

Universal Design



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

- Blindness
- Low vision
- Hearing impairments
- Mobility impairments
- Learning disabilities
- Health impairments
- Psychiatric impairments

Students want to learn and their instructors share this goal. How can instructors select their curriculum and instructional strategies to maximize the learning of all students? The field of universal design (UD) can provide a framework for instruction. This body of knowledge can guide instructors in creating courses where lectures, discussions, visual aids, videos, printed materials, web resources, labs, and field work 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. Often the design is created for the "average" user. In contrast, "universal design (UD) [15]" is, according to the Center for Universal Design [16], "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."

UD is an approach to designing the environment, products, and services that takes into consideration the variability in abilities and disabilities of the student body. Rather than focus on adapting things for an individual at a later time, an accessible environment, information resource, or service is created from the beginning. It meets 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 facilities, information resources, and services 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 video displays in airports and restaurants are captioned, they benefit people who cannot hear the audio because of a noisy environment as well as those who are deaf.

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. The principle of universal design are listed below along with an example of an application in an educational setting for each.

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 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 campus 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. A navigation screen for an online registration system that is accessible to a visitor who is blind and using text-to-speech software 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 student union facility includes captioning.
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 minimal fatigue. For example, 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 study area with adjustable tables designed for use by students with a wide variety of physical characteristics and abilities is an example of employing this principle.

UDI 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 to be usable by all students, without the need for adaptation or specialized design.

When designing classroom instruction or a distance learning class, strive to create a learning environment that allows all students, including a person who happens to have a characteristic that is termed "disability," to access the content of the course and fully participate in class activities. Universal design principles can apply to lectures, classroom discussions, group work, handouts, web-based instruction, fieldwork, and other academic activities.

Below are examples of instructional methods that employ principles of universal design. They are organized under eight performance indicator categories, with a goal statement for each. Applying these strategies can make your course content accessible to people with a wide range of abilities and disabilities, ethnic backgrounds, language skills, and learning styles.

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, education 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.

Consult *Equal Access: Universal Design of Instruction* [17] for more examples of universal design strategies.

Employing universal design principles in instruction does not eliminate the need for specific accommodations for students with disabilities. There will always be the need for some specific accommodations, such as sign language interpreters for students who are deaf. However, applying universal design concepts in course planning will assure full 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 re-development is necessary if a blind student enrolls in the class; planning ahead can be less time-consuming in the long run. Letting all students have access to your class notes and assignments on an accessible website can eliminate the need for providing materials in alternative formats.

Check Your Understanding

Employing UD principles to fully include one group of students can generate unanticipated benefits to others. Select from the list below those students who might benefit from captioning of videos.

1. Students for whom English is a second language
2. Students who are deaf
3. Students with visual impairments
4. Students in a noisy environment
5. Students who have learning disabilities

Responses:

1. **Students for whom English is a second language**
Yes, captioning can benefit students for whom English is a second language. Often their reading skills are better than their spoken English skills.
2. **Students who are deaf**
Yes, captioning provides access to deaf students.
3. **Students with visual impairments**
Captioning is generally not useful for students with visual impairments, but there is one exception: students who are deaf and have low vision (i. e., they can see large print) can benefit from captioning if the captions are large enough for them to see.
4. **Students watching the video in a noisy environment**
Students in a noisy environment will benefit from captioning. Students who have learning disabilities Some students with learning disabilities comprehend material better when they both see text and hear it spoken aloud. They benefit when videos are captioned.
5. **Students who have learning disabilities**
Some students with learning disabilities comprehend material better when they both see text and hear it spoken aloud. They benefit when videos are captioned.

Specific Academic Applications of UDI

Employing UD principles in everything we do makes a user-friendly world for all of us. It creates an accessible environment, minimizing the need to alter it for individuals with special needs.

