

A Study on the Prototype of Focusing on the Operability for Requirement Acquisition

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Abstract. The purpose of this study is to propose the effective usage of the prototype of focusing on operability. As a result, participants indicated the design aspects and operability aspects when using the High-fidelity prototype more than Medium and Low-fidelity prototype. Also, participants indicated the function aspects when evaluating the Low-fidelity prototype more than High and Medium-fidelity prototype. The results suggested that a High-fidelity prototype is suitable for evaluating design aspects and operative aspects. In this study, the effective usage of prototype was proposed based on the experiments. It is possible to decrease the additional demand in the later phase of the project.

Keywords: prototype, requirement acquisition, operability, protocol analysis.

1 Introduction

It is difficult to complete the whole users demands at the early phase of the software development project. The lack of communication leads to vague specification of the demand definition of users. It is important to grasp the user's real needs in the early stage of the project. The prototype is useful for user's demand acquisition, it will be able to assume the products image. According to the previous work, the developer can obtain much functional demand when Low-fidelity prototype was used [1]. And it was also useful to obtain much design demand by High-fidelity prototype. In the experiment, the prototype of focusing on operability was used. This experiment was conducted with the stimulus varied the quantity of color information and quantity of graphical information. This contains the sum quantity of cognitive selective and brightness information.

2 Objective

The purpose of this study is to propose the effective usage of the prototype of focusing on operability. Two kinds of experiment were conducted in this study.

3 Experiment 1

Overview

In this experiment, the employed prototype was divided into 3 types, low fidelity, medium fidelity and high fidelity. A subject's utterance was recorded and analyzed.

3.1 Method

(a) Experiment procedure

Three kinds of stimuli (High, Medium, and Low fidelities) were given to each participant. The protocol of each participants were measured and analyzed.

(b) Stimulus

The High-fidelity prototype was close to the actual usage. Color information was not included for the Medium-fidelity prototype. Color information and graphical information was not include for the Low-fidelity prototype. This prototype based on the 7steps model Norman (1986) [2]. This prototype was developed by Axure RP 6.0.

(c) Participants

Participants were 14 students (male: 13, female: 1) of Chiba Institute of Technology. Each participant were with normal visual performance, and their binocular vision was 0.7 or better.

3.2 Results

Participants talked the design aspects and operability aspects when evaluating the High-fidelity prototype more than Medium and Low-fidelity prototype. Participants talked the function aspects when evaluating the Low-fidelity prototype more than

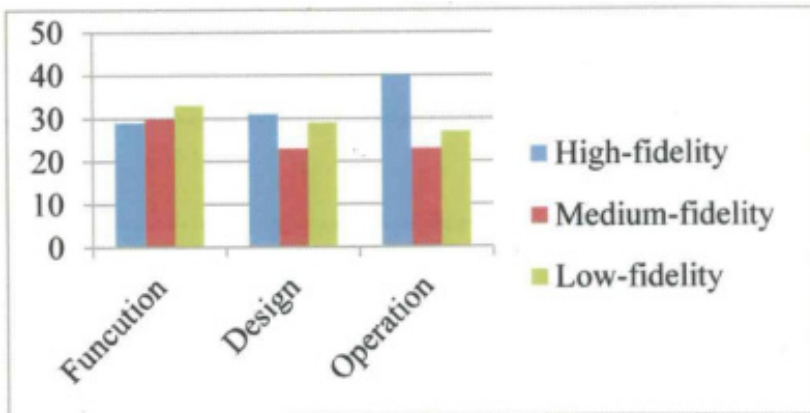


Fig. 1. Comparison of protocol analysis data 1

High and Medium-fidelity prototype. Frequency of protocol was different. High-fidelity prototype was 100 times. Medium-fidelity prototype was 76 times. Low-fidelity prototype was 89 times.

The results suggested that a High-fidelity prototype is suitable for evaluating design aspects, and suitable for evaluating operative aspects. A Low-fidelity prototype is suitable for acquiring function requirements. As a result, the effective usage of prototype was proposed based on the experiments. It is possible to decrease to the additional demand in the later phase of the project.

4 Experiment 2

Overview

In the experiment 1, the user's demands were divided into functional, design and operational demands. In the experiment 2, the design demands were clarified as "color and scheme", "lay out", "form", "arrangement", "operational design elements" and "feedback".

4.1 Method

The participants of this experiment were 10 students of the department of Chiba Institute of Technology. In this experiment, the employed prototype was divided into 3 types, low fidelity, medium fidelity, and high fidelity. The protocol of each participants were recorded and analyzed. The utterance data obtained in the experiment was classified into the functional elements design elements and operability. The amount of utterance was measured by each fidelity.

4.2 Results

The prototype of lower fidelity is effective for acquiring functional demand. The cognitive level differed by design elements. Such as "The operation method" and "feedback". In some elements contained in a design element, there were some in which a cognitive level differs from other things. They are the operation method and feedback. It is necessary to pay attention for the low design element of cognitive level than the other design elements.

Figure 2 show the utterance frequency for each design elements. From this figure, it is suggested that Low fidelity prototype is effective for accruing functional demands. This is the same tendency as experiment 1. Also, High fidelity prototype was effective for acquire the design elements such as "color and scheme", "Lay out", "Form", "Arrangement", "Operational design elements", and "Feedback". On the contrary, there were Low frequency of utterance on "the operational demand" and "feedback". It is assumed that this kinds of elements required higher cognitive information processing than the other design elements. When acquiring such "the operational design elements" and "feedback", the more careful approach is required.

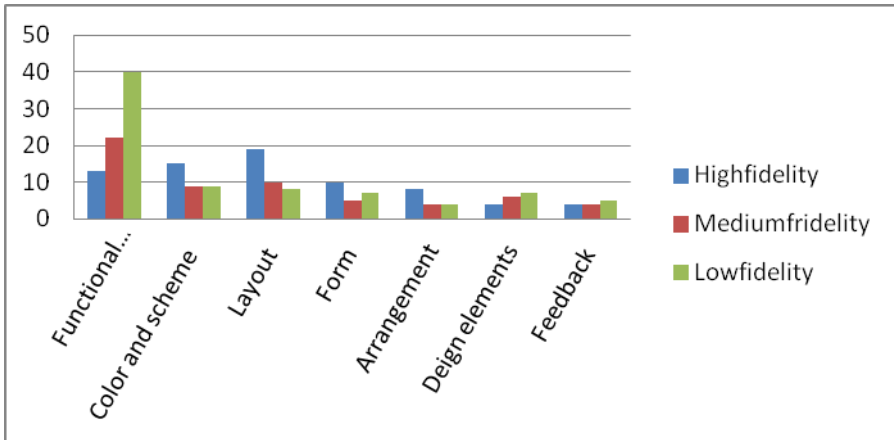


Fig. 2. Comparison of protocol analysis data 2

5 Conclusion

For acquire user's demands effectively, it is important to use prototype properly based on the purpose. Low-Fidelity Prototype is effective to acquire functional demands. Low-Fidelity Prototype is effective to acquire functional design and operational demands. Especially, when acquire cognitive difficult design elements, such as “the operational design elements”; “feedback” the more careful approach is required.

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