

Usability Evaluation

-Subject Summary

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(*) The subject is covered in a summary by Mohammad Mahagna.

Definitions

The definitions chosen are those most relevant to the concepts of Computers, Human-Machine Interaction and Software Development.

Usability-

- The effectiveness, efficiency and satisfaction with which specified users achieve specified goals in particular environments.¹
- The ease with which a user can operate, prepare inputs for, and interpret outputs of a system or component.²
- The effort needed for use, and for individual assessment of such use, by a stated or implied set of users.³

User-

- A person who requires a computer for the performance of a task or recreational activity. Also called an end-user.⁴
- A user of an application program. Typically, the term means that the person is not a computer programmer. A person who uses a computer as part of their daily life or daily work, but is not interested in computers per se.⁵

Evaluation-

- The process of determining whether an item or activity meets specified criteria.⁶
- Evaluation has several distinguishing characteristics relating to focus ,methodology, and function. Evaluation (1) assesses the effectiveness of an ongoing program in achieving its objectives, (2) relies on the standards of project design to distinguish a program's effects from those of other forces ,and (3) aims at program improvement through a modification of current operations.⁷

Relating to the first definition of Usability:

Effectiveness-

- The accuracy and completeness with which specified users can achieve specified goals in particular environments.

Efficiency-

- The resources expended in relation to the accuracy and completeness of goals achieved.

Satisfaction-

- The comfort and acceptability of the work system to its users and other people affected by its use.

Usability Evaluation Process

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The Usability Evaluation Process is not a constant pre-defined process. A different process may be needed to be devised for an individual project. However, there are some main milestones which should take a part in every modern Usability Evaluation Process.

The main concept which should be the base of a Usability Evaluation Process is iteration. The Usability Evaluation is not a linear process, the conclusions and development of each phase affects the end product which should be re-evaluated to ensure the meeting of the required criteria.

At the beginning of a Usability Evaluation Process we should define some measurable and accurate objectives. As we can see from the definitions section, many entities and actions are subjective and cannot be accurately measured without proper thinking and planning.

Main stages of the Usability Evaluation Process iteration are:

- Understanding users' needs
- Measure per users' needs
- Design & implement per measures

These stages should be performed using a pre-defined technique or method.

Usability Evaluation Techniques are explained and compared in more detail in a summary by Mohammad Mahagna. The Usability Evaluation can be divided into 3 distinct groups:

- Testing- In Usability Testing approach, representative users work on typical tasks using the system (or the prototype) and the evaluators use the results to see how the user interface supports the users to do their tasks.
Examples: Thinking Aloud, Wizard of Oz
- Inspection- In Usability Inspection approach, usability specialists -- and sometimes software developers, users and other professionals -- examine usability-related aspects of a user interface.
Examples: Cognitive Walkthrough, Heuristic Evaluation
- Inquiry- In Usability Inquiry approach usability evaluators obtain information about users' likes, dislikes, needs, and understanding of the system by talking to them, observing them using the system in real work (not for the purpose of usability testing), or letting them answer questions verbally or in written form.
Examples: Interviews, Surveys, Logging Actual Use

The final result is reached when the measurable objectives are achieved by the software implementation. The result is basically the same program with a refined user interface.

As we've seen, The Usability Evaluation Process has some common practices and methods that are used by many professional evaluators and HCI engineers. As any software development process the developers would want the most convenient and easy tools to use the Usability Evaluation features in their work. Automatic tools help in every aspect of development to save costs, diverse concerns and enable the human developers to focus on areas that the computers can't do (some might add "yet").

In the past years many Automatic Usability Evaluation tools have been developed for websites in the World Wide Web.

The main reason for the rapid growth of Automatic Usability Evaluation is the common interface that most websites share. All websites regardless of the backend servers and technology produce for the client side an HTML page (Hyper Text Markup Language). Since HTML pages have well defined rules and interface it can be checked automatically and very easily for errors. A simple script can parse an HTML page and check for errors, and advancing to other linked pages since the link is also well defined.

The general problem of Automatic Usability Evaluation is more problematic. For example Desktop Applications have the general look and feel of a certain platform but the conventions used by one developer can be the opposite of other developers. A desktop application API can be a maze of buttons, check boxes, text fields and radio buttons scattered in many tab pages, group boxes and forms within forms. The Windows and Forms GUI is a very open protocol enabling anyone to use buttons and labels and vice versa.

Unfortunately that is just the tip of the iceberg, many other usability features such as response time, navigation efficiency, robustness and flexibility do not adhere to common grounds when we're dealing with desktop applications.

Thus, the web platform is much easier to automatically evaluate its usability.

However, there is hope, since this is a growing field of research, solution may appear in the near future. For example, an article about "Automatic Usability Evaluation Using AOP"¹¹ which utilizes Aspect Oriented Methods to ease the evaluation process of desktop application. Another direction is "Usability Properties in Dialog Models"¹² which uses modeling to represent every dialog between the user and the application and by doing so enables automatic testing of the dialogs by determining a set of rules or conventions or with inspection of real users using the dialog, deciding which parts are used effectively, efficiently and in a satisfactory manner.

References

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- ⁸ [The 234311 First Presentation](#)
- ⁹ <http://www.usabilityhome.com/>
- ¹⁰ "Automatic web usability evaluation: what needs to be done?" By Giorgio Brajnik
(<http://users.dimi.uniud.it/~giorgio.brajnik/papers/hfweb00.html>)
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(<http://welie.com/papers/dsv-is99.pdf>)