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Universal Design

Transparent, Inclusive, Attractive . . . and an Essential Consideration for Today's Residential Designers

By JOSEPH DENNIS KELLY II

Universal design means finding opportunities for helping every client live better.

All photos in this article are of the Sarah and James Pirkl home in Placitas, New Mexico, for *AARP The Magazine* by Rodolphe Foucher.

To eliminate slips, this soaking tub is surrounded by a wide tiled bench.

Advocates predict that in the next decade universal design will transform the American home, significantly altering real estate, design and construction standards. Their benchmark is the capacity of a home to accommodate the physical, sensory and psychological abilities and limitations of all its occupants—and their visitors—over the course of their lifetimes.

Redefining Perceptions

Designer and writer Valerie Fletcher, executive director of Adaptive Environments, a Boston-based nonprofit design education organization, says that although most people think universal design is limited to designing for the disabled and the elderly, it's also a philosophy for resolving pressing social concerns. In Japan, with the world's fastest-aging population, universal design practitioners help the elderly live more

"Designers must start thinking about universal design if they are to remain competitive in the next decade."

– MICHAEL THOMAS, FASID

comfortably. But in Brazil, Fletcher explains, universal design helps accommodate a nation dominated by 20- to 40-year olds—and their children. When Fletcher and her organization visit Rio in December 2004 to host the international *Designing for the 21st Century III* conference, she and the conference participants will see in abundance the symbol that defines universal design in Brazil—and the subject of most of its universal design projects—a pregnant woman.

Back home in the United States, Fletcher adds, universal design is emerging as a practice for aiding the cognitive, physiological and psychological development of children. Using the Seven Principles of Universal Design (see sidebar on p. 14)—compiled in 1997 by several universal design advocates through The Center for Universal Design at North Carolina State University— designers have created daycare facilities with low-height windows and color-coded rooms and circulation areas. The windows allow children to view the outside environment unassisted, and the color-coded rooms and halls provide children with a system for navigating the building unescorted. From this, children develop the confidence to independently engage their environment.

Known as "design for all" in Europe, universal design is built on the premise that we all have changing needs throughout our lives. Viewed this way, universal design helps communities and individuals prepare for the future as it improves the quality of life today. Florida-based interior designer Michael Thomas, FASID, principal of The Design Collective Group and a universal design instructor, says that as universal design becomes "more palatable, more than just three-dimensional, it will become more human and less technique and more philosophical." Thomas, who is an NAHB-certified Aging in Place specialist and an official ASID spokesperson for aging in place, says designers must start thinking about universal design if they are to remain competitive in the next decade. He asserts that designers need a new perception about universal design—that it's not a specialized design practice. It is, he says, an approach for finding opportunities that help each client live better. Everyone, says Thomas, has a mobility limitation; builders and designers need to understand this.

Selling the Idea

The biggest challenge that designers face in selling universal design to clients is shifting the popular perception that it only addresses the needs of the disabled and elderly. The designers interviewed for this article all report that clients have refused universal design solutions. Many clients refuse even to discuss universal design, wanting to avoid the thought of aging and impairment. Like many other universal design experts, Thomas focuses on the positives of universal design: open space, easy-to-use equipment, and large storage and circulation areas. And like other universal design practitioners, he integrates the principles of universal design into all of his projects. The intent is to find the best solution for the client, without evoking the negativity that universal design sometimes prompts.

Every nook, appliance and storage area in the Pirkl kitchen is within easy reach.

The laundry area is adjacent to the kitchen and includes a front-loading washer and dryer and a generous expanse of easy-to-reach counter space.

The Seven Principles of Universal Design

Principle 1
Equitable Use
The building's design should make it equally usable by everyone. Ideally, the means by which people use the building should be the same (e.g., providing one means of entry to the building that works well for everyone). If it cannot be identical, the several means provided must be equivalent in terms of their privacy, security, safety and convenience. The building must never employ means that isolate or stigmatize any group of users or privilege one group over another.

