

Functional Prototyping is “a sample or model of a product built to test a concept or process or to act as a visual prop to be replicated, improved and learned from.”(3D PROTOTYPE DESIGNER, 2015). We hope users could understand the function and user interface, establish some user experience during the test and give us feedback.

In this evaluation, we invited 13 testers to test.

The methods used to conduct this evaluation includes:

- Design Walkingthrough
- Thinking Aloud
- System Usability Scale (SUS)

1. Design Walkthrough

1.1 Background of Design Walkthrough

Design Walkthrough is an important evaluation method, especially in the early design. Design walkthroughs provide designers with a way to identify and assess early on whether the proposed design meets the requirements and addresses the project's goal. (Geol, 2009) This evaluation method is designed for asking participants to complete several tasks and see whether they can operate appropriately, and ask questions when necessary.

1.2 Evaluation process of Design Walkthrough

Before showing the prototype to the user, we have asked the user to read the tasks they need to complete. We ask users to perform two tasks. The first task is to understand the basic function of the prototype. The second task is for the user to be able to hear our instructions and interact with the prototype according to the instructions.

1.3 Reasons for using Design Walkthrough

“A design walkthrough is a quality practice that allows designers to obtain an early validation of design decisions related to the development and treatment of content,

design of the graphical user interface, and the elements of product functionality. Design walkthroughs provide designers with a way to identify and assess early on whether the proposed design meets the requirements and addresses the project's goal.”(Taruna Goel, 2009)

1.4 Result Presented

The result is divided into two parts. The first is the time required for the user to complete each task, and the second is whether the user made a mistake in completing the task. If a mistake is made, the specific details need to be recorded.

1.5 Limitation of Design Walkthrough

- The design exercise method intersects with other methods and takes more time.
- No discussion is involved in the design exercise. The result depends entirely on time.
- The results of the design exercise partly depend on the user's technical ability and experience, and there are certain deviations.

2. Thinking Aloud

2.1 Background of Thinking Aloud

Think Aloud is an evaluation method that can be used to get the users' ideas on a project. After the participants complete the tasks, they will give their real insight on how they think about the project. This evaluation method can be combined with Design Walkthrough, and it is essential to give some reminders when participants are doing the tasks.

2.2 Evaluation process of Thinking Aloud

In this test, we asked testers to give them thoughts, feelings, and opinions of the project based on their user experience and interaction with the project. We would record their response and generate it in a document.

2.3 Result presented

Thinking aloud is a “cheap, robust, flexible, convincing, easy to learn” usability tool (Nielsen, 2012). This method allows us to discover the user's real ideas for the design, and allows us to better collect feasible suggestions through their feedback (Nielsen, 2012).

2.4 Thinking Aloud Results

We generate text records according to the record results and analyze them one by one.

2.5 Limitation of Thinking Aloud

- Unnatural situation. Unless they're a bit weird, most people don't sit and talk to themselves all day. This makes it hard for test participants to keep up the required monologue (Nielsen, 2012).
- Filtered statements (vs. brain dump). Users are supposed to say things as soon as they come to mind rather than reflect on their experience and provide an edited commentary after the fact (Nielsen, 2012).
- Biasing user behavior. Prompts and clarifying questions are usually necessary, but from an untrained facilitator, such interruptions can very easily change user behavior (Nielsen, 2012).
- No panacea. That this one method isn't the only usability tool you'll ever need is not a true downside, as long as you are willing to use other methods from time to time (Nielsen, 2012).

3. System Usability Scale (SUS)

3.1 Background of System Usability Scale

The System Usability Scale (SUS) provides a “quick and dirty”, reliable tool for measuring the usability. It consists of a 10-item questionnaire with five response options for respondents; from Strongly agree to Strongly disagree. Originally created by John Brooke in 1986, it allows you to evaluate a wide variety of products and

services, including hardware, software, mobile devices, websites and applications (Affairs, 2013).

3.2 Evaluation process of System Usability Scale

Users need to complete a survey, which consists of ten questions that asked about the availability of our project. These problems have five options, ranging from 11 completely agree to completely different. Users need experience to make a choice based on the first two assessment tasks.

3.3 Reasons for using System Usability Scale

SUS is a very easy scale to administer to participants. It can be used on small sample sizes with reliable results. It also can effectively differentiate between usable and unusable systems (Affairs, 2013).

3.4 Result presented

The participant's scores for each question are converted to a new number, added together and then multiplied by 2.5 to convert the original scores of 0-40 to 0-100(5). According to the result, the final score of the system is 70.

3.5 Limitation of System Usability Scale Limitation

- The scoring system is somewhat complex (Affairs, 2013).
- There is a temptation, when you look at the scores, since they are on a scale of 0-100, to interpret them as percentages, they are not (Affairs, 2013).
- The best way to interpret your results involves "normalizing" the scores to produce a percentile ranking (Affairs, 2013).
- SUS is not diagnostic - its use is in classifying the ease of use of the site, application or environment being tested (Affairs, 2013).

Reference

Affairs, A. S. for P. (2013, September 6). System Usability Scale (SUS). Usability.gov.
<https://www.usability.gov/how-to-and-tools/methods/system-usability-scale.html>.

Nielsen, J. (1994, April 24). 10 Usability Heuristics for User Interface Design. Nielsen Norman Group. <https://www.nngroup.com/articles/ten-usability-heuristics/>

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