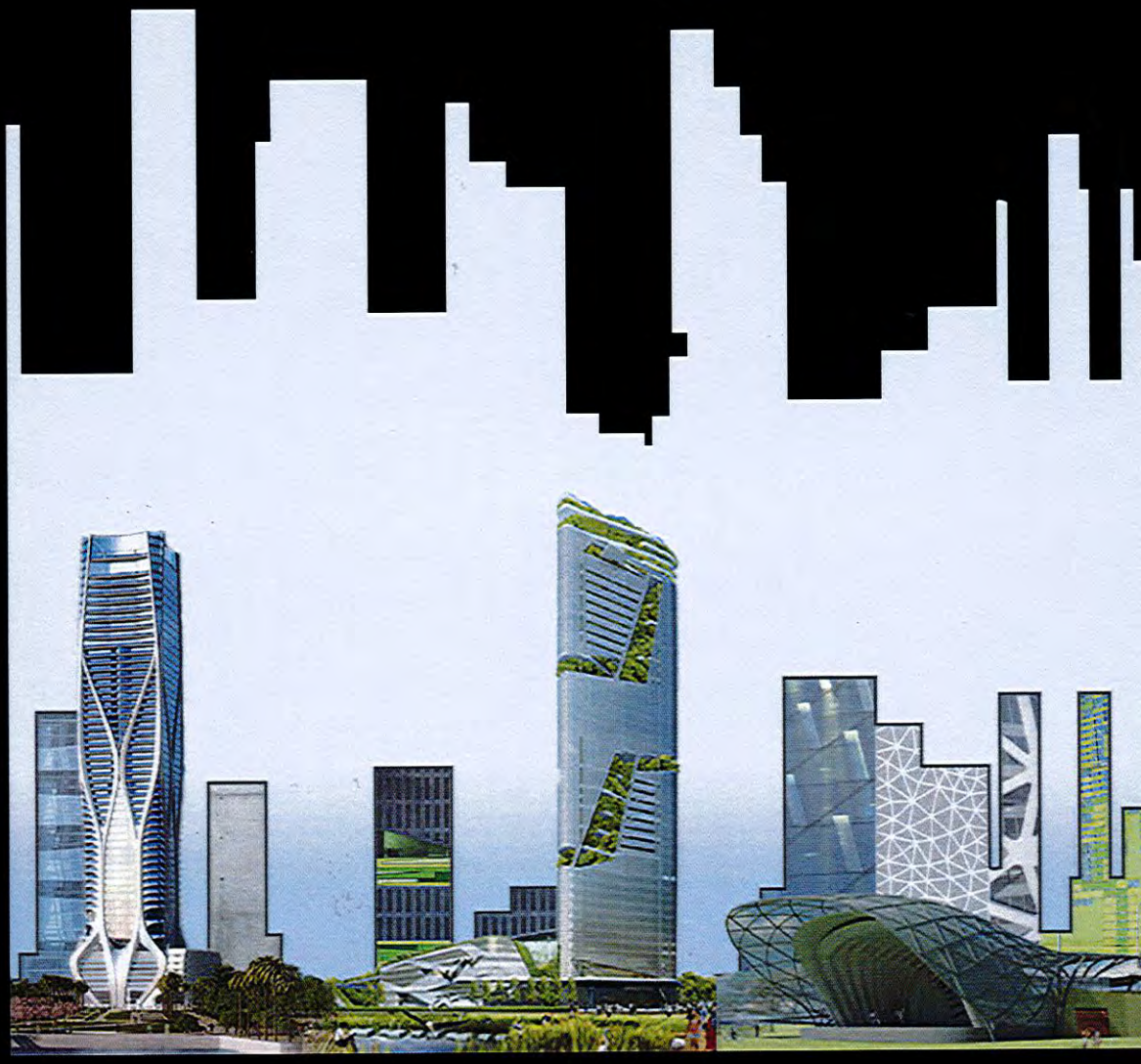
ROUTLEDGE COMPANIONS



The Routledge Companion for Architecture Design and Practice

Edited by Mitra Kanaani and Dak Kopec

17

Inclusive/Universal Design

People at the Center of the Design Process

Valerie Fletcher

Design as a Social Art

We episodically remember that architecture—and all of design—is a "social art" by people for people. Our definition of "social" evolves and shifts in response to the current context. With Vitruvius' treatise on architecture in the first century, a perfectly proportioned young athletic male was the starting point for a rational architecture that aligned human symmetry with the perfect geometries of the circle and the square. More than 1,400 hundred years later Leonardo da Vinci created the drawing that defined that perceived harmony between the idealized human body and the physical world (Froyen, 2012).

In the Middle Ages, the mingling of architecture and devotional practices emphasized every aspect of the mind and body's involvement in pilgrimage. The Abbey at Cluny and the Cluniac monasteries throughout Western Europe created magnificent vaulted stone structures that were perfect complements to the sound of chanted psalms. The effect was so compelling that the monasteries drew crowds of pilgrims hundreds of miles, some making the trek at the end of their lives to the splendor of that multisensory experience as the ideal transition to the afterlife (Conant, 1978).

Early modernists Marcel Breuer, Le Corbusier, Walter Gropius, and Mies van der Rohe took up the reformist stance of the Arts and Crafts movement and "embraced the philosophy that good design might, by bringing unity to the arts, operate as a tool for social change" (Barter, 2001). For them, the opportunity for standardization of quality would make good design available to everyone across the economic spectrum.

