

Usability Evaluation

AISD 2005

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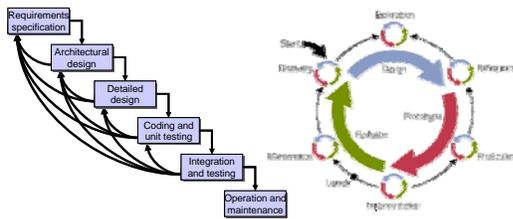
What is usability?!!

- ISO usability standard 9241
 - **Effectiveness** - can you achieve what you want?
 - **Efficiency** - can you do it without wasting effort?
 - **Satisfaction** - do you enjoy the process?
- Nielsen, Usability Engineering, 1993
 - **Learnability** - how easy is for a new user to use an interface and accomplish tasks?
 - **Efficiency of use** – how much time a user takes to perform his tasks, once he is familiar with the interface?
 - **Memorability** - how does the user use the system after a period of not using it?
 - **Few and non catastrophic errors** – how many errors occur, what is its severity and how easy is to recover from them?
 - **Subjective satisfaction** – what is the level of user satisfaction while interacting with the system?

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Design life-cycle



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Evaluation

- Accesses level in which design follows principles
- Motivates & supports (re)design process
- Should be present along conception, development and maintenance
- Different techniques to apply (depending on...)

 - Evaluation goals
 - Budget
 - Availability of final/real users
 - Evaluators expertise
 - State of development of the product
 - Laboratory or field studies
 - With or without tangible artifact

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Cognitive walkthrough

- Proposed by Polson et al.
- Origin - code walkthrough
- Analyses actions user has to perform to complete task
- Implies description
 - Of system prototype
 - Of task to be performed by user
 - Of actions to perform in order to complete the task
 - Of system users, indicating their knowledge and experience

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Cognitive walkthrough (2)

- For each actions evaluators ask:
 - Is the user trying to produce one of the possible effects of the action?
 - Is the user able to understand that the correct action is available?
 - Once the right action is identified, will the user notice that he/she is facing the correct action to produce the result he/she is trying to achieve?
 - Once the action is completed, will the user be able to recognize the system feedback?

Application stage	Resources (materials)	Human resources expertise	Costs		Results
			Time	Intrusive?	
all	few	high	low	no	subjective qualitative

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Heuristic evaluation

- Developed by Jacob Nielsen and Rolf Molich
- Inspection method to critique the system
- Based in set of general and simple heuristics
 - Visibility of system status
 - Match between system and the real world
 - User control and freedom
 - Consistency and standards
 - Error prevention
 - Recognition rather than recall
 - Flexibility and efficiency of use
 - Aesthetic and minimalist design
 - Help users recognize, diagnose, and recover from errors
 - Help and documentation

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Heuristic Evaluation (2)

- Proceedings...
 - Experts check interface individually, identifying potential problems
 - Conclusions from all evaluators are merged in a hierarchical set of usability problems
- Outcome - list of usability problems, with reference to
 - Violated principles
 - Severity
 - Frequency
 - Correction priority

Application stage	Resources (materials)	Human resources expertise	Costs		Results
			Time	Intrusive?	
all	few	average	low	no	subjective qualitative

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Review-based evaluation

- Evaluation based on previous studies
- Results from the literature used to support or refute parts of design
- Care needed to ensure results are transferable to new design.

Application stage	Resources (materials)	Human resources expertise	Costs		Results
			Time	Intrusive?	
Design	Few	Average	Average	No	objective source qualitative

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Model based evaluation

- Based in cognitive or design models
- GOMS - Goals, Operators, Methods and Selection
 - predicts user performance with a particular interface
- KLM - keystroke Level Model
 - facilitates the prediction of the time needed by users to conclude a certain task

Application stage	Resources (materials)	Human resources expertise	Costs		Results
			Time	Intrusive?	
design	few	high	low	no	subjective qualitative

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User testing

- Most powerful method to perform design evaluation
- Provides empirical evidence/results about real tasks
- Selection of subjects, variables and hypothesis is vital
- Goal - demonstrate that initial suppositions are statistically confirmed and correct
- Development teams are more receptive to changes in the design if these are based in empirical tests

Application stage	Resources (materials)	Human resources expertise	Costs		Results
			Time	Intrusive?	
all	some	average	high	yes	objective quantitative

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Talk aloud protocol

- Popular & simple way of gathering information about the way users interact with the system
- User observed performing his usual tasks, while evaluator, virtually invisible, records user actions
- Users are asked to
 - Perform a task
 - Externalize their thoughts
 - Describe what they are doing, what they think is happening and the reasons why they are taking their decisions
- Allows identification of important clues about the interface without requiring a great level of expertise

Application stage	Resources (materials)	Human resources expertise	Costs		Results
			Time	Intrusive?	
development	few	average	high	yes	subjective qualitative

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Retrospective testing

- Tries to answer the question why?
- Reflection about tasks performed
- Transcript or video played back for participant to comment
 - immediately => fresh in mind
 - delayed => evaluator has time to identify questions
- Useful to identify reasons for actions and alternatives

Application stage	Resources (materials)	Human resources expertise	Costs		Results
			Time	Intrusive?	
development	few	average	average	yes	subjective qualitative

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Interrogation techniques

- Obtains information about
 - User tasks and requisites
 - User interpretations of the system
 - User needs, preferences and experience
- Specially productive in detecting critical incidents
- Interviews
 - Data collected in a direct and structured way
 - Advantage - adjusting the dialogue to the context, interviewee, deepness, interest and relevance to give to each topic
- Questionnaires
 - Less flexible than interviews
 - Questions, sometimes answers, defined *a priori*.
 - Reaches large user group

Application stage	Resources (materials)	Human resources expertise	Costs		Results
			Time	Intrusive?	
all	few	average	low	no	subjective qualitative quantitative

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Quantification tools

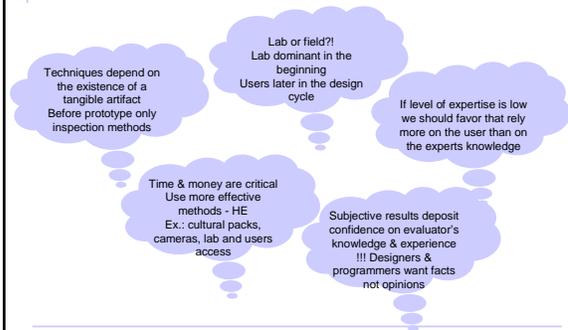
- Applications installed on the server to
 - Collect and store data about user actions
- Log analysis allows descriptive statistics on
 - Frequency of system access
 - Name and size of downloaded or accessed files
 - Number of clicks
 - User paths
- Give clues about problematic areas but do not answer the question why

Application stage	Resources (materials)	Human resources expertise	Costs		Results
			Time	Intrusive?	
development	some	average	low	no	subjective qualitative quantitative

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Which to select, when and why??!!



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Combination is important...

Inspections methods
Formative evaluation
Low cost and time
Eliminate obvious problems
Identify potential problematic areas – clues for user testing
Valuable opinions during development



User testing
Summative evaluation
Average time needed to complete task
Percentage of tasks concluded
Number of errors
Facts to validate system and justify changes

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Major conclusions...

- Start evaluating as soon as possible
- Evaluate as often as possible
- Combine more than one technique
- Manage advantages and disadvantages of when used individually
- What to correct??!!
 - Not pacific or easy...
 - Goals vs constraints => trade offs
 - Different people to please (programmers, designers, end users)
 - Deadlines
 - Money

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Some bibliography

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