
CHAPTER 1

UNIVERSAL DESIGN: AN EVOLVING PARADIGM

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1.1 INTRODUCTION

On March 30, 2007, the United Nations gathered 82 signatories on the opening day of the first comprehensive human rights treaty of the twenty-first century. This was the highest number of opening day signing countries in the history of UN conventions. In addition, it was the fastest negotiated human rights treaty in UN history. On July 30, 2009, the United States became the 142d country to sign and, on September 23, Monaco became the 143d signatory. By the end of 2009, three-quarters of the world's countries had signed. United Nations' press releases called the outcomes of the convention "a paradigm shift" (United Nations, undated). What was the convention? Did it address poverty, genocide, hunger, health? No, it was the Convention on the Rights of Persons with Disabilities (CORD).

During the past 35 years, the social definitions and concepts of disability have changed radically. The World Health Organization's classification system (WHO, 2002) has shifted from exclusively emphasizing the medical model, which views disability as a feature of the person, to the social model that sees disability resulting from an interaction of people with the environment. The recognition of the power of environmental factors to enable or disable a person highlights the challenge for designers and advocates. Likewise, the approach to design that accommodates people with functional limitations has changed from narrow code compliance to meet the specialized needs of a few to a more inclusive design process for everybody. Contrary to the assumption that attention to the needs of diverse people limits good design, the results of imaginative designers around the world reveal a wide range of applications that delight the senses and lift the human spirit when "universal design" is integral. With initiatives such as the UN CORD, universal design (UD) is gaining growing importance. In fact, UD was included in the UN CORD action plan. Building upon Ron Mace's (1985) definition of UD, the action plan included the following: "'Universal design' means the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design" (National Disability Authority, n.d.). This marks one of several milestones in the evolution of the universal design paradigm, which are highlighted in this chapter and which have led to the emergence and evolution of the universal design paradigm.

1.2 WHAT IS A PARADIGM?

A paradigm is an overarching theoretical framework or system of beliefs and values. Paradigms may be formal or informal. Kuhn (1962) stated that paradigms are often guided by traditions and not an established or agreed upon set of "rules." According to Hatch (2002),

When you are standing within the circle of logic created by the assumptions of your paradigm, the positions taken by those working in other paradigms simply do not make sense. Paradigms are indeed completing ways of thinking about how the world is or is not ordered, what counts as knowledge, and how and if knowledge can be gained.

Similarly, Rifkin (1980) stated:

The most interesting aspect of a society's world view is that its individual adherents are, for the most part, unconscious of how it affects the way they do things and how they perceived the reality around them. A world view is successful to the extent that it is so internalized, from childhood on, that it goes unquestioned.

As such, paradigm shifts are relatively rare. The reliance on traditional results is commonly referred to as *paradigm paralysis*. This is especially the case in many design professions, where tradition, convention, and history play a significant role. Moreover, designers are notoriously autobiographical in their approaches to design. Frank Lloyd Wright (1953), e.g., stated: "It has been said that were I three inches taller (I am 5' 8½" tall), all my houses would have been quite different in proportion. Perhaps." This autobiographical thinking perpetuates the rarity of paradigm shifts. Paradigms, as well as paradigm shifts, may be represented by a variety of physical or nonphysical artifacts. Language is among the most common markers of paradigms. This is true of the emergence and evolution of the universal design paradigm, as discussed below. Likewise, as stated by Preiser (2009), this new paradigm may be marked by a shift in what is most valued, a change from "mechanization" to "living systems," such that "information and knowledge is the new currency."

1.3 THE EMERGENCE OF THE UD PARADIGM

Worldwide there are two major, distinctive threads that can be traced to the emergence of the UD paradigm: (1) the legislative measures that included specialized requirements to accommodate people with disabilities, primarily affecting the larger-scale built environment, and (2) the nonregulated market-driven responses to an aging society, primarily relating to products. In the United States, e.g., concerns regarding social justice led to civil rights legislation in the 1950s and 1960s. In Japan, on the other hand, there was economic pressure to address the massive challenge of being the fastest-aging country in the world.

