addressing is provided for each interior frame.

- **Provide alternatives for forms and databases.**

Some combinations of browsers and screen readers encounter errors with nonstandard or complex forms. Always test forms and databases with a text-based browser. Include an e-mail address and other contact information for those who cannot use your forms or database. Make sure that form elements are labeled according to the HTML specification.

- **Provide alternatives for content in applets and plug-ins.**

As future versions of software develop, applets (such as programs created with JavaScript™) and plug-ins (such as Adobe Acrobat™) may provide accessibility features. However, many of these programs are currently not accessible to people using text-based browsers. To ensure that people with visual and hearing impairments can access your information, provide the content from these programs in alternative, text-based formats. When using JavaScript, make sure to employ the built-in accessibility features that are within the Java Developer's Kit.

Accessibility Tests

Test your Web site with a variety of Web browsers, and always test your pages with at least one text-based browser and with multi-media browsers with graphics and sound-loading features turned off. This way

you will see your Web resources from the many perspectives of your users. Also view the resources at your site using a variety of computing platforms, monitor sizes, and screen resolutions. Make sure you can access all of the features of your Web site with the keyboard alone, simulating the experience of Web users who cannot use a mouse. Make use of accessibility testing software such as A-Prompt, Bobby, and WAVE; they will point out elements that could be inaccessible. Then, revise your HTML to make your site accessible.

Resources

A-Prompt

<http://aprompt.snow.utoronto.ca/>

Americans with Disabilities Act of 1990

<http://www.usdoj.gov/crt/ada/adahom1.htm>

Bobby, CAST (Center for Applied Special Technology)

<http://www.cast.org/bobby/>

Disabilities, Opportunities, Internetworking, and Technology (DO-IT) - Technology and Universal Design

<http://www.washington.edu/doi/Brochures/Technology/>

EASI (Equal Access to Software and Information)

<http://www.isc.rit.edu/~easi/>

International Center for Disability Resources on the Internet

<http://www.icdri.org/>

National Center on Accessible Information Technology in Education (AccessIT)

<http://www.washington.edu/accessit/>

National Center for Accessible Media (NCAM) resources.

<http://ncam.wgbh.org/>



Section 508 Standards of the Access Board
<http://www.access-board.gov/sec508/508standards.htm>

Trace Research and Development Center
<http://www.trace.wisc.edu/>

W3C's Web Accessibility Initiative (WAI)
<http://www.w3.org/WAI/>

Web Accessibility in Mind (WebAIM)
<http://www.webaim.org/>

Web Accessibility Versatile Evaluator (WAVE)
http://www.temple.edu/inst_disabilities/piat/wave/

World Wide Access Videotape

An 11-minute videotape, *World Wide Access: Accessible Web Design*, introduces accessible Web design and may be purchased by sending \$25 to DO-IT. You will receive an open-captioned as well as an open-captioned and audio-described version. Permission is granted to reproduce DO-IT videotapes for educational, non-commercial purposes as long as the source is acknowledged.

Grants and gifts fund DO-IT publications, videotapes, and programs to support the academic and career success of people with disabilities. Contribute today by sending a check to DO-IT, Box 355670, University of Washington, Seattle, WA 98195-5670.

Your gift is tax deductible as specified in IRS regulations. Pursuant to RCW 19.09, the University of Washington is registered as a charitable organization with the Secretary of State, State of Washington. For more information, call the Office of the Secretary of State, 800-322-4483.

About DO-IT

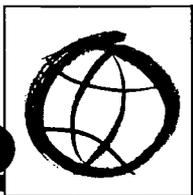
DO-IT (Disabilities, Opportunities, Internet-working, and Technology) serves to increase the successful participation of individuals with disabilities in challenging academic programs and careers, such as those in science, engineering, mathematics, and technology. Primary funding for the DO-IT program is provided by the National Science Foundation, the State of Washington, and U.S. Department of Education. This publication was developed with funding from the National Science Foundation (grant #9800324). However, the contents do not necessarily represent the policy of the federal government, and you should not assume their endorsement. For more information, to be placed on the DO-IT mailing list, or to request materials in an alternate format, contact:

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University of Washington
 College of Engineering
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DO-IT Prof: A Project to Help Postsecondary Educators Work Successfully with Students Who Have Disabilities

DO-IT

DO-IT at the University of Washington has, since 1992, worked to increase the success of individuals with disabilities in postsecondary education and employment. DO-IT, which stands for Disabilities, Opportunities, Internetworking, and Technology, has been recognized for its efforts through several awards including the 1995 National Information Infrastructure Award in Education; the 1997 Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring; the 1999 Golden Apple Award for excellence in education; the 2001 AHEAD Recognition Award for outstanding work for students with disabilities; and the 2001 Bright Ideas award.

The *DO-IT Prof* project applies lessons learned by DO-IT and other researchers and practitioners nationwide to implement a comprehensive professional development program for college faculty and administrators. It is funded by the U.S. Department of Education (grant #P33A990042). "*Prof*" was selected as part of the project name to represent two project characteristics - "professional," the quality of project materials and strategies, and "professor," its primary target audience.

DO-IT Prof serves to improve the knowledge and skills of postsecondary faculty and administrators in order to make them better prepared to fully include students with disabilities in academic programs on their campuses. Responding to the diverse content and scheduling needs of faculty and administrators, the *DO-IT Prof* team has created and delivered six models of professional development.

Model 1: A 20-30 minute presentation to introduce participants to basic legal issues, accommodation strategies, and resources specific to their campuses.

Model 2: A 1-2 hour presentation with special focus on providing accommodations to students with a variety of disabilities.

Model 3: A tailored workshop for more in-depth training on topics selected for a specific audience.

