



Universal Design of Instruction (UDI): Definition, Principles, Guidelines, and Examples

by Sheryl Burgstahler, Ph.D.

Precollege and college students come from a variety of ethnic and racial backgrounds. For some, English is not their first language. Also represented in most classes are students with a diversity of ages and learning styles, including visual and auditory. 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 (UD) can provide a starting point for developing a framework for instruction. You can apply this body of knowledge to create courses that ensure lectures, discussions, visual aids, videos, 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, industry standards, safety concerns, and cost. Often, products and environments are designed for the average user. In contrast, UD 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” (www.ncsu.edu/project/design-projects/udi/center-for-universal-design/the-principles-of-universal-design). 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. Applying UD principles 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 carrying a large box, an elderly woman, a person using a walker or wheelchair.

When designers apply UD principles, their products and environments meet the needs of potential users with a 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.

UDI Goal

The goal of UDI is to maximize the learning of students with a wide range of characteristics by applying UD principles to all aspects of instruction (e.g., delivery methods, physical spaces, information resources, technology, personal interactions, assessments).

UD Principles

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 (Connell, et al., 1997). The CUD’s principles of UD are listed below. They are followed by an example of application in instruction.

1. *Equitable use.* The design is useful and marketable to people with diverse abilities. Example: A professor’s website is designed



so that it is accessible to everyone, including students who are blind and using text-to-speech software.

2. *Flexibility in use.* The design accommodates a wide range of individual preferences and abilities. Example: A museum, visited as a field trip for a course, allows each student to choose to read or listen to a description of the contents of display cases.
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. Example: Control buttons on science equipment are labeled with text and symbols that are simple and intuitive to understand.
4. *Perceptible information.* The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities. Example: A video presentation projected in a course includes captions.
5. *Tolerance for error.* The design minimizes hazards and the adverse consequences of accidental or unintended actions. Example: Educational software provides guidance and background information when the student makes an inappropriate response.
6. *Low physical effort.* The design can be used efficiently, comfortably, and with a minimum of fatigue. Example: Doors to a lecture hall open automatically for people with a wide variety of physical characteristics.
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. Example: A flexible science lab work area has adequate workspace for students who are left- or right-handed and for those who need to work from a standing or seated position.

UDI Definition, Guidelines and Examples

Universal design principles can be applied to many products and environments. Using the CUD format, UDI can be defined as the design of instruction of products and environments to be usable by all students, to the greatest extent possible, without the need for adaptation or specialized design.

Universal design principles can be applied to the overall design of instruction as well as to specific instructional materials, facilities, and strategies (such as lectures, classroom discussions, group work, 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, action and expression, and engagement (called Universal Design for Learning by the Center for Applied Special Technology (CAST), www.cast.org/). Listed below are examples of instruction that employ principles of UD. They are organized under eight performance indicator categories, with a general guideline for each (Burgstahler, 2007).

1. *Class climate.* Adopt practices that reflect high values with respect to both diversity and inclusiveness. Example: Put a statement on your syllabus inviting students to meet with you to discuss disability-related accommodations and other special learning needs.
2. *Interaction.* Encourage regular and effective interactions between students and the instructor and ensure that communication methods are accessible to all participants. Example: Assign group work for which learners must support each other and that places a high value on different skills and roles.
3. *Physical environments and products.* Ensure that facilities, activities, materials, and equipment are physically accessible to and usable by all students, and that all potential student characteristics are addressed in safety considerations. Example: Develop safety procedures for all students, including those who are blind, deaf, or wheelchair users.
4. *Delivery methods.* Use multiple, accessible instructional methods that are accessible to all learners. Example: Use multiple modes to deliver content; when possible allow students to choose from multiple options for learning; and motivate and engage students—consider lectures, collaborative learning options, hands-



on activities, Internet-based communications, educational software, field work, and so forth.