The U.S. Supreme Court's 1954 decision *Brown vs. Board of Education* established the precedent that "separate is not equal." This precedent of equal opportunity in education is the milestone that established the beginning of an approach to design that respects all users. The Supreme Court's decision was followed by the race-based civil rights movement of the 1960s that led to far-reaching federal civil rights legislation, which included the right to vote and nondiscrimination in housing. This inspired the disability rights movement that began in the 1970s and led to the federal legislation that prohibited discrimination based on disability. The initial legislation in 1973 included accessibility requirements for facilities built with federal funds. Later, the Fair Housing Amendments Act and the Americans with Disabilities Act included much of the built environment, regardless of the funding source. These design requirements were rarely considered during the design process, usually added later in a code compliance effort. The design corollary of "separate is not equal" is accessibility features that are thoughtless add-ons. They have a stigmatizing quality similar to the segregated "back of the bus" practices that were once the norm in the United States.

In Japan, the momentum toward universal design has been fueled by economic as well as social interests. Since 1997, in response to Japan's aging demographic, both government and business saw the challenges and opportunities of this trend (Kose, 2001). Housing, product design, health care, and other services needed rethinking. At the 2002 International Conference on Universal Design in Yokohama, there was a call for a new, business-oriented organization to be formed, the International Association of Universal Design (IAUD). Similarly, the United Kingdom has been

a generative place for design innovations in response to aging demographics, with a developing program of academic-industry-government partnerships, such as DesignAge at the Royal College of Art in London (see Chap. 21).

The emergence of universal design thinking can be witnessed in nations and regions throughout the world, including, but not limited to, Australia, Brazil, Canada, France, Germany, India, Ireland, Israel, Italy, the Netherlands, Norway, Southeast Asia, and Switzerland (see Preiser and Ostroff, 2001). As such, there are significant cultural differences in how the movement has evolved in each country, but the similarities are more apparent than the differences as they transcend national laws, policies, and practices. Some of these cultural differences are evident in terminology. There has also been a developmental change in the language used in some countries, not only reflecting the evolution from initial efforts to remove barriers that exclude people to a more inclusive design approach, but also changing social policies and growing globalization.

The terms *barrier-free design*, *accessible design*, *inclusive design*, *design-for-all*, and *universal design* hold somewhat divergent historical and cultural meanings in what Iwarsson (2005) collectively refers to as the *enabler concept*. Universal design was first used and promoted in the United States by Mace in 1985 to communicate a design approach that could be utilized by a wider range of users. The seven Principles of Universal Design (see Chap. 4), developed in 1997 by the Center for Universal Design with a group of U.S. experts, articulated a process by which to define and evaluate the usability of design elements. The seven principles were a tool that invited adaptation; the initial introductory material invited the user to create additional guidelines that would extend the utility of the principles. Awareness of the seven principles is evident worldwide. They were translated into 11 languages by proponents in France, Germany, Indonesia, Japan, Italy, Korea, Netherlands, Norway, Portugal, Spain, and Sweden (Center for Universal Design). Although Sandhu's concern in Chap. 44 that the seven principles are not useful to or applicable to the "majority world" (i.e., developing countries) is important, there is actually some evidence of their use in several countries in the majority world. Delegates from Africa who participated in the 2000 conference on universal design in Providence, RI, e.g., spoke about the waste when World Bank funds were used to build schools that did not respond to the seven Principles of Universal Design. Likewise, delegates from Lebanon spoke about the importance of the reconstruction in Beirut that had a high level of accessibility, which made the war-torn city more usable by everyone. Nevertheless, UD is still relatively young in terms of transfer of technology, and it is generally not incorporated into the policies of the economic development sources for developing economies.

