Relevance of User-Participation Experiments in Web Design and Development

Author: Jing Gu
U Number: u7777749
Date: 2024-05-17

Executive Summary: This report explores the importance of user-participation experiments in web design and development, particularly in the field of Human-Computer Interaction (HCI). By analyzing two experiments in detail: Mechanisms of Visual Search Experiment (MVS) and University Identity, Attitudes toward Studying, and Being at University Experiment (UIA), the report summarizes how user-participation experiments enhance user experience, drive data-based design decisions, support user-centered design principles, and promote continuous improvement and optimization. It points out that through user-evaluation experiments, designers and developers can better understand user needs, optimize design, and provide high-quality user experiences.

Introduction: This report examines the relevance of user-participation experiments in web design and development, particularly in the field of HCI. HCI emphasizes enhancing system usability and user experience through understanding user interactions with computer systems. This report will introduce the two experiments participated in: MVS and UIA, and analyze their applications in web design and development.First, the report will outline the design and participation experience of MVS and UIA experiments. Then, it will discuss how user-participation experiments enhance user experience, drive data-driven design decisions, support user-centered design principles, and promote continuous improvement and optimization. Finally, through the review of relevant literature, the report will further emphasize the importance of user-evaluation experiments in HCI.

Experiment One: Mechanisms of Visual Search Experiment

This online study aims to understand the mechanisms of visual search in different experimental samples (Goodhew, 2024). The first part of the experiment involves filling out an information form, asking about daily attention, memory and motor errors (e.g., missing appointments, bumping into people), and basic demographic information (e.g., age, gender, native language, country of birth, and handedness). After completing the form, I participated in a game-like test that required downloading software to my computer. In the test, numbers and circular symbols of different sizes appeared alternately. I was required to press the space bar when I saw a number, except for the number 3. I did not need to press any key when I saw the number 3. I pressed the keyboard for about 5 minutes to complete this test.

During the experiment, I was not required to perform special tasks; the tasks were clearly stated in the study information form. From the perspective of difficulty, the experiment was not difficult for me. The number of questions I needed to answer was moderate, not overly long, nor too private to make me uncomfortable. As for the subsequent test, it was like a mini-game. I found this test very interesting and wanted to try it again after completing it. The instructions were clear and straightforward, and I understood what I was supposed to do.

Experiment Advantages： This test required downloading software to the computer. I liked this download step very much; it was straightforward, and I understood how to operate it. I clicked on the blue icon linking to the download package, which automatically detected my computer as a Mac and downloaded the software package to my computer. The entire process took less than 2 minutes, providing an excellent experience. The all-black screen also helped me immerse myself in the test.

Experiment Disadvantages： Before the test, the instructions lacked intuitive guidance. For a non-native speaker, if I did not patiently read the text on the black screen, I might easily give up on the experiment. The instructions were somewhat ambiguous. When I first saw the instruction "press no

key," I thought it asked me to press the NO key on the keyboard. I was confused since there was no "NO" key on my keyboard! Did it mean pressing the letters N and O? Thanks to the practice before the test, I understood it meant not pressing any key. I think using a phrase like "don’t press any key" might be easier for non-native speakers to understand.

I believe the information collected in the information form is reliable because the last question on each page of the form is designed to test participants' attention, requiring participants to choose a specific answer. This question helps experimenters filter out inattentive participants. However, I am skeptical about the correctness of the data collected in the subsequent keystroke test. Firstly, the experiment did not set up a relevant screening mechanism (e.g., a 5-second rest without pressing any key). Secondly, I think this is not just a test of concentration but also a test of reaction time and concentration. Sometimes it took me a while to realize I should not press any key, leading my finger to press the space bar before my brain did.

Experiment Two: University Identity, Attitudes toward Studying, and Being at University

This study, conducted by researchers at the Australian National University, is a short psychological study (lasting 20-30 minutes) aimed at understanding how university students perceive themselves and their study methods, as well as how they currently feel about themselves (Platow, 2024). This experiment involved filling out four questionnaires, with topics on my identity as a university customer, my identity as a university student, my learning experience, and my feelings in daily life.

Experiment Advantages： At the top of the questionnaire, there was a progress bar indicating how far along I was in the questionnaire. Each questionnaire had screening questions that required participants to select a specific key. These screening questions appeared at different positions in different questionnaires and required different answers, helping to filter out participants who were not serious about the experiment and improving the reliability and authenticity of the data collected.

Experiment Disadvantages： Firstly, the keywords in the questions were not clearly defined. For me, it was difficult to distinguish between the definitions of a university student and a university customer. In China, my undergraduate tuition was very cheap, and the primary source of funding for the university was government grants. I fully understood that I was a university student during my undergraduate studies. When I came to ANU for my master's degree, I spent over forty times the undergraduate tuition fees. Although the fees were high, my experience was no different from my undergraduate studies, even worse. I felt neither like a university student nor a university customer. Secondly, the questions were abstract. For example, "Being a university customer is unimportant to my sense of what." What level of importance is considered important? What level is unimportant? I did not understand. Finally, there were too many questions, which were very monotonous and boring, making it easy for participants to lose patience. These disadvantages were mainly found in the first two questionnaires, causing confusion during the initial stages of the experiment.

