# Golden Rules

From Preece, Rogers & Sharp's *Interaction Design*

029511-1
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박경신

## Overview

- Principles of Universal Design
- 8 Golden Rules of Interface Design

## Handheld Electronic Device & User Interaction

- What is good and bad about the way the device work?
- What is its functionality? How would a typical user want to use it? Is the functionality greater, equal or less than what the user wants to do?
- What are usability and user experience goals for this product?
- How well does your device fare?
- What design concepts and usability principles are relevant?
- What are possible improvements to the interface?

## RECAP: Usability Goals

- Effective to use
- Efficient to use
- Safe to use
- Have good utility
- Easy to learn
- Easy to remember how to use

## RECAP: User Experience Goals

- Satisfying
- Enjoyable
- Engaging
- Pleasurable
- Exciting
- Entertaining
- Helpful
- Motivating
- Challenging
- Aesthetically pleasing
- Supportive of creativity
- Rewarding
- Fun
- Provocative
- Surprising
- Enhancing Sociability
- Emotionally fulfilling

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## RECAP: Usability Principles

- Visibility
- Feedback
- Constraints
- Mapping
- Affordance

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## Determine User's Skill Levels

- "Know the user"
- Age, gender, physical and cognitive abilities, education, cultural or ethnic background, training, motivation, goals and personality
- Design goals based on skill level
  - Novice or first-time users
  - Knowledgeable intermittent users
  - Expert frequent users
- Multi-layer designs

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## Universal Design

- Definition
  - "Universal design is 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." (Ron Mace)
- The intent of universal design is to simplify life for everyone by making products, communications, and the built environment more usable by as many people as possible at little or no extra cost.
- Universal design benefits people of all ages and abilities

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## Universal Usability

- Physical abilities and physical workplaces
    - Basic data about human dimensions comes from research in anthropometry
    - There is no average user, either compromises must be made or multiple versions of a system must be created
    - Physical measurement of human dimensions are not enough, take into account dynamic measure such as reach, strength or speed
    - Screen-brightness preferences vary substantially, designers customarily provide a knob to enable user control
    - Account for variances of the user population's sense perception
    - Vision: depth, contrast, color blindness, motion sensitivity
    - Touch: keyboard, touch-screen sensitivity
    - Hearing: audio clues must be distinct
    - Workplace design can both help and hinder work performance

## Universal Usability

- Cognitive and perceptual abilities
    - The human ability to interpret sensory input rapidly and to initiate complex actions makes modern computer systems possible
    - The journal "Ergonomics Abstracts" offers this classification of human cognitive processes
        - Long-term and semantic memory
        - Short-term and working memory
        - Problem solving and reasoning
        - Decision making and risk assessment
        - Language communication and comprehension
        - Search, imagery, and sensory memory
        - Learning, skill development, knowledge acquisition, and concept attainment

## Universal Usability

- They also suggest this set of factors affecting perceptual and motor performance
    - Arousal and vigilance
    - Fatigue and sleep deprivation
    - Perceptual (mental) load
    - Knowledge of results and feedback
    - Monotony and boredom
    - Sensory deprivation
    - Nutrition and diet
    - Fear, anxiety, mood and emotion
    - Drugs, smoking and alcohol
    - Physiological rhythms
- But not, in any application, background experience and knowledge in the task domain and the interface domain play key roles in learning and performance

## Universal Usability

- Personality difference
    - There is no set taxonomy for identifying user personality types
    - Designers must be aware that populations are subdivided and that these subdivisions have various responses to different stimuli
    - Myers-Briggs Type Indicator (MBTI)
        - Extroversion versus introversion
        - Sensing versus intuition
        - Perceptive versus judging
        - Feeling versus thinking

## Universal Usability

- Cultural and international diversity
  - Characters, numerals, special characters, and diacritical
  - Left-to-right versus right-to-left versus vertical input and reading
  - Date and time formats
  - Numeric and currency formats
  - Weights and measures
  - Telephone numbers and addresses
  - Names and titles
  - Social-security, national identification, and passport numbers
  - Capitalization and punctuation
  - Sorting sequences
  - Icons, buttons, colors
  - Plural, grammar, spelling
  - Etiquette, policies, tone, formality, metaphors

