Making STEM Accessible to POSTSECONDARY Students with Disabilities

Making STEM Accessible to Postsecondary Students with Disabilities

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Preface

Making STEM Accessible to Postsecondary Students with Disabilities was years in the making. It includes content developed—and routinely updated—from the earliest days of the DO-IT Center—where "DO-IT" stands for Disabilities, Opportunities, Internetworking, and Technology. DO-IT began with our first round of funding from the National Science Foundation (NSF) in 1992. Since then, DO-IT has hosted dozens of projects funded externally by federal agencies, corporations, foundations, and private parties. Many of DO-IT's activities continue to be funded by NSF. Current projects include *AccessSTEM*, *AccessComputing*, *AccessEngineering*, *AccessERC*, and *AccessCyberlearning*. You'll notice the similarity in the titles. Most of our projects are about access! Access to education at all levels, access to careers, access to technology, access to physical spaces, access to all life activities for everyone, with a particular focus on individuals with disabilities. The ultimate goal is a more inclusive society where everyone, regardless of their personal characteristics, can participate and contribute according to their abilities and interests. Consult the DO-IT website at *www.uw.edu/doit* for information about specific projects along with relevant videos, publications, and other resources.

This publication pulls together resources that are particularly useful to postsecondary educators and administrators who strive to make science, technology, engineering, and mathematics (STEM) welcoming and accessible to students with disabilities. This includes computing facilities, science and engineering labs, classrooms, makerspaces, online resources, curriculum, and instruction. Highlighted are strategies that are easy to implement when designing STEM facilities or instructional practices, as well as those that are more difficult but will yield long-term results (e.g., changing the culture of a STEM department to be more inclusive of individuals with disabilities). Although focused on postsecondary institutions, most of the content in this publication is relevant to K-12 STEM courses, labs, and programs as well.

Making STEM Accessible to Postsecondary Students with Disabilities is an online multimedia "book." It includes links to videos and publications within the "book." The video presentations are particularly useful to those new to the field and to learners who prefer to view images related to the content and hear the perspectives of people with disabilities and practitioners regarding specific content areas.

All of the content in this publication is accessible to individuals with disabilities. Videos are captioned and audio described and publications are available in two formats, fully accessible hypertext markup language (HTML) and Portable Document Format (PDF), which is ideal for creating printed documents that can be used for individual study and presentation handouts. Each document includes permission to make multiple copies for presentation participants and for distribution in other ways. To make individual documents in print-ready format, you'll notice that there is some repetitive content in some introductory paragraphs and in the resources and credits at the end. DO-IT documents are updated regularly and some videos are occasionally updated as well. Anytime you access this book online you will be linking to the most current version of the products.

The book contains the following chapters.

This content is useful to anyone who desires to make STEM learning settings welcoming and accessible to students with disabilities. If you wish to join the effort to support that goal or if you have been in the field for many years, you are likely to find something useful here—whether you are learning this material for the first time, prefer viewing and hearing content or reading it, wish to focus on only a few content areas or read all of the content from cover to cover, are an administrator of practitioner, are looking for videos and handouts to use in delivering a presentation or workshop, or wish to find related products or projects.

Because content included in this online book is easy to update and it is easy to add new materials, consider it a work in progress. Please share with me your recommendations for updates to individual products currently included in the book as well as for new publications or videos that would make it more complete.

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Chapter 1
Introduction

By Sheryl Burgstahler, Editor

This chapter provides an overview of the need for interventions to increase the participation and success of individuals with disabilities in science technology, engineering and mathematics (STEM); theoretical and conceptual frameworks for interventions, as well as a summary of the content included in the remaining chapters of this multimedia "book."

Need for Interventions

To fill increasing numbers of positions in STEM, the U.S. must draw from a talent pool that includes all demographic groups, including those with disabilities (American Association for the Advancement of Science, 2001; Committee on Equal Opportunities in Science and Engineering, 2015; Office of Science and Technology Policy, 2006). Although increasing numbers of individuals with disabilities are attending college, with their initial interest in STEM similar to that of their nondisabled peers, they experience far less academic and career success in STEM (National Science Foundation, 2015; Office of Disability Employment Policy, 2001, November), and those who are also minorities, females, and/or veterans face multiple challenges (Donovan & Cross, 2002; Freeman, 2004; Gil-Kashiwabara, Hogansen, Geenan, Powers, & Powers, 2007; Leake, et al., 2006).