Principle 2
Flexible Use
The building's design should allow people to use its design features in more than one prescribed way (e.g., providing a countertop orientation map that is viewable from either a seated or standing position). It should accommodate both right- and left-handed use and be adaptable to the individual user's pace. The building's design should have the built-in flexibility to be usable even when it is employed in an unconventional or unanticipated manner.

Principle 3
Simple and Intuitive
The building should make it easy for everyone to understand the purpose of each design feature and how to use it (e.g., providing washroom lavatory faucets that make their method of operation readily apparent and relatively easy). Moreover, its means of use should be intuitively obvious so that it operates as anticipated and, therefore, can be used spontaneously.

Principle 4
Perceptible Information
The building should provide all essential information in a variety of modes (e.g., written, symbolic, tactile, verbal) to ensure effective communication with all users regardless of their sensory abilities. The information provided must be presented with sufficient contrast to surrounding conditions so that it is distinguishable from its context and decipherable in all its various modes of presentation.

Principle 5
Tolerance for Error
Ideally, the building's design should eliminate, isolate or shield any design features that could prove hazardous or inconvenient to any user. When potentially dangerous conditions are unavoidable, users should receive warnings as they approach the design feature (e.g., providing proximity warnings in a variety of sensory modes near the top of stairs). The building's design should also anticipate accidental or unintended actions by any user to minimize the inconvenience and/or protect the user from harm.

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This foldaway ironing board adjusts up or down to allow the ironer to work standing or sitting.

Thomas adds that conversations with clients about their future mobility must be handled carefully.

One approach Thomas often uses to open clients up and get them talking about short-term and long-term plans for the house—as opposed to any anticipated long-term physical limitations—is to show them design alternatives that might make their house more accommodating for their disabled and elderly friends and relatives. These alternatives include locating a bathroom and bedroom on the first floor, positioning motion detector lights on stairs and in halls, and adding multilevel kitchen counters. Two of his favorite uncommon alternatives are single-level stories void of step-up and step-down rooms and 30-inch high light switches. The latter positions the switch out of sight, allows grandchildren to easily turn the light on and accommodates seniors who have difficulty lifting their arms.

Children and seniors are not the only people who benefit from interiors crafted with a universal design perspective. When a mid-forties Florida couple needed a redesign of their newly constructed four-story townhouse, they called on Thomas. The challenge was that the woman suffers from an advanced arthritic condition. Thomas discovered that some of the redesign issues were immediately apparent: changing faucet, door and cabinet knobs to levers; installing sliding rollouts and shelf dividers in the kitchen cabinetry; and creating an interior arrangement uncluttered with furniture and furnishings. His mastery in working with universal design showed itself when he designed a built-in seating arrangement in the dining room, which allowed him to create larger pathways that could easily accommodate a wheelchair traversing the space. "What's amazing," says Thomas, "is that the builder of [this] high-end home could have easily utilized basic universal design principles without any additional cost [and] that would have addressed the needs [of the homeowner]. Instead, a good deal of client dollars were spent just to swap out [the] items for something just as good-looking but a lot more functional . . . The single most important thing designers can do is to help clients maintain a high quality of life and to keep them living independently."

Interior designer Drue Lawlor, FASID, believes that the design industry is far ahead of other industries in its acceptance of universal design principles and its capacity to meet the expected sharp increase in consumer demand for universal design environments and products. Lawlor, a

The Seven Principles of Universal Design

continued

Principle 6
Low Physical Effort
The building's design should employ design features that require little or no physical force to use them (e.g., replacing a traditional door knob with a lever handle that does not require the ability to grasp and turn the wrist). If a low level of force is required, any user should be able to engage the feature without assuming an awkward or hazardous body position (e.g., providing a smooth travel surface with minimal slope along the path of travel leading to the entrance).