Model 4: A televised instruction option using a series of videotapes to deliver on public television.

Model 5: A distance learning "anytime-anywhere" course that provides lessons and discussion delivered via electronic mail.

Model 6: Self-paced, Web-based instruction in The Faculty Room at <http://www.washington.edu/doit/Faculty/>.

The *DO-IT Prof* team includes faculty, disabled student services staff, and administrators at institutions of higher education in 23 states. The nationwide recruitment process was highly competitive, attracting more than one hundred applications. DO-IT's Academic Advisory Board selected applicants that had the potential to contribute to project efforts and to create a team with diverse characteristics.

Project partners include representatives from AHEAD (Association on Higher Education and Disability), the National Center for the Study of Postsecondary Educational Supports, the HEATH Resource Center, and WAPED (Washington Association on Postsecondary Education and Disability).

Project team members chose institutional partners in their states. If a team member is from a four-year institution, the partner school is a community or technical college; if the team member is from a community or technical college, the partner school is a four-year school.

Project team members participated in three-day collaborative meetings in Seattle in 2000 and 2001. Before the first meeting, team members conducted focus groups with students who have disabilities, teaching assistants, and faculty members. At the working meetings, team members discussed faculty and administrator support issues and strategies. They developed professional development materials, data collection plans, and timelines for their home institutions.

Each team member and partner campus is delivering professional development programs, disseminating materials, providing technical assistance to faculty and administrators, and institutionalizing successful strategies in their schools. Discussion and coordina-



tion of *DO-IT Prof* activities take place year-round on an interactive Internet discussion list.

Completion of this project will result in faculty and administrators being better prepared to fully include students with disabilities on their campuses and contribute to systemic change within postsecondary institutions across the nation. Ultimately, this project will result in greater postsecondary educational opportunities for individuals with disabilities.

The Faculty Room

Campuses nationwide are encouraged to link to The Faculty Room at <http://www.washington.edu/doit/Faculty/> and refer faculty and administrators there to learn how to accommodate students with disabilities in their on-campus and distance learning courses, field experiences, and international studies programs. Useful training videotapes and materials can also be purchased from the DO-IT office; request the DO-IT Publications and Resources publication for more information. All project materials, including on-line resources, videotapes, and printed materials, are offered in formats that are readily accessible by individuals with disabilities. Permission to copy and further distribute project products is granted for noncommercial, educational purposes.

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DO-IT Prof Project Partners

The following organizations support *DO-IT Prof*:

AHEAD (Association on Higher Education and Disability), represented by Carol DeSouza, Stephan Smith, past and current Executive Director, respectively
<http://www.ahead.org/>

National Center for the Study of Postsecondary Educational Supports, University of Hawaii at Manoa, represented by Robert Stodden, Director
<http://www.rrtc.hawaii.edu/>

WAPED (Washington Association on Postsecondary Education and Disability), represented by Dyane Haynes, past President

Model Demonstration Projects

DO-IT Prof is one of 22 Model Demonstration Projects to Ensure Students with Disabilities Receive

a Quality Higher Education. Funded by the Office of Postsecondary Education of the U.S. Department of Education, their purpose is to develop innovative, effective, and efficient teaching methods to enhance the skills and abilities of postsecondary faculty and administrators in working with students who have disabilities. Links to all of the projects can be found at <http://www.ed.gov/offices/OPE/disabilities/index.html>.

About DO-IT

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For more information, to be placed on the mailing list, or to request materials in an alternative format, contact:

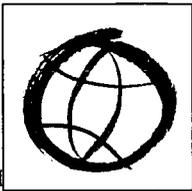
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Academic Accommodations for Students with Psychiatric Disabilities

DO-IT

By Alfred Souma, Nancy Rickerson, and Sheryl Burgstahler

More than 400,000 students enrolled in American postsecondary institutions report having a disability (Lewis, Farris, & Greene, August 1999). Of that total population, over 33,000 report having a mental illness. Recent increases in the size of this group are due in part to improved medications that result in symptoms mild enough for them to enjoy the benefits and meet the challenges of postsecondary education (Weiner & Wiener, 1996). Students with psychiatric disabilities are entitled to reasonable academic accommodations as provided by the American Disabilities Act (ADA) of 1990. Providing effective accommodations allows students equal access to academic courses and activities. Their presence also contributes to the diversity of the student population.

What is a Psychiatric Disability?

Persons with a "psychiatric disability" have a diagnosable mental illness causing severe disturbances in thinking, feeling, relating, and/or functional behaviors that results in a substantially diminished capacity to cope with daily life demands.

A psychiatric disability is a *hidden* disability; it is rarely apparent to others. However, students with a psychiatric disability may experience symptoms that interfere with their educational goals, which may include, yet are not limited to:

- Heightened anxieties, fears, suspicions, or blaming others
- Marked personality change over time
- Confused or disorganized thinking; strange or grandiose ideas
- Difficulty concentrating, making decisions, or remembering things
- Extreme highs and/or lows in mood
- Denial of obvious problems and/or a strong resistance to offers of help
- Thinking or talking about suicide

Psychiatric Diagnoses

A student with a psychiatric disability may have one or more of the following psychiatric diagnoses (American Psychiatric Association,

Depression. This is a mood disorder that can begin at any age. Major depression may be characterized by a depressed mood most of each day, a lack of pleasure in previously enjoyed activities, thoughts of suicide, insomnia, and consistent feelings of worthlessness or guilt.

Bipolar Affective Disorder (BAD, previously called Manic Depressive Disorder). BAD is a mood disorder with revolving periods of mania and depression. In the manic phase, a person might experience inflated self-esteem, high work and creative productivity and decreased need to sleep. In the depressed phase, the person would experience the symptoms of depression (see above).