The mid-twentieth century called for a new modernism that explored the relationship between architecture and human needs as well as synthesizing social science disciplines that could enhance architecture's positive impact on people. The College of Environmental Design at the University of California at Berkeley pays homage to its founders from that era and quotes William Wurther's vision expressed in an essay on architectural education in 1948 in the *Journal of the AIA*. Wurther extols the importance of emphasizing architecture for the social and public good over personal expression and promotes the incorporation of scientific knowledge from the social sciences and economics (College of Environmental Design, University of California at Berkeley, n.d.).

Intersections between social trends and architecture, from Vitruvias' foundational ideas about the body as a base element for form to industrialization as an opportunity to extend good design to everyone, have defined the sequential iteration of architecture as a social art.

Twenty-first Century Demographics as a Catalyst

In the twenty-first century, another intersection of cultural trends poses a radical challenge to architecture and design. This time, it is a demographic tsunami competing for attention in a world still newly awakened to a shared responsibility for sustainability. Twentieth-century inattention, if not blatant irresponsibility, to the protection of the planet's finite resources demands a sense of urgency that few would question today. For those designers of the built environment who make choices about materials and energy, there is a special onus. A weekly bounty of lectures, publications, conferences, and symposia sound the alarm of the risk to life as we know it. They assert the critical role of designers to find ways to stem the damage and uncover new methods of making places and things that not only do no harm but contribute to the restoration of balance. Opportunities abound in design education to pursue undergraduate and graduate degrees and certificates in environmental sustainability. Though some programs offer a more expansive attention to social sustainability, it's rare to find attention to design for a world more diverse in age and ability than ever before.

Global Aging

The dramatic extension of the human lifespan is an equally dramatic by-product of the twentieth century. Longer lives—worldwide—are an irreversible fact of the twenty-first century with profound implications for architecture and design. A recent joint publication from the United Nations Population Fund and HelpAge International, *Ageing in the Twenty-First Century: A Celebration and A Challenge,* makes the point that global aging is the most stunning accomplishment of the last hundred years but also that it demands a comparable sense of urgency to green if we are to make it work.

The hallmarks of development worldwide are that the population lives healthier and longer lives and that each woman has fewer children. As development progresses, the population age cohorts shift dramatically. Today, only Japan has a population where the percentage of people aged 60 and over is 30 percent of the population. By 2050, it's expected that 64 nations will have 30 percent or more of their population over 60 (United Nations Populations Fund, Help Age International 2012). The longer lives in the developed nations are no surprise where there are resources to ensure safety, adequate nutrition and good healthcare. But the phenomenon of aging is at least as extraordinary a story in the developing nations. Today 50 countries have more than 10 million people aged 60 or over; seven of them in developing countries (United Nations Populations Fund, Help Age International, 2012).

We don't have the option to cheer our good fortune and our 30-year 'longevity dividend' and get on with our longer lives. If we do nothing, our demographic bonus catapults us into untenable social and economic conditions in which a sizable portion of elders are physically and economically dependent. With the reduction or eradication of infectious and parasitic diseases and with safer drinking water, we now live long enough for a high proportion of us to experience chronic conditions and non-communicable diseases. Our challenge is to figure out how to design a world that can accommodate an increasing volume of episodic and persistent functional limitations and allow as many people as possible to be independent and thriving as contributors for all of their lives.

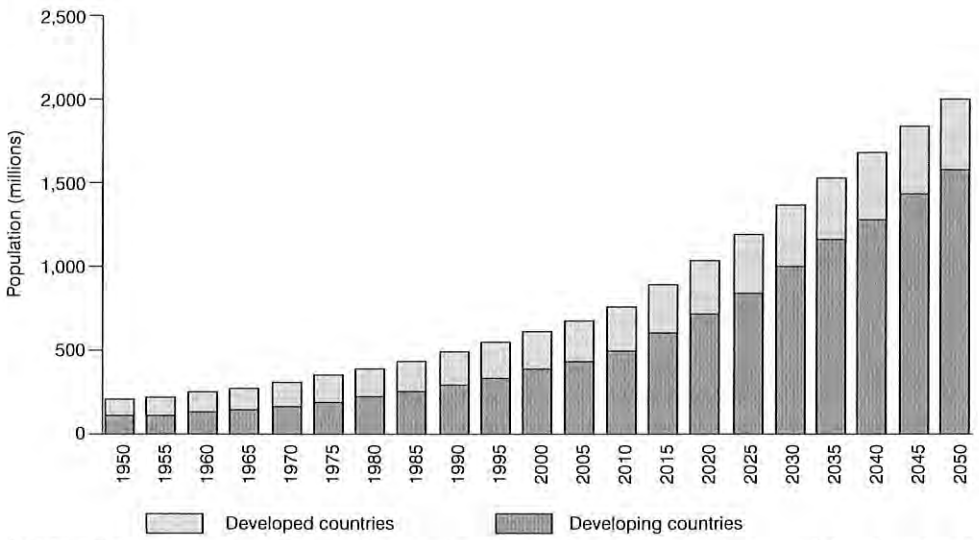


Figure 17.1 Chart of world population aging depicts the identical trajectory of developed and developing countries. Chart courtesy: HelpAge International

A Global Shift in the Etiology of Disability

The extraordinary boon in lifespans is not the only by-product of the global public health successes of the twentieth century. Disability has changed fundamentally in etiology and in the shift from a focus on diagnosis as destiny to an appreciation that functional impact is what's significant to understand and to mitigate. We once assumed disability to be the fixed state of a minority who had congenital impairments, birth trauma, or who acquired significant functional impairments from injury or illness. Now, with longer lives and high survival rates, difference in ability has increased to become a predictable human experience, at least episodically, for everyone.

