

CIS 443/543
User Interfaces

Lecture 2: What is Usability?
(chapter 1.1-1.3)

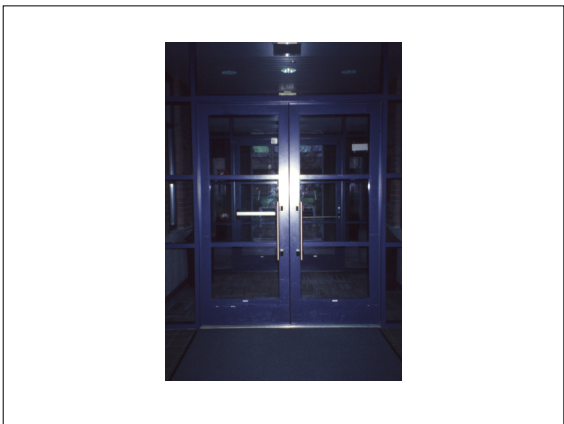
Goals of this Course

- Learn how to design useful, usable and safe interactive software
 - Human-centered software design & development
 - Evaluation of usability
- Understand why systems and people fail to work and play together
 - Basic issues of human psychology & sociology
 - Common design flaws and how to avoid them

- What can we learn about usability from simple everyday things?













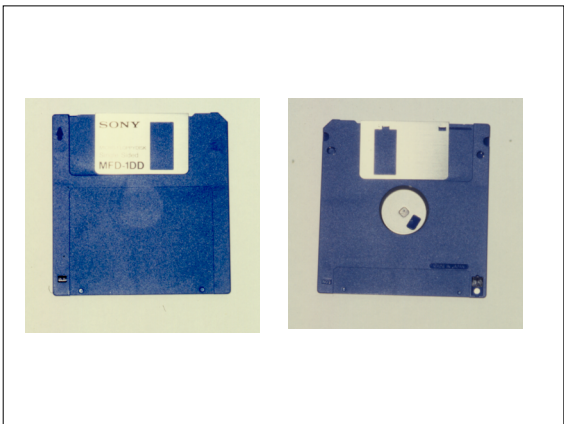






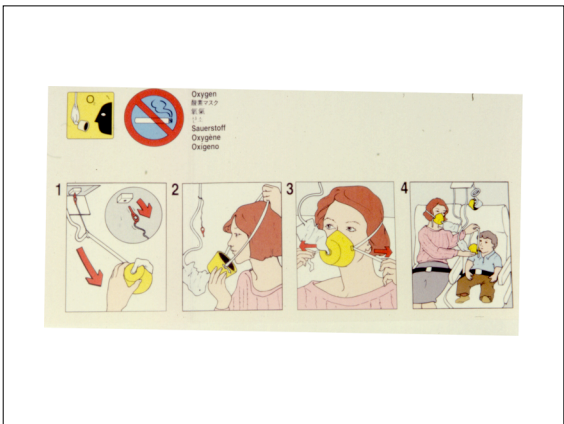












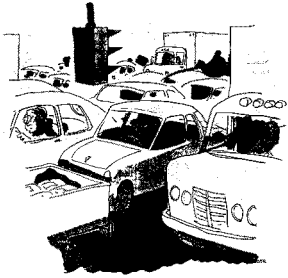


Design Lessons Learned

- Form follows function (use)
- Form follows human physical anatomy and behavior
- Form follows average or stereotyped person
- Form follows custom (culture)
- “Intuitive” interface just means the designer matched the design with what people expect!

Categories of Design for Usability

- **FUNCTIONALITY PROBLEM**
 - What are the functions this object can perform?
 - Will it do what I want?
- **CONTROL PROBLEM**
 - Which control or sequence of controls do I use to get what I want?
- **FEEDBACK PROBLEM**
 - How do I know I got what I wanted?
- **CONTEXT PROBLEM**
 - Am I using the right functions at the right time?



"If your engine has stalled. Your engine has stalled. Carefully, now coast completely off the highway and stop. Release the hood and get out of your car. Look at your engine. Look at your engine. There are the metal-and-ceramic objects with wires attached to your engine. These are your spark plugs. These are your spark plugs. Your spark plugs are dirty, dirty, dirty. You did not release the hood. Release the hood and get out of your car. Look at your engine. Look at your engine. There are the metal-and-ceramic objects with wires attached to your engine. These are your spark plugs. These are your spark plugs. Your spark plugs are dirty, dirty, dirty."

Key Concept: Usability

- What is usability?
 - "Intuitive" ?
 - "Natural" ?
 - "User friendly" ?
 - "Easy to use" ?
 - "Idiot proof" ?
- Problem
 - Vague
 - Subjective
 - Can't be measured or tested
 - Can't be used for design

What is usability?

- DEFINITION
 - Systematic process that develops usable systems for specific users in a specific context
 - Usability requirements + usability measures

Chapter 1.2 Usability requirements

- **DEFINITION Usability requirement**
 - Evolving detailed description of *what* the system should do and *why* with regards to human behavior
 - Does not describe *how* the system should do it such as the detailed system design
- Other requirements: functional, hardware, etc.
- *Usability requirements* formed early during requirements analysis phase of design

Example of a usability requirement

- Proposed system: Kiosk for rapid transit system
 - Sample Functional requirement
 - User must be able to buy a ticket
 - Sample Usability requirements
 - User must be able to buy typical trip ticket in 2 minutes
 - Blind user must be able to buy typical trip ticket unassisted in 4 minutes
 - Sample Hardware requirement
 - ATM type machine

Usability requirements analysis

- Ascertain the user's functions
 - Determine what tasks and subtasks must be carried out (Task Analysis)
 - Task types
 - Core tasks performed frequently
 - Occasional tasks
 - Functionality must match need or else users will reject or underutilize the product

Usability requirements analysis

- Promote standardization, integration, consistency, and portability
 - *Standardization*: use pre-existing industry standards where they exist to aid learning and avoid errors (e.g. the W3C and ISO standards)
 - *Integration*: the product should be able to run within the system
 - *Consistency*:
 - compatibility across different product versions
 - compatibility with related paper and other non-computer based systems
 - use common action sequences, terms, units, colors, etc. within the program
 - *Portability*: allow user to convert data across multiple software and hardware environments

Chapter 1.3 Usability measures

- DEFINITION
 - *Usability measure* allows us to objectively assess the effectiveness of a usability requirement
 - Must define the target user community and class of tasks associated with the interface

Usability Measures

- 5 human factors central to evaluation:
 - *Time to learn*
How long does it take for typical members of the community to learn relevant task?
 - *Speed of performance*
How long does it take to perform relevant benchmarks?
 - *Rate of errors by users*
How many and what kinds of errors are made during benchmark tasks?
 - *Retention over time*
Frequency of use and ease of learning help make for better user retention
 - *Subjective satisfaction*
User feedback via interviews, free-form comments and satisfaction scales

Usability Measures

- Other factors
 - Fatigue
 - Enjoyment
 - Safety

Usability measures (cont.)

- Usability measures are taken during UI evaluation
 - Using mockups or prototype system
 - Methods
 - Predictive methods such as average time to perform actions
 - Usability evaluation using real users
- Trade-offs in design options frequently occur between usability requirements.
- Changes to the interface in a new version may create consistency problems with the previous version, but the changes may improve the interface in other ways or introduce new needed functionality.
