

COMPSCI 708S1C Multimedia and Hypermedia Systems

Gathering Usability Data from Users

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<http://www.cs.auckland.ac.nz/compsci708s1c/>

How is Usability Defined? (1)

- ISO 9241-11 defines usability as: “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”

How is Usability Defined? (2)

- Widely adopted definition by J. Nielsen:
- Usability refers to:
 - Learnability*: the ease of **learning** the functionality and behaviour of the system.
 - Efficiency*: the level of **attainable productivity**, once the user has learned the system.
 - Memorability*: the ease of **remembering** the system functionality, so that the casual user can return to the system after a period of non-use, without needing to learn again how to use it.
 - Few errors*: the capability of the system to have a **low error rate**, to **support users** making few errors during the use of the system, and, in case they make errors, to **help** them recover easily.
 - Users' satisfaction*: the measure in which the user finds the system **pleasant to use**.

Web Usability Criteria

- Each criteria of general Usability principles should be detailed further into measurable attributes, which are then used to gather data from evaluations
- A Hypermedia development has three dimensions:
 - Data (content)
 - Hypertext (structure)
 - Presentation (interface design)

Measuring Presentation

- Existing heuristics for interface design can be readily applicable.
- Nielsen's ten heuristics for user interface design and evaluation (http://www.useit.com/papers/heuristics/heuristic_list.html)

Nielsen's 10 Heuristics (1)

HEURISTIC	DESCRIPTION
1. Visibility of system status	The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.
2. Match between system and the real world	The system should speak the users' language, with words, phrases, and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.
3. User control and freedom	Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.
4. Consistency and standards	Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.
5. Error prevention	Even better than good error messages is a careful design which prevents a problem from occurring in the first place.

Nielsen's 10 Heuristics (2)

HEURISTIC	DESCRIPTION
6. Recognition rather than recall	Make objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.
7. Flexibility and efficiency of use	Accelerators – unseen by the novice user – may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.
8. Aesthetic and minimalist design	Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.
9. Help users recognise, diagnose, and recover from errors	Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.
10. Help and documentation	Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large

Other Heuristics [Ivers and Barron 02]

- Flow: chunks information in a meaningful way, text is easy to follow and understand.
- Possible way to measure using a scale from 0 to 3:
 - 0 means that information is scattered and difficult to understand
 - 1 means that information is somewhat organised, but difficult to understand
 - 2 means that information is somewhat organised and easy to understand
 - 3 means that it meets all the requirements

Other Heuristics [Ivers and Barron 02]

- Mechanics: Spelling, grammar, and punctuation are correct.
- Possible way to measure using a scale from 0 to 3:
 - 0 means that more than four spelling, grammar, or punctuation mistakes were made
 - 1 means that three or four spelling, grammar, or punctuation mistakes were made
 - 2 means that one or two spelling, grammar, or punctuation mistakes were made
 - 3 means that it meets all the requirements

Other Heuristics [Ivers and Barron 02]

- Navigation Links: All links work correctly.
- Possible way to measure using a scale from 0 to 3:
 - 0 means that more than two of the links do not work correctly.
 - 1 means that all but two of the links work correctly.
 - 2 means that all but one of the links work correctly.
 - 3 means that it meets all the requirements

Other Heuristics [Ivers and Barron 02]

- Menu Links: All menu links work correctly.
- Possible way to measure using a scale from 0 to 3:
 - 0 means that more than two of the menu links do not work correctly.
 - 1 means that all but two of the menu links work correctly.
 - 2 means that all but one of the menu links work correctly.
 - 3 means that it meets all the requirements

Other Heuristics [Ivers and Barron 02]

- Media elements: All media elements operate correctly.
- Possible way to measure using a scale from 0 to 3:
 - 0 means that more than two of the media elements do not work correctly.
 - 1 means that all but two of the media elements are working.
 - 2 means that all but one of the media elements are working.
 - 3 means that it meets all the requirements

Other Heuristics [Ivers and Barron 02]

- Frame Layout: The layout is very clear and consistent.
- Possible way to measure using a scale from 0 to 3:
 - 0 means that the layout is not clear and is inconsistent.
 - 1 means that the layout is clear but is inconsistent.
 - 2 means that the layout is somewhat clear and is consistent.
 - 3 means that it meets all the requirements

Other Heuristics [Ivers and Barron 02]

- Purpose of media elements: All media elements are meaningful and add to the project.
- Possible way to measure using a scale from 0 to 3:
 - 0 means that more than two media elements are not meaningful.
 - 1 means that all but two of the media elements are meaningful and add to the project.
 - 2 means that all but one of the media elements are meaningful and add to the project.
 - 3 means that it meets all the requirements

Other Heuristics [Ivers and Barron 02]

- Text clarity: All text is easy to read and contrasts with the background.
- Possible way to measure using a scale from 0 to 3:
 - 0 means that text is not easy to read and doesn't contrast with the background.
 - 1 means that text is not easy to read but contrasts with the background.
 - 2 means that text is easy to read but doesn't contrast with the background
 - 3 means that it meets all the requirements

