What is Universal Design?

- Universal design is the process of designing products so that they can be used by as many people as possible in as many situations as possible.

Examples

- I’m having trouble reading smaller print
- Lefties have trouble with scissors
- Someone with arthritis can’t open a bottle
- Chair that a child can’t sit in properly
- …

Users with Disabilities

- Visual impairment
  - Not just about blindness, from age, color issues, limitations
- Hearing impairment
  - From birth, environment, noise
- Physical impairment
  - Wide range, unavailable vs. limited, injury
- Speech impairment
  - Permanent, temporary, noise
- Dyslexia
- Autism

Dyslexia

Autism

- A fast growing serious disability.
- May be caused by Pollution.

… plus …

- Age groups
  - Older people e.g. disability aids, memory aids, communication tools to prevent social isolation
  - Children e.g. appropriate input/output devices, involvement in design process
- Cultural differences
  - Influence of nationality, generation, gender, race, sexuality, class, religion, political persuasion etc. on interpretation of interface features
  - e.g. interpretation and acceptability of language, cultural symbols, gesture and colour

Universal Design

- In HCI terms, this means particularly designing interactive systems that are
  - usable by anyone,
  - with any range of abilities,
  - using any technology platform.

Principles of Universal Design

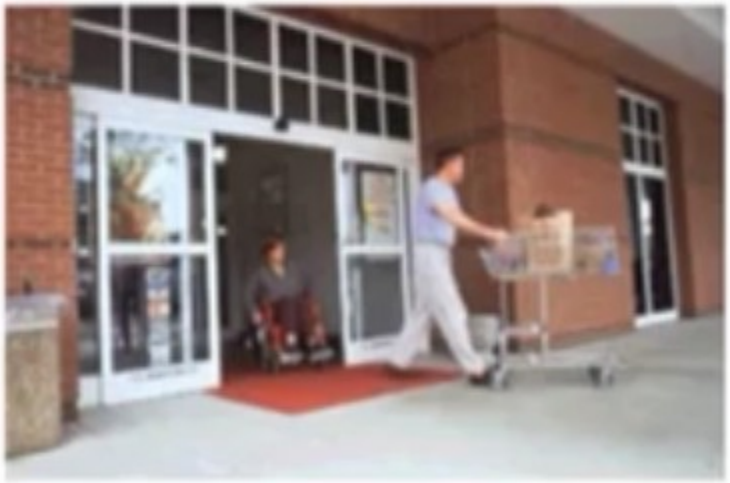
- In the late 1990s a group at North Carolina State University in the USA proposed seven general principles of universal design.
- These principles give us a framework in which to develop universal designs.

Principles of Universal Design

- Equitable use
- Flexibility in use
- Simple and intuitive to use
- Provide perceptible information
- Tolerance for error
- Low physical effort
- Size and space for approach and use

Equitable Use

- **The design is useful and marketable to people with diverse abilities**



GUIDELINES :

- Provide the same means of use for all users: identical whenever possible; equivalent when not.
- Avoid segregating or stigmatizing any users.
- Provisions for privacy, security, and safety should be equally available to all users.
- Make the design appealing to all users.

Flexibility in Use

- **The design accommodates a wide range of individual preferences and abilities.**
- GUIDELINES:
  - Provide choice in methods of use.
  - Accommodate right- or left-handed access and use.
  - Facilitate the user's accuracy and precision.
  - Provide adaptability to the user's pace

Simple and intuitive

- **Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level**
- **GUIDELINES**
  - Eliminate unnecessary complexity.
  - Be consistent with user expectations and intuition.
  - Accommodate a wide range of literacy and language skills.
  - Arrange information consistent with its importance.
  - Provide effective prompting and feedback during and after task completion.

Perceptible Information

- The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities

Perceptible Information

- **GUIDELINES**
  - Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.
  - Provide adequate contrast between essential information and its surroundings.

Tolerance for Error

- **The design minimizes hazards and the adverse consequences of accidental or unintended actions.**
- **GUIDELINES**
  - Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.
  - Provide warnings of hazards and errors.
  - Provide fail safe features.
  - Discourage unconscious action in tasks that require vigilance

Low Physical Effort

- **The design can be used efficiently and comfortably and with a minimum of fatigue.**
- GUIDELINES
  - Allow user to maintain a neutral body position.
  - Use reasonable operating forces.
  - Minimize repetitive actions.
  - Minimize sustained physical effo

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.**
- **GUIDELINES**
  - Provide a clear line of sight to important elements for any seated or standing user.
  - Make reach to all components comfortable for any seated or standing user.
  - Accommodate variations in hand and grip size.
  - Provide adequate space for the use of assistive devices or personal assistance