Arthritis, not surprisingly, in all its manifestations from the common osteoarthritis to rheumatoid arthritis, lupus, fibromyalgia, and gout leads as the most common reason for disability in the U.S. Though it is common among people over 65, two-thirds of people with arthritis are under 65. The symptomatic joint pain and stiffness can dramatically impact both dexterity and the ability to walk or climb stairs (Centers for Disease Control and Prevention, 2013).

Hearing loss is another example of a rising incidence condition related to aging. This observation is borne out by recent epidemiologic data reporting 26.7 million Americans 50 or older have hearing loss, a substantially higher number than those who self-report hearing loss. Fewer than 15 percent of that number own hearing aids with a far smaller proportion who use them (Lin, 2012). We have yet to grapple with the design of environments for work or leisure that anticipate this new reality.

Changing Perspectives on Disability Impact Data

As a demographic category, disability is a human characteristic similar to race or gender. An individual may or may not choose it as part of their personal identity. For some, there is a

sense of community that can be a source of pride and strength. For many others, especially those with non-apparent conditions, there is little impetus to disclose a disability. It is likely that the sharp global shift away from categorization by diagnoses was made possible by the many thousands of people who reinvented the experience of disability by living unique self-directed lives because they were free to do so for the first time. With the shift in focus to a continuum of health and function, we leave behind notions of a sharp line between health and disability and recognize the mutability of individual limitations.

In order to understand better whom we are designing for, it's helpful to know the four questions on disability in the U.S. Census Bureau's American Community Survey (ACS), all of them soliciting a yes or no answer about a set of functional limitations of whatever cause:

- Is this person deaf or does he/she have serious difficulty hearing?
- Is this person blind or does he/she have serious difficulty seeing even when wearing glasses?
- Because of a physical, mental, or emotional condition, does this person have serious difficulty concentrating, remembering, or making decisions?
- Does this person have serious difficulty walking or climbing stairs?
- Does this person have difficulty dressing or bathing?
- Because of a physical, mental, or emotional condition, does this person have difficulty doing errands alone such as visiting a doctor's office or shopping (U.S. Census Bureau, 2013)?

The U.S. Census Bureau annually issues a report to coincide with the anniversary of the passage of the Americans with Disabilities Act on July 26 in 1990. Their 2014 report indicated that there are 56.7 million Americans with disabilities, about 19 percent of the non-institutionalized population. That's 8 percent of children under 15; 21 percent of people 15 and older; 50 percent of people 65 and over.

What is the functional profile of this large slice of the population? The Census Bureau reports that the most common impairment for people 15 and over is movement limitation, such as walking or climbing stairs with 30.6 million reporting it (U.S. Census Bureau, 2014). Most within that big number use no visible assistive devices, not even a cane. As any built environment designer knows, the primary focus across all accessibility standards is design that accommodates people who use wheelchairs or other wheeled mobility. Though many others who report difficulty walking can benefit from designs for wheelchair access, the actual number of people who use wheelchairs in the United States is 3.6 million today, projected to grow to only 4.3 million by 2030.

Children and Disability

The changes in childhood disability are at least as dramatic as for adults. Many of the most common conditions causing disability in the twentieth century have been eradicated (e.g., smallpox, diphtheria, polio, rubella). Families have fewer children. Over the last century the population in the United States tripled but the birth rate declined dramatically, from 32.2 to 14.4 per 1,000 persons (Halfon *et al.*, 2012). The United States has a higher fertility rate than other developed nations but still averages just one or two children per woman and less than the 'replacement rate' of 2.1 births that maintains the existing population (Livingston & Cohn, 2012).

The United States led the world in modeling legal mandates for non-discrimination for children with disabilities but, even more significantly, was the first nation to ensure the provision, regardless of cost, of integrated education for children with disabilities. The 1975 Individuals with Disabilities Education Act (IDEA) mandated that children and youth ages 3–21 with disabilities be provided a free and appropriate public school education in an integrated setting to the maximum extent possible, paid primarily, like all preK-12 public education, from local property taxes and supplemented with federal and state formula grants (U.S. Department of Education, n.d.). The U.S. commitment to integrated education has transformed the experience of growing up with a disability in America as well as guaranteeing that every student is exposed to peers with functional differences.

The most recent Department of Education statistics reports that 95 percent of 6- to 21-year-old US students with disabilities were served in regular schools. Only 3 percent were served in a specialized school for children with disabilities with 1 percent placed in private schools by their parents. Less than 1 percent of children with disabilities between 3 and 21 were served a separate residential facility, educated at home, in a hospital, or in a correctional facility (Halfon *et al.*, 2012).

