Introduction to Human Centered Requirements and Design

SWEN444
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Selected material from *The UX Book*, Hartson & Pyla
First Impression

http://www.lingscars.com/
Difficult to use Products?

- Think about a product that you have found to be difficult to use:
  - What was the difficulty and the consequences of the product being difficult?
  - What do you think contributes to or causes the difficulty?
- Now think of a product you really like to use!

“It is easy to write software that is hard to use and hard to write software that is easy to use”
Why Study Human-Computer Interfaces (HCI) as Software Engineers?

- Virtually all “real” systems have a HCI
  - Graphical user interfaces (GUI) on desktops, laptops, web applications
  - Embedded “smart” devices, non-traditional interfaces
- UI’s a major part of most interactive systems
  - Often over 50% of effort
  - But 50% of effort rarely allocated for UI!
- Bad UI’s cost:
  - Money (your product will be a flop)
  - Safety (vehicles crash, medical equipment mis-used)
Why Study Human-Computer Interfaces (HCI) as Software Engineers?

- In the last 10 years **UX design** has matured
- **Design practices** have been commoditized, especially for **web app** and **mobile app** platforms
  - Best practices checklists
  - Pattern libraries
- However, …
  - You may face **unique design problems**, e.g., embedded IoT devices
  - You will need to **accommodate evolving technologies** such as AI and for accessibility
  - You still have to make “good” **design decisions** based on **user goals**
HCI is Multidisciplinary, including:

- **Software Engineering / Computer Science**
- **Psychology / Cognitive Science**
  - Knowledge of user’s perceptual, cognitive, problem-solving skills
- **Ergonomics**
  - Knowledge of design to accommodate the user’s physical and cognitive abilities
- **Sociology**
  - Helps to understand the wider context of the interaction
- **Business**
  - Markets the system, determines the value
- **Graphic Design**
  - Designs the user interface (element) presentations - aesthetics
- **Communications**
  - Technical writing to produces training materials, manuals, etc.
  - Effective information interaction
Psychology and Cognitive Science

- HCI design principles based on psychology and cognitive science principles

“Usability guidelines live for a long time; usability methods live even longer. Human behavior changes much more slowly than the technology we all find so fascinating, and the best approaches to studying this behavior hardly change at all.”

Jakob Nielsen
Who Builds Interfaces?

• Ideally: A multidisciplinary team of specialists
  – Graphic designers
  – UX interaction designers
  – Ergonomic specialists
  – Technical writers
  – Marketers
  – Software engineers
  – Customers and users
“Traditional” computing – desktops, laptops, graphical user interfaces (GUI), the web
  – User interaction is doing computing
  – Design for usability

Usability …
  – Help novices become experts
  – Help experts be highly productive

Readily measureable
To User Experience (UX)

- **Ubiquitous computing** – embedded in everyday things, wearable, carried, “smart”
  - User interaction hides computing
  - Used by everyone
  - Design for User experience (UX)

- Interaction in the **UX context** is broad …
  - Seeing, touching, and thinking about system or product
  - Admiration and anticipation **before** …
  - Entire experience **during** …
  - Savoring memory **after** … interaction

“The world is not a desktop” — Tscheligi, 2005 (paraphrasing Mark Weiser)
Aspects of UX

- Usability
- Usefulness
- Emotional impact
Usability Is…

- **Ease of learning**
  - Faster the second time and so on...
- **Ease of Remembering (memorability)**
  - Remember how and what between and within sessions
- **Productivity / Task Efficiency**
  - Perform tasks quickly and efficiently (for frequent users)
- **Understandability**
  - Of what the system does; important in error/failure situations
- **User satisfaction**
  - Confident of success and satisfaction with the system

“MULES”
Usefulness

- System functionality …
- Gives ability to use system or product to *accomplish goals* of work (or play)
Emotional Impact

- About **user feelings** …
  - Pleasure, fun, joy of use, aesthetics, desirability
  - Engagement, novelty, originality, “coolness” factor
  - Appeal, self-expression, self-identity, pride of ownership
  - Elegance, trustworthiness, a feeling of contribution to world
  - (Relates to user satisfaction)

**UX cannot be designed!**
**But you can design for a good user experience**
Measuring UX

- **Hard** to measure directly
- **Usability** and **usefulness** evaluation – generally quantifiable
- **Emotional impact** more challenging
  - Qualitative **interviews, surveys, observation** to understand before, during, after experience
  - Consider **cumulative effects** of **emotional impact** over long term
  - E.g., “presence” of a product - relationship with users in which product becomes a personally meaningful part of their lives
CUSTOMERS ARE COMPLAINING BECAUSE OUR USER INTERFACE IS CONFUSING.

FOR EXAMPLE, OUR MENU CHOICE FOR DELETING A FILE IS LABELED "SAVE FILE."

THAT'S WHY WE HAVE A HELP MENU.

OUR HELP MENU IS LABELED "REFORMAT HARD DRIVE."