



Access FOR ALL

No matter what name it's known by, adopting the principles of Universal Design leads to products, buildings, spaces, and modes of transportation that are better for everyone.

By Russ Willcutt



Whether it's called Universal Design, Design for All, or Inclusive Design, the movement advocating greater accessibility in architecture, city planning, product design, and other shared areas of life is gaining momentum. Proof can be found in the existence of entities such as The Center for Universal Design at North Carolina State University, which defines Universal Design as "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." Others include The Institute for Human Centered Design in Boston and the Center for Inclusive Design and Environmental Access—or The IDEa Center—at the University of Buffalo, among many others. While these organizations have different structures and missions, one thing they share is encouraging the embrace of the seven principles of Universal Design (UD): equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error, low physical effort, and size and space for approach and use (*see boxes for details*).

"One of our main thrusts involves educational outreach," according to Jordana Maisel, who is director of outreach and policy studies at The IDEa Center. "While we definitely reach out to consumers, we also target professionals in a wide variety of fields such as architects, realtors, engineers, and health-care providers. And thanks to the combined efforts of advocates around the world, we're really seeing a growing awareness and acceptance of the fact that UD results in cities, structures, and products that are better for everyone, and for those with physical and sensory disabilities in particular."

UD Advocates

Some may be surprised to learn how long organizations supporting UD have been around. The Institute for Human Centered Design was founded under the name Adaptive Environments in 1978, for instance, and The IDEa Center was launched in 1984. "Its founder is Edward Steinfeld, an architect, gerontologist, professor, and current director of the center," Maisel explains. "He was one of the authors of the *Principles of Universal Design*, and he was involved in a lot of the original accessibility standards that were developed in the mid to late seventies, so he's been involved in this for a long time now."

Established to conduct research and development activities in the UD field, the center's first decade saw projects completed on accessible bathroom and housing design, wayfinding for people with severe visual impairments, and product designs for those with limited reach and grip, just to list a few examples. Its activities expanded in 1999 with the help of a major center grant from the U.S. Department of Education's National Institute for Disability and Rehabilitation Research. Officially known as the Rehabilitation Engineering Research Center on Universal Design at Buffalo, the grant—usually referred to as an RERC grant—allowed the center to take on staff and begin collaborations that still exist today with the U.S. Access Board, Concrete Change, and others. This grant was followed by another RERC in 2005, this one focusing on UD and the built environment. The third, awarded in 2008, is a collaboration with the Robotics Institute at Carnegie Mellon University and addresses accessible public transportation, with partners including the United Spinal Association and Gillig Bus, Inc.



The IdeA Center

EQUITABLE USE

The design is useful and marketable to people with diverse abilities. **Guidelines:** provide the same means of use for all users—identical whenever possible, equivalent when not; avoid segregating or stigmatizing any users; make provisions for privacy, security, and safety are equally available to all users; make the design appealing to all users. *Source: The Principles of Universal Design, Connell et al., 1997.*

UD1

“As you can see, we’ve experienced a great deal of growth in the last 10 years alone,” Maisel says, “and in addition to our R&D and educational outreach efforts—which includes our e-newsletter and the development of online continuing education courses—we also offer consulting services on housing and information design as well as conducting accessibility assessments and online surveys.”

These surveys are an interesting approach to UD: examining whether it’s actually working where its principles have been incorporated. “We’re strong believers in evidence-based practice, because if you can show that UD doesn’t cost more, and that it does have health and usability benefits, more people may come to adopt its principles,” she explains. “For instance, Dr. Steinfeld recently took a tour of the Boston Transportation System to examine its fare gates. They’d noticed the gates designed for accessibility were breaking down more often because more people were using them than they’d anticipated, for the simple reason that it’s easier to get your luggage and packages through a wider exit or entrance. So that’s a great example right there of how UD makes things better for everyone.”

Urban Accessibility

Boston could be seen as a city leading the charge in adopting the principles of Universal Design. One longtime advocate is Steve Spinetto, a commissioner in the Mayor’s Office on Disability. In recent years he has focused much attention on maritime accessibility. “If you look at a map you’ll see how much of the city is separated by water, so getting around can

involve using one or all the modes of water transportation that are available, such as ferries and water taxis,” he says. “One of the biggest considerations for people with mobility issues involves getting on and off the watercraft.”

Boston has some of the most extreme tide variances of any U.S. city, with a mean of nine and a half feet and occurring twice each day. “So the challenge involves ramping systems for the floating docks that can adjust to that variance,” Spinetto says.