However, success stories in STEM fields demonstrate that opportunities do exist for students with disabilities who successfully overcome barriers imposed by (1) inaccessible facilities, curricula, websites, technology, and student services; insufficient accommodations and supports; and others' low expectations as well as (2) inadequate personal skills in academics and self-advocacy and access to STEM role models and peers with disabilities (DO-IT, 1993-2015; Stern, & Woods, 2001). To support NSF's mandate to apply the best ideas from the most capable researchers and educators, efforts should be made to increase participation in STEM by citizens with disabilities. Professors, student services, and other campus units can play important roles in this effort.

The evidence base for practices of the DO-IT Center—where DO-IT stands for Disabilities, Opportunities, Internetworking, and Technology—comes from literature reviews, student outcome data, suggestions from practitioners, and input from students with disabilities (DO-IT, n.d.). In 2007, SRI International was commissioned to evaluate the alliance program funded by the Research in Disabilities Education (RDE) program at NSF; DO-IT's *AccessSTEM* project was rated highly with respect to its organization, activities, and results. The research team concluded that the most important things participants gained from DO-IT participation with respect to transition and retention outcomes were

- A sense of belonging (both academic & social integration),

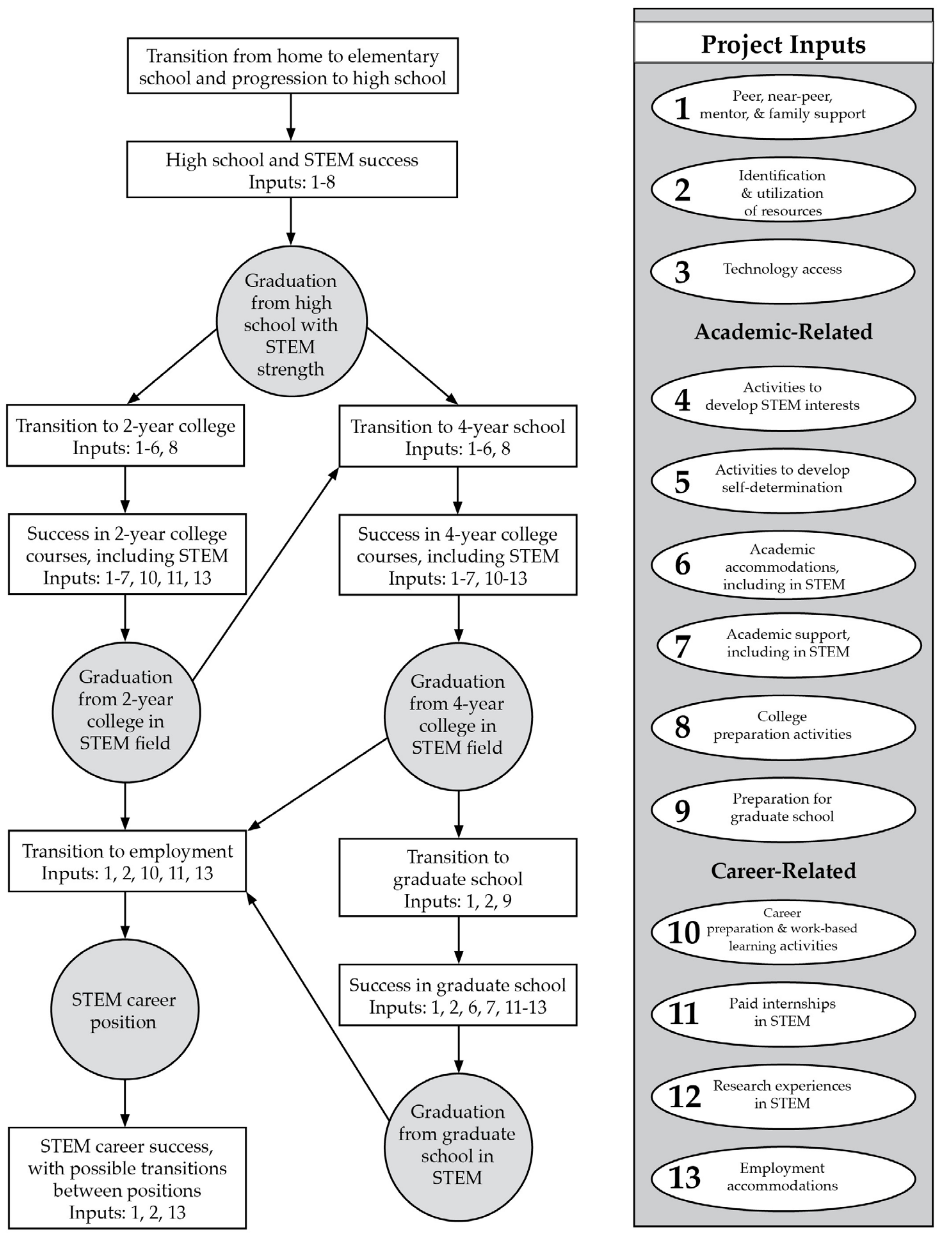
- Involvement (in academic & social life),
- Sense of purpose (through internships, workshops, networking, mentoring,…), and
- Self-determination skills (skill building, practice).