## Universal Usability

- Users with physical challenges
  - Designers must plan early to accommodate users with disabilities
  - Early planning is more cost efficient than adding on later
  - Businesses must comply with the "Americans With Disabilities" Act for some applications
- Older Adult Users
  - Including the elderly is fairly easy
  - Designers should allow for variability within their applications via settings for sound, color, brightness, font sizes, etc with less distracting animation

## 7 Principles of Universal Design

- Equitable Use
  - The design is useful and marketable to people with diverse abilities
- Flexibility in Use
  - The design accommodates a wide range of individual preferences and abilities
- 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
- Perceptible Information
  - The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities

## 7 Principles of Universal Design

- Tolerance for Error
  - The design minimizes hazards and the adverse consequences of accidental or unintended actions
- Low Physical Effort
  - The design can be used efficiently and comfortably and with a minimum of fatigue
- 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

# 8 Golden Rules of Interface Design

- Strive for consistency
- Cater to universal usability
- Offer informative feedback
- Design dialogs to yield closure
- Prevent errors
- Permit easy reversal of actions
- Support internal locus of control
- Reduce short term memory load

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# 1. Strive for Consistency

- Consistent sequences of actions should be required in similar situations
- Identical terminology should be used in prompts, menus, and help screens
- Consistent color, layout, capitalization, fonts, etc. should be employed throughout
- Exceptions, such as required confirmation of the delete command, should be comprehensible and limited in number

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# 2. Cater to Universal Usability

- Recognize the needs of diverse users and design for plasticity, facilitating transformation of content.
- Novice-expert differences, age ranges, disabilities and technology diversity affect the requirements that guide design

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# 3. Offer Informative Feedback

- For every user action, there should be system feedback
- For frequent and minor actions, the response can be modest
- For infrequent and major actions, the response should be more substantial

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## 4. Design Dialogs to yield Closure

- Sequences of actions should be organized into groups with a beginning, middle and end
- Informative feedback at the completion of a group of actions gives operators a sense of accomplishment (and relief) and a signal to prepare for the next group of actions

## 5. Prevent Errors

- As much as possible, design the system so that users cannot make serious errors. For example, gray out inappropriate menu items, do not allow alphabetic data in a numeric field
- If a user makes an error, the interface should detect the error and offer simple, constructive and specific instructions for recovery
- Erroneous actions should leave the system state unchanged, or the interface should give instructions about restoring the state
- Make error messages specific, positive in tone, and constructive

## 6. Permit Easy Reversal of Actions

- As much as possible, actions should be reversible. This feature relieves anxiety, since the user knows that errors can be undone, thus encouraging exploration of unfamiliar options
- The units of reversibility may be a single action, a data-entry task, or a complete group of actions, such as entry of a name and address blocks

## 7. Support Internal Locus of Control

- Experienced operators strongly desire the sense that they are in charge of the interface and that the interface responds to their actions.
- Surprising interface actions, tedious sequences of data entries, inability to obtain or difficulty in obtaining necessary information, and inability to produce the desired actions all build anxiety and dissatisfaction.

# 8. Reduce Short-Term Memory Load

- The rule of thumb for short-term memory is "seven plus or minus two chunks"
- The limitations of human memory requires that displays be kept simple, multiple-page displays be consolidated, window-motion frequency be reduced, and sufficient training time be allotted for codes, mnemonics, and sequences of actions
- Where appropriate, online access should be provided

# What is involved in Interaction Design?

- It is a process
  - A goal-directed problem solving activity informed by intended use, target domain, materials, cost and feasibility
  - A creative activity
  - A decision-making activity to balance trade-offs

# What is involved in the Process of Interaction Design?

- Identifying needs and establishing requirements for the user experience
- Developing alternative designs to meet these
- Building interactive prototypes that can be communicated and assessed
- Evaluating what is being built throughout the process and the user experience it offers