

Human Computer Interaction

2. Usability and heuristics

National Chiao Tung Univ, Taiwan

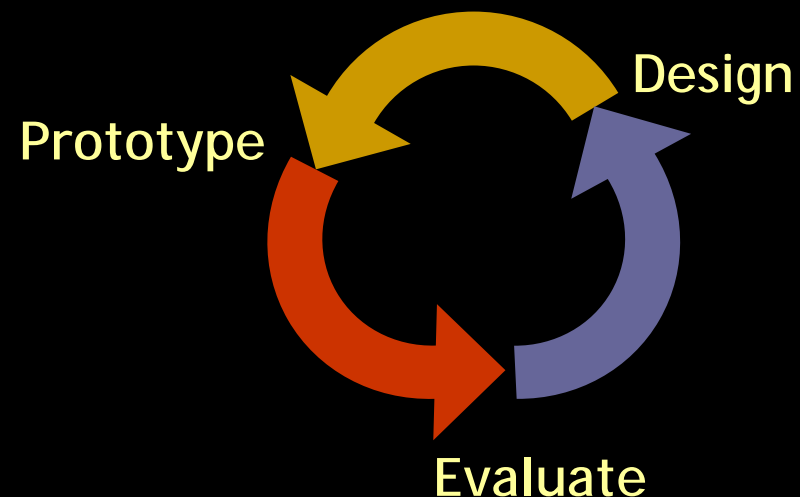
By: I-Chen Lin, Assistant Professor

"One most unfortunate product is the type of engineer who does not realize that in order to apply the fruits of science for the benefit of mankind, he must **not only grasp the principles of science**, but must also know the needs and aspirations, the possibilities and the frailties, of those whom he would serve."

-- Vannevar Bush

User-centered Iterative Design

- Developers working with target users
- Think of the world in users' terms
- Identify **usability** and **user experience goals**
- Understanding work process
- **Not** technology-centered/feature driven
- Iterate at every stage



Objectives of this chapter

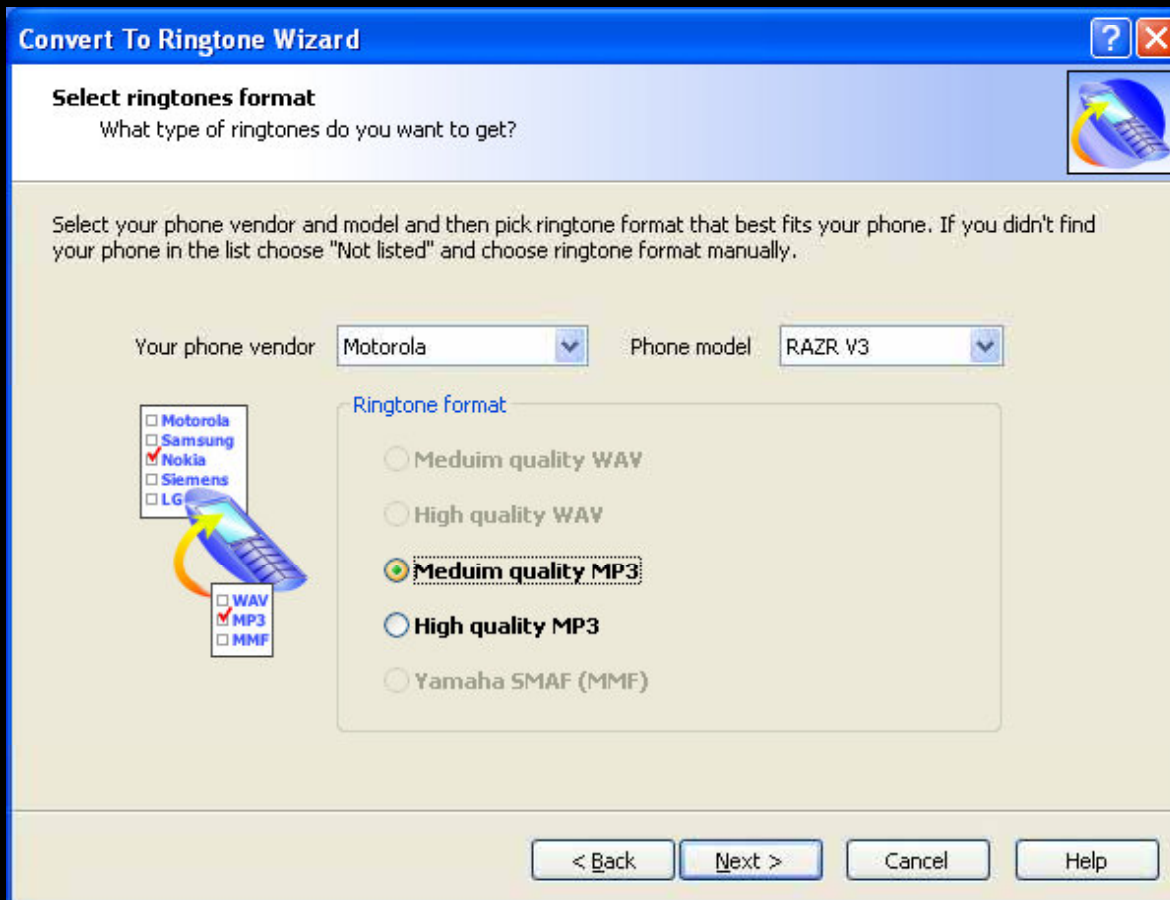
- The goals of interaction design
- Understand when and how design tradeoffs are made
- Have a first-level knowledge of the major concepts in usability and their associated guidelines