He describes a trip he once took to Venice, Italy, which is crisscrossed by canals spanned by bridges with stairs and too steep for wheelchairs to navigate. The solution involved utilizing the boat buses zooming around the city, which were all highly accessible. “They’d developed a system where people in wheelchairs could roll right on and off, and the boats would alternate the sides of the canal where they docked, so you could use the boats to get across the canal. I’d never thought about a boat or ferry as a means of enhancing a city’s accessibility before, so that really opened my eyes as to what we could accomplish in Boston as well.”

The first project involved one of the city’s busiest piers, Pier 4 in Charlestown, next to where the *USS Constitution*—or “Old Ironsides”—is docked. “We developed an articulating ramp that connects the shore to the floating docks, and it worked so well that we ended up adding them to our entire water transportation system.”

Still, adjustments were required, especially in addressing both high and low tides. The challenge in this instance has to do with the steepness of the ramp, with a short ramp for the high tides and a longer one connected to additional ramps on the floating dock. There were also two different ramping systems, one for low tide and another for high, with signs posted to alert commuters of the current situation.

In addition to this work Spinetto is an adjunct faculty member at Suffolk University, where he teaches disability studies. He also collaborates with organizations such as the U.S. Access Board, where he chaired the Passenger Vessel Advisory Board that drafted the passenger vessel access standards for the ADA. As an advocate of Universal Design, Spinetto works closely with water-tour and other

FLEXIBILITY IN USE

The design accommodates a wide range of individual preferences and abilities. **Guidelines:** provide choice in methods of use; accommodate right- or left-handed access and use; facilitate the user’s accuracy and precision; provide adaptability to the user’s pace.

UD2



A familiar scene of chaos and confusion, above, compared to a sweeping space at the Vancouver International Airport utilizing the rules of Universal Design that's intuitive and easy to navigate, at right.

Stantec

maritime operators in providing accessibility to their passengers, and he says they have a long history of mutual cooperation.

"They've always been open to accommodating both our office and their customers with physical disabilities," he says. "I think anyone who's in the transportation business realizes that by taking all of their passengers into consideration, they're going to do more business. It's really as simple as that."

Global Ambassadors

Another Boston-based advocate is The Institute for Human Centered Design, which was established more than three decades ago and also played a role in the development of the principles of Universal Design. As executive director, Valerie Fletcher is in a position to discuss the evolution of UD both chronologically and geographically. "The movement really began in the seventies, when social mores shifted so that people with disabilities were entering the community rather than being institutionalized," she explains. "Sometimes

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referred to as the ‘barrier-free’ movement, this was occurring throughout the United States, Europe, and Japan, and it’s an important factor in the beginnings and the evolution of Universal Design.”

Founded as Adaptive Environments by Elaine Ostroff and Cora Beth Abel, the organization recently changed its name to The Institute for Human Centered Design in order to truly reflect the broad spectrum of its mission and activities. “As they relate to design, the laws on accessibility tend to focus on people who are wheelchair users,” she says. “But that population numbers around 3.3 million people in the United States, while the total number of people with disabilities of all types is approximately 54.4 million, so we wanted our name to encompass our desire to promote design that works for everyone across the spectrum of ability and age.”

The institute began as an outgrowth of what was known as the Arts and Human Services Project, which was a graduate program supported by the Massachusetts Department of Mental Health at the Massachusetts College of Art in Boston. The multidisciplinary program emphasized the role artists and designers play in creating community-based programs for people with disabilities. “Deinstitutionalization was in play and schools, libraries, public recreational spaces, and even homes weren’t designed to accommodate this new level of community diversity. So the institute was established to address these concerns, in terms of the design of places, in order to achieve greater social equity.”

In the decades since the institute’s sphere of influence has greatly expanded, with its concerns and contributions now international in scope. “It’s very important for us to be aware of what’s going on outside of the United States because it informs our work here, as well as our audience,” Fletcher says. “We do a great deal

Universal Design URLs

The Center for Inclusive Design and Environmental Access/IDEA Center
www.ap.buffalo.edu/idea

The Institute for Human Centered Design
www.humancentereddesign.org

City of Boston/Commission for Persons with Disabilities
www.cityofboston.gov/civilrights/disability.asp

The Center for Universal Design/NC State University
www.design.ncsu.edu/cud

Canadian Transportation Agency
www.otc-cta.gc.ca

Stantec
www.stantec.com

Waypoint-Backstrom Principles/Maritime UD
www.waypointcharter.com/accessible_travel.htm

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:** eliminate unnecessary complexity; be consistent with user expectations and intuition; accommodate a wide range of literacy and language skills; arrange information consistent with its importance; provide effective prompting and feedback during and after task completion.

