A member of the University at Buffalo – State University of New York facilities team paints a new rainbow crosswalk design on campus, to make the crosswalk more visible to all pedestrians

THE EVOLUTION OF UNIVERSAL DESIGN

In the past most Universal Design definitions have largely focused their attention on those with physical disabilities. However, in the last decade, Universal Design has evolved into an approach that focuses on social justice, equality of opportunity, and personal empowerment.

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Mace Definition

In 1950, at the age of nine, Ronald Mace was diagnosed with polio. The effects of his illness required him to use a wheelchair for the rest of his life (Silver/Wilson 2007: 114). During his adolescent years, Ron encountered many physical barriers in his environment. Even at this early age, he knew that if the built environment were designed differently, he would be able participate in more events. As a consequence, he chose to study architecture, and, in 1996, he received his degree from North Carolina State University (CUD 2008). As an architect, Mace focused his practice on accessibility in the built environment. His experience as an advocate for people with disabilities, especially in the development of building codes and U.S. legislation, led him and his colleague Ruth Hall Lusher to the realization that good design should work for everyone, and especially for those with disabilities. In 1985, Mace developed the term Universal Design, which, after several iterations, he defined 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" (Mace 1985: 147; Mace et al. 1988: 3).

Principles Meeting in 1997

In 1997, Professor Mace gathered a group of like-minded designers to discuss ways to promote and implement Universal Design in both professional practice and education. This working group of architects, product designers, engineers, researchers, and educators agreed that they needed to develop a set of basic principles to persuade designers and builders that good design accommodates everyone. After some debate, participants agreed to limit the list to seven principles so that people could easily remember them:

- Equitable Use
- Flexibility in Use
- Simple and Intuitive Use
- Perceptible Information
- Tolerance for Error
- Low Physical Effort
- Size and Space for Approach and Use (CUD 1997)

Mace's definition and the Seven Principles, developed in the early stages of Universal Design, reveal roots in the Disability Rights Movement. They were created at a time when several pieces of U.S. legislation were passed requiring more accessibility in the built environment. The original definition and Seven Principles focused primarily on physical (including sensory) function, and reflected the authors' professions as well as the place, time, and culture in which they were developed. Their aim was to move beyond legal minimums of accessibility by considering all people. The argument was that, at times, everyone has difficulties moving through their environments. The man rolling his child in a stroller and the family rolling their luggage through the airport benefit from slanted walkways just as much as someone using a wheelchair might.

The Evolution of UD

The world has changed dramatically since 1997. The past two decades have brought transformations in technology, science, medicine, global demographics, politics, and socio-cultural norms. Our global population has mushroomed. Life expectancy has increased. International migration has soared. Climate change has become real. Gene editing can now prevent disease. We work at giga- and nano-scales. Social media has taken over. In 1997, cell phones and the internet were just taking hold in technologically progressive countries; today, they affect almost every aspect of our lives from the ways that we communicate to how we learn, shop, monitor our health, and entertain ourselves (Abadi 2018).

These changes have fostered improvements in the design professions as well. During the past few decades, "design has broadened beyond the industrial application to address a variety of human-centered social, cultural, and environmental issues" (LaBarre 2016). They have spawned new fields

such as bio-design, experience design, and pervasive technology design just to name a few.

Likewise, Universal Design has expanded and evolved into an approach that not only includes physical function, but, also, other issues that contribute to well-being in our more socially progressive and digitally augmented age. More recent definitions reflect this expansion. Consider this example, "Universal design is design for human diversity, social inclusion, equality" (DfA 2004). This definition removes traditional explicit references to the built environment, and opts instead for a more general approach. It argues that if design processes are socially focused, non-discriminatory, and address equality of opportunity and personal empowerment, they are universally designed (Dolph/Tauke/Weidemann 2019). A more recent definition posits that Universal Design is "a design process that enables and empowers a diverse population by improving human performance, health and wellness, and social participation" (Steinfeld/Maisel 2012: 29). Both of these more recent definitions show how the language of Universal Design has evolved to prioritize human-centered issues and social inclusion. While the earlier definitions implied some of these concepts, the focus was on products and buildings. Also implied was a priority for physical function, and although the phrase "all people" is used, the history of accessibility looms large in both the definitions and principles. The more recent definitions move away from a focus on disability alone to other notions that include socio-economic status, culture, race, ethnicity, gender identity, religion, age, physical and mental health. All of these issues can affect the ways that we interact with our built environments, and, thus, can be the basis for improved design.