Ref:

- CS, UC Berkeley, "User Interface Design, Prototyping, and Evaluation"
- CS, Stanford, "Introduction to Human Computer Interaction Design"
- J. Preece, Y. Rogers, and H. Sharp, Interaction Design beyond Human Computer Interaction, John Wiley & Sons, 2002.
- D. Stone, et al., "User Interface Design and Evaluation", Morgan Kaufmann Publishers

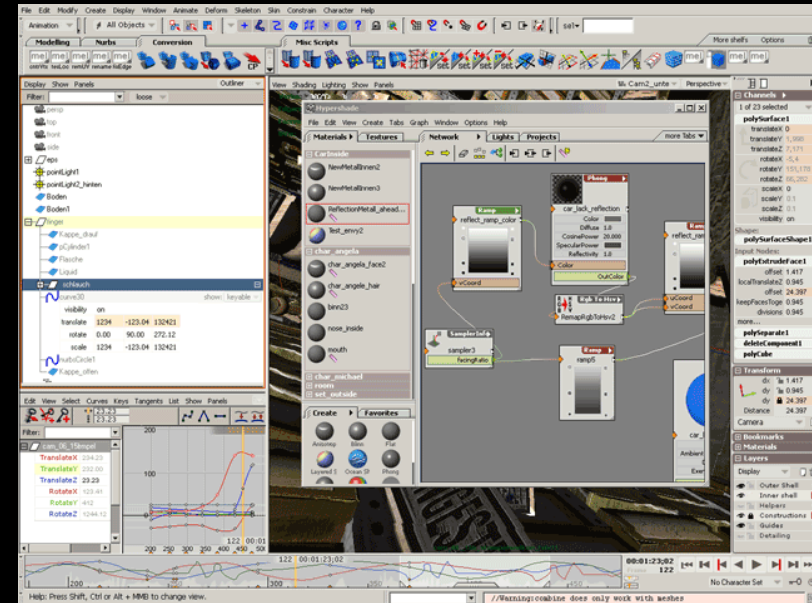
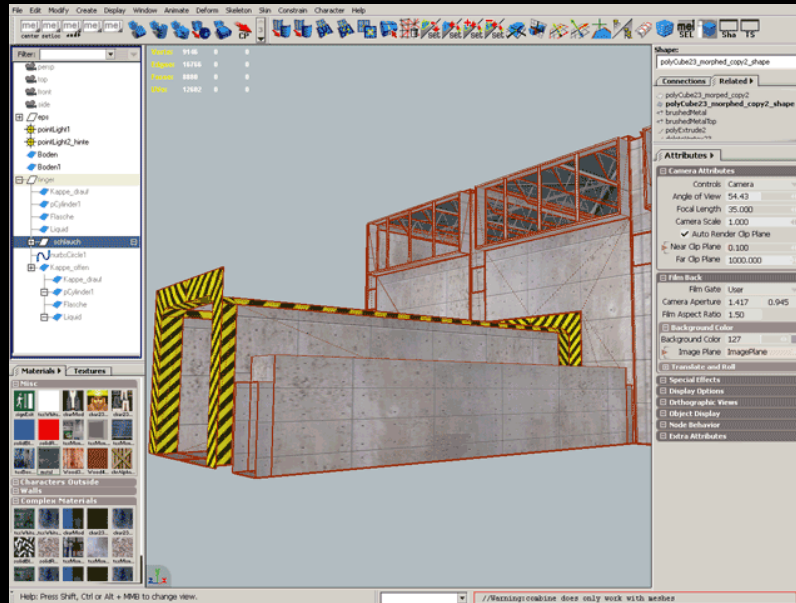
Usability goals

- Effective to use (effectiveness)
 - General goals
- Efficient to use (efficiency)
 - E.g. number of steps, one-click option...
- Safe to use (safety)
 - Preventing users from serious errors.
 - Recovery functions [e.g. undo...]



Usability goals (cont.)

- Have good utility (utility)
 - With powerful tools
- Easy to learn (learnability)
 - E.g. Tutorials ...
 - 10-minute rules (Nelson, 1980)
 - Dependent on frequency of usages, complexity of tasks, etc.



Maya interfaces, <http://www.pixtur.de>

Usability goals (cont.)

- Easy to remember how to use (memorability)
 - E.g. meaningful icons, command names,...



These goals can be in conflict with one another !

User experience goals

- Satisfying
- Enjoyable
- Fun
- Entertaining
- Helpful
- Motivating
- Aesthetically pleasing
- Supportive of creativity
- Rewarding
- Emotionally fulfilling

These can be hard to evaluate!