Theoretical and Philosophical Foundations for Practices

Over the course of DO-IT projects, effective student interventions were organized into a model of inputs to promote movement through critical junctures (DO-IT, n.d.) that have also been identified by other researchers and practitioners as effective ways to bring students from underrepresented groups into STEM fields (Allen, Bonous-Hammarch, & Teranishi, 2006; Burgstahler, Bellman, & Lopez, 2004; Burgstahler & Chang, 2008, 2009; Burgstahler, Crawford, & Acosta, 2001; Burgstahler & Cronheim, 2001; Isakson & Burgstahler, 2008; Luecking & Fabian 2000; Phelps & Hanley-Maxwell, 1997; Stern & Woods, 2001; Stewart, et al., 2009; Valentine, et al., 2009).

***AccessSTEM*: Progress of Teens with Disabilities Toward STEM Careers**

Project Inputs Leading Students to Critical Junctures



Observations of *AccessSTEM* staff and others suggest that

- students with disabilities have little access to peers and mentors with disabilities;
- individuals face common issues as well as unique challenges related to specific disabilities;
- both academic and non-academic (e.g., self-advocacy) issues must be addressed;
- motivational activities are needed to recruit students without initial interests in STEM; and
- comprehensive retention interventions produce more positive outcomes than isolated efforts.

The content presented in this publication embraces disability as a diversity issue; a social model of disability; a universal design approach in transforming technology, courses, and student services; social justice education practices to engage students with disabilities in activities that increase their success while promoting positive change on campus; and a multi-faceted view of retention. Components of this theoretical and conceptual framework are described in the paragraphs that follow.

Disability and Diversity. Traditional efforts to assist students with disabilities on campuses nationwide embrace a "medical model" of disability, in which focus is on the "deficit" of the individual and how the person can be rehabilitated or how accommodations can be made so that he/she can fit into an established environment and access information (Loewen & Pollard, 2010; Moriarty, 2007). In contrast, the "social model" of disability and other integrated approaches within the field of disability studies (DePoy & Gibson, 2008a; DePoy & Gibson, 2008b; Gabel & Peters, 2010) consider variations in abilities—like those with respect to gender, race, and ethnicity—a natural part of the human experience and suggest that more attention should be devoted to designing products and environments—including courses, technology, and student services—that are welcoming and accessible to everyone.

Universal Design. Universal design (UD)—defined 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" (Center for Universal Design, n.d.)—is an approach that is consistent with the social model of disability, addresses other diversity issues as well, and has the potential to reduce the need for some individual accommodations. UD challenges society to construct a world where everyone can participate with maximum independence (Loewen & Pollard, 2010).

When UD principles are applied in a postsecondary institution, educational products and environments meet the needs of potential students with a wide variety of characteristics. Disability is just one of many characteristics that a student might possess. For example, one student could be an English-language learner, six feet tall, male, thirty years old, an excellent reader, primarily a visual learner, and deaf. UD requires consideration of all characteristics of potential users, including abilities and disabilities, when developing a course or service.

UD can be applied to any product or environment. For example, a typical service counter in a career services office is not accessible to everyone, including students who are short in stature, use wheelchairs, and cannot stand for extended periods of time. Applying UD principles might result in the design of a counter that has multiple heights-the standard height designed for individuals within the typical range of height and who use the counter while standing up and a shorter height for those who are shorter than average, use a wheelchair for mobility, or prefer to interact with service staff from a seated position.

Making a product or an environment accessible to people with disabilities often benefits others. For example, automatic door openers benefit students, faculty, and staff using walkers and wheelchairs, but also benefit people carrying books and holding babies, as well as elderly citizens. Sidewalk curb cuts, designed to make sidewalks and streets accessible to those using wheelchairs, are often used by students on skateboards, parents with baby strollers, and delivery staff with carts. When television displays in restaurants, museums, and other public areas are captioned, programming is accessible not only to people who are deaf but also to others who cannot hear the audio in noisy areas.

