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# HUMAN-CENTERED DESIGN

(also known as universal design, life span design, inclusive design)

Human-centered design is based on the physical and psychological needs of the human user, enabling the user to function at the highest level possible. It includes products and aspects of the physical environment that meet the needs and abilities of the user, not those that demand adaptation to the design *by* the user. Human-centered design is not a design *style,* but is a process for designing and developing buildings, products, and communities that is grounded in information about the people who will be using them—utilizing research findings and data on cognitive abilities, physical abilities and limitations, social needs, and task requirements in order to provide living-environment solutions that enable all users to function at their highest capacity—regardless of age or ability.

The principles underlying human-centered design range across disciplines—from community design, to architectural design, to interior design, industrial design, and design of communication venues. And, according to the Institute for Human Centered Design,[1] universal or human-centered design "has a parallel in the green design movement, which also offers a framework for design problem-solving based on the core value of environmental responsibility. Universal Design and green design are comfortably two sides of the same coin—green design focusing on environmental sustainability, universal design on social sustainability."

- Some examples of human-centered design include:
  - Lever door handles, which provide ease of opening for children with small hands, elderly people with reduced wrist strength, adults with full use of their arms and hands who may be carrying packages and babies, or an individual with no hands. A lever handle allows a person to use an elbow, a prosthesis, a carried item, or the full strength of his/her arm to easily open a door—thereby allowing for a vast range of abilities . . . and enabling a vast range of people.
  - Zero-step entryways into a home or building, which help small children and frail older people who cannot negotiate steps, people of all ages who have a permanent or temporary impairment, and people who use mobility aids.
  - Numerous interior-environment features, such as raised-height dishwashers, clothes washers, and dryers; sit-to-work space in the kitchen and other work areas; glare-free lighting and task lighting; walk-in showers with seats and stability bars; fire alarm lights for hearing-impaired people; adaptable room divider walls to convert first-floor rooms into a bedroom or bath; and others.
  - Numerous exterior-environment features, such as no-slip driveways and sidewalks; covered bus stop waiting areas; complete streets, which allow easier, safer crossing and increased access to stores and amenities; and others.

- Walkable communities, in which the design integrates residences, commercial areas, and places of employment, as well as providing pathways, bikeways, and sidewalks—allowing residents to easily and safely walk to destinations in place of total reliance on personal automobiles.

- In contrast, the principles of human-centered design have *not* been followed in this example: Many public buildings, health care facilities, apartment houses, and private homes use reflective materials for floors—which are easy to clean but which distort vision acuity; ceiling-mounted light fixtures that provide spots of illumination rather than even lighting; and a window at the end of a hallway or corridor, which distorts the ability to accurately discern distance or judge where to step. As Noell-Waggoner reports,[2] all of these are disabling to individuals of any age who are vision-impaired or have diseases of the eye, as well as older people with cataracts, glaucoma, and other age-related vision changes. Such a hazardous visual environment not only increases the risk of falls, but is also a psychological barrier, limiting the chosen activities of residents.

For much of recorded history, humans have been aware of the impact of the built environment. For example, the great European cathedrals were designed with an intent to awe and uplift through the use of soaring ceilings, spires, and other design features. In a different vein, toilet areas are designed to provide privacy. But while we may have been aware of the messages the environment can send, or how it can make us feel, societies have often underestimated the true impact of the built environment on a person's level of functioning, degree of independence, and physical well-being.

Traditionally, buildings, homes, and products have been developed for "the average person"—employing biometric data for an average distribution of the population in terms of strength, balance, reach, and height, and assuming normal cognitive, visual, speaking, and hearing abilities. However, there are few "average" people. Instead, there is great variation *among* age groups (children, teenagers, adults, and older people), as well as substantial natural variation among individuals *within* any one age group (size, strength, agility, capacity, functional ability). The growing move toward human-centered design reflects an increasing understanding of the critical negative impact of routinely designing environments for the "average" person.

The field of environmental psychology began to grow significantly in the 1960's, and the field is defined by Proshansky's 1970 book, *Environmental Psychology: Man and His Physical Setting*,[3] a collection of essays by many pioneering researchers and theorists in the field. Murray's 1938 book, *Explorations in Personality*,[4] and Lawton and Nahemow's 1973 adaptation model[5] explored various facets of "environmental press,"[6] proposing that there is a level of fit between the capability of a user and the challenges/demands (press) of his/her environment—and that, as functional capability diminishes, the effects of the environment (press) are more pronounced. Optimum fit is the level at which the demands of one's environment (for example, entryway steps, lighting level, distance to public

transportation, allotted time to cross a street) are within his or her range of abilities.

In the early 1980s, the term "universal design" was coined by the late Ronald Mace, architect and founder of the Center for Universal Design at North Carolina State University. According to the Center, "Ron . . . created the term 'universal design' to describe the concept of designing all products and the built environment to be aesthetic and usable to the greatest extent possible by everyone, regardless of their age, ability, or status in life."[7] Over the years, his substantial work and significant influence slowly but certainly revolutionized the design and use of products and the built environment. An excellent history of the Universal Design movement can be found at: http://www.design.ncsu.edu/cud/about_ud/udhistory.htm.

During that same time period, the industrial designer, J. J. Pirkl, coined the term "Transgenerational Design,"[8] promoting design that enables all generations and inspiring the growth of human-centered design. In recent years, various advocates use the terms "integrative design," "life cycle design," "inclusive design," and "user-centered design" in place of universal design or human-centered design.

