

Introduction to Usability

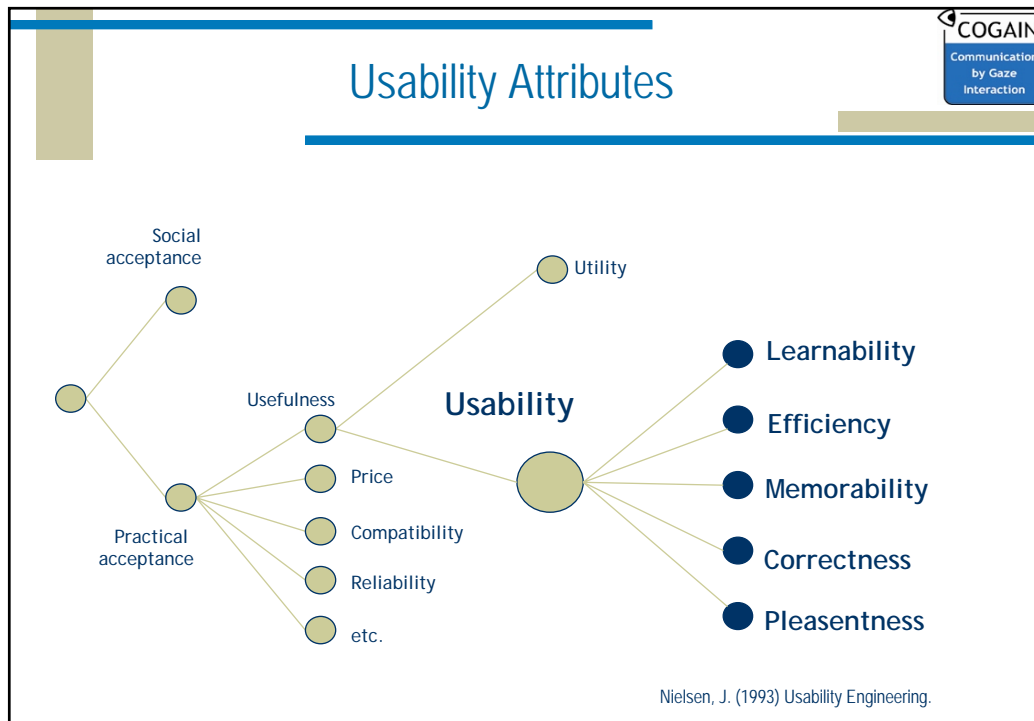
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COGAIN Camp 2006
Eye-Computer Interaction: Eye Performance and Interface Design

Usability



- ◆ ISO 9241-11 definition
*"the extent to which a product can be used by **specified users** to achieve **specified goals** with **effectiveness, efficiency, and satisfaction**, in a **specified context** of use."*



- ## Why?
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- ◆ Cost factor for clients
 - People do learn to use it eventually, but time costs money.
 - Manuals and help files do not help. People do not typically read manuals. They try it out
 - ◆ Cost factor for producers
 - The application may be very logical, however, people only see the (poorly designed) user interface
 - Help line busy all the time

Usability Goals are Business Goals

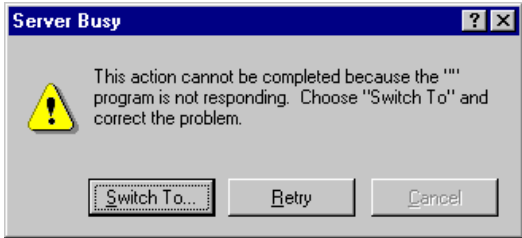
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- ◆ *"Usability goals are business goals. Web sites that are hard to use frustrate customers, forfeit revenue, and erode brands."*
McCharty&Souza, Forrester research, September 1998
- ◆ If the user does not find it, he will not buy it.
- ◆ Unhappy users do not recommend it to others
- ◆ Good usability is a big part of the overall quality of the product


How?