Inclusive schools are normative in the U.S. But accessibility standards for the design of schools hasn't caught up with the changing profile of childhood disability. Until the 1960s, the typical image of childhood disability was of a child with polio using leg braces and crutches. Rates of childhood disability are increasing but they are due primarily to emotional, behavioral, and neurological conditions (Livingston & Cohn, 2012). The United States also experienced much higher survival rates of very fragile preterm births, some of whom will have complex physical, sensory and cognitive limitations all of their lives. The design interventions for children on the Autism Spectrum and others such as learning disabilities and sensory processing disorders are being explored in small studies around the world but not yet widely known.

One constant remains in place: the disparity in rates of disability between poor and non-poor families. Poor households have rates of disability 150 percent of non-poor families (Salmen, 2001).

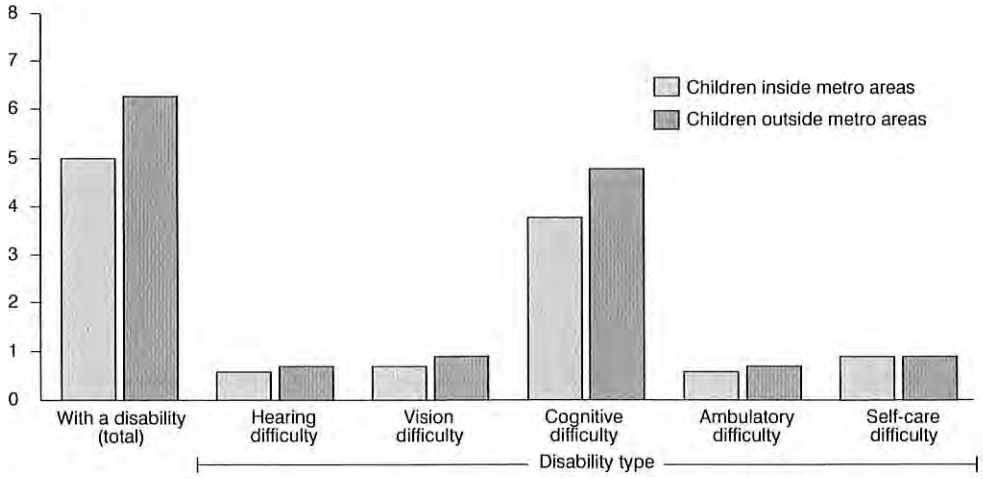


Figure 17.2 Chart illustrates the dramatic prevalence of cognitive difficulty as a reason for disability among school-aged children. Image courtesy: International Copyright, 2016, U.S Department of Commerce, U.S Government

In the twenty-first century, the social art of design must find ways to respond to a new world shaped by our collective good fortune in which we can expect to live longer and survive more than at any time in human history. Design is a key to that being a celebratory challenge and not a shared burden.

Requirements for Accessibility

United States Legal Infrastructure for Accessibility

The United States was an early adopter of mandates for accessibility that date to the early 1960s. The American National Standards Institute (ANSI) issued the first standards for accessibility in 1961 with ANSI A117, initiating a continuing practice of public/private collaboration. It became the basis for model building codes. At the federal level, the Architectural Barriers Act of 1968 referenced ANSI A117, the first of a sequence of laws with regulations and standards that became the framework for legally mandated accessibility in the U.S. (National Council on Disability, 2003).

The passage of the Rehabilitation Act in 1973 marked the first time that people with a range of functional limitations were considered a "class" that could be identified as having a shared experience of discrimination. It built upon the 1964 Civil Rights Act. In a time of social ferment and activism, people with disabilities shared strategies and tactics with the anti-war, women's, and gay right's movements.

Section 504 of the Rehabilitation Act was designed to promote and expand opportunities for persons with a broad range of disabilities and offer protection from "unwarranted discrimination stemming from prejudice, social stigmas, and negative assumptions about their ability to fully participate in the mainstream of society" (U.S. Access Board, 2004). Previously, people with developmental disabilities, blindness or low vision, mental health conditions, who were Deaf or hard-of-hearing, veterans, polio survivors, and others were considered separately in the nation's laws and policies. For the first time anywhere, design was identified as a civil right, making the case that equal opportunity for people with disabilities is contingent on accessible environments.

From 1984 to 1990, a sequence of three federal laws expanded the rights of the newly protected class of people with disabilities, all with stipulations for accessible design. The 1984 Voting Accessibility Act mandated that polling places be accessible or that alternative ways be identified that would enable older adults and people with disabilities to exercise their right to vote. The 1988 Amendments to the 1968 Fair Housing Act (FHA), expanded the original protections of the Act that prohibited discrimination based on race, national origin or family status to include people with disabilities and requirements for accessible design and construction in multi-family housing regardless of public money and applicable to both owned and rental properties.

The landmark Americans with Disabilities Act (ADA) was signed into law on July 26, 1990, the most sweeping legislation regarding the equal rights of people with disabilities to date worldwide. It prohibited discrimination on the basis of disability in employment, state and local government, public accommodations, commercial facilities, transportation, and telecommunications. The ADA expands beyond the condition of federal financial participation in the Rehabilitation Act and establishes responsibilities for nearly all public and private organizations. The ADA Accessibility Guidelines (ADAAG) set a new bar for mandated accessible design requirements for new construction and alterations but also provided clarity about expectations for existing conditions in private places of public accommodation.