Borderline Personality Disorder (BPD). BPD is a personality disorder which includes both mood disorder and thought disorder symptoms. This diagnosis has both biological and environmental determinants. Individuals diagnosed with BPD may have experienced childhood abuse and family dysfunction. They may experience mood fluctuations, insecurities and mistrust, distortion of perceptions, dissociations, and difficulty with interpersonal relationships and limited coping skills.

Schizophrenia. This is a thought disorder that can cause a person to experience difficulty with activities of daily living and may experience delusions, hallucinations and paranoia. Schizophrenic individuals typically demonstrate concrete thought processing and appreciate structure and routines.

Anxiety Disorders. These are mood disorders in which the individual responds to thoughts, situations, environments and/or people with fear and anxiety. Anxiety symptoms can disrupt a person's ability to concentrate and focus on tasks at hand. Symptoms may be in response to real or imagined fears. Specific anxiety disorders include Generalized Anxiety Disorder, Obsessive-Compulsive Disorder, Panic Disorder, Social and



Specific Phobias, and Post Traumatic Stress Disorder.

The following conditions are behavior or personality disorders excluded from coverage under the ADA: transvestitism, transsexualism, pedophilia, voyeurism, gender identity disorders, compulsive gambling, kleptomania, and pyromania (Blacklock, 2001).

Functional Limitations

The following functional limitations related to psychiatric disabilities may affect academic performance and may require accommodations (Center for Psychiatric Rehabilitation, 1997).

- **Difficulty with medication side effects:** side effects of psychiatric medications that affect academic performance include drowsiness, fatigue, dry mouth and thirst, blurred vision, hand tremors, slowed response time, and difficulty initiating interpersonal contact.
- **Screening out environmental stimuli:** an inability to block out sounds, sights, or odors that interfere with focusing on tasks. Limited ability to tolerate noise and crowds.
- **Sustaining concentration:** restlessness, shortened attention span, distraction, and difficulty understanding or remembering verbal directions.
- **Maintaining stamina:** difficulty sustaining enough energy to spend a whole day of classes on campus; combating drowsiness due to medications.
- **Handling time pressures and multiple tasks:** difficulty managing assignments, prioritizing tasks and meeting deadlines. Inability to multi-task work.
- **Interacting with others:** difficulty getting along, fitting in, contributing to group work, and reading social cues.
- **Fear of authority figures:** difficulty approaching instructors or TA's.
- **Responding to negative feedback:** difficulty understanding and correctly interpreting criticism or poor grades. May not be able to separate person from task (personalization or defensiveness due to low self-esteem).
- **Responding to change:** difficulty coping with

unexpected changes in coursework, such as changes in the assignments, due dates or instructors. Limited ability to tolerate interruptions.

- **Severe test anxiety:** such that the individual is rendered emotionally and physically unable to take the exam.

Instructional Strategies

Students with a history of psychiatric disabilities can be intelligent, sensitive, creative and interesting. You can employ strategies that will promote their success in your class. For example:

- Address a variety of learning styles (e.g. auditory, visual, kinesthetic, experiential, or combination of styles).
- Incorporate experiential learning activities.
- Be prepared to set behavioral expectations for all students in your class.
- Embrace diversity to include people with psychiatric disabilities.

Reasonable Accommodations

Some students with psychiatric disabilities may require accommodations to allow them equal access to classes, programs and coursework. An accommodation is the removal of a barrier to full participation and learning. The emphasis is on access, not on outcome. This is done by providing the student with a disability *equal access* to the content and activities of a course.

Each student with a disability is encouraged to register with the office that supports students with disabilities in order to receive accommodations. Personnel from this office typically send instructors a letter documenting specific accommodations required for the student with the disability. It is the responsibility of the instructor to provide the accommodations. It is the student's responsibility to fulfill the academic requirements of the course. The best solutions result when the instructor, student, and disability support service professional work cooperatively. Meeting as a group may facilitate problem-solving alternatives. Respecting the privacy of the student by not discussing his/her disability or accommodations with others outside of this meeting is essential. Review accommodations periodically with the



student to assess effectiveness and adjust to changing needs.

The following are typical classroom, exam, and assignment accommodations that may be recommended by the disabled student service professional for a student with a psychiatric disability.

Classroom Accommodations

- Preferential seating, especially near the door to allow leaving class for breaks.
- Assigned classmate as volunteer assistant.
- Beverages permitted in class.
- Prearranged or frequent breaks.
- Tape recorder use.
- Notetaker or photocopy of another's notes.
- Early availability of syllabus and textbooks.
- Availability of course materials (lectures, handouts) on disk.
- Private feedback on academic performance.

Examination Accommodations

- Exams in alternate format (e.g., from multiple choice to essay; oral, presentation, role-play, or portfolio).
- Use of adaptive computer software (e.g. Optical Character Recognition, allowing scanned text to be read aloud by the computer's sound card; or speech recognition for converting the spoken word to printed word on the computer screen).
- Extended time for test taking.
- Exams individually proctored, including in the hospital.
- Exam in a separate, quiet and non-distracting room.
- Increased frequency of exams.

Assignment Accommodations

- Substitute assignments in specific circumstances.
- Advance notice of assignments.
- Permission to submit assignments handwritten rather than typed.
- Written assignments in lieu of oral presentations, or vice versa.
- Assignments completed in dramatic formats (e.g. demonstration, role-play, and sculpture).

- Assignment assistance during hospitalization.
- Extended time to complete assignments.