UD3

PERCEPTIBLE INFORMATION

The design communicates necessary information effectively to the user, regardless of ambient conditions or the user’s sensory abilities. **Guidelines:** use different modes (pictorial, verbal, tactile) for redundant presentation of essential information; provide adequate contrast between essential information and its surroundings; maximize “legibility” of essential information; differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions); provide compatibility with a variety of techniques or devices used by people with sensory limitations.

UD4

of writing, and we speak at various universities and institutions around the world, and it’s very interesting to see how differently the idea of accessibility and human-centered design are embedded in these cultures.”

She points to Japan, the United Kingdom, and Australia as leaders in incorporating UD into the very fabric of their societies. “In Australia, for instance, our colleagues are involved in a national initiative on smart housing, which isn’t about technology as you might first think,” according to Fletcher. “It’s about human-centered design that integrates economic, environmental, and socially sustainable features into one package, resulting in smart housing. And in England you have the Commission on Architecture in the Built Environment, which was created by Tony Blair to improve the quality of public architecture, and they’ve made a tremendous commitment toward educating people about inclusive design.”

Knowing of this work, and being involved in it, helps the institute in its relationship with various U.S. agencies, writing interpretive guidance on the Americans with Disabilities Act (ADA) for the Department of Justice and standing as one of 10 geographic Disability and Business Technical Assistance Centers that are supported by the Department of Education. In addition, it is the national Design and Construction Resource Center as part of the Fair Housing Accessibility FIRST Program, which is funded by the U.S. Department of Housing and Urban Development.

“We believe that human-centered design should be a core characteristic of socially sustainable design,” Fletcher says, “and while that’s a common theme in other countries, it’s still a very unfamiliar concept in the United States. We’d like to do what we can to help change that.”



Open spaces in airport terminals provide travelers with clear lines of sight to their destinations, lowering stress and unnecessary confusion. The Ottawa International Airport is shown here.

Other Approaches

Anyone with a disability who has traveled widely throughout the United States knows that ADA compliance at many facilities is quite often a matter of meeting the bare minimum required rather than embracing it wholeheartedly. This may be an unintended consequence of the way the law is structured and enforced, relying more on punishment for noncompliance than education on the resulting benefits of embracing acces-

sibility and the principles of Universal Design. Considering Canada's approach provides an interesting contrast.

Janet Glendenning is acting manager of Regulations, Research, and Analysis in the Accessible Transportation Directorate of the Canadian Transportation Agency. In her work involving rail, air, ferry, and interprovincial bus she explains that the country's approach primarily involves "voluntary codes of practice" rather than regulations.



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A charrette—or intense design session—at the Stantec architectural and engineering design firm, above. A home designed according to the principles of Universal Design, in which The IDEa Center was involved, on the opposite page.

“We have two sets of regulations, with one concerning the training of staff who deal with the public and may interact with people with disabilities, another for air transportation involving carriers of a certain size, and five voluntary codes of practice that provide guidelines encouraging the use of UD,” she says. “While these voluntary codes are not actual regulations that we can go out and enforce, we developed them in consultation with all of our stakeholders, which includes not only the disability organizations but industry as well. If we receive a complaint however, we assemble a panel to consider the case, and if the complaint is covered under our codes we take that into consideration in the formal decision-making process and can order corrective measures through the decision. We do expect transportation service providers to comply since they were consulted and involved in the development of the standards. However, that’s just one factor that a panel will take into consideration upon receipt of a formal complaint.”

According to Glendenning, this approach works. “I personally believe that people want to have accessible facilities,” she says. “The thing is, they have a million other things they also have to do, and a million things competing for their money, so if we can collaborate with them and encourage them to adopt the principles of UD, it makes it so much easier for everybody. And most of the time I find that they really want to do it.”