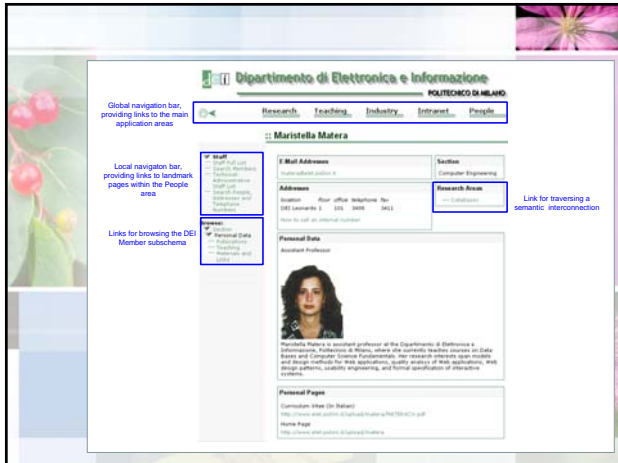
Other Heuristics [Ivers and Barron 02]

- Navigation buttons: Navigation buttons are clearly marked and identified.
- Possible way to measure using a scale from 0 to 3:
 - 0 means that none of the navigation buttons are easy to understand.
 - 1 means that some of the navigation buttons are easy to understand.
 - 2 means that most navigation buttons are easy to understand.
 - 3 means that it meets all the requirements

Measuring Content and Structure

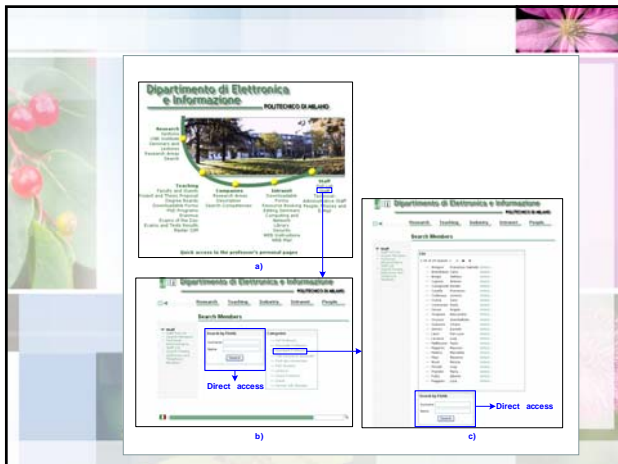
- Matera et al. propose that:
 - Content should be organised into core information concepts
 - Structure should make use of:
 - Global landmarks
 - Local landmarks

The screenshot shows the website for the Dipartimento di Elettronica e Informazione at Politecnico di Milano. The page is organized with a clear layout, featuring a central banner image of a building. The navigation is structured into several columns: Research (Sections, CDR Institute, Seminars and Lectures, Research Areas, Search), Teaching (Faculty and Guests, Project and Thesis, Degree Boards, Documents and Forms, PhD Programs, Examinus, Exams of the Day, Exams and Tests Results, Master SDR), Companies (Research Areas, Description, Search, Competences), Intranet (New Emergencies, Course, Documents and Forms, Resource Booking, Editing Seminars, Computing and Network, Library, Security, WEB, Instructions, Web Mail), and Staff (Full List, Staff, Technical-Administrative, People, Events and E-Mail). A 'Quick access to the professor's personal pages' section is also present. The footer includes contact information for the Dipartimento di Elettronica e Informazione (Via Ponso, 34/0 - 20133 MILANO - Tel. 02 23993400) and the Politecnico di Milano logo.



How to access content?

- Navigational access (e.g. multi-level indexes)
- Search-based access (e.g. keyword-based search) => provides direct access to content



Evaluations

- Guidelines are not enough. Must carry out evaluations to make sure applications are usable.
- Three different evaluation methods
 - User testing (expensive)
 - Usability inspection (cheap)
 - Usage analysis using access logs (cheap)

Evaluations: User testing

- Aims to analyse in detail how real users interact with the application while accomplishing well-defined tasks.
- To provide meaningful results must be based on a representative sample of real users.
- Tasks must represent real scenarios
- Evaluations can be recorded or use think-aloud protocols.

Example of User testing questionnaire

- Please rate on a difficulty level of 1 (very easy) to 5 (very difficult) what you thought of each of these tasks. Please circle your answer.

Tasks	1	2	3	4	5
Going to frame "x"					
Going back to the main frame					
Opening the Help screen					
Finding information "Y"					

Evaluations: Inspection Methods

- Aim is to use inspector to predict usability problems that could have been detected via user testing
- Inspectors can be usability specialists, designers and engineers with special expertise (e.g. knowledge of specific domains or standards)

Evaluation: Usability Inspection

- Two types of inspection
 - Heuristic Evaluation
 - Cognitive Walkthrough

Inspection: Heuristic Evaluation

- Inspectors evaluate an application against a list of usability heuristics.
- Findings of the different inspectors are compared and aggregated.
- Drawback: reliance on experts' skills and experience

Inspection: Cognitive Walkthrough

- Simulates a real user's problem solving process, trying to anticipate what real users will do while carrying out tasks, and why they will do it.
- Inspectors go through the interface using a task scenario, and discuss the usability issues as they arise. Useful technique to evaluate an application's interface.
- Useful technique to be applied at a later stage in the development life cycle.

Usage Analysis

- Looks at access logs (if available) containing historical data of usage.
- Can help discover navigation patterns that correspond to high usage, or patterns that correspond to users leaving the application early on.