Whichever names are used, advocates for such design are looking to enable all of society to function at the highest level possible, asking the questions:

- Why should the built environment serve as an obstacle to functioning?
- Why are we designing for a small segment of the population, leaving out millions of others?
- Why place our older adults or our younger-aged people with disabilities in institutions when appropriately designed environments will delay or prevent institutionalization?
- Why limit the lives and contributions of persons with frailties or disabilities when simply building "visitable"[9] homes could allow them to interact with their friends and relatives in the same way as others?

*Community Planning:*
Communities that set about planning for their current and future residents must understand the power of *informed* design—design based on research and on an understanding of the differing needs and abilities of their residents. If the design of spaces, buildings, and products is done for the "average" person, communities must ask themselves, "Does this describe the population we serve?" Communities must also understand that informed design provides many community benefits, including:

- *Support for Public Policies*—A crucial aspect of human-centered design is its role in supporting New York's public policies that promote the ability of residents to successfully age in place—delaying or preventing institutionalization and the resulting impact on the costs of health and long-term care. This is a potent resource for communities and service providers.

- *Increased Independence and Self-management*—The overwhelming preference of older people and people with disabilities is to continue living in their own

homes for as long as possible. The use of human-centered design for products, the built environment, and community elements can improve both their physical and mental well-being—by maintaining residents' independence and their ability to be self-managing for longer periods of time; increasing their level of self-esteem and feelings of competency; and decreasing the risk of falls, other injuries, depression, and isolation. An outcome is the smaller use of the formal services system, resulting in lower public expenditures for in-home and community-based health and long-term care.

- *Support for Family Caregivers*—Human-centered design for products, the built environment, and community features strongly supports the substantial efforts of informal, unpaid family members who have assumed caregiving responsibilities for older family members and younger family members with disabilities.

- *Stabilized Resident Population*—Human-centered design is an aspect of a "livable community," encouraging individuals and families to remain living in the community rather than relocating out of the area.

**References:**

[1] (Retrieved 10-19-10). "What is Universal Design," *Universal Design*. Boston, MA: Institute for Human Centered Design.

[2] E. Noell-Waggoner (2004), "Lighting Solutions for Contemporary Problems of Older Adults," *Journal of Psychological Nursing & Mental Health Services,* Vol. 42, No. 7, p. 14-20.

[3] H. Proshansky, W. Ittelson, and L. Rivlin (1970). *Environmental Psychology: Man and His Physical Setting.* Austen, TX: Holt, Rinehart, and Winston, Inc.

[4] H. Murray (1938). *Explorations in Personality.* Hoboken, NJ: John Wiley & sons, Inc.

[5, 6] M. P. Lawton and L. Nahemow (1973). "Ecology and the aging process," *The Psychology of Adult Development and Aging,* (Ed.: C. Eisdorfer and M. P. Lawton). Washington, DC: American Psychological Association.

[7] Center for Universal Design (CUD). Raleigh, NC: North Carolina State University.

[8] James J. Pirkl, *Transgenerational Design Matters* web site.

[9] "Principles and Beginnings," *Visitability* web site. Visitability refers to housing designed in such a way that it can be lived in or visited by people who have mobility impairments (difficulty using steps, or who use wheelchairs, walkers, or other mobility aids). A house is visitable when it meets three basic requirements: (1) at least one zero-step entrance, (2) interior and exterior doors with 32 inches of clear passage space, and (3) at least one bathroom on the ground-level floor that allows entry, navigation, and exit by someone in a wheelchair.

**Other Resources:**

- Bayer and L. Harper (2000), *Fixing to Stay: A National Survey on Housing and Home Modification Issues*, Research Report. Washington, DC: American Association of Retired Persons, Public Policy Institute: http://assets.aarp.org/rgcenter/il/home_mod.pdf.

- Concrete Change, a coalition of advocates for universal design in individual homes, whose members' efforts have made considerable progress and significant impact on construction and legislation regarding equal opportunity residences: http://concretechange.org/.

- E. S. Greenhouse (2003), *The Impact of Improved Lighting on Minimizing Environmental Press Associated with the Visual Deficits of Alzheimer's Disease*," Cornell University Library, Ithaca, NY.

- L. G. Hiatt (1986), "The environment's role in the total well-being of the older person," *Well-Being and the Elderly: An Holistic View,* (Ed.: G. G. Magan and E. L. Haught). Washington, D.C.: American Association of Homes for the Aging.

- S. Howell (1982), "Built space, the mystery variable in health and aging," *Advances in Environmental Psychology,* (Ed.: A. Baum and J. Singer). Hillsdale, NJ: Lawrence Erlbaum Associates. Also, *Environment and Health*, Vol. 4.

- R. Mollica, et al. (March 26, 2009), "Taking the Long View: Investing in Medicaid Home and Community-Based Services is Cost-Effective," *Insight on the Issues,* Research Report. Washington, DC: AARP, Public Policy Institute. http://assets.aarp.org/rgcenter/il/i26_hcbs.pdf.

- Usability Professionals' Association—promoting usability concepts and techniques worldwide; describes the four activities forming the main cycle of work in a user-centered model: http://www.upassoc.org/usability_resources/about_usability/what_is_ucd.html.