As an example of how the implementation of UD can be approached, progressive design firms are considering the needs of persons with disabilities from the very beginning stages of design through completion, and they are engaging in consultation with disability organizations and experts. One architect who has personal experience with this process is Stanis Smith, senior vice president of Stantec, an architectural and engineering design firm with offices across North America. An acknowledged expert on utilizing UD in terminal design, he has worked on the airports in Vancouver, Ottawa, and Winni-

TOLERANCE FOR ERROR

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

Guidelines: arrange elements to minimize hazards and errors, with the most-used elements being the most accessible and hazardous elements eliminated, isolated, or shielded; provide warnings of hazards and errors; provide fail safe features; discourage unconscious action in tasks that require vigilance.

UD5

It’s very important for us to be aware of what’s going on outside of the United States because it informs our work here.”

—Valerie Fletcher

LOW PHYSICAL EFFORT

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

Guidelines: allow user to maintain a neutral body position; use reasonable operating forces; minimize repetitive actions; and minimize sustained physical effort.

UD6

peg, all of which were “greenfield” projects, meaning they involved designing a freestanding structure from the ground up rather than making renovations to an existing facility. He says that one of his first steps is to think of his own experiences while flying.

“For most of us, I think the airport is a pretty stressful place,” he says, “and to the extent that we can reduce that stress by making the space easier to navigate, we’re basically benefiting everyone, not just people with physical disabilities.”

The key, he says, is to consider every aspect of the airport experience, beginning with a passenger’s arrival at the approach to the terminal. “How easy to read and intuitive is the signage, and how friendly is the check-in experience to someone with mobility disabilities or in a wheelchair? How simple is it to get through security with some semblance of dignity intact, and how easy is it to find your gate? Our interest as a design firm is to make the experience something that people look forward to rather than dread,” he says, “and that’s something incorporating UD principles can help us to achieve.”

Some of the solutions are the simplest. One approach is to provide a clear line of sight from the check-in all the way through to the aircraft at their gates, thereby making wayfinding and orientation easy and intuitive. Other approaches involve subtle touches such as using the patterns in the carpets and floor tiles to act as a subliminal guide, facilitating wayfinding. This is also achieved using lighting and architectural devices that direct people to their gate naturally, without that panicked feeling of being late and lost. “One of the things I always say to my design team is that the use of signage is an admission of failure,” he says with a laugh, “because if we need to use them, we haven’t properly done our job as designers.”

With the Winnipeg terminal his firm designed still under construction, Smith points to the Ottawa and Vancouver airports—which have been fully operational and open for some time now—as proof of the benefits to be realized by incorporating UD into the original designs. “The Ottawa International Airport has won several awards for its accessibility, and we’re quite proud of the innovative ways



The iDeA Center

Growing Acceptance

Not long ago, most people may have thought that Universal Design had to do with theology, or spaceship construction. These days you find evidence of the growing awareness of this concept in the mainstream media, with articles on UD and accessibility appearing in major newspapers such as The New York Times and USA Today. Quite often these stories appear in the travel section, which is further proof that these concepts are increasingly being considered in the design/planning stages of resort developments, cruise ships, airports, planes, trains, and even entire cities. Steve Spinetto has a front-row seat on the latter.

“I can tell you that there has been a real surge in the attention paid to these concepts in the area of urban planning and transportation in recent years,” he says, “and one sign is that the Boston Mayor’s Office on Disability and my position both exist. And that’s something you’ll find happening in cities across the country. In fact, there are now so many of us that we’re considering establishing a professional organization for people who are involved in issues such as Universal Design and accessibility in large and small cities across the United States. So I think that travelers with disabilities who enjoy visiting metropolises like Boston, Chicago, and Los Angeles have every reason to feel encouraged at this point in time, because every day we’re lowering the barriers so that everyone can fully enjoy these great American cities.”

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:** provide a clear line of sight to important elements for any seated or standing user; make reach to all components comfortable for any seated or standing user; accommodate variations in hand and grip size; provide adequate space for the use of assistive devices or personal assistance.

UD7

in which we were able to use lighting to help people navigate the space in Vancouver.”

A native of South Africa, Smith’s relationship with a quadriplegic friend awakened him to the challenges people in wheelchairs face as they attempt to utilize the public spaces we share. “It struck me that it was almost impossible for her to get to our house for a visit because of all the curbs and other things that would’ve cost so little to fix,” he says, “so that’s how I became interested in the whole subject of UD and accessibility. One of our first airport commissions once I’d immigrated to Canada was in Vancouver, and that’s been in operation for about 17 years now and has received international recognition for its design, structure, and accessibility. It continues to number among the 10 best terminals in the world, according to the likes of Condé Nast and others, so you can see how incorporating the principles of Universal Design results in a space that’s useful and appealing to everyone.”



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