Not all requested accommodations are "reasonable." An accommodation is *not* reasonable if:

- Making the accommodation or having the individual involved in the activity poses a direct threat to the health or safety of others.
- Making the accommodation means making a substantial change in an essential element of the curriculum.
- Making the accommodation would require a substantial alteration in the manner in which educational opportunities are provided, such that the course objectives are altered.
- Making the accommodation would impose an undue financial or administrative burden to the institution.

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- Weiner, E., & Wiener, J. (1996). Concerns and needs of university students with psychiatric disabilities. Journal of Postsecondary Education and Disability, 12(1), 2-8.



Resources

DO-IT has created a videotape, *Building the Team: Faculty, Staff and Students Working Together*, that features postsecondary faculty and administrators and students with disabilities sharing useful information and experiences about how to effectively accommodate students with disabilities. To order this videotape, which is captioned and audio described, send \$25 to DO-IT. You may also find the following resources useful as you explore this topic further.

American Academy of Psychiatry and the Law
<http://www.emory.edu/AAPL/>

American Psychological Association
<http://www.apa.org/>

Anxiety Disorder Association of America (ADAA)
<http://www.adaa.org/>

The Faculty Room, DO-IT
<http://www.washington.edu/doi/Faculty/Strategies/Disability/Psych/>

Mental Health
<http://www.mentalhealth.com/>

National Mental Health Association
<http://www.nmha.org/index.cfm/>

National Alliance for the Mentally Ill (NAMI)
<http://www.nami.org/>

National Institute of Mental Health (NIMH)
<http://www.nimh.nih.gov/>

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About DO-IT

The University of Washington helps individuals with disabilities transition to college and careers through DO-IT (Disabilities, Opportunities, Internetworking, and Technology). Primary funding for the DO-IT project is provided by the National Science Foundation, the U.S. Department of Education, and the State of Washington. This publication was developed with funding from the U.S. Department of Education, Office of Postsecondary Education (grant# P33A990042). However, the contents do not necessarily represent the policy of the Department of Education, and you should not assume their endorsement. For more information, to be placed on the mailing list, or to request materials in an alternative format, contact:

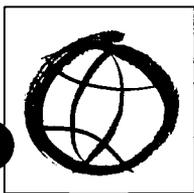
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University of Washington
College of Engineering
Computing & Communications
College of Education



Working Together: People with Disabilities and Computer Technology

DO-IT

By Sheryl Burgstahler, Ph.D.

People with disabilities meet barriers of all types. However, technology is helping to lower many of these barriers. By using computing technology for tasks such as reading and writing documents, communicating with others, and searching for information on the Internet, students and employees with disabilities are capable of handling a wider range of activities independently. Still, people with disabilities face a variety of barriers to computer use. These barriers can be grouped into three functional categories: barriers to providing computer input, interpreting output, and reading supporting documentation. Hardware and software tools (known as adaptive or assistive technologies) have been developed to provide functional alternatives to these standard operations. Specific products, and approaches to using them, are described below.

Mobility Impairments

Some wheelchairs may not fit under standard height computer tables and some computer users do not have enough use of their hands and arms to operate a standard keyboard or mouse.

Input

Equipment which provides flexibility in the positioning of monitors, keyboards, documentation, and tabletops is useful for many individuals with disabilities. Plugging all computer components into power outlet strips with accessible on/off switches makes it possible for some individuals to turn equipment on and off independently.

Some technology assists individuals with little or no use of their hands in using a standard keyboard. Individuals who have use of one finger, or have access to a mouth- or head-stick or some other pointing device, can control the

computer by pressing keys with the pointing device. Software utilities can create "sticky keys" that electronically latch the SHIFT, CONTROL, and other keys to allow sequential keystrokes to input commands that normally require two or more keys to be pressed simultaneously. The key repeat function can be disabled for those who cannot release a key quickly enough to avoid multiple selections. Keyboard guards (solid templates with holes over each key to assist precise selection) can be used by those with limited fine motor control.

Sometimes repositioning the keyboard and monitor can enhance accessibility. For example, mounting keyboards perpendicular to tables or wheelchair trays at head-height can assist individuals with limited mobility who use pointing devices to press keys. Other simple hardware modifications can assist individuals with mobility impairments. For instance, disk guides can assist with inserting and removing diskettes; a dedicated hard disk and/or computer network access can eliminate or reduce the necessity to do so.

For individuals who need to operate the computer with one hand, left- and right-handed keyboards are available. They provide more efficient key arrangements than standard keyboards designed for two-handed users.

Some hardware modifications completely replace the keyboard and/or mouse for individuals who cannot operate these standard devices. Expanded keyboards (larger keys spaced far apart) can replace standard keyboards for those with limited fine motor control. Mini-keyboards provide access to those who have fine motor control but lack a range of motion great enough to use a standard keyboard. Track balls and specialized input devices can replace mice.



For those with more severe mobility impairments keyboard emulation is available, including scanning and Morse code input. In each case, special switches make use of at least one muscle over which the individual has voluntary control (e.g., head, finger, knee, mouth). In scanning input, lights or cursors scan letters and symbols displayed on computer screens or external devices. To make selections, individuals use switches activated by movement of the head, finger, foot, breath, etc. Hundreds of switches tailor input devices to individual needs. In Morse code input, users input Morse code by activating switches (e.g., a sip-and-puff switch registers dot with a sip and dash with a puff). Special adaptive hardware and software translate Morse code into a form that computers understand so that standard software can be used.

Speech input provides another option for individuals with disabilities. Speech recognition systems allow users to control computers by speaking words and letters. A particular system is "trained" to recognize specific voices.

Special software can further aid those with mobility impairments. Abbreviation expansion (macro) and word prediction software can reduce input demands for commonly used text and keyboard commands. For example, word prediction software anticipates entire words after several keystrokes and increases input speed.

