Abstract

This was an experiment measuring and analysing people’s behavior towards various types of reading displayed on the computer screen. The experiment aims to help us have a better understanding of Human-Computer Interaction (HCI). Through the use of advanced and scientific ways, it is possible to have a close observation of people’s reactions, of which are not easily found by the human eye. By comparison, a secondary experiment was set in which my partner and I were given two kinds of eReaders and asked to evaluate them by giving scores. This report outlines the background and experiences from participation in the primary experiment, which is compared with the experience in the secondary experiment. Ultimately, the relationship between human computer interaction and web design has been realised, as informed by the experiences in the two experiments.

Introduction

Nowadays, people’s designs have become more and more systematic and scientific, while in early years there were no principles to follow. Designs were usually according to the designer’s intuition. However, observation by direct watching is limited as such that some tiny changes in people’s feelings are not easy to find. This experiment was to detect the way people interacted by monitoring physical characteristics and physiological signals. The experiment described in this paper monitored galvanic skin response (GSR) (Wu et al. 2010), electrocardiography (ECG) (Cai et al. 2009), blood pressure (BP) (Zhai et al. 2005), eye gaze (Weibel et al. 2012) and pupil diameter (Partala & Surakka 2003).
**Background**

This experiment was to collect data for developing a computational model to draw conclusions about behavior of people towards content from different types of sources. With this data, a designer can know what kind of content is more attractive to readers and what is not, from which they can improve their designs more scientifically. This is a trend that by using big data technology, researchers can find people’s underlying preferences, which people themselves couldn’t even find. Analysis of data sets can find new correlations to "spot business trends, prevent diseases, combat crime and so on."[1].

**Experiment Participation**

The experiment was done in the Psychophysiology lab room in the Psychology building at ANU. The room is warm because the temperature in the lab room is set at 22°C, which is probably to ensure all the sensors can work well and make the experiment environment consistent. The room we were doing the experiment in is called Inquisition room. There was equipment provided on each table including a computer which displayed content on a 1050 x 1680 pixel Dell monitor and some sensors. Figure 1 shows the set-up of the Inquisition room.

*Figure 1: The experiment was conducted in a room with a consistent environment for all participants. The inquisition computer displayed the content. Participants wore GSR, ECG and BP equipment while reading, as their eye gaze and changes in pupil diameter were tracked using cameras.*
This experiment looks a medical test. GSR, ECG and BP sensors were attached to me. When the experiment began, content was shown on the screen for 1 minute. They were cut outs from magazines, technical papers, travel information and novels. After finishing the reading task, we did an assessment. Figure 3 shows the data obtained from the sensors.

![Signals obtained over a period during the experiment (a) GSR (b) ECG (c) BP (d) Eye gaze (e) Pupil diameter](image)

Actually, when doing the experiment I didn’t personally feel any huge difference across the different content. I only felt that the magazines and travel information were more interesting with some images attached. Novels were easier to read while technical papers were relatively more monotonous. However, the tiny changes in my body can be clearly seen from the data collected by the sensors. There could be some kind of correlation between the data and my feelings which a designer could figure out and thereafter make use of in order to customise the best content for readers.

**Comparison between primary and secondary experiment**

To tell the truth, the secondary experiment was more interesting. Before the lab, my partner and I received an unexpected gift and we couldn’t open it until the experiment began. We were given two e-book readers: Kindle and Kobo Touch. We were asked to register the e-reader and give scores to them. Our method was very simple in that we gave score in accordance with the time it took for us to finish the registration. We counted and recorded the time we used. Finally, the evaluation of all 4 products was collected by combining all the scores together.
This was indeed an interesting way to evaluate products, but I think there is still some things that could be improved. For example, I had conversed with some other participants and understood that some of them had used some of the electronic products before and were very familiar with them, which would seriously affect the result. Furthermore, the number of participants was only 12, which could not provide an entirely accurate representation of all people. In comparing the two experiments, we can see that the first one is similar to giving designers data and inspiring them to create and design, while the second one is similar to asking designers to find problems in different products through comparison and using such to try and improve these products or apply these principles to their own designs. These are two different ways to make progress: one is to focus on the details that others won’t notice; the other is to find problems from existing things and try to perfect them.

**HCI and Web design**

The HCI principles derived from the two experiments can also be used in web design. Web page is like a console in that if you make it easy to control users will enjoy it and visit again. For example, if magazines and travel papers with great color combination and interesting images can raise people’s attention better, we should not only use large paragraphs of words in our web page. If you want to make a horror movie theme website, you should apply the data from the experiment in order to increase people’s blood pressure and enlarge their pupil diameter. From the experiments we can also conclude that we should not make our websites too complex to use. We should simplify the procedures that people use achieve to their goals.

**Conclusion**

From these experiments, we can conclude that some simple things can easily affect our reactions and that they are often being ignored. Designers should learn to find the underlying patterns from data and apply them to their designs in big data time. They can also perfect a design by finding problems, collecting advantages and improving the existing design. Websites are widely used nowadays and HCI principles are particularly useful in web design.
Reference