Universal design strategies can be employed in designing specific campus services. Access the following sections of The Faculty Room to learn more:

- [Assistive Technology](#) [18]
- [Computer Labs](#) [19]
- [Design and Art](#) [20]
- [Distance Learning](#) [21]
- [Fieldwork](#) [22]
- [Group Work/Discussions](#) [23]
- [International/Travel Programs](#) [24]
- [Lectures](#) [25]
- [Science Labs](#) [26]
- [Test Taking](#) [27]
- [Web Pages](#) [28]
- [Work-Based Learning](#) [29]
- [Writing Assignments](#) [30]

The Process of UDI

The principles of universal design can be employed to the development and delivery of any course curricula, classroom activity, or student assessment. To apply universal design, the instructor can take the following steps:

1. **Identify the course.** Describe the course, its learning objectives, and its overall content.
2. **Define the universe.** Describe the overall population of the students eligible to enroll in the course and then consider their potential diverse characteristics (e.g., with respect to gender; age; ethnicity and race; naive language; learning style; and abilities to see, hear, manipulate objects, read, and communicate).
3. **Involve students.** Consider perspectives of students with diverse characteristics in the development of the course. If they are not available directly from students, gain student perspectives through diversity programs such as the campus disability services office.
4. **Adopt instructional strategies.** Adopt overall learning and teaching philosophies and methods. Integrate these practices with universal design guidelines or strategies for learning or instruction.
5. **Apply instructional strategies.** Apply universal design strategies in concert with good instructional practices to the overall choice of course teaching methods, curricula, and assessments. Then apply universal design to all lectures, classroom discussions, group work, handouts, web-based content, labs, fieldwork, assessment instruments, and other academic activities and materials to maximize the learning of students with a wide variety of characteristics.
6. **Plan for accommodations.** Learn campus procedures for addressing accommodation requests (e.g., arranging for sign language interpreters) from specific students for whom the course design does not automatically provide full access.
7. **Evaluate.** Monitor the effectiveness of instruction through observation and feedback from students with a diverse set of characteristics, assess learning, and modify the course On an

ongoing basis, monitor effectiveness of the instruction by gathering feedback from student participation and learning and make modifications based on this feedback. Also include universal design issues in the course evaluation and make course modifications based on this feedback.

Getting Started

Looking at all of these suggestions may seem overwhelming. The great thing about universal design, however, is that it can be applied incrementally. For example, a department might begin by assigning an existing diversity committee or creating a new task force to explore ways of making the department more welcoming and accessible to everyone. For more details, consult [Equal Access: Universal Design of an Academic Department](#) [31] and [Equal Access: Universal Design of Computing Departments](#) [32].

Using the [UDI Checklist](#) [33], members of the advisory group council could, as they go through the checklist, cross off checklist items not applicable in their department, note as "done" those that have already been implemented, and label with a recommended deadline date for those they feel should be addressed by the department. Then, using the online version of the checklist, they could order the items by date and add additional notes as appropriate. Presenting the timeline to the department decision-maker on diversity issues could be the next step. Once approval is secured, assigning staff and, when needed, securing budget funds could move the project along.

Review the [Applications of Universal Design](#) [34] for further information about universal design applications and processes. Consult the following sections of The Faculty Room to learn about access challenges and solutions for students with specific types of disabilities:

- [Attention Deficits](#) [35]
- [Autism Spectrum Disorders / Asperger Syndrome](#) [36]
- [Blindness](#) [37]
- [Deaf or Hard of Hearing](#) [38]
- [Health Impairments](#) [39]
- [Learning Disabilities](#) [40]
- [Low Vision](#) [41]
- [Mobility Impairments](#) [42]
- [Multiple Chemical Sensitivity](#) [43]
- [Psychiatric Impairments](#) [44]

Acknowledgments

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- Burgstahler, S. *Universal Design in Education: Principles and Applications* [46]. Seattle: University of Washington.
- Burgstahler, S. *Universal Design of Instruction: Definition, Principles, and Examples* [47]. Seattle: University of Washington.
- Burgstahler, S. *Universal Design: Principles, Process, and Applications* [48]. Seattle: University of Washington.

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- [1] <http://www.washington.edu/doit/doit/programs/accessdl>
- [2] <http://www.washington.edu/doit/doit/programs/accessengineering/overview>
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- [7] <http://www.washington.edu/doit/doit/programs/do-it-pals>
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