Output

Screen output does not present a challenge, but individuals with mobility impairments who have difficulty obtaining output from printers may need assistance from others.

Documentation

On-screen help can provide efficient access to user guides for individuals who are unable to turn pages in books.

Blindness

Individuals who are blind cannot access visual

material presented on the computer screen or in printed materials.

Input

Most individuals who are blind use standard keyboards, however, Braille input devices are available. Braille key labels can assist with keyboard use.

Output

Speech output systems can be used to read screen text to blind computer users. Special software programs (called screen readers) "read" computer screens and speech synthesizers "speak" the text. The availability of earphones for individuals using speech output systems can reduce the distractions for others nearby.

Refreshable Braille displays allow line-by-line translation of screen text into Braille on a display area where vertical pins move into Braille configurations as screen text is scanned. Braille displays can be read quickly by those with advanced Braille skills, are good for detailed editing (e.g., programming and final editing of papers), and do not disrupt others in work areas because they are quiet. Braille printers provide "hard copy" output for blind users.

Documentation

Scanners with optical character recognition can read printed material and store it electronically on computers, where it can be read using speech synthesis or printed using Braille translation software and Braille printers. Such systems provide independent access to journals, syllabi, and homework assignments for blind students. Some hardware and software vendors also provide Braille or ASCII versions of their documentation to support computer users who are blind.

Low Vision

For some people with visual impairments the standard size of letters on the screen or printed in documents are too small for them to read.



Some people cannot distinguish one color from another.

Input

Most individuals who have visual impairments can use standard keyboards, but large print keytop labels are sometimes useful.

Output

Special equipment for individuals who are visually impaired can modify display or printer output. Computer-generated symbols, both text and graphics, can be enlarged on the monitor or printer, thereby allowing individuals with low vision to use standard word processing, spreadsheet, electronic mail, and other software applications. For individuals with some visual impairments, the ability to adjust the color of the monitor or change the foreground and background colors is also of value. For example, special software can reverse the screen from black on white to white on black for people who are light sensitive. Anti-glare screens can make screens easier to read. Voice output systems are also used by people with low vision.

Documentation

Scanners with optical character recognition can read printed material and store it electronically on computers, where it can be read using speech synthesis or printed in large print. Some hardware and software vendors also provide large print or ASCII versions of their documentation.

Hearing and/or Speech Impairments

Speech and hearing disorders alone do not generally interfere with computer use. However, advanced speech synthesizers are close enough to human quality to act as substitute voices and thus provide a compensatory tool for students who cannot communicate verbally. Students with portable systems can participate in class discussions once adapted computers provide them with intelligible speaking voices. Word processing and educational software may also help hearing impaired students develop writing skills.

Input

Students with hearing and/or speech impairments typically use a standard keyboard and mouse.

Output

Alternatives to audio output can assist the hearing-impaired computer user. For example, if the sound volume is turned to zero, a computer may flash the menu bar when audio output is normally used.

Documentation

Individuals with hearing and/or speech impairments typically do not have difficulty using standard written or on-screen documentation.

Specific Learning Disabilities

Educational software where the computer provides multi-sensory experiences, interaction, positive reinforcement, individualized instruction, and repetition can be useful in skill building. Some students with learning disabilities who have difficulty processing written information can also benefit from completing writing assignments, tutorial lessons, and drill-and-practice work with the aid of computers. For example, a standard word processor can be a valuable tool for individuals with dysgraphia, an inability to produce handwriting reliably.

Input

Quiet work areas and ear protectors may make computer input easier for individuals with learning disabilities who are hyper-sensitive to background noise.

Software that aids in efficient and accurate input can also assist. Some people can compensate for high rates of input errors by using spell checkers, thesauruses, and grammar checkers. In addition, word prediction programs (software that predicts whole words from fragments) have been used successfully by students with learning disabilities. Similarly, macro software which expands abbreviations



can reduce the necessity to memorize keyboard commands and can ease the entry of commonly used text.

Output

Some learning disabled individuals find adaptive devices designed for those with visual impairments useful. In particular, large print displays, alternative colors on the computer screen, and voice output can compensate for some reading problems. People who have difficulty interpreting visual material can improve comprehension and the ability to identify and correct errors when words are spoken or printed in large fonts.

Documentation

Some individuals with learning disabilities find it difficult to read. Computer documentation provided in electronic forms can be used by enlarged character and voice synthesis devices to make it accessible to those with reading difficulties.

Next Steps

Continue your exploration of computer technology for people with disabilities by:

- Buying the directory and/or attending the conference of Closing the Gap. To request information, write to P.O. Box 68, Henderson, MN 56044 or call 612-248-3294. Visit their Web site at <http://www.closingthegap.com/>.
- Contacting technology assistance centers in your state (<http://www.resna.org/taproject/at/statecontacts.html>) or region (<http://www.adata.org/dbtac.html>).
- Joining electronic discussion lists and accessing resources on the Internet. A good place to start is DO-IT's publication *Disability-Related Resources on the Internet* at <http://www.washington.edu/doi/Brochures/DRR/>

Videotape

A 14-minute videotape, *Working Together: People with Disabilities and Computer Technology* may be ordered by sending a \$25 check to DO-IT. Permission is granted to reproduce DO-IT videotapes for educational, non-commercial purposes as long as the source is acknowledged.