The U.S. Department of Justice issued revised 2010 ADA Standards for Accessible Design in the Federal Register on September 15, 2010. The U.S. Access Board generates the design standards that are then issued in final form with the force of law by the U.S. Department of Justice. In these revised ADA standards, the Access Board prioritized "harmonization" to state building codes and worked closely with the International Codes Council (ICC) and the American National Standards Institute (ANSI) in order to reduce the confusion of meeting the requirement of federal standards deriving from civil rights legislation with state buildings code accessibility requirements (Goldsmith, 2000). Though helpful in some ways, the emphasis on harmonization with building code risks occluding the civil rights vision of the federal legislation that challenged designers to use their skills to create integrated settings.

The United Kingdom's Legal Infrastructure for Accessibility

The United Kingdom's commitment to accessible design has followed a similar but not identical pattern to the United States. The Royal Institute of British Architects (RIBA) published *Designing for the Disabled* in 1963 that became a standard textbook for architects. The Polio Research Fund commissioned Selwyn Goldsmith, registered architect and polio survivor, to write it (Staintons, 2014). Second editions were published in 1967 and 1976.

U.K. minimum standards for accessibility were issued in 1992 as Approved Document M of the Building Regulations and modified in 1995 and in 2004. Compliance with Part M initially required Access Statements to be developed and provided as part of the pre-schematic, design development, and construction documentation phases for major developments. It required an innovative Access Statement that involved people with disabilities. If needed, the Access Statements could be used to identify constraints to typical compliance and to describe alternatives (Equality Act 2010, C.15, Chapter I. 2010).

The Disability Discrimination Act of 1995 used a human rights approach similar to Section 504 and the ADA, and focused on people with disabilities as a protected class. It was superseded, along with other anti-discrimination laws, by the Equality Act 2010. The anti-discrimination focus remained but with a much broader set of social conditions covered under a single umbrella law (Equality Act 2010, C.15, Chapter I).

Both the United States and the United Kingdom had extensive history with mandates for equal rights and design standards primarily focused on architectural access by wheelchairs users. It had become clear that many other people benefited from the standards despite that narrow focus. Curb cuts, ramps and accessible vertical access made wheeled luggage the rational choice for everyone. Few people used wheelchairs but ten times that number had difficulty walking.

Universal Design Leadership Evolves from Accessibility

Two figures emerged at approximately the same time in the 1990s with a shared perspective that it was time to think more expansively about designing for everyone. Both Selwyn Goldsmith, born in 1932 in Nottinghamshire, and Ronald (Ron) Mace, born in 1941 in North Carolina, were licensed architects who had survived polio and used wheelchairs. Both had the credibility of being wheelchair users bent on summoning attention to a bigger idea. For them, mandated accessibility was a valuable floor but too narrowly focused for an increasingly diverse world.

Universal Design

Ron Mace, FAIA was a key figure in the development in the United States of the Principles of Universal Design in 1997. Ten authors (Bettye Rose Connell, Mike Jones, Ron Mace, Jim Mueller, Abir Mullick, Elaine Ostroff, Jon Sanford, Ed Steinfeld, Molly Story, and Gregg Vanderheiden) from five U.S. organizations compiled the Principles. They were copyrighted to North Carolina State University's Center for Universal Design. The definition of universal design introduces the principles: "The design of products and environments to be usable by all people, to the greatest expect possible, without the need for adaptation or specialized design." The seven principles follow with a key concept and definition. The full set also includes brief guidelines and key elements.

- *Principle One: Equitable Use*: The design is useful and marketable to people with diverse abilities.
- *Principle Two: Flexibility in Use*: The design accommodates a wide range of individual preferences and abilities.
- *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.
- *Principle Four: Perceptible Information*: The design communicates necessary information effectively to the user, regardless of ambient condition or the user's sensory abilities.
- *Principle Five: Tolerance for Error*: The design minimizes hazards and the adverse consequences of accidental or unintended actions.
- *Principle Six: Low Physical Effort*: The design can be used efficiently and comfortably and with a minimum of fatigue.
- *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 (Mace, 1998).

The original publication closed with a note that the Principles address only universally usable design and that the practice of design must also integrate other considerations such as economic, engineering, cultural, gender, and environment.

In June 1998 the first international conference on universal design was held in New York, *Designing for the 21st Century: An International Conference on Universal Design* with participants from 30 nations. Ron Mace delivered a keynote on June 19, *A Perspective on Universal Design*. He expressed his concern that there be clarity that accessibility and barrier-free design were not universal design. He stressed that terminology mattered and described accessibility as focused on people with disabilities, a useful baseline but only a floor. He clarified that assistive technologies like wheelchairs and white canes solve problems at the individual level and universal design at the general level (Staintons, 2014). Ron died suddenly of post-polio syndrome ten days after his lecture.

Just two years later, in 2000, Selwyn Goldsmith published *Universal Design* with PRP Architects. He critiqued the traditional practice of accessible and barrier-free design as "top-down" dictates of special provisions for people with disabilities. He posited that we need a shift to a "bottom-up" way of thinking that would reframe normal to include all potential users, requiring that anticipating diversity of ability should be a given in good design (Froyen, 2012). Goldsmith stressed that his publication focused solely on information that could be conveyed with diagrams, well short of the plethora of details like acoustics, finishes, and heating and cooling systems that comprise a universally designed environment.