5. *Information resources and technology.* Ensure that course materials, notes, and other information resources are engaging, flexible, and accessible for all students. Example: Choose printed materials and prepare a syllabus early to allow students the option of beginning to read materials and work on assignments before the course begins. Allow adequate time to arrange for alternate formats, such as books in audio format.
6. *Feedback.* Provide specific feedback on a regular basis. Example: Allow students to turn in parts of large projects for feedback before the final project is due.
7. *Assessment.* Regularly assess student progress using multiple accessible methods and tools, and adjust instruction accordingly. Example: Assess group and cooperative performance, as well as individual achievement.
8. *Accommodation.* Plan for accommodations for students whose needs are not met by the instructional design. Example: Know campus protocols for getting materials in alternate formats, rescheduling classroom locations, and arranging for other accommodations for students with disabilities.

CAST has focused specifically on the application of UD to curriculum. Specifically, CAST defines Universal Design for Learning (UDL) as “a framework for designing curricula that enable all individuals to gain knowledge, skills, and enthusiasm for learning. UDL provides rich supports for learning and reduces barriers to the curriculum while maintaining high achievement standards for all.” UDL calls for the integration of multiple means of representation, action and expression, and engagement into course curriculum.

Employing UD principles 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 ensures 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.

UD benefits students with disabilities but also benefits 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 website benefits students with disabilities and everyone else. Planning ahead saves time in the long run.

Employing UD principles in everything we do makes a more accessible world for all of us. It minimizes the need to alter it for anyone. For a complete UDI application checklist, consult *Equal Access: Universal Design of Instruction* at www.uw.edu/doit/Brochures/Academics/equal_access_udi.html.

Resources

Consult the following resources for further information on UDI.

Applications of Universal Design
www.uw.edu/doit/Resources/udesign.html

Bar, L., Galluzzo, J., & Sinfit, S.D. (1999). *The accessible school: Universal design for educational settings*. Berkeley, CA: MIG Communications.

Burgstahler, S. (2012). *Equal access: Universal design of instruction*. Seattle: DO-IT, University of Washington. www.uw.edu/doit/Brochures/Academics/equal_access_udi.html

Burgstahler, S. , & Coy, R. (Eds.). (2008). *Universal Design in Higher Education: From Principles to Practice*. Boston: Harvard Education Press.



Center for Applied Special Technology (CAST)
www.cast.org/udl/

The Center for Universal Design
www.ncsu.edu/project/design-projects/udi/

The Center for Universal Design in Education
www.uw.edu/doi/CUDE/

Connell, B. R., Jones, M., Mace, R., Mueller, J., Mullick, A., Ostroff, E., et al. (1997). *The principles of universal design*. www.ncsu.edu/project/design-projects/udi/center-for-universal-design/the-principles-of-universal-design/

Edyburn, D., & Higgins, K. (Eds.). (2005). *Handbook of special education technology research and practice*. Whitefish Bay, WI: Knowledge by Design.

National Center for Accessible Media (NCAM)
www.ncam.wgbh.org

Orkwis, R., & McLane, K. (1998). *A curriculum every student can use: Design principles for student access*. www.cec.sped.org/osep/udesign.html

Pisha, B., & Coyne, P. (2001). Smart from the start: The promise of universal design for learning. *Remedial and Special Education*, 22(4), 197-203.

Pliner, S., & Johnson, J. (2004). Historical, theoretical, and foundational principles of universal design in higher education. *Equity of Excellence in Education*, 37, 105-113.

Scott, S., McGuire, J., & Shaw, S. (2003). Universal design for instruction: A new paradigm for adult instruction in postsecondary education. *Remedial and Special Education*, 24(6), 369-379.

Silver, P., Bourke, A., & Strehorn, K. C. (1998). Universal instructional design in higher education: An approach for inclusion. *Equity & Excellence in Education*, 31(2), 47-51.

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, such as those in science, engineering, mathematics, and technology. Primary funding for DO-IT is provided by the National Science Foundation, the State of Washington, and the U.S. Department of Education.

For further information, to be placed on the DO-IT mailing list, request materials in an alternate format, or to make comments or suggestions about DO-IT publications or web pages, contact:

DO-IT
Box 354842
University of Washington
Seattle, WA 98195-4842
doi@uw.edu
www.uw.edu/doi/
206-685-DOIT (3648) (voice / TTY)
888-972-DOIT (3648) (toll free voice / TTY)
509-328-9331 (voice / TTY) Spokane
206-221-4171 (fax)
Founder and Director: Sheryl Burgstahler, Ph.D.

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