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- ◆ Know the user
- ◆ Use tried and tested user-based methods
 - E.g. User centred design (UCD), usability testing, etc.
- ◆ Evaluate and iterate




Know the User



- ◆ Take into account what people are good and bad at
 - Generally, human factors (cognition, perception, ...)
 - Specifically, e.g. users with special needs
- ◆ Define target user groups
 - E.g. customers, salespersons, management
 - Novices vs. occasional users vs. experts
- ◆ Define user requirements
- ◆ Listen to what people want and get them involved

Principles of Good Design



- ◆ Make things visible
 - Look at the device and see the possible actions
- ◆ Mappings
 - Reserve one control for each action
- ◆ Support the user in forming the correct conceptual model
 - Consistency with existing models and user's knowledge
- ◆ Offer feedback
 - Meaningful, easy to understand and interpret
- ◆ To err is human
 - Help to prevent and recover from an error

Norman, D. A.(1990) The Design of Everyday Things.

User Experience Goals

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- ◆ Satisfying
- ◆ Rewarding
- ◆ Motivating
- ◆ Helpful
- ◆ Enjoyable
- ◆ Fun
- ◆ Entertaining
- ◆ Aesthetically pleasing
- ◆ Emotionally fulfilling
- ◆ ...and more


Preece et al. (2002) Interaction Design



Usability Evaluation Methods


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- ◆ User testing
 - Involves an actual user
 - E.g. usability test
- ◆ Inspection methods
 - E.g. expert reviews and walkthroughs
- ◆ Techniques and tools (used with evaluation methods)
 - E.g. think-aloud, eye tracking, log files, observation, interviews
- ◆ Quantitative vs. qualitative methods/metrics
 - E.g. error rates vs. observed difficulties



Usability Test

- ◆ Information about how the user *actually* uses the product
- ◆ Participants are representatives of **target user groups**
- ◆ **Concrete tasks** derived from use cases
- ◆ Conducted in a usability laboratory
- ◆ Tools and techniques: video, log files, eye tracking, think-aloud, retrospection, pre/post interview
- ◆ Data: task times, error rates, gaze paths, user's comments, ...
- ◆ Analysis takes time but provides fairly reliable results
- ◆ Artificial environment may affect results



Usability Test vs. Experiment


Usability test	Experiment
◆ Aim: improve products	◆ Aim: discover knowledge
◆ Few participants	◆ Many participants
◆ Results inform design	◆ Results validated statistically
◆ Not perfectly replicable	◆ Replicable
◆ Controlled conditions	◆ Strongly controlled conditions
◆ Procedure planned	◆ Experimental design
◆ Results reported to developers	◆ Scientific paper reports results to community

Preece et al.(2002) Interaction Design

The User in the Usability Test

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- ◆ Take care of the ethics
 - Anonymity and rights
- ◆ Help the user feel as comfortable as possible
 - Introduce people, laboratory, machines, product
 - Make sure the user knows what is expected from him/her and has now questions
- ◆ **Emphasise the purpose to test the *product*, not the user!**



Expert Evaluation

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- ◆ Cognitive walkthrough
 - Stepping through actions required for completing a task
 - Anticipating the user's actions and problems
- ◆ Heuristic evaluation
 - Based on a check list or set of rules
 - Experts evaluate whether the product follows the rules or not
 - Report lists potential usability problems & suggested improvements
 - Cost-benefit ratio is good



Nielsen's Heuristics

1. Visibility of system status
2. Match between system and real world
3. User control and freedom
4. Consistency and standards
5. Error prevention
6. Recognition rather than recall
7. Flexibility and efficiency of use
8. Aesthetic and minimalist design
9. Help users recognize, diagnose, recover from errors
10. Help and documentation

http://www.useit.com/papers/heuristic/heuristic_list.html



Other Methods


- ◆ Contextual inquiry
 - Users are observed in real life usage situations
- ◆ Focus group interviews
 - Users discussing the system with a moderator
- ◆ Questionnaires
- ◆ Automatic evaluation
 - Used especially to evaluate web accessibility
- ◆ Modeling and simulation
- ◆ Paper prototyping
 - Example: testing the usability of a mobile device



Users with Special Needs

- ◆ Accessibility
 - ISO-16071: "*the usability of a product, service, environment or facility by people with the widest range of capabilities*"
 - Children, elderly, disabled, anyone of us at some situations/times
- ◆ Usability evaluation with users with special needs
 - requires flexibility
 - may need to collect data with several complementary methods
 - need to adjust methods to suit the characteristics of the participants
 - need to find new methods

See e.g. Lepistö & Ovaska (2004); COGAIN Deliverable D6.1



Thank you for your attention!

Credits

Thanks to Anne Aula, Mika Käki and Salla Ovaska

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