A dozen years later, another architect with a disability, Hubert Froyen, explored a frontier area in universal design. A professor of architecture in Hasselt, Belgium, Froyen was a diligent student of modernism, studying in the Netherlands with John Habrakan and at the University of California at Berkeley with Christopher Alexander. Deeply involved in the global movement called by a variety of terms by that time: universal design, inclusive design, design-for-all, Froyen developed a narrative that tied modernism to the movement's radical reversal of focus from designing for a person who needs to be accommodated to designing an enabling environment for all.

Professor Froyen mounted a long-term research project to investigate what we know and don't know about the needs and desires of an increasing proportion of the population with functional limitations. He acknowledged that we knew a great deal about people who used wheelchairs but that there was scant information about what failed and what worked for the great majority of people who experienced physical, sensory or cognitive differences.

The principles of universal design had been in use globally for fifteen years. Froyen diagnosed a knowledge gap that designers needed filled in order to be able to design the deeply creative and high quality solutions that needed better empirical evidence to inform design. Unlike environmental sustainability that derives data from measurable use of energy and materials' life-cycle costs, universal design needed more data about human experience. He recognized that filling the gap required generating substantial new information about a large number and diversity of users interacting with a multitude of detailed elements within the built environment.

Froyen also called for designers to heed the complementary work of other disciplines that could inform and compel inclusive design. He tied it to the pervasive commitment

Figure 17.3 A simple touch is all it takes to activate the flow of water in Delta kitchen faucet with Touch20 Technology. Photo courtesy: Delta Faucet

Figure 17.4 The tactile Bradley watch, named for blind paralympian swimmer, Brad Snyder, is as esthetically compelling as it is functional. Photo courtesy: Eone Timepieces

to the environment/economy/equity foundation of sustainability. He linked not only the obvious resonance with equity in considering equal opportunity and equal participation. He also makes an economic argument that societies will suffer the economic cost of caring for dependent people unless we can design a world to support independence and life-long contribution. He pointed to the pertinent explosion of the growth of neuroscience that has revealed the extraordinary plasticity of the nervous system, opening the door to a radically new potential for recovery from illness and injury.

If universal design is ever to have the kind of impact that radically alters how we design and how we think about the consequential power of design, Froyen argued that we must invest in research as a central priority. He called for interdisciplinary research through the creation of a dynamic open content community development model of research by and with diverse users. Having tested the method for seven years, he had proven that user data could illuminate patterns about design that could minimize limitations and enhance strengths for people across a wide range of functional abilities (Guimarães, 2011).

Universal/inclusive design builds from a floor of accessibility that has an abundance of fixed standards within a larger vision of equal rights. Those standards vary little from nation to nation. While establishing awareness and appetite for universal design, it's important to gather precedents that demonstrate universal design that is satisfying esthetically as well as environmentally and economically sustainable. Though vital, precedents cannot obviate the critical task of additional research that will give architects and designers the information about user experience that can drive and inspire innovation.

Pervasive accessibility requirements have resulted in an unintended negative consequence of just-tell-me-what-I-have-to-do that is an impediment to universal design. Brazilian architect and professor of architecture Marcelo Pinto Guimarães laments that his nation has some good examples of inclusive design but misses the chance to integrate it in Brazil's

rapid development. He describes the basic catalogue of accessible solutions as "grammar" as opposed to creative writing of the "poetry" of design for inclusion that we need now (World Health Organization, 2001).

Global Policy Responds

The United Nations' World Health Organization (WHO) spent ten years building consensus among 192 U.N. member states for a more accurate definition of disability appropriate to the twenty-first century's seismic demographic shifts. They published the International Classification of Functioning, Disability, and Health (ICF) of 2001 with a dramatic new definition of disability that has shaped an evolving consensus across the globe. It suggested that disability is "an umbrella term for impairments, activity limitations, and participation restrictions" (World Health Organization, 2002).

The new WHO's ICF offered a common language that reflected the demographic transformations of the twenty-first century. With greatly extended lifespans worldwide and dramatically improved survival rates from congenital conditions and from illness and injury, WHO mainstreamed functional limitation as a universal human experience. WHO also succeeded in equalizing physical and mental reasons for impairments.

Most significantly for designers, the new definition described disability as a contextual variable. Functional limitation becomes disabling at the intersection of the individual and her or his multiple environments: physical, information, communication, social or attitudinal and policy. Designers, significant shapers of the human context, have the power to minimize disability despite a rising tide of functional limitation.

Given the advances of the twentieth century and substantial experience of people with disabilities living fully integrated lives in the community, it had become clear that diagnosis of a condition did not predict the level of disability. With decades of experience with mandated accessibility standards in the U.S. and E.U., there was ample evidence that barrier removal benefited people with and without disabilities. But accessibility was not enough to minimize limitations for the extraordinarily varied and changing profile of functional limitations at the start of the twenty-first century. Even removing familiar barriers in all environments would fall short of a new WHO vision of designing facilitating environments.

The World Health Organization specifically identified universal design as the most promising framework for identifying facilitators. It assumed that universal design was the starting perspective but that work would be required to assess needs, identify potential solutions, test them with users, refine them, and gradually to develop guidelines for facilitating environments for a mix of sectors (United Nations Populations Fund, 2012).

