Participating in human-computer interaction experiments: Reflections on web design and development

Zhuolan Lin - u7709177

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Executive Summary

Human-Computer Interaction (HCI) plays a critical role in modern web design and development by helping to understand how users interact with computer systems and web sites. This helps to create products that efficiently cater to users' wants and habits.

This report explores the insights gained from two human-computer interaction experiments and their implications for web design and development. The first experiment included a questionnaire and a visual search task. While the questionnaire interface was user-friendly, maintaining focus and accuracy in visual search tasks proved to be a challenge over time. The second experiment was designed to investigate how social networks affect mental health outcomes. Participants completed three questionnaires at regular intervals and were offered a reward for completing them.

A comparative analysis of the two experiments shows that the online nature and questionnaire of the two experiments are similar, but there are differences in research focus and task complexity.

Some lessons learned from these experiments, such as a clear interface, structured questionnaires and effective incentives, provide valuable guidance for improving website design and increasing user engagement. Combining these insights can lead to a more user-friendly interface and increase user engagement in online platforms.

Introduction

This report delves into insights get from participating in human-computer interaction experiments and their relevance to web design and development. I attended two experiments on SONA, each with distinct focuses. The first, titled ‘Can you search like a baggage screener?’, aimed to understand visual search mechanisms for low-prevalence targets. The second, ‘Understanding how social groups support mental health’, explored the role of social networks in mental well-being.

First Experiment

The experiment I participated in was an online study focusing on investigating the mechanisms of visual search for low-presentation targets. The purpose was to collect data on memory, mood state, and other factors while exploring contextual and individual elements that could improve accuracy in low-presentation visual search tasks.

My experience involved two main parts. Firstly, I engaged in a questionnaire session where I answered inquiries about daily attention, mood states, memory, motor mistakes, and personal information. The interface was user-friendly, allowing easy navigation through the questions. Questions ranged from attention-related queries to memory assessments, providing a comprehensive view of cognitive functions. The second part of the experiment was a visual search task, which presented a more challenging aspect. This task required identifying whether a gun weapon appeared in pictures by selecting the appropriate key on the keyboard. Initially, I performed well in identifying high-frequency targets but experienced a decline in accuracy as the task progressed. Sustaining focus and accuracy over time proved to be a challenge.

Overall, the experiment's structure was logical, and the tasks were clearly defined. The questionnaire part of the experiment was simple and clear, easy to understand the options, and there was no duplication or similar questions before and after. I appreciate the option not to answer any personal questions, which makes the experience more comfortable.

However, notable weaknesses were evident in the visual search task. Sustaining concentration during prolonged search periods proved challenging and led to psychological fatigue, impacting accuracy and data reliability. Furthermore, the experiment provided no immediate feedback or data to participants, potentially leaving them confused about their performance.

Second Experiments

The second experiment was a multi-part online study designed to investigate how social networks support mental health and well-being. The study further explores how different aspects of an individual's social identity (such as nationality, gender, religion) interact and influence mental health outcomes. Participants were required to complete three questionnaires, with a certain amount of time between each questionnaire, and were rewarded for completing all of them.

The questionnaire primarily inquired about recent mental states, and I found the process to be seamless. While some questions required reflection, they didn't feel intrusive, and I appreciated the structured format. Moreover, the intervals between questionnaires allowed for manageable participation, offering moments for self-reflection on mental health changes.

Although the long time interval between questionnaires may lead to the loss of participants, thus affecting the consistency and integrity of the data, this experiment included the rewards of credit cards and virtual mastercard shopping vouchers, which can better attract users' attention and motivate them to visit the website regularly to complete the questionnaire, ensuring the website's activity and data integrity.

Comparison of the two Experiments

The two experiments have many similarities, but there are differences in research focus and methods.

The first is the similarity, both experiments are conducted online, users can choose their own time to participate, more flexible. And each experiment included a questionnaire section that collected data about personal information and specific aspects of behavior.

But there are also differences between the two experiments in terms of their goals and task complexity. Compared to the first experiment, which required rapid reactions and high concentration, it required a long period of patience and attention, which took longer and more energy. And the psychological needs are significant, and the focus on identifying guns and weapons may cause discomfort for some participants. The questionnaire for the second task was easier to process, with intervals allowing for reflection on changes in mental health with relative ease. In addition, the second experiment provided more substantial rewards and may have increased participants' motivation and retention.

Overall, both experiments performed well. The first experiment provided valuable insights into the mechanics of visual search, but was psychologically demanding. The second experiment was more user-friendly and the incentives were effective, although long intervals between questionnaires may have led to participant turnover.

The relevance of user-participation experiments to web design and development

In the field of human-computer interaction (HCI), user participation experiments play an indispensable role in web design and development. In today's digital ecosystem, the effective implementation of user engagement strategies is critical to the success and sustainability of online platforms and applications. These experiments help design teams better understand user needs and behaviors by obtaining direct user feedback, thereby improving product usability and user experience.

SONA's experiments closely align with user participation experiments in web design and development. They offer valuable insights into experiment conduct, formatting, and process flow, inspiring improvements in network design and development. In the SONA experiment, participants encounter a detailed introduction interface before engaging in two main components: a questionnaire and a visual recognition task. This setup provides significant reference value for our design and development endeavors. Clear guidance, as demonstrated in the experiment's interface, is equally vital in web design. Providing users with explicit navigation and usage instructions not only reduces confusion but also enhances their overall experience. For instance,

e-commerce platforms benefit from clear shopping processes, which reduce user dropout rates.

Both experiments incorporate a questionnaire section, offering valuable insights into user behavior and preferences essential for creating effective interfaces. This data collection method is pivotal in web design and development. Through user surveys and feedback mechanisms, design teams can continually refine designs based on user input. For example, setting up feedback sections on websites can gather user opinions, informing targeted improvements in new designs.

The visual recognition task part of the experiment captures the behavioral data of users by observing their performance in a specific task, which provides an important basis for understanding the aesthetic degree of the interface. In web design, the aesthetic degree of the interface will not only affect the user's first impression, but also directly related to the user's experience and satisfaction. For example, in the first experiment it was found that people tend to miss low-frequency information. Therefore, in web design, in order to avoid users missing key information, relevant information should appear multiple times. In addition, the experiment also found that overlapping items placed at lower levels tend to be overlooked, so important information should be visually displayed in a prominent place, rather than hidden or placed in a complex navigational hierarchy. In addition, the beautiful interface can not only improve the user's visual enjoyment, but also better attract users. Improve the overall user experience by optimizing color schemes, fonts, and layout designs to create beautiful and functional interfaces.

Incentives in SONA's experiment, such as rewarding users for completing questionnaires, are critical to keeping users engaged and sites active. Similar incentives can be used in website design and development to encourage user participation, thereby keeping the site's users engaged. For example, point systems, reward programs, and limited-time offers can incentivize users to engage with a website or app on a regular basis. Such incentives promote long-term engagement, leading to improved retention and community building.

Reference

1. Garett, R., Chiu, J., Zhang, L. and Young, S.D. (2016). A Literature Review: Website Design and User Engagement. Online Journal of Communication and Media Technologies, 6(3). doi:https://doi.org/10.29333/ojcmt/2556.
2. Anon, (n.d.). How Web Design Can Improve Engagement Rates | Wensum Print. [online] Available at: https://www.wensumprint.co.uk/how-web-design-can-improve-engagement-rates/#/ [Accessed 26 May 2024].