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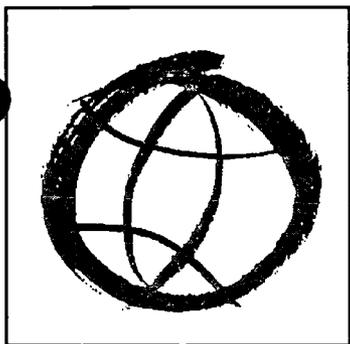
About DO-IT

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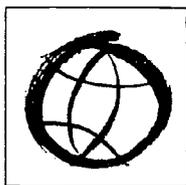
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DO·IT

Working Together: Science Teachers and Students with Disabilities

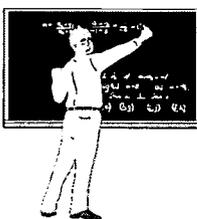
**Disabilities
Opportunities
Internetworking
Technology**



Working Together: Science Teachers and Students with Disabilities

As scientific fields make increasing use of technology, new opportunities emerge for people with a variety of abilities. When students with disabilities and science teachers form learning partnerships, the possibilities for academic and career success multiply.

Some students with disabilities have conditions that are invisible; some are visible. Since each person's situation is unique, the best solutions for maximizing participation come about when the student and teacher work together to develop creative alternatives for challenges faced by students with disabilities. Such challenges include gaining knowledge and demonstrating knowledge. In most cases, it takes just a little creativity, patience, and common sense to make it possible for everyone to learn and contribute.



Gaining Knowledge

Many students with disabilities face challenges to gaining knowledge. Examples of specific challenges and accommodations follow.

The student who has difficulty...

...reading standard text or graphics due to visual impairment

...seeing materials on blackboard or overhead projector due to visual impairment

...reading output from standard equipment because of visual impairment

...hearing presentations and instructions

...hearing multimedia and videotaped presentations

...participating in class discussions due to hearing or speech impairment

can be accommodated by...

...materials in large print or Braille, on tape, or via computer; enlarged or tactile drawings; access to adaptive technology that provides enlarged, voice, and /or Braille output.

...binoculars; verbalization of the content and oral descriptions of all visually displayed materials.

...interfacing lab equipment with computer and providing large print and /or speech output; scientific equipment with Braille and large print markings.

...FM system; interpreter; printed materials; facing student for lip reading; overhead projector or blackboard.

...captioned presentations; interpreter.

...electronic communications (e.g., Internet) where the ability to hear or speak is not required; portable computer with speech output

...understanding concepts due to a specific learning disability

...reading because of a specific learning disability

...taking notes in class because of mobility or visual impairment

...operating lab equipment and conducting lab experiments due to mobility impairment

...seeing demonstrations while seated in a wheelchair; viewing lab experiments

...completing an assignment or lab because of a health impairment

...doing research

...visual, aural, and tactile demonstrations incorporated into instruction.

...extra time and access to materials via a computer equipped with speech and large print output and Internet access.

...in-class access to a computer with adaptive technology and a word processor.

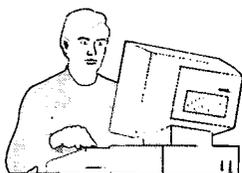
...accessible facility; adjustable-height tables; lab partner; scribe; computer-controlled lab equipment with alternative input devices (e.g., speech, Morse code, alternative keyboard); modified scientific equipment.

...adjustable height tables and flexible seating arrangements.

...flexible scheduling arrangements.

...information accessible on computer (disk, Internet) with adaptive technology.

Demonstrating Knowledge



Some students with disabilities cannot demonstrate mastery of a subject by writing, speaking, or by working through a problem in a lab. Many of the accommodations for gaining knowledge can help the student demonstrate mastery of a subject as well. Examples of other accommodations follow.

The student who has difficulty...

...completing and submitting worksheets and tests because of visual impairment and/or specific learning disability

...completing a test or assignment because of a disability that affects the speed at which it can be completed

...completing a test or assignment because of the inability to write

can be accommodated by...

...worksheets and tests in large print or Braille, on tape, or via computer; access to adaptive technology that provides enlarged, voice and/or Braille as well as standard print output.

...extra time or alternative testing arrangements.

...in-class access to a computer with alternative input (e.g., Morse code, speech, alternative keyboard) devices.

Electronic Resources

- To contact staff, request electronic copies of DO-IT NEWS, request publications or ask questions about the program, send electronic mail to doit@u.washington.edu
- To send a message to all DO-IT Scholars, DO-IT Pals, or DO-IT Mentors, send electronic mail to one of the following addresses:
doitkids@u.washington.edu
doitpals@u.washington.edu
mentors@u.washington.edu
- To discuss issues pertaining to individuals with disabilities and their pursuit of science, engineering, and mathematics (sem) academic programs and careers, subscribe to the doitsem LISTPROC discussion list by sending electronic mail to listproc@u.washington.edu.

In the message text type "subscribe doitsem" followed by your name.

- For information resources related to DO-IT, disabilities, adaptive technology, science, engineering, mathematics, and postsecondary education, access the DO-IT World Wide Web pages at <http://www.washington.edu/doit/>

Videotape

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About DO-IT

DO-IT (Disabilities, Opportunities, Internetworking, and Technology) serves to increase the successful participation of individuals with disabilities in challenging academic programs such as those in science, engineering, mathematics, and technology. Primary funding for the DO-IT program is provided by the National Science Foundation, the State of Washington, and the U.S. Department of Education. Additional grants and gifts have been received from the AOL Foundation, the Boeing Company, the Braitmayer Foundation, Dynamac Corporation, the Jeld-Wen Foundation, Microsoft, Mitsubishi Electric America Foundation, NASA, NEC Foundation of America, the Samuel S. Johnson Foundation, the Seattle Foundation, the Telecommunications Funding Partnership, Qwest, the U.S. Department of Labor, and the Washington State Office of Superintendent of Public Instruction. The University of Washington also contributes substantial resources to this project. The University of Washington also contributes substantial resources to this project. This material is based upon work supported by the National Science Foundation under Grant Nos. 9255803 and 9550003. Any questions, findings, and conclusions or recommendations expressed in this material are those of the author and do not necessarily reflect the views of the National Science Foundation. For further information, to be placed on the DO-IT mailing list, or to request materials in alternative format, contact:

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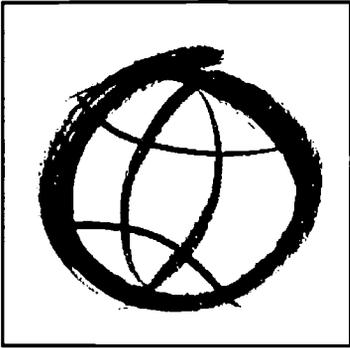


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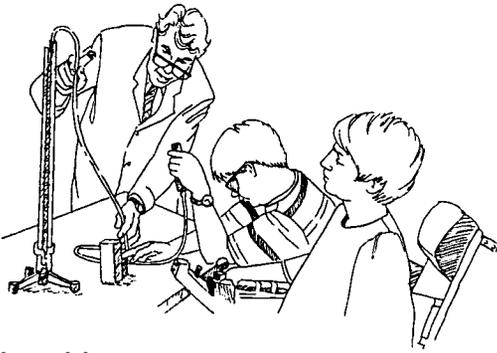
College of Education



DO·IT

Working Together: Faculty and Students with Disabilities

**Disabilities
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Technology**



Legal Issues

Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 prohibit discrimination against individuals with disabilities.

According to these laws, no otherwise qualified individual with a disability shall, solely by reason of his/her disability, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity of a public entity.

"Qualified" with respect to post-secondary educational services, means "a person who meets the academic and technical standards requisite to admission or participation in the education program or activity, with or without reasonable modifications to rules, policies or practices; the removal of architectural, communication or transportation barriers; or the provision of auxiliary aids and services."

"Person with a disability" means "any person who 1) has a physical or mental impairment which substantially limits one or more major life activities [including walking, seeing, hearing, speaking, breathing, learning, and working], 2) has a record of such an impairment, or 3) is regarded as having such an impairment."

Disabilities covered by legislation include (but are not limited to) AIDS, Cancer, Cerebral Palsy, Diabetes, Epilepsy, head injuries, hearing impairments, specific learning disabilities, loss of limbs, Multiple Sclerosis, Muscular Dystrophy, psychiatric disorders, speech impairments, spinal cord injuries, and

Working Together: Faculty and Students

Faculty members are encouraged to be responsive to the pedagogical needs of all students. However, students with disabilities may have some additional educational needs which they should discuss with each faculty member. It is helpful to include a statement on the class syllabus inviting students who have disabilities to discuss academic needs. An example of such a statement is "If you have a documented disability and wish to discuss academic accommodations, please contact me as soon as possible."

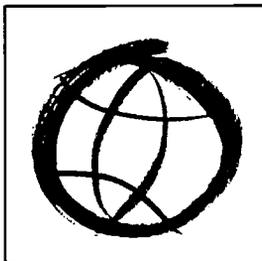
The student with a disability is the best source of information regarding necessary accommodations. In post-secondary settings it is the student's responsibility to request special accommodation if desired, but a faculty member can make a student comfortable by inquiring about special needs.



Examples of Academic Accommodations

| Disability | Accommodations |
|---------------------|--|
| Low Vision | <ul style="list-style-type: none"> • Seating near front of class • Large print handouts, lab signs, and equipment labels • TV monitor connected to microscope to enlarge images • Class assignments made available in electronic format • Computer equipped to enlarge screen characters and images |
| Blindness | <ul style="list-style-type: none"> • Audio-taped, Brailled or electronic-formatted lecture notes, handouts, and texts • Verbal descriptions of visual aids • Raised-line drawings and tactile models of graphic materials • Braille lab signs and equipment labels, auditory lab warning signals • Adaptive lab equipment (e.g., talking thermometers and calculators, light probes, and tactile timers) • Computer with optical character reader, voice output, Braille screen display and printer output |
| Hearing Impairment | <ul style="list-style-type: none"> • Interpreter, real-time captioning, FM system, notetaker • Open or closed-captioned films, use of visual aids • Written assignments, lab instructions, demonstration summaries • Visual warning system for lab emergencies • Use of electronic mail for class and private discussions |
| Learning Disability | <ul style="list-style-type: none"> • Notetakers and / or audio-taped class sessions, captioned films • Extra exam time, alternative testing arrangements • Visual, aural, and tactile instructional demonstrations • Computer with voice output, spellchecker, and grammar checker |
| Mobility Impairment | <ul style="list-style-type: none"> • Notetaker / lab assistant; group lab assignments • Classrooms, labs, and field trips in accessible locations • Adjustable tables; lab equipment located within reach • Class assignments made available in electronic format • Computer equipped with special input device (e.g., voice input, Morse code, alternative keyboard) |
| Health Impairment | <ul style="list-style-type: none"> • Notetaker • Flexible attendance requirements and extra exam time • Assignments made available in electronic format; use of email to facilitate communication |

Campus Resources



DO·IT

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Working Together: Faculty and Students with Disabilities **Meet the Speakers in the Videotape**

Dr. Sheryl Burgstahler is an Assistant Director within Computing & Communications and a Research Assistant Professor in the College of Education at the University of Washington. She directs DO-IT (Disabilities, Opportunities, Internetworking, and Technology), a project to recruit students with disabilities into science, engineering, and mathematics academic programs and careers. She received bachelors and masters degrees in mathematics and a Ph.D. in higher education at the University of Washington. She has published dozens of articles on access to computers and the Internet and electronic resources for individuals with disabilities; faculty training; and electronic communities.