UD is a goal that puts a high value on diversity, equity, and inclusiveness. It is also a process. Rich details about UD applications to higher education can be found the DO-IT's Center on Universal Design in Education (n.d.) and in the book Universal Design in Higher Education: From Principles to Practice (Burgstahler, 2008). The following paragraphs summarize the process, principles, and applications of UD.

Process of Universal Design. The process of UD requires a macro view of the application being considered as well as a micro view of subparts of the application. The following list suggests a process that can be used to apply UD in a postsecondary setting.

- Identify the application. Specify the product or environment to which you wish to apply universal design.
- Define the universe. Describe the overall population (e.g., users of service), and then describe the diverse characteristics of potential members of the population for which the application is designed (e.g., students, faculty, and staff with diverse characteristics with respect to gender; age; size; ethnicity and race; native language; learning style; and abilities to see, hear, manipulate objects, read, and communicate).
- Involve consumers. Consider and involve people with diverse characteristics (as identified in Step 2) in all phases of the development, implementation, and evaluation of the application. Also gain perspectives through diversity programs, such as the campus disability services office.
- Adopt guidelines or standards. Create or select existing universal design guidelines or standards. Integrate them with other best practices within the field of the specific application.
- Apply guidelines or standards. Apply universal design in concert with best practices within the field (as identified in Step 4) to the overall design of the application, all subcomponents of the application, and all ongoing operations (e.g., procurement processes, staff training) to maximize the benefit of the application to individuals with the wide variety of characteristics identified in Step 2.
- Plan for accommodations. Develop processes to address accommodation requests (e.g., purchase of assistive technology, arrangement for sign language interpreters) from individuals for whom the design of the application does not automatically provide access.
- Train and support. Tailor and deliver ongoing training and support to stakeholders (e.g., instructors, computer support staff, procurement officers, volunteers). Share institutional goals with respect to diversity and inclusion and practices for ensuring welcoming, accessible, and inclusive experiences for everyone.
- Evaluate. Include universal design measures in periodic evaluations of the application; evaluate the application with a diverse group of users, and make modifications based on feedback. Provide ways to collect input from users (e.g., through online and printed instruments and communications with staff; Burgstahler, 2015).

Principles of Universal Design. At the Center for Universal Design (CUD) at North Carolina State University, a group of architects, product designers, engineers, and environmental design researchers established seven principles of UD to provide guidance in the design of products and environments. Following are the CUD principles of UD, each paired with an example of its application:

- Equitable use. The design is useful and marketable to people with diverse abilities. For example, a website that is designed to be accessible to everyone, including people who are blind, employs this principle.
- Flexibility in use. The design accommodates a wide range of individual preferences and abilities. An example is a museum that allows visitors to choose to read or listen to the description of the contents of a display case.
- Simple and intuitive. 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 clear and intuitive control buttons is an example of an application of this principle.
- 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 is captioned television programming projected in noisy restaurants.
- 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 software applications that provide guidance when the user makes an inappropriate selection.
- Low physical effort. The design can be used efficiently, comfortably, and with a minimum of fatigue. Doors that open automatically for people with a wide variety of physical characteristics demonstrate the application of this principle.
- 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 work area designed for use by employees with a variety of physical characteristics and abilities is an example of applying this principle. (Burgstahler, 2015)

Social Justice Education and Self-Determination

Social justice education is an educational philosophy committed to equity and social change, with its goals clustering around three main areas: social responsibility, student empowerment, and the equitable distribution of resources (Bell & Griffin, 1997; Loewen & Pollard, 2010). Combined with UD and the view of disability as a diversity issue, this student-centered approach is one response to the challenge of addressing the needs of students with disabilities along with members of other marginalized groups (Hackman & Rauscher, 2007) and engaging students with disabilities as agents of change as they develop their own self-determination skills (Cory, White, & Stuckey, 2010).

Self-determination skills—that allow people to take charge of their lives—are critical to postsecondary success all students with disabilities. Characteristics of postsecondary campuses that support self-determination for students with disabilities include self-determined role models, self-determination skill instruction, opportunities for students to make choices, positive relationships with others, and availability of specific support services. In addition, universal design of instruction, fosters self-determination by offering students multiple opportunities for learning (Field, Sarver, & Shaw, 2003).

Retention

Factors impacting student retention occur within individuals, the institution, and the external community (Braxton, Sullivan, & Johnson, 1997; Tinto, 1993). Current studies reflect a shift from a focus on the student to the institution and from the general student population to "non-traditional" students (Berge & Huang, 2004). Berge and Haung (Berge & Huang, 2004) propose a holistic, customizable model of retention that encourages institutions to consider the interconnectivities among personal, institutional, and circumstantial factors.

