Universal Design: An Evolved Approach to Contemporary Product Design

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Abstract

The import of universal design (UD), its evolution and the forces which drive its contemporary momentum in the beginning decades of the 21st century are examined. UD is expressed as of paramount import to America’s academic institutions, industries, research, development and services, mandating application of universal design principles to adapt to contemporary manifold global motivations for change in order to remain vital, competitive and prosperous. The evolutionary origins of universal design focus on the Center for Universal Design at North Carolina State University and its founder, Ronald L. Mace. The motivations which drive UD momentum: disabilities, an aging population, social movements, legislation, globalization and usability are illuminated. The article, written by an undergraduate student at California State University, East Bay, ultimately relates to the myths which would counter arguments for universal design.

Keywords: disabilities, human factors, legislation, usability, universal design, UD
Thousands of years past, humankind began fashioning tools, at first roughly from the available materials of the environment; purposed first to simplify the tasks of survival, later intents evolved to enhance human quality of life. The earliest products addressed the essentials in response to human needs, hunting and agricultural tools, clothing, containers and protection from the elements. Today, by contrast, the essentials have been supplemented to include leisure products, games, toys, entertainment systems, educational and exploratory products and so much more. The current generation’s products and tools have become a ubiquitous part of the human condition, a condition that has seen much change, notably, toward significantly aged populations. Contemporary products and tools extend human reach and evolve over time towards sophistication that demands specialized integrated processes and contributions from teams of designers, managers, developers, manufacturers and marketers to bring ever new products into vogue and use by eager consumers. Such products reshape entire societies on a global scale. It is paramount that America’s academic institutions, its industries, research, development and services apply universal design principles to adapt to contemporary manifold global motivations for change in order to remain vital, competitive and prosperous.

The importance of universal design to the average person cannot be overstated. Technology has not only decreased distances on a global scale, but has acted to eliminate borders and barriers between people and societies of divergent cultures, languages and standards. It has enabled people to live longer, healthier and more fulfilling lives. And it has facilitated their capacity to reach out without travelling, across borders, oceans and mountains to people with different cultural and linguistic roots. Technological advances have also exposed people to products and tools for which usage can be and often is obscure and difficult to comprehend.
Homes have been electronically automated, household appliances often include built in *embedded* logic devices which increase their functionality and range of available control. Communication and recreation devices as well as other tools have evolved to a miniaturized degree of sophistication that allows them to be carried in a shirt pocket. Keypad controls provide access to an astonishing degree of information and functionality, making available tools, leisure and access to exploration of information that exceeds personal capacity to grasp it all. Universal design (UD) principles apply to the contemporary design of such products, purposed to make their functionality intuitive and easy to grasp, regardless of the language, literacy, culture and physical and psychological limitations of any user. Achievement of those goals, not always perfect, purposes designers to understand usability beyond their own personal knowledge of the problem. Designers must investigate and see usage as the multiply variant users of the product will see usage. And they must accommodate those many variant users via the product’s interfaces. This is the nature of universal design. And from this, future product consumers and users will benefit by transcending all manner of impediments to usage and enrich the human condition by extending their personal reach and capacity through products openly designed to easily and intuitively accommodate and transcend the impediments they encounter in usage. Acquiring an intimate understanding of universal design, its history and its momentum and import to contemporary products serves not only designers and industry stakeholders, but users alike.

Global motivations which impact product design are many. The College of Design at North Carolina State University (NCSU), the host for Ronald L. Mace’s Center for Universal Design, examined several of these.
Without doubt, these motives include accommodation for people with disabilities. But they also include accommodation of that increasingly large percentage of the population that can be categorized as advanced in age and with tendencies for impairment. Social movements and the demands of those movements generate pressures to adopt universal design principles. These social movements intend to eliminate the discriminatory aspects of contemporary products and services, especially those which limit accessibility and usability by the disabled and impaired. They in turn, drive the introduction of legislation; laws written in response to social movements mandate adoption of accessibility principles, either directly for public universities and government, its agencies and those businesses and contractors providing services and products to government or consequentially, in response to discriminatory lawsuits applicable to products and services in the public domain. Globalization and market competitiveness introduce aspects of universal design which are applicable beyond accessibility, supporting transcendence of usage, culture, literacy, language and national standards. Additional motivations stem from accommodation of usability and user experience. Combined, these motivational sources elevate products and services which adhere to universal design principles to the top tier of competitiveness, usability and applicability to the widest possible audience.