Universal design remains the dominant terminology in Japan, although increasingly in the United States it is used interchangeably with *inclusive design*. *Design-for-all* and *inclusive design* have become the prevailing terms in the United Kingdom and much of northern and central Europe, although the Council of Europe uses universal design in many of its resolutions (Council of Europe, 2007). Although other terms in the United States are frequently used, such as *life-span design* and *transgenerational design*, Mullick and Steinfeld (1997) explained that UD's focus on social inclusion is what separates it from these other terms. Similarly, Weisman (2001) contended that there is no separation between human health, environmental health, and social justice. As such, *social sustainability* has emerged in the United States and Japan as terminology that places universal and inclusive design under the umbrella of sustainable design (Fletcher, 2008). Likewise, Walsh (2001) encouraged the European disability agenda to incorporate concepts of sustainable development in its mission, a notion paralleled by Szenasy in Chap. 2, and illustrated by Fletcher in Chap. 37.

Notwithstanding the importance of Mace's contribution, the underlying concepts of UD were evident earlier (e.g., Bednar, 1977; Harrison, 1971). The initial term used around the world was *barrier-free design*, and it related to efforts that began in the late 1950s to remove barriers for "disabled people" from the built environment. An international conference held in Sweden in 1961 cited extensive efforts throughout Europe, Japan, and the United States, primarily by rehabilitation organizations, to "reduce the barriers to the disabled" (International Society for Rehabilitation of the Disabled, 1961). This phrase was later replaced with the term *accessibility*, which focused on issues of mobility, such as wheelchair access, in many countries. In the United States, *accessible design* became more widely used than *barrier-free design* in the 1970s. It was and is still very much linked to legislative requirements in the United States. *Accessibility*, however, has a very different meaning

for some European experts. For example, to Wijk (1996), *accessibility* is the umbrella concept for all parameters that influence human functioning in the environment. In some European countries, e.g., in Norway, universal design has been increasingly used since 1997 (Bringa, 2001). The distinction in terminology is blurred, and the terms in current use illustrate the overarching paradigmatic shift in design thinking—from a lack of awareness of the restrictive and emancipatory roles that design plays, to an awareness and elimination of environmental barriers, and beyond that to a concept of designing, at the outset, for the widest range of potential users.

Unfortunately, the term *universal design* has been inappropriately adopted by some architects, especially in the United States, as a trendy synonym for compliance with the Americans with Disabilities Act. Welch and Jones (1999) note: “This indicates that significant systemic and attitudinal barriers stand in the way of real change.”

1.4 THE EVOLVING PARADIGM OF UD

Beyond terminology, the basic premises and aspirations of UD continue to be transformed. These transformations are evident in a variety of policies, practices, and exemplars throughout the world. The morphology of universal design is most clearly evident in three primary areas—education, business, and society—as discussed below.

Universal Design and Education

Universal design has become widely used as an approach to teaching and learning. Frank Bowe’s (1999) book *Universal Design in Education: Teaching Non-traditional Students* was the first application of the principles of UD to learning. His book is highlighted in Universal Design Education Online as an example of inclusive teaching techniques, based on his own experience as a professor of education at Hofstra University. Bowe’s approach responds to the need for more inclusive teaching as it relates to people of different cultures, ages, and learning styles, as well as his own needs as a deaf professor. He stated:

Most teachers cannot individualize instruction for so many diverse learners. What they can do is present material in multiple ways. Is it really necessary for teachers to present the great bulk of our instruction via speech? Isn’t there a way, or aren’t there several ways, for us to offer much of the same material visually (in print, on disk, etc.)? Of course, the obverse obtains as well: Must we assign only printed materials for student reading? Can’t we find audible (spoken) versions, too, and make those available for people who need or prefer them?