The Goals Meeting in 2012

In 2012, researchers from the Center for Inclusive Design and Environmental Access (IDeA Center) at the University at Buffalo, State University of New York met to revisit the Seven Principles given the expanding scope of Universal Design. Dr. Edward Steinfeld and Dr. Jordana Maisel and their colleagues wanted to retain important components of the principles, but also acknowledge the larger social issues implied by the newer definitions of UD. They wanted to move beyond a western-centric notion of equity towards a more global approach. For example, they argued that Universal Design practice in Niger is quite different from UD practice in Canada. Basic needs, topography/climate, healthcare, values, and aesthetics vary widely in these two environments, and Universal Design should work in both of these contexts. To address these issues, they developed the eight Goals of Universal Design (see figure 1)

The first four goals are oriented towards human performance, each of which is focused on one of the four areas of UD knowledge: anthropometry, biomechanics, perception, and cognition. Wellness addresses both human performance and social participation. The last three goals address social participation and identity issues as integral to design (Steinfeld/Maisel 2012: 90).

Of great importance to the IDeA researchers was a framework that established goals, guidelines, strategies, and best practices to ensure a comprehensive knowledge base for educators and professionals. Goals define the overall scope of UD, guidelines provide specific design criteria, strategies

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Eight Goals of Universal Design

- Body fit. Accommodating a wide a range of body sizes and abilities
- Comfort. Keeping demands within desirable limits of body function
- Awareness. Insuring that critical information for use is easily perceived
- Understanding. Making methods of operation and use intuitive, clear, and unambiguous
- Wellness. Contributing to health promotion, avoidance of disease, and prevention of injury
- Social integration. Treating all groups with dignity and respect
- Personalization. Incorporating opportunities for choice and the expression of individual preferences
- Cultural appropriateness. Respecting and reinforcing cultural values and the social, economic and environmental context of any design project

Source: Steinfeld/Maisel 2012: 90

suggest ways to meet the guidelines, and best practices provide precedents (Steinfeld/Maisel 2012: 89). Currently, educators, researchers, and practitioners are using the goals to develop ways forward that provide guidelines, strategies, best practices, and measurable outcomes so that Universal Design can work better in many different places. They realize that there is a lot of work to be done in order for the field to mature enough to have significant impact at the global level.

Current Education and Practice

Education

Understanding the shift in the scope of Universal Design has been the one of the first steps towards progress. According to a recent survey sponsored by the National Endowment for the Arts, design educators in U.S. universities have a good understanding of the expanded notion of UD. As part of a larger study, faculty teaching in accredited architecture and interior design programs were given older and newer definitions of UD as well as definitions of accessibility, and asked to assess their appropriateness in defining the term Universal Design. Over 80% of the interior design faculty and over 70% of architecture faculty respondents considered the newer definitions to describe UD extremely, very, or moderately well. The majority recognized the differences between Universal Design and accessibility (Dolph/Tauke/Weidemann 2019).

In this same survey, many faculty members reported social inclusion-focused components in their Universal Design curricula. For example, studio projects that were mentioned included a pre-school for children, a cultural community center that embraces varying gender identities, a shelter for homeless youth, health care stations in refugee settlements, and many other projects that include those who traditionally have been marginalized in the design process. Many respondents discussed including and involving a wider range of participants, particularly users, into the design process in both their seminars and studios. One respondent summed it up by writing, "The practice of design is taught as a social responsibility" (Dolph/Tauke/Weidemann 2019).

Research

Two of the major research centers focusing on Universal Design have expanded their agenda to develop knowledge and tools that center around social inclusion. The Center for Inclusive Design and Environmental Access (IDeA Center) at the University at Buffalo – State University of New York is conducting research that enables and empowers an increasingly diverse population through an evidence base that aims to improve the human performance, health and wellness and social participation of groups who have been marginalized by traditional design practices. Their current research activities include systematic reviews, human factors research, usability studies, survey research, focus groups and ethnographic studies. The IDeA team has recently developed a set of guidelines titled innovative solutions for Universal Design (isUD), a voluntary initiative based on extensive evidence from research and practice that offers a tool for designers, facility managers, and other stakeholders to implement universal design in their built environment, policies, and business practices. isUD seeks to create inclusive and healthy environments that make everyone feel welcome (IDeA 2019).

The Helen Hamlyn Centre at the Royal College of Art in London has established three research areas that speak to newer models of Universal Design. The Age & Diversity research group studies age in all of its forms; digital age, social age, educational age, the age spectrum, and life course transition. The Healthcare research group specializes in how healthcare is delivered to ensure that the people receiving care are at the center of the design and development process. The Social & Global research group studies four rapidly evolving research areas that impact how we live today and in the future: new technology, development and sustainability, community, and inclusive mobility (Helen Hamlyn Centre 2019).