To fully understand universal design, its roots in accessibility for the disabled must be examined. The connection of universal design (UD) to the disabled (attributable to Ronald L.
Mace, the founder of the Center for Universal Design at North Carolina State University) attests not only to its origins in architectural accessibility, but also, to the role of the disabled in promoting a fundamental global social good. Wolfgang Saxon wrote Mace’s obituary in the New York Times on July 13th, 1998, detailing his contribution and crediting him with coining the term *universal design* in 1985. Clearly, UD has roots within design for the disabled, particularly architectural and home design concepts for those suffering mobility impairments and this has often lead to misconceptions regarding the definition of UD. But Ronald L. Mace had recognized crossovers between products for accessibility and assistive technologies with products intended for the mainstream population. As stated by the North Carolina State University College of Design (2008) “A number of products have enjoyed crossover success, often starting as assistive devices and later, becoming mainstream products …” (Para. 23). Other credible sources echoed the broader definition of UD; according to Alan Dix, Janet Finlay, Gregory Abowd and Russell Beale (1993) “Universal design is the process of designing products so that they can be used by as many people in as many situations as possible” (p. 366). Ronald Mace’s seven principles of universal design are key factors applied toward achieving these goals. The value of UD arose from accommodating all people, disabled or otherwise, across a wide spectrum, to include variances in culture, literacy, language, national standards and other factors. Products applying universal design principles ideally met the challenges of a global product market. The Center for Universal Design along with others, A. Cavender & R. Ladner, S. L. Henry and S. H. Kurniawan, identified an increased percentage of the world’s population characterized by advanced age as primary among social variances, demanding increased accommodation by products and services in a more generalized way. Cavender and R. Ladner,
S. L. Henry and NCSU educators further illuminated that transcending barriers in a world affected by globalization demanded another dimension of accommodation.

Legislation applicable to the disabled responded to early social and civil rights movements and served as a fundamental motivation to adopt universal design principles. North Carolina State University College of Design (2008) indicates that the first civil rights law for people with disabilities, Section 504 of the Rehabilitation Act of 1973, “made it illegal to discriminate on the basis of disability and applied to federal agencies, public universities, federal contractors, and any other institution or activity receiving federal funds” (Para.13). The landmark Americans with Disabilities Act (ADA) of 1990 provided enormous momentum to changes in barrier free architectural and home design. And Section 508 of the Rehabilitation Act of 1973, tied to digital media, computing devices, software products and in particular, the World Wide Web, regarded accessibility standards in a more recognizable area of common mainstream usage. The W3C (World Wide Web Consortium) published several guidelines for the design and development of web sites which facilitate accessibility and compliance with section 508. These included according to S. L. Henry, J.P Mueller and C. D. Waddell, guidelines under the auspices of the Web Accessibility Initiative (WAI), the Authoring Tool Accessibility Guidelines (ATAG), the Web Content Accessibility Guidelines (WCAG) and the User Agent Accessibility Guidelines (UAAG). Waddell (2006) illuminated the shift in web usage from being a source of static information to hosting dynamic applications “where our global policies, technologies and purchasing choices will determine whether or not every person will benefit from and directly participate in, the digital economy” (p. 55). People, both with and without
disabilities and impairments, had come to depend upon the web, not only as a source of information, but significantly, as a source of income. Take note that section 508 applied to universities, government, government agencies, government contractors and others who provide government products and services. But complaints in the public domain were not unheard of. Legislation while motivating product design which accommodated the disabled, has served to influence a greater acceptance for universal design principles which apply to mainstream usage.

