

USING THE ISO 9241-11 DEFINITION OF USABILITY IN REQUIREMENTS DETERMINATION: CASE STUDIES

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ABSTRACT

Two case studies of using the standard definition of usability from ISO 9241-11 in usability requirements determination are described. It was found that the definition process is sense-making and effective training but setting the usability target levels and the management of complexity is a challenge.

Keywords

Usability, requirements definition, ISO 9241-11

1. INTRODUCTION

The definition of usability from ISO 9241-11 [1] - *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* - is becoming the main reference of usability. For example, the new Common Industry Format, CIF, for usability testing [2] uses the definition as the reference for usability testing.

In spite of the popularity of the definition, there are only a limited number of empirical studies on its practical use. Case studies such as [3] have been conducted on how to use the definition in usability testing. However, there is a gap in empirical research on how to systematically use the definition in determining usability requirements.

To fill this gap, we explored the use of the definition of usability in determining usability requirements in two different cases: an industrial product development

project of a mobile application, and a development effort of a description language as part of an ITEA research project (Nomadic Media).

2. OVERVIEW OF THE CASES

Our main guideline in the case studies was the standard ISO 9241-11 itself. The standard contains - in addition to the definition of usability - also guidelines for how to apply the definition. We also used other guidelines that recognize the definition, such as [2], [4] and [5]. In addition, we also looked at other usability engineering literature such as [6], [7] and [8]. Although the latter ones do not explicitly use the ISO 9241-11 definition, they do provide guidance to many aspects of the definition (determining users, user goals and environments of use, how to specify measurable usability requirements).

Our practical procedure for determining usability requirements was to organize workshops which were run by usability professionals and where the participants were the members of the development project. In the case of a mobile application we had three workshop sessions; in the case of description language we had one session.

In the workshops, we tried to systematically analyze the knowledge that the members of the project team had on the users and formalize this knowledge into usability requirements. Various teamwork techniques such as brain storming, board walking, voting, and setting priorities were utilised. In the case of the mobile application, the users were the end users of the mobile application; in the case of the description language the users were user interface developers (i.e. the users of the description language).

Following the definition of usability, the basic procedure was to first determine the users, then the user goals, then the context of use, and finally the target levels of effectiveness, efficiency and satisfaction. In practice, the procedure was not that straight forward. For example, iteration took place at various phases of the process.

As the result of the workshops, a considerable set of user data (user groups, user goals, task attributes etc.) could be determined, based on elicitation and analysis of the project team's knowledge on users. Also innovative requirements were identified. However, we were able to produce only a part of the usability requirements.

3. FINDINGS

3.1 Positives

Overall, we - the usability practitioners and the designers as well - found the definition of usability and the requirements determination process as effective training of usability to the development staff. The process was found sense-making and useful. The definition of usability looks complex but makes sense to people after it is systematically explored.

Especially the process of analyzing and identifying user goals was perceived useful. The participants gave comments such as "a new and meaningful way of thinking".

A considerable set of user data could be determined, based on elicitation and analysis of the project team's knowledge on users. The systematic approach of the workshop sessions was generally perceived good.

3.2 Challenges

One challenge was in determining the 'right' target levels of effectiveness, efficiency, and satisfaction. The levels, in the end, define the usability of the product.

Some basic guidance for the measures of effectiveness, efficiency and satisfaction is provided in [1] and [2]. The handbook [4] provides guidance for determining qualitative usability goals but very little for quantitative ones. Some methodologies, e.g. [7], do not address this issue at all. Altogether, we found the existing guidance quite general. It is easy to agree that "usability for the new system should be at least as good as for the old system" [1]. But in which aspects the new system should be "better" than the old one, and in which ones "as good" is enough? If "better" then how much better, and in which usability measures?

Further, the cases showed that usability requirements are a very complex thing. A product typically has many different user groups. Each user group may have many different goals. The levels of different goals may be different in terms of effectiveness, efficiency, and satisfaction - also in cases where different users share the same goals. We truly met a challenge of how to manage all this complexity.

Probably the main advice that we found from the literature was to select the most important user goals: "Focusing ... on the most important user goals may

mean ignoring many functions, but is likely to be the most practical approach" [1]. This is how we approached our cases but we felt uncertainty here, too. How to know to select the "most important" goals? Can one just ignore "less important" goals?

4. CONCLUSIONS

Determining usability requirements is a critical step in systematic usability engineering. We explored the use of the definition of usability from ISO 9241-11 in the requirements phase of development projects. We found the definition basically sense-making but we also found that its use is challenging. We conclude that more methodological guidance should be developed especially for determining user goals, determining target levels of usability, and generally managing the complexity of usability requirements process.

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6. REFERENCES

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