Practice

As a social practice, UD takes concepts such as equity and justice, and translates them into material and spatial realities. Despite its complexity, these skills and sensibilities have been at the fore of a number of design practices. Alejandro Aravena Architects, Henriquez Partners Architects, Kéré Architecture, Estudio Teddy Cruz + Fonna Forman, Studio H, and Shiguru Ban Architects are just a few of the more well-known firms that focus on social architecture. Many of these practices brand themselves as human-centered or socially sustainable; and focus on the development of programs, processes, and products that promote social interaction and cul-

Photographer: Erik-Jan Ouwerkwerk

Primary School in Burkina Faso, built 2008. Windows in this school are designed to be adjusted for airflow, light, and rain (Architect: Francis Kéré, Kéré Architecture)

tural enrichment. They emphasize protecting the vulnerable, respecting social diversity, and ensuring social capital as a priority. Because social sustainability relates to how we make choices that affect others in our global community, Universal Design is considered as a key component to success.

A number of organizations have supported this type of practice. Design Corps, DesignBuild Xchange, Open Architecture Collaborative, and Design Justice Network are just a few that promote social agendas.

Moving Forward

Universal Design is an asymptotic concept and, as such, will continue to evolve towards the goal of design that works for all people. Many conditions in our rapidly changing world pose questions and suggest possibilities about the ways that we are choosing to study and practice Universal Design as well as ways that UD can inform other design approaches.

Already the democratization of design brought about by new and cheaper technology has interrogated the roles of traditional designers as the centers of control. A new class of "citizen designers" is disintegrating the "us-them" relationship of the typical designer and client. It is being replaced with the Universal Design practice of involving users as part of multi-disciplinary design teams.

Already, artificial intelligence has changed how we work and live. While it has the potential to positively transform many aspects of life (information technology, telecommunications, transportation, health care, education, agriculture, etc.), designers need to be involved in the prediction and prevention of unintended negative societal consequences. Applying Universal Design goals to artificial intelligence systems will help us to face some of the ethical challenges that it poses.

Already, pollution of our water, air, and land have threatened our health. While this is a global problem, Universal Design in action focuses on small steps towards progress, solving challenges at the local level on case-by-case situations. These many solutions, backed by an evidence base, eventually add up to larger solutions, which might lead to greater change.

Finally, advances in bio-tech have blurred the boundaries between natural and human-built products and environments. Technologies that use living organisms to both make products and alter living entities have changed our understanding of life at just about every level. Applying the UD concepts of designing for human diversity, social inclusion, and equality when considering bio-tech solutions might level the playing field so that gaps between the haves and have-nots do not increase or can be reduced or eliminated.

These recent developments and the ways that they interface with Universal Design need not take us into a "UD will save the world" hype. Rather, they suggest ways that evidence-based inclusive approaches can improve design decisions. They focus on both the short and long-term impacts that these decisions will have on everyone, and, especially, those who often are left out of the process. It is through this strategy that Universal Design can be a catalyst for continual positive change.

Literature

Abadi, Mark, 2018: Eleven Ways the World Has Changed in the Last Twenty Years. Accessed: https://www.businessinsider.com/progress-innovation-since-1998-2018-3 [retrieved on 25.10.2019].

Center for Inclusive Design and Environmental Access, 2019: isUD: Innovative Solutions to Universal Design. Accessed: https://thisisud.com [retrieved on 25.10.2019].

CUD – Center for Universal Design, 1997: The Principles of Universal Design. Accessed: https://projects.ncsu.edu/ncsu/design/cud/about_ud/udprinciplestext.htm [retrieved on 25.10.2019].

Design for All Europe, 2004: EIDD Stockholm Declaration Accessed: http://dfaeurope.eu/what-is-dfa/ [retrieved on 25.10.2019].

Dolph, Eric; Tauke, Beth; Weidemann, Sue, 2019: Effectively Teaching Universal Design: Survey Results. Charlotte, North Carolina, USA.

Helen Hamlyn Centre for Design, 2019: Design. Different – The Helen Hamlyn Centre for Design. Accessed: https://www.rca.ac.uk/research-innovation/research-centres/helen-hamlyn-centre/ https://projects.ncsu.edu/design/cud/about_us/usronmace.htm

LaBarre, Suzanne, 2016: The Most Important Design Jobs of the Future. Accessed: https://www.fastcompany.com/3054433/the-most-important-design-jobs-of-the-future [retrieved on 25.10.2019].

Mace, Ronald L., 1985: Universal Design, Barrier Free Environments for Everyone. In Designers West Conference Proceedings. Los Angeles, California, USA: 147–152.

Mace, Ronald L., 1988: Universal Design: Housing for the Lifespan of All People. Washington, DC, USA.

Silver, Julie K.; Wilson, Daniel, 2007: Polio Voices: An Oral History from the American Polio Epidemics and Worldwide Eradication Efforts. Westport, Connecticut, USA.

Steinfeld, Edward; Maisel, Jordana, 2012: Universal Design: Creating Inclusive Environments. Hoboken, New Jersey, USA.

The Center of Universal Design, 2008: About the Center: Ronald L. Mace. Accessed: https://projects.ncsu.edu/ncsu/design/cud/about_us/usronmace.htm [retrieved on 25.10.2019].