


MONASH University
 Information Technology
 IMS5302
 Human computer interaction



Lecture 5
 Evaluation and Usability
 Testing

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Overview

- Define success and use of systems
- Principles and theories
- Usability
- Why evaluate systems
- Evaluation considerations
- Usability testing/evaluation

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DeLone and McLean

Use: → Acceptable measure of IS success
 Providing usage is voluntary


User satisfaction: → Associated with user attitude. Most widely used method of measuring success.
 "Hard to deny the success of a system which its users say that they like"

Individual impact: → Hard to define, related to performance.

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Other measures


- Use of system measured by intended or actual use of system
- Favourable attitude towards system on part of users ie users like the system
- Degree to which system accomplishes its original objective.
- Payoff to the organisation \$\$ Coe (1996),

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Donald Norman

“Designers have become so proficient with the product that they can no longer perceive or understand the areas that are apt to cause difficulties. Even when designers become users, their deep understanding and close contact with the device they are designing means that they operate it almost entirely from knowledge in the head. The user, especially the first time or infrequent users, must rely almost entirely on knowledge in the world. That is a big difference, fundamental to the design.”

(Norman 'Design of Everyday Things', 1990, pg 156)

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“Designers can become so entranced with their creations that they may fail to evaluate them adequately. Experienced designers have attained the wisdom and humility to know that extensive testing is a necessity. If feedback is the 'breakfast of champions', then testing is the 'dinner of the gods'.” (S&P pg 140)

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What is usability?

“Usability means that the people who use the product can do so quickly and easily to accomplish their own tasks. This definition rests on four points:

1. Usability means focusing on users.
2. People use products to be productive.
3. Users are busy people trying to accomplish tasks.
4. Users decide when a product is easy to use.”

(Dumans and Redish, 4)

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Usability

- *“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.”*
International Standards Organisation (<http://www.iso.org>)
- Usability focuses on the users being more productive in accomplishing tasks

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Usability

Reflects key business processes

Hardware, backend software, network

View of the system, business processes etc the user has

Figure 7.1 Usability: How product pieces fit together.
Mandel (1997), pg 102

Usability is the glue that holds together all the pieces in a product

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• What is evaluation?
• When should evaluation take place?
• What is involved?

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What is evaluation?

- Using different methods at different times to elicit user feedback.
- Feedback should focus on those areas of the system that impact on users' use of the system. Does it do what they expected it to do? Is the functionality from a user perspective correct? Is the workflow appropriate?
- Feedback should be used to inform the next stage of design.
- Can cost between 5 – 20% of the project budget.

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When should evaluation take place?

- Star model suggests evaluation takes place throughout the development process.
- Evaluation needed at all stages of development.

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graph TD; Implementation[Implementation] --- Evaluation[Evaluation]; TaskAnalysis[Task Analysis/functional analysis] --- Evaluation; Requirements[Requirements/specification] --- Evaluation; ConceptualDesign[Conceptual design/formal design representation] --- Evaluation; Prototyping[Prototyping] --- Evaluation;
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What does evaluation involve?

Developing an evaluation plan – key questions


1. When to evaluate – which stage?
2. How many users will be involved?
3. Criticality of the interface – is it a life critical system?
4. How long will the evaluation take?
5. Who will do the evaluation and how?
6. What are the costs?
7. What is the experience of the design and evaluation team? (S&P 140)

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Evaluation techniques


1. Expert reviews
 - Heuristic evaluation
 - Usability inspection
 - Consistency inspection
 - Cognitive walk through
 - Guidelines review
2. Usability testing
3. Evaluation during active use.

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Heuristic evaluations


- *“A process through which information about the usability of a system is gathered in order to improve the system or assess a complete interface”* (Preece, 1994 p 713)
- *“Describes a method in which a small set of evaluators examine a user interface and look for problems that violate some of the general principles of good user interface design.”* (Dumas and Redish, 65)

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Reviewers examine the system as it would normally be used

- Reviewers examine the system as it would normally be used
- The review is guided by a set of high level heuristics (or principles), which guide participants' focus on key usability issues of concern.

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Background of heuristic evaluation


- Molich & Nielsen (1990) devised a method (*heuristic evaluation*) to provide cheap, cost effective methods that could be used by small companies who could or did not have the time, money, facilities, resources etc to do full usability tests. (Preece, 1994 p 672, refers to this method as *standards inspection*)
- Their first study showed that 5 evaluators working separately found 50% to 75% of usability problems.