David Rose’s research in cognitive neuroscience was a significant underpinning to his early thinking about the use of digital media in teaching children with disabilities (Rose and Meyer, 2005). He cofounded the Center for Applied Special Technology (CAST) in 1984 as an assistive technology project to develop and apply technologies that would enable students with disabilities to access a print-based curriculum. Over the years, CAST shifted their attention to transforming the curriculum—the methods and the materials—so that it could respond to the needs of diverse learners. What began as an approach to reading is now an acclaimed national resource on Universal Design for Learning (UDL). The National Center on Universal Design in Learning includes guidelines for UDL in three main areas: representation, expression, and engagement (Chap. 39). Universal Design for Instruction (UDI) is another approach that focused on college instruction for diverse learners (McGuire and Scott, 2006). UDI provides a framework for college faculty to incorporate inclusive strategies in their teaching. The dissemination of UDI was enhanced through the leadership and advocacy of the Association on Higher Education and Disability (AHEAD), a professional North American association of postsecondary disability service providers at colleges and universities. AHEAD began an initiative in 2001 to educate disability service professionals about promoting universal design in

learning, the built environment, and policies. The goal was to make policies and practices more inclusive, by working as allies with faculty and administrators to reach more students rather than a “one-at-a-time” model of service and curriculum delivery.

Another approach involves raising awareness of diversity in the professions, to improve the practice of universal design. Access to Design Professions is a project directed by the author at the Institute of Human Centered Design in Boston and supported in part by grants from the National Endowment for the Arts. The project was developed in 1999 as a living memorial to the late Ron Mace, to support the participation of people with disabilities in the design profession. John Kemp (2002) expressed the need clearly:

When designers with disabilities participate in the planning and design of schools, housing, landscapes, and workplaces, we gain a combination of personal experience of disability and professional design skills. When that happens, pluralism in functional use of structures and products isn't an afterthought; it is integrated into the fundamentals of design and subsequent use. And, aesthetically, our pluralistic world needs new challenges and new ideas that incorporate beauty with function. These solutions to accommodate diversity might possibly come slowly from educated non-disabled designers, but the process will be more elegant and coherent when designers with disabilities are involved from the start. It also makes the shift from them and us to we.

Beth Tauke's award-winning Diversity and Design course, a general education course at the University at Buffalo, has engaged over 200 students each semester since 2002. It introduces students to eight issues of diversity—race, ethnicity, gender, class, age, physical ability/disability, mental ability/disability, and religion—and the multiple realms of design—media, product, architectural, and urban design. The course, described in Universal Design Education Online (Tauke, 2004), “focuses on the relationship of design to the changing nature of . . . society” and is open to students in all academic majors.

Universal Design and Business

Not unlike the sustainability movement, universal design has seen a growing presence in business and industry. In 1996, Japanese travel agencies began to organize tours for business and government representatives seeking information on UD to Adaptive Environments, which was cofounded by the author in 1978 in Boston and which is currently named the Institute for Human Centered Design. Within a three-month period four groups of 20 or more people crowded into the organization's conference room. In 1997, after spending the first of three annual tours throughout Japan, the author learned of both the intense concern evidenced by the government as well as the intense interest of businesses, manufacturers, and designers regarding the growing “silver market.” Japan launched a universal design magazine in 1997 that is still being published. In June 1998, when Adaptive Environments initiated an International Conference on Universal Design of Information, Products, and Environments at Hofstra University, over 100 participants came from Japan. Japan held its first international conference on UD in Yokohama in 2002 and held the inaugural seminar of the International Association of Universal Design (IAUD) in 2003. The Declaration of Inauguration noted that it was “seeking the popularization and the realization of universal design.” His Imperial Highness Prince Tomohito opened the seminar, along with other dignitaries, including the Minister of Economy, Trade, and Industry. IAUD is comprised of over 144 of the world's major corporations headquartered in Japan and has a growing agenda and a strong mass media strategy. In addition to the sophisticated business response, the Japanese public has been very responsive. At the 2006 International Conference in Kyoto, more than 14,000 people visited the Exhibition Hall, and IAUD officially announced participation from 29 countries or regions. There were 3360 registered attendees for the conference itself (Kawahara, 2009).

