



Universal Design of Instruction

DO·IT

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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 racial/ethnic backgrounds, ages, native languages, and learning styles, including visual and auditory learners. In addition, increasing numbers of students with disabilities are included in regular precollege and postsecondary courses. Their disabilities include blindness, low vision, hearing impairments, mobility impairments, learning disabilities, and health impairments.

Students are in school to learn and instructors share this goal. How can educators design instruction to maximize the learning of all students? The field of universal design can provide a starting point for developing a 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 environment involves the consideration of many factors, including aesthetics, engineering options, environmental issues, safety concerns, and cost. Typically, products and environments are designed 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.htm). For example, a standard door 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 installation of sensors that signal the door to open when anyone approaches, making the building accessible to everyone—a small child, a man whose arms are temporarily unavailable because he is carrying a large box, an elderly woman, a person using a walker or wheelchair.

When designers apply universal design principles, their products and environments 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 environment she and others might use.

Making a product or environment 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.

Universal Design of Instruction

At the Center for Universal Design at North Carolina State University a group of architects, product designers, engineers, and environmental design researchers established seven principles of universal design to provide guidance in the design of products and environments (Connell, Jones, Mace, Mueller, Mullick, Ostroff, Sanford, Steinfeld, Story, & Vanderheiden, 1997). The principles of universal design are listed below along with an example of an educational application for each.



1. **Equitable Use.** The design is useful and marketable to people with diverse abilities. *For example, a website that is designed so that it is accessible to everyone, including students who are blind and using text-to-speech software, 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 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 an 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 multimedia projected in a noisy academic conference exhibit includes 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 educational software that provides guidance when the student makes an inappropriate selection.*
6. **Low Physical Effort.** The design can be used efficiently and 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.*
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 principles can be applied to many products and environments. Using the Center for Universal Design format, universal design of instruction can be defined as the design of instruction to be usable by all students, without the need for adaptation or specialized design. The Council for Exception Children elaborates as follows:

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.

Universal design principles can be applied to the overall design of instruction as well as to specific instructional materials, facilities, and strategies such as curricula, lectures, classroom discussions, group work, handouts, Web-based instruction, labs, field work, and demonstrations. Universally designed curriculum provides students with a wide range of abilities, disabilities, ethnic backgrounds, language skills, and learning styles multiple means of representation, expression, and engagement (<http://www.cast.org/>). Listed below are examples of instruction that employ principles of universal design.

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.** Use multiple modes to deliver content 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. Provide printed materials that summarize content that is delivered orally.
4. **Information Access.** Use captioned videos. Make the content of 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. Make interactions 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 assures full access to the content for most students and minimizes the need for special accommodations. For example, designing Web resources in accessible formats as they are developed means that no redevelopment is necessary if a blind student enrolls in the class.

Accessible design can also generate unanticipated benefits for others. For example, captioning course videos, 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 students with a variety of learning styles and cultural backgrounds. Letting all students have access to your class notes and assignments on a Web site benefits students with disabilities and everyone else. Planning ahead saves time in the long run. 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/>

Council for Exceptional Children
<http://www.cec.sped.org/osep/udesign.html>

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<http://www.washington.edu/doi/>

National Center for Accessible Media (NCAM)
<http://main.wgbh.org/wgbh/pages/ncam/>

Recordings for the Blind and Dyslexic
<http://www.rfbd.org/>

Trace Research and Development Center
<http://www.trace.wisc.edu/world/>

Web Accessibility Initiative, World Wide Web Consortium
<http://www.w3.org/WAI/>

About DO-IT

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