Personal Variables	Institutional Variables	Circumstantial Variables
Demographic Variables: age, gender, ethnicity, socioeconomic status, parent educational levels/ expectations *Individual Variables*: academic skills/abilities, motivation, goals, commitment *Prior Educational Experiences*: record of academic achievements, prior school experiences	*Bureaucratic Variables*: Mission/policy, budgeting/funding, institutional awareness/ participation *Academic Variables*: structural/normative systems *Social Variables*: social system, mechanisms for social integration	*Institutional Interactions*: academic/ bureaucratic/ social interactions *Interactions External to Institution*: life, work, family/other circumstances

Change efforts to make STEM courses and related services more welcoming and accessible to students with disabilities can build on Berge and Haung's multifaceted conceptualization of retention by employing practices that:

- encourage commitment (on the part of students with disabilities, faculty, IT managers, student service units, and the institution).
- enhance integration (by transforming existing services to be more inclusive of students with disabilities).
- improve delivery systems (for both general student support services and specialized services for students with disabilities).
- increase person-environmental fit (through systemic changes in departments, courses, labs, and student services).
- improve outcomes (as measured by STEM degree attainment and course/service ratings of students with disabilities).

Components of a Model for Change Toward More Inclusive Practices

Review of research and practice leads to the following vision of postsecondary offerings that are responsive to the needs of STEM students with disabilities.

- Priorities. Institution, college, and department vision, mission, and value statements reflect a high value with respect to diversity, including that defined by disability.

- Data collection and reporting. Data collection and reporting routines reflect high priorities with respect to diversity, thus including information relevant to STEM students with disabilities.
- UD and accommodations. All departments, courses, technology units, and student services are welcoming and accessible to all students, including those with disabilities. Their practices (with respect to planning, policies, and evaluation; physical environments and products; teaching practices; staff training; information resources and technology; and events) are designed to meet the needs of all students, specifically students with disabilities.

Systemic change efforts toward a campus environment that is more inclusive of students is particularly powerful when bottom-up strategies are combined with top-down support (Amabile, 2002; Burgstahler, 2005; Steffy, 1993; Williams, Berger, & McClendon, 2005).

Change Management. Change can be viewed from three perspectives: The reason for change, the content of change, and the process of change (Levy & Merry, 1986). Federal legislation requiring full access to campus offerings to individuals with disabilities and increasing numbers of students with disabilities attending postsecondary institutions provide two solid external reasons for changes in practices. Content presented in the remaining chapters of this book provides additional motivations for change, such as the desire for consistent and equitable practices. Also provided is the content for change—such as universal design checklists for instruction and student services.

The process for change can be guided by a change management model, such as the ADKAR (Haitt, 2006) people-oriented model, which attempts to overcome some of the commonly-reported problems with the people dimension of change management. Change agents can align their interventions with the five ADKAR fundamental processes for promoting and sustaining change—Awareness, Desire, Knowledge, Ability, Reinforcement.

ADKAR Goals	Examples
Awareness of the need to change. Make sure personnel understand why the desired change is needed and what will be the result of the change.	Through meetings, trainings, online communication and resources, increase knowledge and skills of faculty and staff regarding opportunities for students with disabilities in STEM fields, about the social model of disability and UD, and how their application can make courses and student services more inclusive and students with disabilities more successful.
Desire to participate and support change. Motivate personnel to make changes.	Show stakeholders how UD practices can improve teaching and technology/student services overall and be integrated into existing practices.

ADKAR Goals	Examples
Knowledge of how to change (and what the change looks like). Ensure that personnel know how to make the desired change.	Meet with faculty and IT/service personnel to go through DO-IT checklists of UD strategies for instruction and/or student services (organized under categories such as planning, policies, and evaluation; instructional practices; physical environments; staff training; information resources, technology; events), rate progress (e.g., accomplished already, partially implemented, not done at all, not applicable to the unit); rate each strategy remaining with respect to (1) level of importance and (2) implantation difficulty; and use the results to help the individual or unit focus on high priority strategies, as well as "low-hanging fruit" (readily achievable changes a unit can easily make to improve accessibility). Explore ways the unit/individual will proceed with making changes.
Ability to implement the change on a day-to-day basis. Give personnel the information, resources, and training they need to implement change.	Offer training to prepare participants to apply UD and provide accommodations for computers/labs, resources, and instruction (Burgstahler, 2015); and encourage students with disabilities to pursue STEM. Help individuals/units translate ideas into goals and objectives, determine annual priorities, and record progress.
Reinforcement to keep the change in place. Implement a system to sustain the change.	Encourage campus units to integrate changes into their vision, mission, values statements; practices; and data collection and reporting routines.

