Exploring HCI Experiments: Insights for Web Design and Development

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Abstract:

This report provides a reflection on two user-participation experiments, which are a virtual rescue game in bushfire scenarios and an eye tracking and attention experiment.

Introduction:

It provides a detailed experiences of two user-participation experiments that were undertaken to explore different aspects of human-computer interaction. The first experiment focused on a virtual rescue game in bushfire scenarios, where participants assumed specific roles within a team to respond to simulated situations. The second experiment involved an eye tracking and attention study that aimed to investigate the connection between eye movements and changes in spatial patterns of attention. At first, this report will provide a brief overview of the experiments, strengths and weaknesses of each experiment. Furthermore, we will discuss the relevance of these user-participation experiments to web design and development, specifically in relation to navigation systems and the use of multimedia elements. The insights gained from these experiments contribute to our understanding of user engagement and interaction, offering valuable implications for improving website usability and enhancing the overall user experience.

First Experiment: Virtual rescue game in bushfire scenarios

Summary:

This study investigates the social media effects on team responses to bushfire events. For the whole experiment, I was part of a team with other four participants. Each of us was assigned a specific role, such as firefighter, water/fuel supplier, rescuer, team leader, or information officer. The entire game was conducted through a computer-based simulation game.

Description the experience:

At the beginning of the experiment, we were randomly assigned seats, and each desk had a paper indicating our assigned roles and their main responsibilities. In my case, I was given the role of the water/fuel supplier, responsible for providing water to the firefighters and fuel to the rescuers for saving people. Before the game start, we underwent a 20 minutes training session in which the experimenters used PowerPoint presentations to guide us through the game step by step. Following

the training, we had 10 minutes to practice the game both individually and as a team. Once we completed the induction, the game began. There was a total of three game sessions, with each session becoming progressively more challenging than the previous one. After each session, we were required to fill out a survey that assessed our subjective experiences regarding coordination, trust, and communication within the team.

When I first saw the topic of the experiment, I was immediately drawn to it as it seemed incredibly enjoyable and provided an opportunity to interact with other participants. During the game induction, I was enjoyed being part of the experiment and put in as much effort as possible. However, after the first game session, I realized that the experiment was quite challenging as we had to manage multiple tasks at the same time. For example, my role involved going to the water and fuel station, collecting the necessary supplies, and delivering them to the firefighters and rescuers. However, our individual locations were concealed from one another, with only the team leader having access to this information. Furthermore, we were required to use an internal social media chat box for communication, which meant I had to text the team leader to obtain their information and location. Meanwhile, I also had to monitor my own panel to check my location and personal details.

Moreover, I noticed that some of my teammates seemed to struggle with understanding the rules and their assigned responsibilities, as the panel interface had numerous buttons that caused confusion. As a result, they were unable to keep up with the social media chat box and did not respond to any of my inquiries. These issues persisted until the final game session, remaining unresolved.

Strengths and Weaknesses:

In terms of strengths, the experiment provided a unique and engaging platform which is very different compared to other experiments. Moreover, the use of a computer-based simulation game allowed for realistic scenarios and interactions among team members. Additionally, the random assignment of roles ensured a diverse range of perspectives and contributions from each participant. This experiment also included a pre-game training sessions which allowed participants to familiarize themselves with the game mechanics and roles. However, there were also weaknesses in the experiment. One weakness was the confusion and difficulty in understanding the rules and responsibilities. As the interface is complicated that there are many buttons on the panel. This led to some teammates struggling to fulfil their assigned tasks and affected coordination within the team.

Second Experiment: Eye Tracking and Attention Experiment

Summary:

This project aims to explore the connection between eye movements and changes in spatial patterns of attention over time. As a participant, I need to complete an experiment that involves making keyboard responses to visual stimuli presented on a screen and my eyes movements are being recorded. As part of the study, I will also be providing some basic demographic information.

Description the experience:

First, I was required to fill out a survey providing basic information such as my age and gender. Once that was completed, I proceeded to the initial stage of the experiment. I had to place my head into a stabilizer to ensure that it remained still. A camera was positioned to track my eye movements, and a large screen positioned behind the camera displayed instructions and the experimental tasks. The experimenter then guided me on how to use the keyboard to answer questions. Additionally, I had a practice question set to try with the experimental environment.

During the experiment, I found the experience is different from the psychology experiments I had participated in during my undergraduate studies. In the past, those experiments were involved simple questionnaires, without any advanced technology to track my movements. Therefore, I was highly excited to be part of this experiment which this experiment is conducted in a different way. The first task was straightforward which I had to concentrate on the screen and try to remember all the images presented. Subsequently, I was required to answer a series of questions by determining whether option A or option B matched the image I had just seen. However, the images were similar, such as a series of green forests, making it challenging to discern the differences.

Next, I was instructed to move another computer desk for a more challenging task than the previous one. In this task, I had to remember 3-5 numbers within a minute and use those numbers to select the appropriate mathematical symbols to produce a given target number. For instance, if the numbers 1, 2, and 0 were presented, and the target number was 3, I had to choose the mathematical symbols (+ and -) in a way that the resulting formula (1+2-0) equal to 3.

Strengths and Weaknesses:

For the strengths, this experiment used an eye-tracking technology and a camera to record eye movements which can provides accurate data on participants' eye movements and enhance the validity of the study. However, participants who are not proficient in calculating numbers may contribute to less accurate data. Since the second task involves manipulating numbers and selecting mathematical symbols to produce a target number, participants who struggle with calculations may make errors. This could potentially introduce variability and inaccuracies in the data collected, making it challenging to draw reliable conclusions about the relationship between eye movements and cognitive processes.

Comparison of the two Experiments:

In both experiments, I found the participation is engaging and stimulating. The virtual rescue game allowed for interactive teamwork and decision-making, which made me feel actively involved and immersed in the scenario. Similarly, the eye tracking and attention experiment offered a unique perspective and allowed me to explore the relationship between eye movements and cognitive processes. Both experiments provided me with a sense of being part of a larger study and contributing to scientific research.

Relevance of user-participation experiments to web design and development:

Navigation :

In the virtual firefighting game, the interface is overly complex and the buttons scattered throughout different areas. This lack of organization made it challenging for us to locate the appropriate buttons to click on. Additionally, the interface failed to provide any in-game instructions where I forgot the functions of certain buttons. It would be better to have a feature that allowed me to hover my mouse over the buttons to display a little descriptions, but unfortunately, this option was not available. On the other hand, the second experiment I participated in had a clear navigation bar with easily understandable symbols on the buttons. As a result, these contrasting experiences emphasize the importance of a well-designed navigation system for websites. A good navigation structure ensures that users can easily find what they need, enhancing their overall experience and enabling seamless interactions with the website (Garett, 2016).

Multi-media use:

Both experiments I attended have a same feature which was the incorporation of different media elements throughout the tasks. Unlike traditional experiments that only rely on plain text, these experiments implement the use of visual media, such as images and symbols, to enhance the participant's engagement and interaction with the tasks. This approach mirrors the principles of good web design, which recognizes the importance of incorporating various media elements to create a dynamic and immersive user experience (Lowry, 2014).

For the website design, incorporating different media elements, such as images, videos, and interactive graphics, can significantly enhance the user experience. Visual elements can convey information more effectively and efficiently than plain text alone, capturing the user's attention and aiding comprehension (Lowry, 2014).

References:

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