Principle 7
Size and Space for Approach and Use
A building's design features should provide an adequate amount of space that is appropriately arranged to enable anyone to use them (e.g., providing knee space under a washroom lavatory to enable use by someone in a seated position). In addition, the space needs to be arranged to provide a clear path of travel to and from important design features for all users.

universal design instructor and co-principal of the Dallas-based education-works, inc., has been helping professional designers, architects and builders understand the basics of universal design for five years. Although designers cannot possibly know the lifestyle and mobility requirements that clients will have 10 or 20 years down the road, Lawlor says that designers can create opportunities that will enable their clients to adapt their homes to the limitations they acquire as they age. Hence, the house ages with the client. Through her seminars, Lawlor seeks to help designers understand how to provide their clients with environmental solutions that adapt to the client's requirements, rather than to design interiors where the client must adapt themselves to the obstacles in the environment. (See sidebar on p.18.)

Understanding that universal design can help people live better in their personal environments, Lawlor says, presents a challenge to builders and designers: they must accept responsibility for helping those they serve achieve their residential goals. In her seminar *Unlimited by Design: Kitchens and Bathrooms,* Lawlor informs designers about the array of products that serve people with impairments. She also helps

Universal design means open space, large storage and circulation areas, and easy-to-use equipment.

Suspended toilets in the bathrooms of the Pirkl house allow easy access and cleaning. Pull handles on cabinets and drawers permit easy retrieval of stored items.

designers understand the challenges and requirements that clients face as they age and their abilities gradually diminish. It is through initiatives such as her seminars that the Seven Principles find continuous renewal and everyday relevance.

For one active and healthy couple in their early 50s, Lawlor redesigned their kitchen and bathroom with an eye toward the future. Her intent also involved making their everyday lives much easier. In the kitchen, she replaced the conventional slide-in range with a built-in cooktop and built-in oven and removed the cabinetry and counters, installing instead a system of slide-out storage spaces—including narrow pantry shelving—in combination with varying height counters topped with granite. These features offer the client an environment of limited bending and stretching; the granite helps decrease mold accumulation. The kitchen also houses a refrigerator with a bottom freezer and an updated lighting arrangement that includes a variety of natural and artificial light sources.

In the bathroom, Lawlor replaced the tub with a large shower containing a fold-down seat and a hand-held shower head. The conventional sink was removed in favor of a pedestal sink—accessible by someone using a mobility aid and offering adjacent mobile storage and an accompanying vanity. The doorways were widened to create the feeling and appearance of spaciousness and to accommodate a wheelchair. Additionally, to improve visibility, a varied selection and greater number of lighting sources

Basic Considerations for Incorporating Universal Design

Drue Lawlor, FASID, is one of several design professionals who advocate that universal design is not only for the disabled and the elderly, but is about designing environments that provide occupants with comfortable, functional and safeguarded settings. To create such environments, Lawlor recommends that designers include the following considerations when crafting project solutions:

- Observe the client's lifestyle and their particular physical abilities and mobility limitations. Doing so enables you to create plans that successfully accommodate the client's immediate needs and that can easily adapt to meet the client's physical changes due to aging and age-related illnesses and injuries.
- Put yourself in the client's shoes and learn what activities—cooking, gardening, getting in and out of the shower on his or her own—are most important to a feeling of independence. Design that is focused on interests and abilities—and not just limitations and challenges—sets a positive tone for the environment and conveys the personality of the individual.
- Question the client about what works for him or her, because what a designer thinks may work for the client may not always coincide with what actually does work best for the client. Of course, what the client believes works best for him or her may not be the best solution either. Investigating alternatives and educating clients about usability and accessibility will often lead to better informed design choices and more effective design solutions.
- Use as many motorized, remote-controlled and motion detector products as possible, especially for window treatments, windows, lights, electronic equipment, toilets and faucets. MyOneRemote.com offers a combination portable phone and audio/visual remote control in one product. Motion detector lights are an excellent energy efficient solution that provides invaluable extra lighting in places like stairs, halls and closets.
- Look beyond the standard. Every individual has unique needs and oftentimes what is considered the standard, like the slope on an ADA-compliant ramp, will not work for some people. Such standards should be viewed as the minimum requirements and not rote application. Learn the abilities of the client, and provide him or her with solutions that he or she can use today as well as five to ten years from now.
- Look beyond the ordinary. Keep an eye out for hidden opportunities. Is one person very tall and another very short? This can influence counter heights in the bath and kitchen, toilet heights, and cabinet and shelving design.
- Understand that clients need environments that they can use. And the bathroom, above all, should easily accommodate the client's needs. If a kitchen doesn't work, one can always hire someone else to cook; if the bathroom doesn't work, the client will need to either redesign or move. Moving is more likely given the amount of time redesigns usually take.
- Plan closets directly above each other in multi-story houses. If the client should ever need an elevator or chair lift installed, this area could easily accommodate such an alteration.
- Design step-less entries, wide doorways and large doors to accommodate wheelchairs or other assisted mobility equipment. Such designs can be sold to the clients as ways of creating more spacious and dynamic interiors.
- Build platforms around bathtubs to provide ledges that allow ease of getting in and out. Tubs should have non-slip surfaces, never non-slip mats, which eventually do slip. Non-slip flooring should be placed in areas where liquids can spill, such as bathrooms and kitchens. Throw rugs—a threat for slipping and tripping—should be avoided everywhere. Padded shower and bath seats provide maximal comfort, and hand-held showers are a benefit for everyone, from the grandparent bathing the grandchild to the grandchild washing the family dog. Taller toilets provide an easy transfer between wheelchair and toilet.
- All bathroom walls should have blocking to support grab rails whether installed now or later. Grab rails—both horizontal and vertical—should be strategically placed near areas such as toilets, tubs and showers.

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were added. This case study shows that universal design need not be cryptic or prescriptive. Many designers, Lawlor included, find that the best way to introduce clients to universal design is to incorporate its principles into their basic methodology. This allows them to present universal design in a way that's free of the stigma associated with accessibility and ADA and that shows how universal design can enhance a client's enjoyment—and improve the usability—of their home. What's surprising to many designers and clients is that most universal design solutions need not be expensive. Typical universal-design-informed configurations, like larger doorways and open shelving, require the same labor and materials as non-universal-design elements.

According to Jackie Simon, GRI, a Washington, D.C.-area real estate agent, "[Universal design] is about educating people to think ahead about their mobility and their ability to stay in their homes over their lifetime." This is a much sounder investment, she says, than waiting for an emergency situation where a family member suffers a life-altering injury—or even a temporary one—and cannot return home because he or she is unable to navigate the house. The most common short-sighted rebuttals that builders employ to defend their non-universal-design-friendly ways of thinking proclaim that no one wants to be reminded that they're getting older, that universal design creates institutionalized environments, and that builders follow the market and give people what they want.

Simon, who sits on a D.C.-area commission for people with disabilities, says the real issue is the lack of consumer knowledge about available options. Most consumers believe that their only housing options are the ones that builders show them. Most don't know to ask for universal design and usually settle for what's offered to them, much to their own detriment. Simon believes every builder should offer at least one universal design model to help consumers understand their options. She sees adversarial responses to universal design as a sign that many

Basic Considerations for Incorporating Universal Design

continued

- Design bathrooms with radiant heating on the floor, heated towel bars, and proper venting. As people age, they become increasingly sensitive to the cold, and with the possibility of needing more space in a bathroom for mobility aids, the room may take longer to heat.
- Add under-counter refrigerators in the kitchen, bedroom or living room. These are easy to access, and put beverages and food within the client's reach if they are confined to a wheelchair. Compact kitchens can be installed in a variety of areas of a home that can accommodate a two-burner cooktop and/or microwave as well as a sink and a refrigerator. Such a solution may eliminate the need to completely remodel the existing kitchen. Cabinet drawers should have full extension capability to prevent clients from bending to look into the back of the drawer. Open shelving, which may offer easier access, should also be considered. An open plan can more effectively channel natural and artificial light into an interior's core.
- Place a bedroom and bathroom—or a room that could be easily adapted into such a space—on the first floor. This should be seen as a necessary standard in all multi-story homes.
- Create one level per floor. Sunken and raised rooms are potential hazards for everyone and should be avoided.

