User-Centered Interface Design and Development

-- Chapter 1: Introduction --

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Winter 2005

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Chapter Overview

- **good vs. bad design**
- **interaction design**
- **interaction design process**
- **goals of interaction design**
- **design and usability principles**

Interaction Design?

Scope and Emphasis

- **interactive products**
- **interactive systems**
- **design emphasis on the system**
- **design emphasis on the user**

Interactive Products

- **intended for a relatively narrow taks**
- **functionality exposed to the user is relatively low**

Examples

- **TV**
- **phone**
- **coffee maker**
- **door**
- **computer mouse**

Interactive Systems

- **intended for a a wide range of taks**
- **user has to deal with complex functionality**
- **computer**
- **car**
- **entertainment system (stereo)**
- **espresso machine**

Good vs. Bad Design

What's the Difference?

- **emphasis is on user experience**
- **tensions between various factors**
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Good Design Makes Users Happy

- product performs its task
- satisfactory, enjoyable user experience
- functionality and performance are critical (within limits)
- the outcome of the task should match or exceed the user's expectations
- performing the task and using the product should be easy
- unexpected events should distract as little as possible
- users with different capabilities should be accommodated

Product Analysis Activity

Scenario: Assume your grandmother is going on a long roadtrip involving a long stretch of road in an unpopulated area. From a usability perspective, is it better for her to have a cell phone with her, or would you rather explain to her how the road-side emergency phones work?

- **aspects to consider**
  - **functionality: what are the most important tasks**
  - **performance: how good are the products at those tasks**
  - **capabilities and background of the user**
  - **environment: external factors that influence the user experience**

Product Analysis Activity (Continued)

Poor Design Makes Users Unhappy

or worse ...

- **lack of functionality or poor performance**
- **difficulty in obtaining a desired result**
- **actions achieve unexpected results**
- **product is difficult to handle**
- **appearence of the product is unpleasant**

Functionality and Performance

- critcal aspects of many products
- designers are often aware of them
- often conscious decisions to sacrifice them because of other important aspects (cost, safety, manufacturing)
- these aspects are in the focus of designes and engineers
- sometimes designers are not aware of the importance users place on certain functionality and performance criteria
- the product may be used for unexpected tasks or in unintended ways
- the product is targeted at the wrong user group
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Achieving Results

- using a product for its intended task is not always obvious for most users
- task familiarity
- user background
- environment
- since the designer spent a lot of time working on the product, it is obvious to them how to use it
- especially difficult for tasks the user is not very familiar with
- user limitations (focus, ergonomics)
- (perceived) urgency or danger can cause stress
- aspects of the environment (e.g. movement, noise) can add to difficulties

Unexpected Outcomes

- an interaction with the product does not produce the expected result
- beyond the parameters the user considers for performance and functionality
- may lead to confusion or worse consequences
- inconsistent outcomes are especially bad
- "you should have read the manual" is not enough
- if possible, products should be designed to prevent bad outcomes in addition to enabling good ones

Product Handling

- manipulation of interaction mechanisms
- makes use of the "affordances" of a product
- touching and experiencing physical aspects of the product while it is being used
- affordances are the "natural" or "obvious" interaction mechanisms with a product
- physical interactions with the product have a significant impact on user experience
- users may have difficulties explaining why they like or dislike the way a product "feels"
- ergonomics deals with such issues
- can be especially challenging for engineers
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Appearance

- sensory percepts relayed by the product
- most often looks, sometimes sound, touch, smell
- appearance may not be relevant for functionality or performance
- it can be an important criterion for users to distinguish "good" from "poor" design
- sometimes design is used as a synonym for appearance (not in this class)
- can also be a major challenge for engineers
- may depend on fashion ("fad")

What is Interaction Design?

Definition of Interaction Design

“Designing interactive products to support people in their everyday and working lives [Preece, Rogers, and Sharp, 2002].”

- **emphasis on *support* of people, not on highest functionality or performance**
- **includes professional and personal activities**

Driving Forces

- before computers were widely used, most complex systems were designed by engineers for engineers
- now, many devices perform complex tasks for regular users
- often it is unrealistic to expect users to spend a lot of energy on learning how to use products
- functionality and performance used to be more important as distinguishing factors, but that is changing for more and more products
- our professional and personal lives are becoming inundated with products that perform complex tasks
- some of these products may affect critical aspects like health, security, privacy

Driving Forces (Continued)

- **poor design should not have to be overcome by forcing the user to adapt to the product**

Contributing Disciplines

- **ergonomics**
- **cognitive science, psychology**
- **informatics**
- **computer science**
- **software engineering**
- **social sciences**
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Related Interdisciplinary Fields

- **human-computer interaction**
- **human factors**
- **cognitive engineering**
- **cognitive ergonomics**
- **information systems**
- **computer-supported cooperative work**
- **computer modeling**
- **virtual reality**

Design Practices

- **product design**
- **graphic design**
- **industrial design**
- **artist-design**
- **photography**
- **film industry**

Chapter Summary

<subtitle>Introduction</subtitle>

Interaction Design