Replication of the Model. There are various steps institutions might take to increase the STEM interest, learning, participation, persistence, and graduation of students with disabilities:

- Seek top-down support and engage campus leadership in determining goals, objectives, timeline, and deliverables that are consistent with the campus vision, mission, and values.
- Form (1) a leadership team with representatives from the faculty and campus units that are most important for supporting the success of students with disabilities in STEM at institution, college, and department levels and (2) a leadership team of STEM students with disabilities. Develop charges, set up communication mechanisms, and timelines. Provide training, deliver tools that will empower them to be effective agents of change, and evaluate their success. Engage in activities to review and transform vision, mission, and values statements; practices; and data collection and reporting routines of relevant campus units.
- Throughout efforts, engage with advocates and students with disabilities to determine which activities for students with disabilities are best hosted by mainstream campus services for all students or tailored to the unique needs for community-building and skill-building for this population.

- Conduct an annual capacity-building institute that includes the two leadership groups and other key stakeholders. Deliver progress reports and develop proceedings with recommendations for furthering the project goal. Deliver the recommendations to appropriate campus leaders and advisory boards. Offer incentives such as capacity-building awards.
- Conduct formative evaluation to guide the campus efforts and summative evaluation to measure outputs, outcomes, and impacts; adjust practices based on results.
- Share lessons learned and evidence-based practices with stakeholder groups.

The remaining chapters of this multimedia "book" are described below.

Chapter 2 Experiences of Students with Disabilities—How students with disabilities view the impact of their disabilities and their experiences in educational settings

Chapter 3 Teaching Students with Disabilities—How accommodations and universal design make on-site and online education welcoming and accessible to students with disabilities

Chapter 4 Making Services Accessible to Students with Disabilities—How student services, departments, and the entire campus can be designed to be welcoming and accessible to students with disabilities

Chapter 5 Assistive Technology for Students with Disabilities—How assistive technology provides access to computers for students with disabilities

Chapter 6 Accessible Technology Design—How technology can be designed so that is accessible to everyone, including users with disabilities

Chapter 7 Access to STEM for Students with Disabilities—How STEM learning can be made welcoming and accessible to students with disabilities

Chapter 8 Incorporating UD and Disability Topics Into the Curriculum—How appropriate disability and UD content can be integrated into existing courses

Chapter 9 Institutional Change and More Resources—More content, products, and projects related to the content of this book

Chapter 2
Experiences of Students with Disabilities

How students with disabilities view the impact of their disabilities and their experiences in educational settings

VIEW	Part of Me, Not All of Me *www.uw.edu/doit/Video/index.php?vid=38*
VIEW	DO-IT Scholar Profile: Alexandra *www.uw.edu/doit/Video/index.php?vid=44*
VIEW	Invisible Disabilities and Postsecondary Education *www.uw.edu/doit/Video/index.php?vid=36*
READ	Invisible Disabilities and Postsecondary Education *www.uw.edu/doit/invisible-disabilities-and-postsecondary-education*
VIEW	Returning from Service: College and IT Careers for Veterans *www.uw.edu/doit/Video/index.php?vid=52*
READ	Returning from Service: College and IT Careers for Veterans *www.uw.edu/doit/returning-service-college-and-careers-veterans-disabilities*
VIEW	Opening Doors: Mentoring on the Internet *www.uw.edu/doit/Video/index.php?vid=21*
READ	Opening Doors: Mentoring on the Internet *www.uw.edu/doit/opening-doors-mentoring-internet*

Chapter 3
Teaching Students with Disabilities

How accommodations and universal design make on-site and online education welcoming and accessible to students with disabilities