Interior designer and universal design instructor Drue Lawlor, FASID, is co-principal of education-works, inc. (www.education-works.com), with ASID President Linda Elliott Smith, FASID. Through their firm's national seminar classes and online training programs, Lawlor and Smith have been helping professional designers, architects and builders understand the basics of using universal design, and have helped professionals in the built environment better understand how to more responsibly serve their clients with designs that enable those clients to more easily live in their homes through all life stages.

Good universal design is transparent and aesthetically pleasing.

still misunderstand it and misjudge its benefits, including that good universal design is transparent and aesthetically pleasing. Simon, who sells about 20 universal design residences each year, says universal design needs to be something all home industry professionals understand. (Last year, Simon received an award from the National Association of Realtors for the universal design seminars she presented at real estate industry conferences and to federal government departments such as the U.S. Department of Housing and Urban Development.)

"It's all about sensible planning," says Simon, a fair housing activist who has contributed to the effort to secure protected class status for people with disabilities. "With most people," she continues, "it's not a question of if, but a matter of when they will have a different physical capacity than they have at the present moment."

Availability of Products

The recent availability of aesthetically pleasing ADA-compliant consumer home products—from OXO, the unofficial poster company of universal design, and Hewi, a German hardware manufacturer noted for its engineering mastery—are also helping bring universal design into the mainstream.

"When universal design came about," Shelley Siegel, FASID, says, "we had a difficult time convincing designers that this was the way they should design. When I first started, we didn't have [attractive, universal-design-informed] products. There was a time when the hoses of hand-held showers were not long enough for someone in a seated position to use. Users changed the hoses themselves. Eventually the manufacturers got on the ball [and realized what was needed]. The challenge [that universal design presents] is to think about everybody in the house and how they are going to use a particular product."

Siegel, principal of the Florida-based Accessible Interiors Network and a long-time universal design educator, explains that everyone endures some type of temporary limitation—injury, illness and distress—during their lifetime that compromises their ability to use their environment and objects. Recently, she broke her foot and found her normal daily activities limited during recovery. Thanks to her universal-design-informed house, Siegel was able to use her home with relative ease. Such universal design success stories rely on the ability of designers to think outside the box. Unfortunately, Siegel adds, designers who don't understand what universal design can bring to a project and how it can serve a client simply ignore it.

More Research

An AIA cognitive research project under the direction of John Eberhard, FAIA, is examining the ability of the brain to produce new cells as a result of encountering well-designed environments and objects. For Fletcher, who sees Eberhard's work as an important step toward scientifically proving a case for universal design, cognitive encounters and design solutions go hand in hand. She recommends to the graduate design students she teaches at the Boston Architectural Center that they each keep a journal of their cognitive responses to the places they visit. Doing so, she advises, provides an invaluable resource they can reference when developing future project solutions. Fletcher also explains that universal design has helped bring to light limitations and disabilities that are under-recognized and little-considered, such as respiratory illness, which she says is the leading disability of U.S. children and the fourth-ranked disability among U.S. adults. Education, she adds, is essential toward advancing universal design. Her organization provides generous programming that promotes professional-level opportunities for a better understanding of universal design. Other organizations that offer ongoing programs include The Center for Universal Design at North Carolina State University, SUNY Buffalo and ASID. Well-respected educators, offering designers an inexpensive alternative for professional development, have recently published several universal-design-related books. (See sidebar on p. 22.)

Training is essential to establish universal design as a core design value among the next generation of professionals.

