



# chapter

## The Principles of Universal Design and Their Application



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Universal design is simple in theory but more complicated in practice, and simply defining the term is not sufficient. Proponents of universal design have traditionally employed two strategies to communicate the approach. The first method has been through citation of good examples of aspects of the concept, such as lever door handles that require no grasping, remote controls to adjust devices from afar, and motion detecting room lights. The second strategy has been to offer time-proven tests for universal use, such as determining whether a device “can be used with a closed fist,” or “can be used in the dark,” or “requires 5 lbs. or less of force.” There were no definitive criteria covering all aspects of any design.

Staff of The Center for Universal Design, as part of its project “Studies to Further the Development of Universal Design,” conducted a series of evaluations of consumer products, architectural spaces, and building elements. The purpose of the evaluations was to determine optimal performance characteristics and use features that make products and environments usable by the greatest diversity of people.

The Center’s staff then convened a working group of architects, product designers, engineers, and environmental design researchers to assemble a set of principles of universal design that would encapsulate the existing knowledge base. These principles would apply to all design disciplines and all people. The principles could be applied to evaluate existing designs, guide the design process, and educate designers and consumers about the characteristics of more usable products and environments.

# The Principles of Universal Design and Their Application

The Principles of Universal Design (The Center for Universal Design, 1997) developed by this group are presented here in the following format:

***name*** of the principle, intended to be a concise and easily remembered statement of the key concept embodied in the principle;

***definition*** of the principle, a brief description of the principle's primary directive for design; and

***guidelines***, a list of the key elements that should be present in a design that adheres to the principle. (Note: all guidelines may not be relevant to all designs.)

Following each guideline are two to five photographs that demonstrate good applications of the guideline. The designs shown in the photos are not necessarily universal in every respect, but each is a good example of that specific guideline and helps illustrate its intent.

## References

The Center for Universal Design. (1997). *The Principles of Universal Design* (Version 2.0). Raleigh, NC: NC State University, Author.

# The Principles of Universal Design

by Betty Rose Connell, Mike Jones, Ron Mace, Jim Mueller, Abir Mullick,  
Elaine Ostroff, Jon Sanford, Ed Steinfeld, Molly Story & Gregg Vanderheiden

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## **PRINCIPLE ONE: Equitable Use**

*The design is useful and marketable to people with diverse abilities.*

Guidelines:

- 1a. Provide the same means of use for all users: identical whenever possible; equivalent when not.
- 1b. Avoid segregating or stigmatizing any users.
- 1c. Make provisions for privacy, security, and safety equally available to all users.
- 1d. Make the design appealing to all users.

## **PRINCIPLE TWO: Flexibility in Use**

*The design accommodates a wide range of individual preferences and abilities.*

Guidelines:

- 2a. Provide choice in methods of use.
- 2b. Accommodate right- or left-handed access and use.
- 2c. Facilitate the user's accuracy and precision.
- 2d. Provide adaptability to the user's pace.

## **PRINCIPLE THREE: 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.*

Guidelines:

- 3a. Eliminate unnecessary complexity.
- 3b. Be consistent with user expectations and intuition.
- 3c. Accommodate a wide range of literacy and language skills.
- 3d. Arrange information consistent with its importance.
- 3e. Provide effective prompting and feedback during and after task completion.

## **PRINCIPLE FOUR: Perceptible Information**

*The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.*

Guidelines:

- 4a. Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.
- 4b. Maximize "legibility" of essential information.
- 4c. Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).
- 4d. Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

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## **PRINCIPLE FIVE: Tolerance for Error**

*The design minimizes hazards and the adverse consequences of accidental or unintended actions.*

Guidelines:

- 5a. Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.
- 5b. Provide warnings of hazards and errors.
- 5c. Provide fail safe features.
- 5d. Discourage unconscious action in tasks that require vigilance.

## **PRINCIPLE SIX: Low Physical Effort**

*The design can be used efficiently and comfortably and with a minimum of fatigue.*

Guidelines:

- 6a. Allow user to maintain a neutral body position.
- 6b. Use reasonable operating forces.
- 6c. Minimize repetitive actions.
- 6d. Minimize sustained physical effort.

## **PRINCIPLE SEVEN: Size and Space for Approach and Use**

*Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.*

Guidelines:

- 7a. Provide a clear line of sight to important elements for any seated or standing user.
- 7b. Make reach to all components comfortable for any seated or standing user.
- 7c. Accommodate variations in hand and grip size.
- 7d. Provide adequate space for the use of assistive devices or personal assistance.