VIEW	Invisible Disabilities and Postsecondary Education *www.uw.edu/doit/Video/index.php?vid=36*
READ	Invisible Disabilities and Postsecondary Education *www.uw.edu/doit/invisible-disabilities-and-postsecondary-education*
READ	Academic Accommodations for Students with Learning Disabilities *www.uw.edu/doit/academic-accommodations-students-learning-disabilities*
READ	Academic Accommodations for Students with Psychiatric Disabilities *www.uw.edu/doit/academic-accommodations-students-psychiatric-disabilities*
READ	Effective Communication: Faculty and Students with Disabilities *www.uw.edu/doit/effective-communication-faculty-and-students-disabilities*
READ	Universal Design in Postsecondary Education: Process, Principles, and Applications *www.uw.edu/doit/universal-design-postsecondary-education-process-principles-and-applications*
VIEW	Building the Team: Faculty, Staff, and Students Working Together *www.uw.edu/doit/Video/index.php?vid=3*
READ	Working Together: Faculty and Students with Disabilities *www.uw.edu/doit/working-together-faculty-and-students-disabilities*
READ	Working Together: Teaching Assistants and Students with Disabilities *www.uw.edu/doit/working-together-teaching-assistants-and-students-disabilities*
READ	Universal Design of Instruction (UDI): Definition, Principles, Guidelines, and Examples *www.uw.edu/doit/universal-design-instruction-udi-definition-principles-guidelines-and-examples*

VIEW	Equal Access: Universal Design of Instruction *www.uw.edu/doit/Video/index.php?vid=13*
READ	Equal Access: Universal Design of Instruction *www.uw.edu/doit/equal-access-universal-design-instruction*
VIEW	Beneficiaries of Universal Design of Instruction *www.youtube.com/watch?v=4FE1CLS7i3k*
VIEW	Real Connections: Making Distance Learning Accessible to Everyone *www.uw.edu/doit/Video/index.php?vid=22*
READ	Real Connections: Making Distance Learning Accessible to Everyone *www.uw.edu/doit/real-connections-making-distance-learning-accessible-everyone*
READ	Equal Access: Universal Design of Distance Learning *www.uw.edu/doit/equal-access-universal-design-distance-learning-programs*

Chapter 4
Making Services Accessible to Students with Disabilities

How student services, departments, and the entire campus can be designed to be welcoming and accessible to students with disabilities

VIEW	Equal Access: Student Services *www.uw.edu/doit/Video/index.php?vid=11*
READ	Equal Access: Student Services *www.uw.edu/doit/equal-access-universal-design-student-services*
READ	Equal Access: Universal Design of Tutoring and Learning Centers *www.uw.edu/doit/equal-access-universal-design-tutoring-and-learning-centers*
READ	Equal Access: Universal Design of Career Services *www.uw.edu/doit/equal-access-universal-design-career-services*
VIEW	Equal Access: Universal Design of an Academic Department *www.uw.edu/doit/videos/index.php?vid=65*
READ	Equal Access: Universal Design of an Academic Department *www.uw.edu/doit/equal-access-universal-design-academic-department*

Chapter 5
Assistive Technology for Students with Disabilities

How assistive technology provides access to computers for students with disabilities

VIEW	Working Together: People with Disabilities and Computer Technology *www.uw.edu/doit/Video/index.php?vid=33*
READ	Working Together: People with Disabilities and Computer Technology *www.uw.edu/doit/working-together-people-disabilities-and-computer-technology*
VIEW	Working Together: Computers and People with Sensory Impairments *www.uw.edu/doit/Video/index.php?vid=31*
READ	Working Together: Computers and People with Sensory Impairments *www.uw.edu/doit/working-together-computers-and-people-sensory-impairments*
VIEW	Working Together: Computers and People with Mobility Impairments *www.uw.edu/doit/Video/index.php?vid=30*
READ	Working Together: Computers and People with Mobility Impairments *www.uw.edu/doit/working-together-computers-and-people-mobility-impairments*
VIEW	Working Together: Computers and People with Learning Disabilities *www.uw.edu/doit/Video/index.php?vid=29*
READ	Working Together: Computers and People with Learning Disabilities *www.uw.edu/doit/working-together-computers-and-people-learning-disabilities*
READ	Checklist for Making Computer Labs Accessible to Students with Disabilities *www.uw.edu/doit/checklist-making-computer-labs-accessible-students-disabilities*

Chapter 6
Accessible Technology Design

How technology can be designed so that is accessible to everyone, including users with disabilities

VIEW	IT Accessibility: What Campus Leaders Have to Say *www.uw.edu/doit/Video/index.php?vid=55*
READ	What can campus leaders do to ensure IT is accessible? *www.uw.edu/doit/what-can-campus-leaders-do-ensure-it-accessible*
VIEW	IT Accessibility: What Webmasters Have to Say *www.uw.edu/doit/videos/index.php?vid=58*
VIEW	World Wide Access: Accessible Web Design *www.uw.edu/doit/Video/index.php?vid=35*
READ	World Wide Access: Accessible Web Design *www.uw.edu/doit/world-wide-access-accessible-web-design*
READ	Web Accessibility: Guidelines for Administrators *www.uw.edu/doit/web-accessibility-guidelines-administrators*
READ	30 Web Accessibility Tips *www.uw.edu/accesscomputing/get-informed/publications/brochures/30-web-accessibility-tips*
VIEW	Captions: Improving Access to Postsecondary Education *www.uw.edu/doit/videos/index.php?vid=59*
READ	Who benefits from captions on videos? *www.uw.edu/doit/who-benefits-captions-videos*