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Nielsen's heuristic principles examine:


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 and recover from errors
10. Help and documentation

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

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Conducting a heuristic evaluation

- Each evaluator inspects the interface alone, and decides how they want to proceed with evaluating the interface. (Usually twice, 1st for familiarity , 2nd for focus)
- Only after all evaluations have been completed do evaluators communicate and aggregate their findings.
- Uses 3-5 evaluators- different people find different usability problems.

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Usability testing

- Usability testing investigates users, tasks and environments to evaluate a product's performance with respect to *users'* effectiveness, efficiency, and satisfaction.
- "to find out what users want and what problems they experience" [Preece et al.,1994 p603]

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Why do a usability test?

- Preece et al (1994 p 603) suggest four reasons:
 - Understand the real world
 - Compare designs
 - Engineer towards target
 - Checking conformance to a standard
- There is no such user as the 'average' user and informal feedback is inadequate
- Easier to fix problems during development rather than after development

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Characteristics of usability testing

1. Primary goal is to improve usability of a product. Each test has a specific role and user type in mind (eg novice, experienced)
2. Participants represent real users
3. Participants perform tasks that would be performed by the user in a real situation
4. Participants are observed in what they do, and recorded in what they say
5. Data is analysed, real problems are diagnosed, and recommendations are made to fix the problems.

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How many users?


- One research activity found 80% of usability problems were detected with between 4 and 5 participants, 90% with 10 participants.
- Number of people will depend on number of groups/subgroups, time and money, time to analyse results.
- After you've seen several people make the same mistake don't need to see it 10 or 20 times more.

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Measuring usability


What can be measured?

- Performance measures: Counts of actions and behaviours you can see
- Subjective measures: People's perceptions, opinions and judgments
- Can be quantified, can count how many errors are made, how many times the same error is made, how long task took.
- Performance measures require careful observation but not judgemental decisions.

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Measuring usability: Examples of performance measures


- **Time**
 - To finish task
 - Spent navigating menus
 - Spent in 'help'
 - Trying to find information
 - Recovering from errors
- **Number of**
 - Wrong menu choices
 - Incorrect choices in dialogue boxes
 - Wrong icon choices
 - Wrong function keys chosen
 - Other errors
 - Repeated errors
 - Screens looked at in online help

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Measuring usability


Subjective measurement:

- Ratings of:
 - Ease of learning
 - Ease of using and doing
 - Ease of installation
 - Helpfulness of online help
 - Ease of understanding information
- Preferences and reasons for preferences:
 - Over previous version
 - Over way they are doing tasks now
- Predictions of behaviour and reasons for behaviour:
 - Would you buy product?
- Spontaneous comments:
 - "I am totally lost here"
 - "that was easy"
 - "I don't understand this message"

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Further reading and references

- Fitzpatrick & Dix (1999) 'A Process for Appraising Commercial Usability Evaluation Methods,' Human-Computer Interaction: Ergonomics and User Interfaces, Proceedings of HCI International
- Dumas, J & Redish, J (1994) "A practical guide to usability testing" Ablex Publishing
- Mandel, T (1997) *The elements of user interface design* Wiley: New York
- Mayhew, D (1992) *Principles and Guidelines in Software User Interface Design*, Prentice Hall
- Preece, J et al (1994) *Human-computer interaction* Addison-Wesley, Essex England

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Further reading

- <http://www.microsoft.com/usability/>
- Elkoutbi, M., Khriss, I & Keller, R (nd) "User interface prototyping using UML specifications" <http://www.iro.umontreal.ca/~keller/Suip/bookChapter.pdf>

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- Nielsen, J 'Usability heuristics' (1993)
- Shneiderman B 'Eight golden rules of dialogue design' (1986)
- Norman, D 'Seven principles that make difficult tasks easy' (1988)
- Brian Shackel 'User acceptance' (1991)
- Apple Computer 'Human interface guidelines' (1987)
- Rudisill, Lewis, Polson, McKay (1996) Human Computer Interface Design.
- Becker and Mottay (2001) "A global perspective on website usability" IEEE Software Jan/Feb

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