Evaluating the Usability of Multimedia, Mobile and Network-Based Products

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ABSTRACT

The usability of a product or service can mean the difference between product success or failure in both the field and the marketplace. Successful products are easy to use and intuitive for the user. There are a set of well-defined methods used to determine if a product, service or system is usable and meets the needs of the end user. This paper describes the four major methods of usability assessment: 1) Inquiry Methods, 2) Inspection Methods, 3) Observation Methods and 4) Automated Methods. Each method and its attendant sub-methods are described, as is a discussion of the methods’ strengths and weaknesses.

Keywords: Ease of Use, Human Factors, Product, Service, Usability

THE IMPORTANCE OF USABILITY ASSESSMENT

Usability professionals use a set of well-defined methods in order to determine if a product, service or system meets the needs of the end users. These needs are measured along the three dimensions specified by the International Standards Organization as effectiveness (can the user actually accomplish the task at hand), efficiency (can the user accomplish the task with a minimum of effort), and satisfaction (is the user satisfied with their interaction with the product) (ISO, 1998). Modern technology requires significant attention to human factors and usability because the number of possible interactions creates a more complex operating environment for the end user. This complexity can make these systems difficult for consumers to learn and use, reducing both the satisfaction of the user and their willingness to purchase or use similar systems in the future.

It is critically important to assess the usability of a product from the onset of the project. Although it is common to perform a summative usability assessment of the product at the end of development, it is typically too late to do anything meaningful with the results at this point because of the cost of changing a complete or nearly complete design. It is most beneficial to engage in a full human factors assessment during the concept generation phases, so that fundamental limitations of human perception and cognition can be considered before designs...
have already been established. Usability assessment should continue throughout the project lifecycle. Rigorous application of these methods helps ensure that the resulting end product will have high user acceptance because of superior ease of use.

**METHODS OF USABILITY ASSESSMENT**

There are four major methods for gathering data for the assessment of a product:

1. Inquiry Methods
2. Inspection Methods
3. Observation Methods
4. Automated Methods

Each method has certain unique advantages and disadvantages that require that they be employed carefully during the project lifecycle. Specific sub-methods within each of these major categories are described in the following sections.

**Methods of Inquiry**

Inquiry methods are those in which users of a product are asked about their experiences. If the product is already available, then inquiry methods tend to focus on the users’ previous experience with the product, especially areas in which the user feels that there are deficiencies. Ideally, however, inquiry methods are employed early in the concept design phase in order to gauge what users want and need in a particular product, as well as what they may dislike in similar or competing products. Four commonly used inquiry methods include contextual inquiry, interviews, self-report and surveys.

In contextual inquiry, the participant is observed using the product in its normal context of use, and the experimenter interacts with the user by asking questions that are generated based on that use. It is important to let the participant “tell the story” and ask questions only to clarify or expand on behaviors of interest. Ideally, data collection takes place with the product in the environment in which the participant would be actually using it so that other relevant connections (i.e. the context of use) can be made. Bailey, Konstan and Carlis (2001) performed a study in which they used contextual inquiry to assess a tool that was being used by multimedia designers in their day-to-day development work. Their contextual inquiry assessment found that the current tools did not support multimedia designers in the way they actually worked. Applying the lessons learned thorough this analysis, they developed specialized software specifically for multimedia designers. For a complete description of the general method, see Beyer and Holtzblatt (1998).

Interviews are a popular method of obtaining information from a set of users. Interviews are best done when contextual inquiry is impractical or cost-prohibitive. For example, it’s difficult to perform contextual inquiry with a participant who is immersed in a fast-paced multimedia game. In this case, pre-use and post-use interviews would be a better choice. Additional information about interview techniques can be found in Weiss (1995).

Verbal inquiry methods have the advantage of leaving open the chance for opportunistic data discovery. As the interviewer interacts with the user, specific behaviors or comments of interest can be further explored. These techniques also allow the interviewer to gather non-verbal data that might otherwise be missed. For example, if the participant rolls his eyes while giving a ‘yes’ answer to an ease of use question, the interviewer can interpret the intent of the answer and follow up with additional questions. Verbal inquiry is also a good technique for gathering information from both experts and novices without significant additional preparation. Verbal inquiry can be done relatively quickly, in groups or one-on-one, and is especially well suited for gathering information before product specifics are available.

Unfortunately, verbal inquiry methods tend to be expensive and time consuming to perform on a large scale. There is a fairly low limit to
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