Educating Professionals, Planning Tomorrow

Maryland-based architect John Salmen, AIA, publisher of the *Universal Design Newsletter* (www.universaldesign.com) also recognizes that training is essential for establishing universal design as a core design value among the next generation of professionals. Although he sees an ever-increasing number of college and university design programs developing courses involving universal design, he believes that many of these programs still stigmatize universal design as a specialized area of study. What's worse, he continues, is that many of the instructors are not as fully informed about universal design as they should be. "[Universal design is] about looking at how different types of abilities are enhanced or supported by the environment," Salmen explains, "and how the Seven Principles are exemplified in facilities . . . the more one knows about people and how they operate, the better the design becomes and the better one is able to anticipate different needs that allow people doing things differently to have choices." (With the late Ronald Mace, universal design's recognized founder and the force behind the Seven Principles, Salmen co-authored the 1988 *Construction Specifier* article in which the idea of universal design first appeared.)

When the consortium of international universal design professionals meets in Brazil later this year, they will revisit the appropriateness of the Seven Principles after several years of use, says Fletcher. Conference attendees are also planning to develop initiatives to diversify the ethnic mix of universal design advocates—most are white, middle-class Americans—and spearhead new opportunities for extending the Seven Principles into disciplines beyond interior, industrial and architectural design, including digital and graphic design. Fletcher believes that only through such developments and a unified effort to advance the discipline can universal design remain fresh and responsive to today's ever-changing global environment. One encouraging development, she adds, is the European Union's embrace of universal design. EU leaders see it as an appropriate approach for transitioning their centuries-old environments into thriving contemporary communities that can accommodate individuals with sophisticated and diverse lifestyles. Developments like this are driving a new public consciousness with an emphasis on universal design as an investment in creating environments that enable everyone to live better. "Time will make universal design successful," Salmen says. "The press is discussing it more and more. Products are becoming available. And more designers are thinking and talking about it." ❍

Philadelphia-based journalist Joseph Dennis Kelly II specializes in writing about architectural, object, interior and urban design. The Home & Design editor of Philadelphia Style *magazine, his work has appeared in* Architectural Record, Architecture, Metropolis, Clear, Core77.com, I.D. (International Design) *and* World Architecture magazine.

Book-Smart Universal Design

Valerie Fletcher, executive director of Adaptive Environments, the 25-year-old Boston-based non-profit offering educational programming in universal design, recommends the following publications for self-education about universal design.

The Universal Design Handbook
By Wolfgang F. E. Preiser and Elaine Ostroff.
Publisher: McGraw-Hill Professional. Published 2001. 1,216 pages. List price: $125; includes book and CD-ROM. ISBN: 0071376054. This 4.8 pound, 69-chapter book is the comprehensive print resource on universal design. Its international focus allows designers to develop a context for understanding how universal design is applied around the world. The book's diverse offering of information—from education and research to detailed case studies to public policy initiatives—is complemented with hundreds of illustrations.

Inclusive Design: Design for the Whole Population
By John Clarkson, Roger Coleman, Simeon Keates and Cherie Lebbon.
Publisher: Springer-Verlag UK. Published 2003. 626 pages. List price: £90 (about $110). ISBN: 1852337001. This 36-chapter book is a compendium of theory and practice, though its focus is primarily product design. It provides a strong historical account of inclusive design with practical approaches for using this design methodology, as well as speculative accounts on its future use.

Universal Kitchen and Bathroom Planning: Design that Adapts to People
By Mary Jo Peterson.
Publisher: McGraw-Hill Professional. Published 1998. 382 pages.
List price: $79.95. ISBN: 0070499802. Peterson offers practical advice with lots of helpful and easy-to-follow floor plans. This resource is for professionals familiar with universal design and looking for fresh ideas and project solutions.

Gracious Spaces: Universal Interiors by Design
By Irma Dobkin, ASID and Mary Jo Peterson.
Publisher: McGraw-Hill Professional. Published 1999. 203 pages. List price: $49.95. ISBN: 0070171513. Primarily dealing with accessibility issues for the disabled and the elderly, this book gives designers what they love most: professional case studies with detailed floor plans.