Universal Design

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People with disabilities and older adults in the past had primarily lived in institutions to address their current conditions. With life spans increasing, the development of vaccines and healthier living, it was realized that changes needed to be identified and addressed for their individual disabilities, independence and safer lifestyles. Federal legislation was enacted that prohibited discrimination against people with disabilities and provided them access to public buildings and transportation. The Veterans Administration, Easterseals and other institutions worked on developing standards that would benefit all those with a disability.

States also started to create accessibility standards, leading to the 1968 Architectural Barriers Act, which focused on building design for outside access to buildings, internal access to the building's rooms and services, i.e., bathrooms, elevators and offices for public use. New technology in orthotics and prosthetics allowed for even more people to become mobile and get involved in their community, care for themselves, have a social life and visit others.

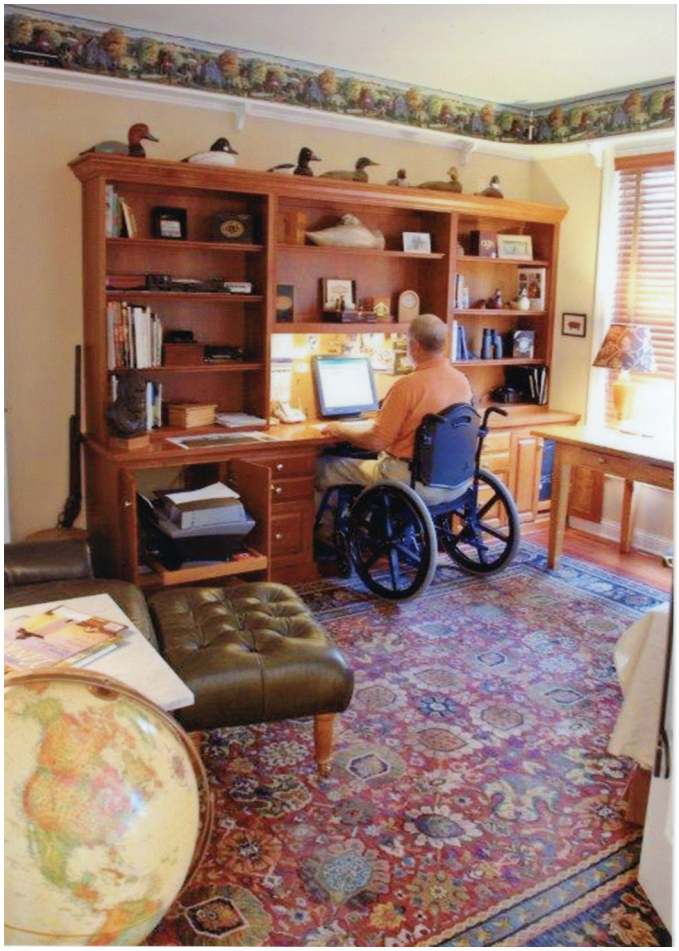
As baby boomers grew older, the growing importance of universal design led to improvements in accessibility in the home—with modifications ranging from simple faucet bath fixtures, lighting and appliances, as well as their location.

Universal design products and environments are to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. Working groups of architects, product designers and environmental design researchers have developed seven universal design principles for use in evaluating existing designs, guiding the design process, and educating both designers and consumers about the characteristics of more usable products and environments.

Principle One: Equitable Use[1]

The design is useful and marketable to any group of users.

- Provides the same means of use for all users: identical whenever possible; equivalent when not.
- Avoids segregating or stigmatizing any users.
- Provisions for privacy, security and safety should be equally available to all.



Principle Two: Flexibility in Use

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

- Provides choice in methods of use.
- Accommodates right or left-handed access and use.
- Facilitate user's accuracy and precision.
- Provides adaptability at 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.

- Eliminates unnecessary complexity.
- Is consistent with user expectations and intuition.
- Accommodates a wide range of literacy and language skills.
- Arranges information consistent with its importance.

◆ Provides effective prompting for sequential actions.

◆ Provides timely 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.

◆ Uses different modes (pictorial, verbal, tactile) for redundant presentation of essential information.

◆ Provides adequate contrast between essential information and its surroundings.

◆ Maximizes legibility of essential information in all sensory modalities.

◆ Differentiates elements in ways that can be described (i.e., makes it easy to give instructions or directions).

◆ Provides compatibility with a variety of techniques or devices used by people with sensory limitations.

Principle Five: Tolerance for Error

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

◆ Arranges elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated or shielded.

◆ Provides warnings of hazards and errors.

◆ Provides failsafe features.

◆ Discourages unconscious action in tasks that require vigilance.

Principle Six: Low Physical Effort

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

◆ Allows user to maintain a neutral body position.

◆ Uses reasonable operating forces.

◆ Minimizes repetitive actions.

◆ Minimizes 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.

◆ Provides a clear line of sight to important elements for any seated or standing user.

◆ Makes reaching to all components comfortable for any seated or standing user.

◆ Accommodates variations in hand and grip size.

◆ Provides adequate space for use of assistive devices or personal assistance.

It must be acknowledged that the principles of universal design in no way comprise all criteria for good design, only universally usable design. Certainly, other factors are important, such as aesthetics, cost, safety, gender and cultural appropriateness. These aspects should be taken into consideration as well.

When we designed and built our home, all seven of the principals were utilized. The house is at grade so there are no steps to enter the five exterior doors. We have carpet walkways in the garage between the two cars for safe footing. The halls are all four

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feet wide, and doors have three-foot openings. The bathroom sink is open underneath to provide room for my legs while sitting in a wheelchair. The bathrooms and toilets have three feet of open space on either side for transferring from a wheelchair. There is a large roll-in shower with no curb to step over. In the kitchen, the center island is low enough to access from a wheelchair. The toaster in the kitchen is in a pullout drawer for safe access.

In my professional capacity, I developed a residential accessibility survey to assist in collecting data on existing homes. In addition, I developed a client survey for gathering information on the client, their physical limitations, visual limitations, hobbies, ability to transfer, long-term prognosis and even medications that might have negative side effects.

The type of disability, current and potential future limitations, their self-confidence and motivations, and even the abilities of the caregiver have to be understood and addressed in order to ensure a positive long-term living situation while adapting to living with a disability. ■

1. Rosetti, Rosemarie. "The Seven Principles of Universal Design." *Action Magazine,* Dec. 2006.

Richard Hardine is the author of *Lessons Learned: My Lifelong Journey with Polio.* His articles include "Universal Design," "Housing Design Breaks Down Barriers" and "Planning to Build Your Retirement Home Using Universal Design."