Experiment Comparison-Similarities：

1. **Experiment Purpose**: Both experiments have clear research purposes. One aims to understand the mechanisms of visual search (MVS), and the other aims to understand university students' identity and attitudes towards studying (UIA).

2. **Participation Method**: Both experiments require participants to fill in some basic information, including personal background and related questions, before the experiment.
3. **Design Considerations**: Both experiments designed screening mechanisms in the tests to ensure data reliability. For example, MVS includes attention check questions, and UIA includes specific selection questions.

Experiment Comparison-Differences：

1. **Experiment Type and Tasks**: MVS involves filling out information and a game-like keystroke test that requires downloading software and operating it, making it a highly interactive experiment. UIA only involves filling out questionnaires, with simple tasks but monotonous content, lacking interactivity.
2. **Participation Experience**: Despite some ambiguity in the instructions, MVS tasks were generally clear, and the game-like test added fun, making the overall experiment experience enjoyable. In contrast, UIA had abstract and boring questionnaire content, lacking interactivity, making the participation process tedious and hard to maintain interest.
3. **Difficulty Level**: MVS tasks were not difficult, and the keystroke test was interesting and easy to understand. UIA tasks were simple, but the questionnaire content was hard to understand, especially with undefined keywords and abstract questions, increasing the difficulty of understanding and answering.

Experience Comparison

- **MVS**: The game-like test was fun, and the overall participation process was enjoyable. Even though there were some ambiguous instructions, practice helped understand the tasks. The software download process was straightforward, enhancing the user experience.
- **UIA**: The questionnaire design had many issues, with abstract and boring content, lacking clear definitions and specific guidance, making the participation process tedious and affecting the experience.

Effectiveness Comparison

- **MVS**: Despite some minor issues, the overall operation was smooth, with a good experience and high reliability of the collected data.
- **UIA**: Due to questionnaire design issues, participants easily felt confused and bored, potentially affecting the reliability and authenticity of the data.

Conclusion: Relevance of User-Participation Experiments in Web Design and Development

User participation experiments are crucial in web design and development, particularly in the broad field of Human-Computer Interaction (HCI). HCI focuses on human-computer interactions, and web design, as a key part of HCI, can significantly enhance user experience and system usability through user evaluation experiments.

1.Enhancing User Experience: User participation experiments, like the Mechanisms of Visual Search (MVS) and University Identity, Attitudes toward Studying, and Being at University (UIA), provide valuable feedback for designers and developers. These experiments help identify user

behavior patterns and potential issues in actual use, guiding design decisions. For instance, in the MVS experiment, the smooth experience of downloading software and keystroke tests demonstrated the importance of a user-friendly interface. Similarly, in web design, user evaluation experiments can help developers identify and resolve interface design pain points, improving user experience (Shneiderman et al., 2016).

2.Data-Driven Design Decisions: Data collected through user participation experiments enable designers and developers to make more scientific and reasonable design decisions. These experiments provide quantitative and qualitative data that can be used to validate design hypotheses and optimize interface elements. For example, the UIA experiment screens out inattentive participants through specific questions, improving data reliability. Similarly, in web design, user testing can validate navigation structure, button layout, and other design elements to ensure they meet user expectations (Nielsen and Molich, 1990).

3.User-Centered Design Principles: User evaluation experiments embody the core principle of user-centered design (UCD), which is to design with the user at the center, meeting their needs and expectations. HCI emphasizes understanding user needs, behaviors, and expectations through user participation. Feedback from MVS and UIA experiments directly influences the refinement and optimization of the experiments. Likewise, in web design, user evaluation experiments ensure the design process consistently focuses on user needs, enhancing system usability and satisfaction (Norman, 2013).

4.Continuous Improvement and Optimization: User participation experiments can be used not only in the initial design phase but also for continuous improvement and optimization after the system is launched. Regular user evaluation experiments can collect ongoing feedback, identify new issues, and find improvement points. For example, improvement suggestions from the MVS experiment's instruction information can be applied to optimize prompt information in web design. Through continuous user participation experiments, web design and development teams can constantly optimize the system, providing a better user experience (Shneiderman et al., 2016).

Reference

Goodhew, S. (2024) *Mechanisms of Visual Search Experiment*, *Psychology Research Participation Scheme*. Available at: https://anupsych.sona-systems.com/exp_info_participant.aspx?experiment_id=1108 (Accessed: 18 May 2024).

Nielsen, J. and Molich, R., 1990. Heuristic evaluation of user interfaces. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 249-256).

Norman, D.A., 2013. *The Design of Everyday Things: Revised and Expanded Edition*. Basic Books.

Platow, M. (2024) *University Identity, Attitudes toward Studying, and Being at University*, *Psychology Research Participation Scheme*. Available at: https://anupsych.sona-systems.com/exp_info_participant.aspx?experiment_id=1114 (Accessed: 18 May 2024).

Shneiderman, B., Plaisant, C., Cohen, M., Jacobs, S., Elmqvist, N. and Diakopoulos, N., 2016. *Designing the User Interface: Strategies for Effective Human-Computer Interaction*. Pearson.