With focus on creating a policy and action agenda for an aging world, the Second World Assembly on Aging convened in Madrid in 2002. Building on the ICF and its contextual definition of disability, it focused on catalyzing policies that would go beyond the too modest goal of barrier removal and "ensure enabling and supportive environments" (*Political Declaration and Madrid International Plan of Action on Ageing,* 2002). The policy repeatedly emphasized multi-generational living and design that enhances individual capabilities and supports the contribution of older people (United Nations, 2006).

The most recent international policy also builds on ICF and responds to the growing proportion of the world's population with functional limitations by establishing a global commitment to equity and participation. The U.N. Convention on the Rights of People with Disabilities (CRPD) was completed and enforceable in 2006. This is the third supplement to the 1948 Universal Declaration of Human Rights. The CRPD established accessible design as

a human right and emphasized universal design as a preferred goal. It also affirmed that these issues must be integrated into global strategies for sustainable development (Convention on the Human Rights of People with Disabilities, Preamble).

Catalysts to Inclusive Design Practice

A baseline of accessibility standards has grown steadily for both new construction and existing conditions in much of the world. There is also a growing tier of practitioners around the world that recognize the limits of fixed standards for people with disabilities and strive to redesign a context for our lives that aligns with the demographic facts of our time. They are creating solutions inspired and informed by human diversity without sacrificing esthetics or delight.

Urban design sometimes leads, with connectivity between places, shared outdoor gathering places, and seamless public transit as lynchpins of designing for people. Great public spaces, like London's South Bank or Los Angeles' Grand Park, illustrate that inclusive public spaces generate the social capital that occurs when people connect in a place they want to be across social, economic, age, ability, and cultural differences.

United Kingdom

The United Kingdom's Commission for Architecture and the Built Environment (CABE) was created in 1999 as a public body to help elevate the quality of public design. By helping decision-makers and professionals to create great spaces and inspire the public to demand good design, CABE committed to integrating environmental sustainability and inclusive design, intent on creating places that work for people (Bonnett, 2013). Until 2012 when more than 90 percent of funding for CABE was cut, CABE set a high and very visible bar for inclusive design in the United Kingdom. Through training designers to bring these values to the local planning tables, fostering participatory planning with local people with functional limitations, and capturing detail in case studies, they helped to instill inclusive design into ordinary design practice.

David Bonnett Associates authored valuable guidance in a 2013 publication by the British Standards Institution, *Inclusive Urban Design*. They make the case for an approach and the use of detailed considerations to deliver inclusive design solutions without adding dozens of fixed standards. Bonnett advises consulting with local users with functional issues in order to understand their perspectives before moving to design development. The guide stresses the significance of legibility and wayfinding as central to places that work and includes recommendations for consistency, lighting, touch, smell, and sound as well as signage (Bonnett, 2013).

Singapore

Singapore, with a population of only 5.4 million, has built an identity as a global design powerhouse. They envision design as a means to economic growth as well as a way to make lives better. They moved very rapidly from establishing requirements for accessibility to exceed compliance by building capacity and creating incentives for universal design. Government engaged leaders in the design community as well as developers. A national green design strategy evolved first and wins international recognition and awards for its smart density and livability strategies. Singapore is now using similar top-down promotion to stimulate innovation in universal design. Good examples grow annually of impressive green

and universal projects. Platinum 2013 Universal Design Mark winner, the United World College of South East Asia (East Campus), also won the 2012 Platinum Green Mark Award. The campus' elevated landscape connects four academic blocks with a main plaza, playing fields, and other amenities while distinctive cultural motifs and colors make wayfinding intuitive and seamless (twenty-six winners for the first BCA Universal Design Mark Award).

Housing

Across the world, a sense of urgency is growing that we must reinvent typical housing that will work for a large proportion of the population with some level of functional limitations. With rising prevalence of functional limitations, traditional solutions of specialized funding or housing types is proving inadequate and outmoded. In the United States, the doubling of the 65+ population over the next 40 years is finally setting off alarms. Too little attention has been paid to a looming misfit between the housing we have and the housing we need (Lipman *et al.*, 2012).

The London 2012 Olympic Park, now the Queen Elizabeth Olympic Park, has resulted in an international exemplar of inclusive design in the public realm but also in housing. Starting with the 2,828 homes of the Olympic Village, there will be a total of 6,800 housing units, as well as health, retail, and community spaces, all of them green and universal. Guidance and oversight are provided by the London Legacy Corporation with strong support from the Mayor (London Development Authority, 2010). This massive development in East London illustrates the fundamental shift to designing for the physical, sensory, and brain-based variations in ability and over the course of a lifetime. One hundred percent of units align with the London Housing Design Guide of 2010 (London Development Authority, 2010) including thoughtful features detailed in the remarkable chapter on "Home as a Place of Retreat."

Culture

Tourism, particularly cultural tourism, has become another driver for universal design especially in Europe. The European Commission hosts conferences on accessible tourism and annually sponsors a conference for cities to compete to be the most accessible city in the European Union. France, perennially one of the most popular destinations for cultural tourism, has struggled to make its historic environment more welcoming to more people and prioritizes its design-for-all investments in culture.