The Royal College of Art in the United Kingdom is the world's only wholly postgraduate university-level institution of art and design. It has pioneered partnerships between businesses, users, and young designers that have become a “springboard for innovation” (see Coleman, Chap. 21). Beginning with DesignAge in 1991, the collaborations benefited both business and the consumers. Coleman highlights the generative strategies that were developed and grew with the establishment of the Helen Hamlyn Center at the Royal College of Art. The Research Associates Programme teams new graduates with industry or voluntary sector groups, and it has worked with more than 70 organizations worldwide since it started in 1999.

Inclusive design is seen as a positive aspect of business strategy and design practice in the United Kingdom (Clarkson et al., 2003). British Telecommunications (BT) has made a strong commitment to inclusive design and commissioned the Design Toolkit, an interactive web-based tool to assist designers in creating better products with greater user satisfaction and greater commercial success. The Helen Hamlyn Center also sponsors the INCLUDE Conference, an international biennial event that engages business executives in the early morning briefing sessions as part of the schedule that celebrates the involvement of users in research and design.

Universal Design and Society

Internationally there are stellar governmental approaches to establish universal design as an integral component of an overall planning and/or design process. This holistic approach is reflected by the comprehensive work of the Norwegian government that began in 1997 (Bringa, 2001) with the goal of creating a high-level strategy that supported accessibility as a component of general planning at all administrative levels. The success of this comprehensive planning strategy is reported in a recent publication *Universal Design as a Municipal Strategy* (Ministry of the Environment, 2009). Since 2005, 17 Norwegian municipalities have been involved in a national development project under the auspices of the Ministry of the Environment. The report shares what the municipalities have learned and is available in both Norwegian and English.

On another continent, the state of Queensland in northeastern Australia has been a growing source of experience about an integrated model of housing development. Queensland promotes the broadened concept of sustainability, and it has long advocated the triple bottom-line concept of sustainability: environmental, social, and economic sustainability. The Smart and Sustainable Homes program is part of the Queensland Public Works Department. The program began within the Department of Housing in 2000 and moved to the Public Works Department for greater impact. Developed in response to the growing concerns over greenhouse gases, the program is involved in a continuing research effort to test the underlying assumptions of their tripartite model. The program has a strong educational component. Model homes across the state illustrate differing responses to climatic conditions of dwellings, and there is a website with extensive resources that can be freely downloaded.

Another integrated approach is taken by the government-supported Commission for Architecture and the Built Environment (CABE) in the United Kingdom. Begun in 1999, CABE is the government adviser on architecture, urban design, and public space. Their responsibility is to improve the quality of people's lives by design. CABE does this by "advising, influencing and inspiring" architects, planners, designers, developers, and clients, offering them guidance on projects that will shape lives. In addition to a staff of 135 people in London, CABE sustains a network of designers who are available for design assistance. Their freely available publications and websites include guidance on Inclusion by Design, looking at the design of buildings and spaces as they influence the quality of people's lives.

In the United States, however, there is nothing comparable to initiatives in Australia or the United Kingdom, although there are two federal agencies that play a generative role in universal design. The National Endowment for the Arts is a small federal agency with an Office for AccessAbility. Since 1989, the Office for AccessAbility has generated some significant work by a wide array of players in the United States by convening an interagency task force on universal design, several national summit meetings, and modest annual grants for Leadership in Universal Design. The case study collection described in Chap. 38 was initiated with seed money from these annual grants. The U.S. Department of Education, through its National Institute on Disability and Rehabilitation Research (NIDRR), has been funding research in universal design since 1987, such as the research that led to the seven Principles of Universal Design.

