Universiti Malaysia PAHANG
Engineering • Technology • Creativity

Graphical User Interface

Chapter Six
Universal Design

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Chapter Description

- Aims
  - ✓ To understand the important of the universal design.
  - ✓ To understand the principles of the universal design.

- Expected Outcomes
  - – Able to apply the universal design principles to design a GUI.

- References

  - ✓ Wilbert O. Galitz, The Essential Guide to User Interface Design: An Introduction to GUI Design Principles and Techniques, John Wiley & Sons Inc, 2007.
  - ✓ Jenifer Tidwell, Designing Interfaces, O'Reilly, 2011
  - ✓ Jeff Johnson, Designing with the Mind in Mind: Simple Guide to Understanding User Interface Design Rules , Morgan Kaufman Publisher, 2010

Universal Design Principle

- Universal design is about designing system so that they can be used by anyone in any circumstance
- Seven principle of universal design by a group at North Carolina State University [Dix, pg 367]:
  - Equitable use
  - Flexibility in use
  - Simple and intuitive to use
  - Perceptible information
  - Tolerance for error
  - Low physical effort
  - Size and space for approach and use

The 7 Principles

1 EQUITABLE USE

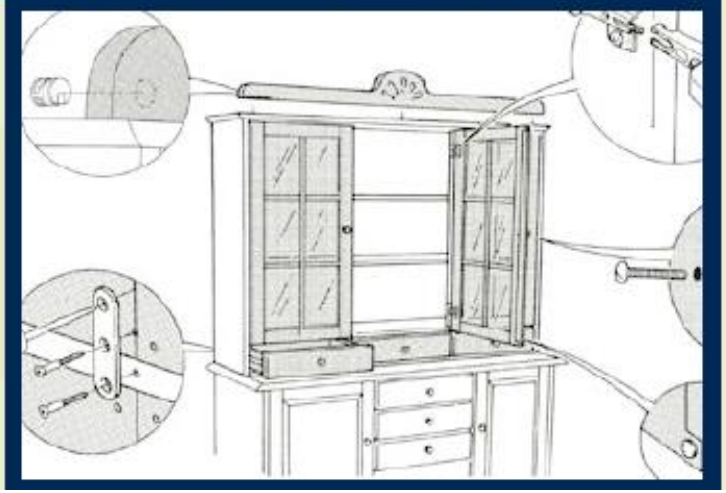
The design is useful and marketable to people with diverse abilities.

2 FLEXIBILITY IN USE

The design accommodates a wide range of individual preferences and abilities.

3 SIMPLE AND INTUITIVE USE

Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.



4 PERCEPTIBLE INFORMATION

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

5 TOLERANCE FOR ERROR

The design minimizes hazards and the adverse consequences of accidental or unintended actions.

6 LOW PHYSICAL EFFORT

The design can be used efficiently and comfortably and with a minimum of fatigue.

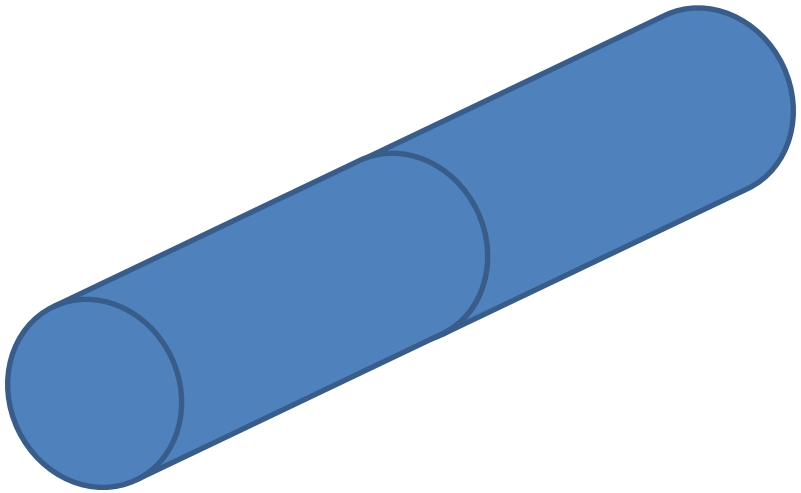
7 SIZE AND SPACE FOR APPROACH AND USE

Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

Beat your competitor!

- Be imaginative and come out with new ideas.
- **You don't have to be cheaper to win customers.**

Tell the world about your design!



Universal Design Principle

- Equitable use
  - Useful to range of ability and appealing to all
  - Security, privacy & safety appropriate
- Flexibility in use
  - Allow range of ability and preference through choice of methods of use and adaptability to the user speed, precision and custom

Universal Design Principle

- Simple and intuitive to use
  - Regardless to the knowledge, experience, language or level of concentration of the user
  - Need to support user expectation and accommodate difference language and literacy skill
  - Should provide prompting & feedback as far as possible

Universal Design Principle

- Perceptible information
  - Effective communication of information regardless of the environmental conditions or the user ability
  - Redundancy is important – represent in different form of modes (graphic, verbal, text, touch)
  - Essential information should be emphasis & differentiated clearly from the peripheral content
  - Presentation should support range of device & technique used to access of information by people with different sensory ability

Universal Design Principle

- Tolerance for error
  - Minimize the impact and damage caused by mistakes or unintended behavior
  - Remove/made hard to reach for potentially dangerous situation
  - Hazard – shield by warning
  - User should be support in task required concentration

Universal Design Principle

- Low physical effort (physical design)
  - for comfortable use by minimizing physical effort & fatigue
  - Allow user maintain natural posture with reasonable operating effort
- Size and space for approach and use
  - Placemen of the system – reached and use by any user (body, size, posture, mobility)
  - All component comfortably reached by standing/seat user
  - Allow variation in hand size

Multi-Modal Interaction

- Multi-modal systems are those that use more than one human input channel in the interaction
- Using
  - Sound (speech and non speech)
  - Touch
  - Handwriting
  - Gesture

Universal Design

- Universal Design means designing for diversity, including
  - People with sensory, physical or cognitive impairment
  - People for different ages
  - People from different cultures and background

Universal Design

- Visual impairment
  - Use sound
  - Screen reader
  - Braille output

Universal Design

- Hearing impairment
  - Email, instant message
  - Multimedia / animation
  - More to visual

Designing for Different Age

- Older people
  - Failing vision, hearing, speech, mobility
  - Design should clear, simple , forgiving error

Universal Design

- Physical impairment
  - Eyegaze – eye track movement to control cursor/ keyboard
  - Driver can attach to user head
  - Head movement, gesture movement
- Others
  - Speed impairment
  - Dyslexia
  - Autism

Designing for Different Age

- Children under 12
  - Lack of vocabulary
  - Focus on understanding & anylizing
  - May difficult using keyboard

Designing for Different Cultural

- Age, gender, class, religious, political persuasion
- Eg : Tick vs cross, shaking head
- Eg : rainbow (hope and peace, diversity, covenant with god)
- Eg: color
  - Red – danger, life, happiness, royalty
  - Green – go, youth, safety