Usability contributed to universal design and had been a primary concern in human factors research since the time of World War II where usability and human factors had traditionally applied to mainstream products and services. And while human factors researchers both understood and applied universal design principles after they were introduced, traditional principles of human factors applicability were observed to act counter to the intent of UD. That is, the fit of product usability was often intentionally limited to a restricted segment of a population and one size fits all approaches were shunned. D. Norman related general usability issues in “The Design of Everyday Things” to the interfaces of products which make product functions and operability psychologically clear, often by non-linguistic symbols or design principles which capitalized on natural or cultural cognitions of operability. M. Sanders and E. J. McCormick illuminated human factors as a process of measurement and selectivity that purposefully focused product design on a percentile, an inter-quartile distribution of a population. Universal design by contrast, sought to open up design to accommodate the largest possible percentage of all populations. The motivations for human factors design principles based on anthropometry and population distributions were justified in terms of efficiencies, safety, costs and other attributes. And undeniably, the traditional human factors approach
remains today, both realistic and valid. The time had not yet arrived for example, to place handicapped persons at the controls of jet fighters and send them off to combat. Jet fighters, their controls, instrumentation and operability were purposefully limited to a small percentage of the human population capable of withstanding extreme G-forces, having specific height, visual, audible and cognitive acuities. The application of anthropometrical measurements to suite specific population distributions naturally gave rise to arguments against universal design. But in truth, product design according to human factors’ traditional approach and that of universal design did not mutually negate each other. Instead, designers necessarily evaluated the context of design requirements and made a choice, either to limit usability or to extend it.

Usability usually focused on user interfaces (UI) and today, more and more, on enhancing user experience (UX). User experience sought to moderate usability to facilitate repeat usage or as applicable to marketing, return customers. If a user had a satisfying experience, they were perceived as likely to return for more of the same. Of the more familiar contexts for UI and UX, the human computer interface (HCI) stood out. Alan Dix, Janet Finlay, Gregory Abowd and Russell Beale presented design principles from vision to release, describing design and development cycles, usability, prototyping and universal design and accessibility as applicable to HCI. They and others pointed out that usability, universal design and other design considerations are best incorporated in the earliest stages of the design and development cycle. To add them in as an afterthought, if not prohibitive would involve extremes of cost. Stakeholders and investors had to be convinced of the viability of such design considerations as they represented additional expense, especially if the organization had not applied them before. Savings were realized on the tail end, after release, in terms of reduced maintenance costs,
extended marketability, distribution and product quality, acceptance and competitiveness.

Today, difficulties typically reign, finding arguments which counter universal design. Often, one must investigate sources which lack credentials and/or credibility, blogs, personal viewpoints and such (Clark 2009). Instead, counters to universal design are often summed up by authors who enumerate a list of myths regarding UD. Buffalo University, The State University of New York, Center for Inclusive Design and Environmental Access, enumerated such a list of myths about universal design. Beyond this, the conflict between human factors anthropometric distribution design concepts and UD has been explored above, establishing that both design philosophies must necessarily co-exist, discriminated by context driven choice, and neither negates the other.

Today, users and consumers of products of all types will be confronted by a myriad number of controls and options, all made possible by technological advances which both miniaturize and make available an incredible density of information and processes to mere human touch. And technology promises more, much more, and with even greater accessibility to users with varying degrees of skill, physical and psychological limitations, languages, customs, literacy and backgrounds. And for every human sense and means of communication, technology promises a palpable interface to such products, by tactile, speech, audible or other means. These products will not only accommodate mainstream users, but those who have often been excluded from open social interaction due to their disabilities or impairments. This new world of highly sophisticated products and services mandates a change in design principles and those principles are already available. Universal design paves the way toward accommodating these new products with interfaces that make them accessible across all barriers and impediments to usage,
culture, literacy, language and national standards. The future tools of humankind will enable consumers and users of such products to extend their reach to previously impossible limits, across all social barriers, improving the human condition to a degree that almost defies description. The wave of change demands efforts to educate users and designers alike about the principles of universal design, to implement those principles in industry and in return, reap the benefits. The benefits of universal design promise to exceed enumeration.
References