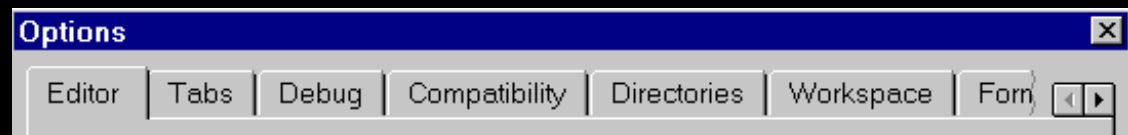
Some combinations will also be incompatible

Heuristics

- "Eight Golden Rules of Interface Design"
[Shneiderman]
 1. Strive for consistency.
 2. Enable frequent users to use shortcuts.
 3. Offer informative feedback.
 4. Design dialog to yield closure.
 5. Offer simple error handling.
 6. Permit easy reversal of actions.
 7. Support internal locus of control.
 8. Reduce short-term memory load.

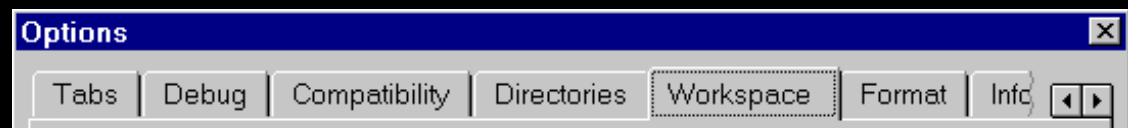
10 usability principles [Nielsen]

1. Visibility of system status
2. Match between system and the real world
 - Speak the users' language
3. User control and freedom
 - "Emergency exits"?!
4. Consistency and standards



Tabbed dialog for setting options in MS Web Studio

- Inconsistent display of possible tabs



10 usability principles [Nielsen]

5. Help users recognize, diagnose, and recover from errors
 - Good error messages
6. Error prevention
7. Recognition rather than recall
8. Flexibility and efficiency of use
 - Invisible to novice users but for experienced users
 - E.g. shortcuts

10 usability principles [Nielsen]

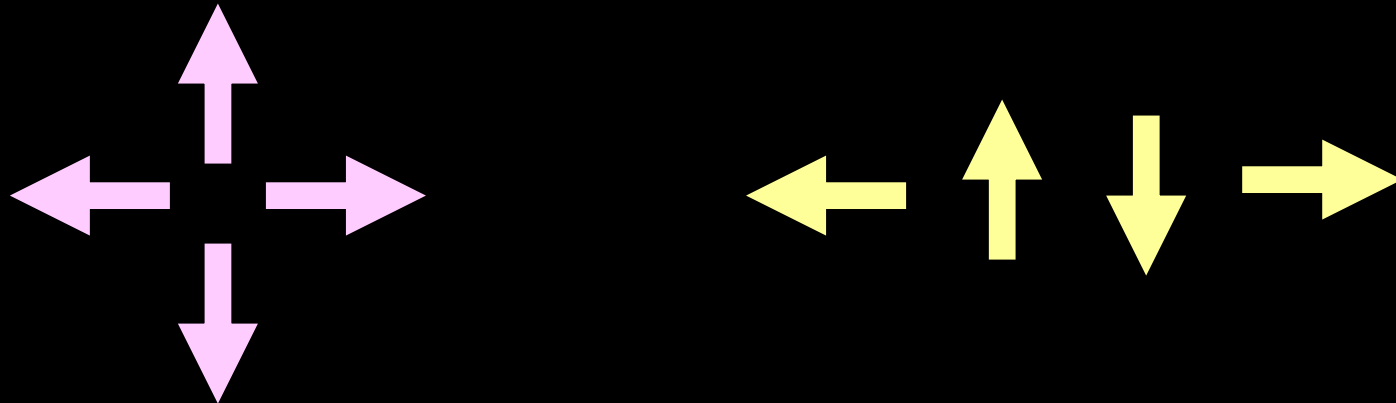
9. Aesthetic and minimalist design

- Avoid irrelevant information

10. Help and documentation

Principles for Transforming Difficult Tasks into Simple Ones [Norman]

1. Use both knowledge in the world and knowledge in the head
2. Simplify the structure of tasks
3. Make things visible
4. Get the mappings right



Principles for Transforming Difficult Tasks into Simple Ones [Norman]

5. Exploit the power of constraints
6. Design for error
7. When all else fails, standardize

Design Tradeoffs

- How can dimensions be evaluated together?
 - Defined in context of users and tasks
 - Require clear consensus on priorities
- Can require violating one to satisfy another
 - e.g., Consistency/efficiency

Design Guidelines Meet the Real World

- Design organizations and their cultures
- Different assumptions about users and goals
- History and legacy
- Conflicting priorities
- External constraints and regulations

Don't be so quick to assume that "bad" designs are the result of ignorance or stupidity

Usability & our project 1



Eyetoy games, PS2

- Interactive games usually have to fulfill user experience goals.
- Usability goals are also important in initiation, game stages, etc.