Designing any product or environment involves the consideration of many factors, including aesthetics, engineering options, environmental issues, safety concerns, industry standards, and cost. Often, designers focus on the average user. In contrast, universal design (UD), according to the Center for Universal Design (CUD) at North Carolina State University, “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/ncsu/design/cud/about_ud/udprinciples.htm).

When UD principles are applied, 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 Hispanic, six feet tall, male, thirty years old, an excellent reader, primarily a visual learner, and deaf. All of these characteristics, including his deafness, should be considered when developing a product or environment he, as well as individuals with many other characteristics, might use.

UD can be applied to any product or environment. For example, a typical service counter in a place of business is not accessible to everyone, including those of short stature, those who use wheelchairs, and those who 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 average 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 individuals using walkers and wheelchairs, but also benefit people carrying groceries and holding babies, as well as elderly citizens. Sidewalk curb cuts, designed to make sidewalks and streets accessible to those using wheelchairs, are more often used by kids on skateboards, parents with baby strollers, and delivery staff with carts. When television displays in airports and restaurants 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, equality, and inclusiveness. It is also a process. The following paragraphs summarize the process, principles, and applications of UD.

### The 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. UD can be applied to a variety of applications. The following list suggests a process that can be used to apply UD:

1. **Identify the application.** Specify the product or environment to which you wish to apply universal design.

2. **Define the universe.** Describe the overall population (e.g., users of service) and 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).
3. **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. Make these processes known in appropriate signage, publications, and websites.

4. **Adopt guidelines or standards.** Create or select existing universal design guidelines/standards. Integrate them with other best practices within the field of the specific application.

5. **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.

6. **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.

7. **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.

8. **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).

**Universal Design Principles**

At the CUD, 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 followed with an example of its application:

1. **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 and using screen reader technology, 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 visitors 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 clear and intuitive control buttons 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 is captioned television programming projected in a noisy sports bar.
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 software applications that provide guidance when the user makes an inappropriate selection.

6. *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.

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 work area designed for use by employees who are left- and right-handed and have a variety of other physical characteristics and abilities is an example of applying this principle.

**Applications of Universal Design**

UD can be applied to any product or environment, such as curricula, career services offices, multimedia, tutoring and learning centers, conference exhibits, museums, microwave ovens, recreational areas, homes, computer labs, worksites, and web pages. DO-IT (Disabilities, Opportunities, Internetworking, and Technology) produces publications and video presentations that promote UD in a variety of educational environments through its online Center for Universal Design in Education (CUDE).

Listed below are some of CUDE’s resources. Videos can be viewed freely online or purchased from DO-IT. Publications are provided in an accessible (HTML) and camera-ready (PDF) formats and may be duplicated for presentations, mailings, and other noncommercial purposes. You may link to the resources in the following list by selecting “Publications and Videos” at [www.uw.edu/doit](http://www.uw.edu/doit).

**UD in Education**

- Universal Design in Education: Principals and Applications
- Equal Access: Universal Design of an Academic Department
- Universal Design of Computer Science Departments

**UD of Instruction**

- Equal Access: Universal Design of Instruction
- Universal Design of Instruction: Definition, Principles, and Examples
- Equal Access: Universal Design of Tutoring and Learning Centers

**UD of Distance Learning**

- Equal Access: Universal Design of Distance Learning
- Real Connections: Making Distance Learning Accessible to Everyone

**UD as a Topic of Instruction**

- Universal Design of Web Pages in Class Projects

**UD of Software**

- Equal Access: Universal Design of Computer Labs
- Designing Software that is Accessible to Individuals with Disabilities
- Access to Technology in the Workplace: In Our Own Words
- Use of Telecommunications Products by People with Disabilities
- Creating Video and Multimedia Products that are Accessible to People with Sensory Impairments
- Web Accessibility: Guidelines for Administrators
- World Wide Access: Accessible Web Design

**UD of Libraries**

- Equal Access: Universal Design of Libraries

**UD of Student Services**

- Equal Access: Universal Design of Student Services
- Equal Access: Universal Design of Advising
- Equal Access: Universal Design of Career Services
- Equal Access: Universal Design of Computer Labs
Equal Access: Universal Design of Housing and Residential Life
Equal Access: Universal Design of Recruitment and Undergraduate Admissions
Equal Access: Universal Design of Registration
Equal Access: Universal Design of Student Organizations

**UD of Professional Organizations, Projects, Conference Exhibits, and Presentations**
Equal Access: Universal Design of Conference Exhibits and Presentations
Equal Access: Universal Design of Professional Organizations
Equal Access: Universal Design of Your Project

**UD of Physical Spaces**
Equal Access: Universal Design of Physical Spaces

**Additional Resources**
Center for Applied Special Technology (CAST)  
www.cast.org/udl/
Center for Universal Design  
www.ncsu.edu/project/design-projects/udi/
Center for Universal Design in Education  
www.uw.edu/doit/CUDE/

**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 DO-IT is provided by the National Science Foundation, the State of Washington, and the U.S. Department of Education.

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