1.5 CONCLUSION

In London in 1974, Jim Sandhu taught a course for architects and industrial designers entitled "Design for the Non-Average," in which he urged his students to "examine the relationship between

the design process and the built environment from the viewpoint of a range of users: those with special needs and those who are average” (Chap. 44). Ray Lifchez was teaching architecture in Berkeley, California, at around the same time. His architecture studio engaged consultants with disabilities, requiring and inspiring the students to think of “people unlike themselves” as they designed (Lifchez, 1986). On a local scale, among two small groups of students, these approaches exemplified a new way of thinking about design in relation to diverse users. These two instances and the aforementioned milestones, taken together, represent the paradigm shift now known as universal design. Their collective inertia has effectively challenged the hidden assumptions that designers hold, and has significantly altered the way many designers—as well as policy makers, educators, and the public—think and act.

Nevertheless, these modest approaches are still a relatively unique component of mainstream design. There are only a handful of universities around the world where universal design, or inclusive design, or design for all is even an elective within the professional curriculum. The enthusiasm among business and government leaders and designers in Japan is unique. Now, in this time of a wide range of global crises—a global economic recession, world climate change, and international political strife—the rare instances of inspired teaching and market-driven promotion are not sufficient. There is a confluence of factors generating the need for systemic change that will lead to more universally designed products, environments, and amenities within a context of socially, environmentally, and economically sustainable design.

Until universal/inclusive design is infused in preprofessional and continuing education, the attitudes of designers will limit their understanding and appreciation of diversity. They will continue to shape their designs for a mythical average norm, creating barriers that exclude the contributions and participation of millions of people all over the world. The growing passion for environmental sustainability in design education must be incorporated with social and economic issues and knowledge of the global community. This broadened approach to design education must begin in elementary school in order for people to see that design matters. People must learn from one another, sharing the range of design education strategies that will flourish at the grassroots level all over the world, from urban to rural settings, and from less developed to more developed economies. Design education must be more inclusive and more diverse, reflecting the range of people who design affects. Educational strategies will have an impact on future businesses as well. Until consumers—from the buyer of personal products to municipal, state, and federal leaders—have more grounded experience in the power of design as a tool to enrich lives, people will not get the design they need and deserve. The collaborations between design students, users, design firms, and corporations that have been developed by the Royal College of Art and the Helen Hamlyn Center provide a model of reflective practice that will generate more responsive, human-centered design at all levels.

Another private-sector strategy to develop a certification and rating process for universal design of both buildings and practitioners, following the model of LEED for sustainable design, is currently underway. The Global Universal Design Commission has been working on standards for UD, using a consensus model with design professionals. This is responsive to those who want to see some type of certification, aligned with training programs and a validation process (as discussed in Chap. 13). Design standards, in this author’s opinion, are not effective by themselves. Standards, which are minimums, often become the maximum effort. Universal design requires integration as a process within the sustainable design framework and mainstream design thinking.

There are continued disagreements on what universal design “really is,” but the discourse has significantly changed. A search on Google in December 2009 resulted in more than 18 million results; there were nearly 14 million results in a search for images. The nuances are not there, but there is evidence of what Goldsmith (2001) described as the bottom-up approach: an assumption that we are designing for everyone and that design can be broadened and adapted to meet the needs of people with disabilities. This is the major shift from the approach of designing for people with disabilities as a separate, specialized population. The challenge is for everyone to create sustainable communities in which people and the environment are protected.

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1.7 RESOURCES

- <http://www.accesstodesign.org>
- <http://www.ahead.org/resources/universal-design>
- <http://www.arts.gov/resources/Accessibility/office.html>
- <http://www.cabe.org.uk/>
- <http://www.careersindesign.org>
- <http://www.design.ncsu.edu/cud/>
- <http://www.hhc.rca.ac.uk/>
- <http://www.iaud.net/en/index.php>
- <http://www.inclusivedesigntoolkit.com/>
- <http://www.sustainable-homes.org>
- <http://www.udcasestudies.org/>
- <http://www.ueducation.org>