Chapter 7
Access to STEM for Students with Disabilities

How STEM learning can be made welcoming and accessible to students with disabilities

READ	Broadening Participation in Science and Engineering by Welcoming Participants with Disabilities *www.uw.edu/doit/broadening-participation-science-and-engineering-welcoming-participants-disabilities*
VIEW	STEM and People with Disabilities *www.uw.edu/doit/Video/index.php?vid=53*
VIEW	Equal Access: Science and Students with Sensory Impairments *www.uw.edu/doit/Video/index.php?vid=10*
READ	Equal Access: Science and Students with Sensory Impairments *www.uw.edu/doit/equal-access-science-and-students-sensory-impairments*
VIEW	Working Together: Science Teachers and Students with Disabilities *www.uw.edu/doit/Video/index.php?vid=34*
READ	Working Together: Science Teachers and Students with Disabilities *www.uw.edu/doit/working-together-science-teachers-and-students-disabilities*
VIEW	The Winning Equation: Access + Attitude = Success in Math and Science *www.uw.edu/doit/Video/index.php?vid=28*
READ	The Winning Equation: Access + Attitude = Success in Math and Science *www.uw.edu/doit/winning-equation-access-attitude-success-math-and-science*
READ	Making Science Labs Accessible to Students with Disabilities *www.uw.edu/doit/making-science-labs-accessible-students-disabilities*
READ	Checklist for Making Science Labs Accessible to Students with Disabilities *www.uw.edu/doit/checklist-making-science-labs-accessible-students-disabilities*

READ	Equal Access: Universal Design of Engineering Labs *www.uw.edu/doit/equal-access-universal-design-engineering-labs*
READ	Checklist for Making Engineering Labs Accessible to Students with Disabilities *www.uw.edu/doit/checklist-making-engineering-labs-accessible-students-disabilities*
READ	Making a Makerspace? Guidelines for Accessibility and Universal Design *www.uw.edu/doit/making-makerspace-guidelines-accessibility-and-universal-design*
READ	Accessible Science Equipment *www.uw.edu/doit/accessible-science-equipment*
VIEW	Communication Access Realtime Translation: CART Services for Deaf and Hard-of-Hearing People *www.uw.edu/doit/videos/index.php?vid=57*

Chapter 8
Incorporating UD and Disability Topics into the Curriculum

How appropriate disability and UD content can be integrated into existing courses

READ	Universal Design of Web Pages in Class Projects *www.uw.edu/doit/universal-design-web-pages-class-projects*
READ	WebD2: A Promising Practice in Integrating Accessibility Topics into Curriculum *www.uw.edu/doit/webd2-promising-practice-integrating-accessibility-topics-curriculum?474=*

Chapter 9
Institutional Change and More Resources

How departments and institutions can become more welcoming and accessible to students with disabilities

VIEW	Self-Examination: How Accessible Is Your Campus? *www.uw.edu/doit/Video/index.php?vid=37*
READ	Self-Examination: How Accessible Is Your Campus? *www.uw.edu/doit/self-examination-how-accessible-your-campus*
READ	Equal Access: Universal Design of Engineering Departments *www.uw.edu/doit/equal-access-universal-design-engineering-departments*
READ	Equal Access: Universal Design of Computing Departments *www.uw.edu/doit/equal-access-universal-design-computing-departments*
READ	Broadening Participation in Science and Engineering by Welcoming Participants with Disabilities *www.uw.edu/doit/broadening-participation-science-and-engineering-welcoming-participants-disabilities*
READ	Increasing the Participation of Students with Disabilities in Science, Technology, Engineering, and Mathematics: Lessons Learned and Resources from NSF's RDE Projects *www.uw.edu/doit/increasing-participation-students-disabilities-science-technology-engineering-and-mathematics*

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Acknowledgment

Postsecondary Institutions, STEM, and Students with Disabilities is available in HTML and PDF versions. For the HTML version, visit *www.uw.edu/doit/postsecondary-institutions-stem-and-students-disabilities*.

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