An outstanding example of inclusive design is in Nantes, France, the former capital of Brittany. The Castle of the Dukes of Brittany (le Château des Ducs de Bretagne), a museum of the history of Nantes, offers a vigorous solution to vertical access designed by Jean-François Bodin. Rather than tucking an elevator out of sight in this fifteenth-century tufa rock castle, he celebrates it in deep bold red, just one of countless details that enrich everyone's experience well beyond concern for function.

DeafSpace Design Guidelines

Gallaudet University in Washington, D.C. offers an example of what's possible when people with functional limitations get involved in identifying design details that facilitate their performance and experience. Through a series of six semester-long courses and additional workshops, Gallaudet students, faculty and staff learned design and research skills sufficient

Figure 17.5 Dramatic dark red elevator makes a strong design statement while also creating vertical access in the sixteenth century castle which is now the Museum of the History of Nantes, France. Photo permission: Château des ducs de Bretagne

to give them the tools to generate design insights. In this case, users were all Deaf and focused on translating to the environment their Deaf culture and their needs related to their visual language, life experiences, and cognitive sensibilities. Hansel Bauman, AIA, Gallaudet's Executive Director of the Design and Planning Department, organized the insights into a pattern book called DeafSpace Guidelines in an initial 2010 draft describing five major points: space and proximity, sensory reach, mobility and proximity, light and color, and acoustics and electromagnetic interference (Bauman, 2010).

Incorporating the DeafSpace Guidelines, LTL Architects designed a new five-storey 60,000 square foot residence hall that opened in 2012. Though a strong design with exposed steel, wood and bamboo, polished concrete and rich color, its real drama is in its function. As Hansel Bauman noted in an article in Metropolis in July/August of 2013: "It's about creating empathy between the individual and the building" (Hales, 2013).

Conclusion

It's time for a sense of urgency that the good fortune of our longer lives and resilient survival demands action as surely as stopping environmental degradation and restoring our planet to health. We have a shared set of global policies, a near complete global understanding of at least rudimentary barrier removal and accessibility, and a framework and precedents for inclusive

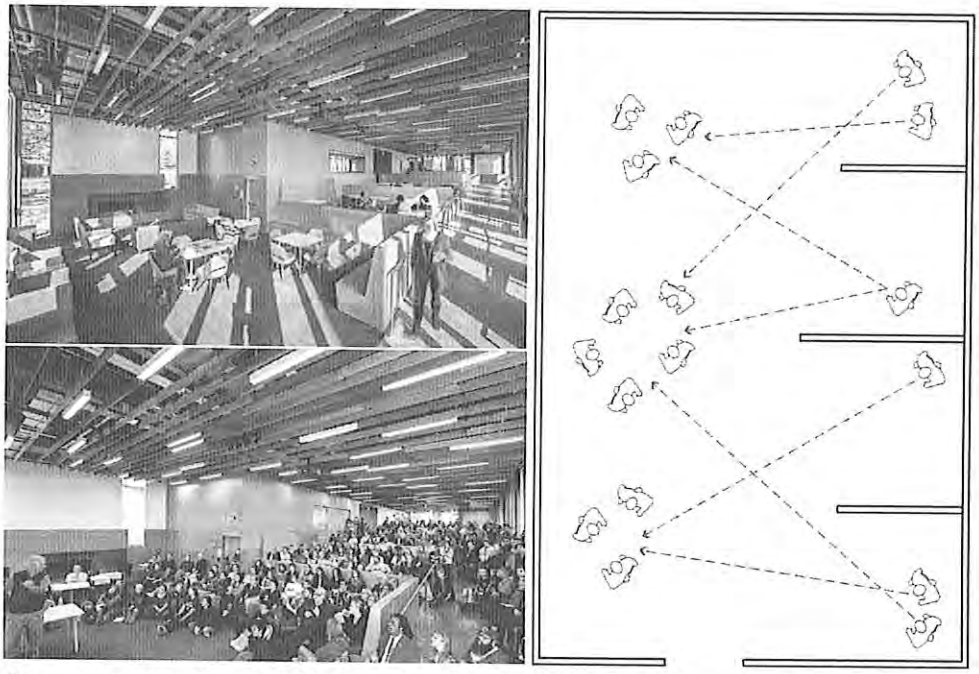


Figure 17.6 DeafSpace Guidelines informed the design of the dormitory by LTL Architects at Gallaudet University. Photo courtesy: LTL Architects; Illustration courtesy: Hansel Bauman, AIA

design that we can build upon. Even the richest societies among us cannot accommodate a steadily expanding population of dependent fellow citizens cut off from independence let alone contribution. We have the frontier of the brain just beginning to reveal what's possible if we design environments to support how our brains develop and function. John Zeisel calls for an Environment/Behavior/Neuroscience (E/B/N) paradigm could contribute to not only quality of life but to survival (Zeisel, 2006).

There is a great deal of research to be done to understand the patterns that reveal the elements that make the most difference to people. "Personas" do not generate insight or detail. We will need to make mining the experiences of real and varied people easy to do anywhere and compelling to people with talent and drive. And we'll need to find ways to make that data an inspirational part of design education and practice. Designing for people in the twenty-first century must be understood as a calling, a vocation. Susan Szenasy, editor-in-chief of Metropolis, has written as much as anyone summoning designers to be more. "We are interested in more than just the fulfillment of the design brief. We want to know how the user, the earth, and the client are served by the design. We want to know what the design says about us as a people" (Hudner, 2014).

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