Dr. Hellmut Golde is Professor Emeritus of Computer Science and Engineering at the University of Washington. He received his Ph.D. in Electrical Engineering from Stanford University and has taught Electrical Engineering and Computer Science at the University of Washington since 1960. He is interested in the application of adaptive computer technology for students with disabilities and is an active participant in the University of Washington DO-IT project.

Kevin Berg has had Cerebral Palsy since birth. He attends Seattle Pacific University and is studying Computer Science. He lives on campus in a dorm; a fellow student is his personal assistant. His interests include multimedia, telecommunications,

and computer games. Over the Internet network, Kevin communicates with many people, including his professors. He uses a head-stick and special software to enter double-key commands on his computer. Upon graduation, Kevin would like to be a computer programmer.

Karl Booksh is a graduate student and teaching assistant in Chemistry at the University of Washington, expecting to complete his Ph.D. soon. He is a member of the DO-IT Advisory Board and a mentor to high school students with disabilities who participate in the DO-IT program at the University of Washington. Karl received a graduate fellowship from the American Chemical Society's Division of Analytical Chemistry. Karl has no use of his legs and limited use of his hands as a result of a spinal chord injury. Upon graduation, Karl would like to teach at a small college.

Dr. Lesley B. Olswang is a Professor in the Department of Speech and Hearing Sciences at the University of Washington. She received her academic degrees at Northwestern University, the University of Illinois, and the University of Washington. Dr. Olswang is also certified as a Speech/Language Pathologist. Her interests have focused on children with communication disorders who function below the age of three. Her research interests include how children learn language and how intervention might alter the language learning process.



Dr. Gay Lloyd Pinder has been deaf for the past twelve years. She uses sign language interpreters to receive information that is presented orally and voices for herself. She uses a TDD for phone conversations. In her doctoral program she was introduced to electronic mail as an alternative for communicating with hearing professors who do not know sign language. Electronic mail allows her to communicate with more people than via TDD because it does not require specialized equipment. She recently completed a Ph.D. in Speech and Hearing Sciences at the University of Washington, with a primary focus on research. Gay Lloyd works as a communication therapist with infants and young children with communication problems that are secondary to their motor disabilities, helping them develop the foundation for communication so they will ultimately be able to use augmentative equipment.

Dr. Wendy (Pava) David has been blind since the age of eight when she experienced an allergic reaction to penicillin. She recently received her Ph.D. in Clinical Psychology from the University of Washington. She is employed at the American Lake Veterans Administration Medical Center, where she works primarily with Vietnam Veterans who suffer from post-traumatic stress disorder. Wendy uses computer systems with speech and Braille output to write notes and reports.

Dr. Mark T. Greenberg is a Professor of Psychology at the University of Washington. He received his B.A. degree from the Johns Hopkins University and his Ph.D. from the University of Virginia. His research interests concern the early development of family relationships, the prevention of violence and delinquency, and the social development of children who are deaf and hearing-impaired. He has published more than 100 scientific articles and books.

About DO-IT

DO-IT (Disabilities, Opportunities, Internetworking, and Technology) is primarily funded by the National Science Foundation, the U.S. Department of Education, and the State of Washington. Funds for the creation of this videotape were provided by US WEST Communications. For more information, to be placed on the DO-IT mailing list, or to request materials in alternate format, contact:

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Building the Team: Faculty, Staff, and Students Working Together Evaluation

We ask that you take time to review the *Building the Team* training materials, complete this evaluation form, and mail it to us. Your responses to this evaluation will be used for research purposes. This will include helping us determine the value of these materials as well as helping us develop new products. The survey will take about 10 minutes to complete. Participation is voluntary and anonymous and you may choose not to answer every question. Thank you in advance for your feedback.

1. Please indicate your position.

Disabled student services director or counselor

College faculty

Other. Please explain _____.

2. Please indicate the type of institution with which you are affiliated.

4-year college/university

2-year college

2-year technical school

Other: _____

3. Describe your overall impressions of the enclosed materials. Please include what you like and dislike, and how the materials could be improved.

4. Which of the following presentation materials will be helpful to you in planning and delivering presentation(s)? Rate each one on a scale of 0-4 where 0=not useful at all and 4=very useful. Indicate NA if not applicable to you.

Short Overview Presentation

Accommodation Strategies

Universal Design of Instruction

Effective Communication

Information Access

Access to Computers

Making Computer Labs Accessible to Everyone

Universal Design of Web Pages

Real Connections: Making Distance Learning Accessible to Everyone

Science/Math/Engineering Access

Accommodating Students with Learning Disabilities
 Accommodating Students with Psychiatric Disabilities
5. Please rate the usefulness of the following types of materials on a scale of 0-4 where 0=not useful at all and 4=very useful.

Videotapes
 Overhead transparency templates
 Power Point Slides (available on-line)
 Camera-ready Handouts
 Web resources (www.washington.edu/doit/Faculty/)

6. Check the following items that are true for you.

I intend to pass these materials on to other individuals or programs.
If so, to whom?

I intend to use these materials for purposes other than to prepare or deliver presentations. Please explain:

I do not intend to use these materials in any way. Please explain:

7. Please suggest additional materials related to postsecondary education and disability that would be useful to you.

Thank you. Please return completed form to DO-IT, Box 355670, University of Washington, Seattle, WA 98195-5670.

Visit The Faculty Room

www.washington.edu/doit/Faculty/

Where postsecondary faculty
and administrators:

- *Learn how to maximize educational opportunities for postsecondary students with disabilities!*
- *Explore accommodation strategies*
- *Learn about legal issues*
- *Find professional development materials*
- *Link to resources*



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