

Role of user-evaluation in web design and development

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Abstract

Human-Computer Interaction (HCI) aims to improve the usability of applications through interactions between humans and technological interfaces. This paper discusses two user-evaluation experiments to analyse their relevance to web design and development through personal experience. The first experiment collects data about mental health and body image issues in males through an extensive questionnaire. In the second experiment, the recording of people comparing two videos allows gathering information about facial expressions during the identification of deceptive behaviour. This report summarises the experiments and my feelings of participation in them. The elements used in these experiments show that there should be balance between aesthetics and cognition to promote usability in human-computer interaction.

Introduction

In the past decade, the world wide web has become an essential element of our daily lives. Designing and developing user interface elements efficiently, including software applications and websites, plays a vital role in an application's success. User-centred design and aesthetics do two things for an application: they make it look appealing to the user, and they make the website more 'usable' and emotionally fulfilling. With the increasing number of websites, usability is one of the primary criteria to make a website stand out and preferred. In short, *usability* may be defined as "the quality of a user's experience" [1] while interacting with an application.

Since 'actual' people use web applications, the web design must keep the user satisfaction and emotions in mind. To improve usability, one of the methods used by practitioners in HCI is User-Evaluation [2]. This method aims to collect feedback from users through participation in different experiments and use the collected data to improve the design. These experiments may result in the collection of quantitative and qualitative data, which may aid in making the design human-centred. This paper discusses two experiments conducted that are relevant to web design and development. The first experiment aims to understand the mental health and body image issues and symptoms in males, focusing on muscularity, eating and exercise. In the second experiment, the user compares two videos to identify deceptive behaviour. In the following two sections, we discuss in detail both these experiments. Section 3 provides a comparative analysis for both these experiments. In Section 4, we reflect on the relevance of these experiments to web design and development. Section 5 concludes the paper.

Experiment 1 : Men's Mental Health Survey - Body Image (Males ages 18-30)

Background & Objectives

'Men's Mental Health Survey - Body Image (Males ages 18-30)' was conducted as an online survey by Cassidy Shaw, a researcher at the Australian National University. The purpose of this study is to understand the characteristics of mental health issues in males [See [Appendix 1](#)]. The motivation for this experiment comes from breaking the stereotypical belief that eating disorders and body-image concerns are associated with only women and that only 1% of the males account for these problems. The researcher aims to examine the validity of this statistic. It has been found in recent research that

men experience significant distress over body image and eating factors. They report activities such as counting calories and exercising excessively to maintain their physique. In order to study these problems in males, this survey includes questions on topics such as appearance concerns, masculinity, eating, anxiety, exercise and distressing thoughts.

Participation

Before the experiment commenced, the researchers presented me with a project information sheet. The sheet included details of the general structure of the project and participant involvement guidelines. The sheet also asked for consent to use my data collected through this experiment. The experiment began with some general demographic questions. The more survey specific questions were pretty simple to understand and answer. The questions in these sections targeted body image and mental health issues. In order to answer the questions, the researchers provided a scale of 1 (least relevant/strongly disagree) to 5 (most relevant/strongly agree). While reading the questions, the situations felt very relevant to me. There were separate sections with related questions across the different topics. For example, one of the categories asked questions about extra supplements taken to maintain body image for eating habits. On the contrary, another category asked questions about being conscious of how much and what to eat.

The experiment provided an efficient method of self-reflection while answering the questions, allowing a conscious realisation of the things I do to maintain body image. The questionnaire affected my emotional state as well, which kept me constantly engaged in the survey.

Reflection

The structure of the questions affected my emotional and cognitive state. Thus, they potentially expose how males suffer from body image and eating disorder issues as much as females do and fulfil the experiment's aim. One of my concerns with data reliability is that not every person answers personal health issues honestly in surveys. Thus, the data collected may be biased and affect the results gathered.

Experiment 2: Are You Good at Identifying Thieves?

Background & Objectives

The experiment 'Are you good at identifying thieves?' was conducted by the researchers Zi Jin, Xuanying Zhu, and Professor Tom Gedeon. The purpose of this experiment was to collect data that may enable information on user interaction and facial expressions by studying how various people express themselves while identifying thieves [See [Appendix 2](#)]. The participants are requested to observe and compare two sets of videos, which showcase an interview process. The interviewees may or may not have stolen a phone before the interview. The participant of this experiment is responsible for identifying deceptive behaviour. The participants were required to record themselves through a webcam for this experiment to enable facial expressions data to be collected.

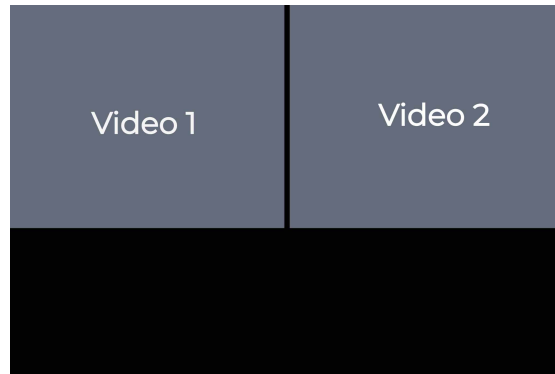
Participation

The experiment took place online. As a participant, I compared six pairs of videos recording a similar interview process. The experiment expected me to observe deceptive behaviour in the two videos intelligently. Before the experiment commenced, I was required to turn on my webcam and record my facial expressions. The experiment began with a series of demographic questions and a consent form to use personal data. The videos followed this. Following each pair of videos, I answered four questions. These questions were as follows:

1. Whom do you think stole the phone?
2. Do you suspect that the person in the first video stole the phone?

3. Do you suspect that the person in the second video stole the phone?
4. Have you watched this video before?

The experiment put into practice my detective skills, which I had not explored before. The videos had no controls to pause them. The layout of these videos was not very appealing. While the required task in the experiment was pretty simple to understand, it was very confusing at the same time. The cause of the confusion was the complexity in identifying thieves, the low sound of the videos, and a moderate video quality. Furthermore, I felt conscious of being recorded and did not freely express myself.



Layout of Experiment Website

Reflection

The experiment was very straightforward in collecting the data and meeting the aims as stated in the experiment sheet. I felt that the major strength of this experiment was that it collects the facial expressions of the people comparing the videos using recordings, providing actual data for the purpose. However, at the same time, I also feel that people may react differently or manipulate their facial expressions while being recorded, leading to a scope of bias in the data. Since the experiment does not aim to measure a quantitative element, the data may still be reliable and help understand the facial expressions of different people while identifying thieves.

Comparison & Reflection

Both the experiments took place online. However, there was a significant difference in the principles of the two experiments. The first experiment, 'Men's Mental Health Survey - Body Image (Males ages 18-30),' was conducted to collect quantitative data from the participants after answering a set of questions in the survey. The quantitative nature arises from the use of a numerical scale to answer the questions. On the other hand, the second experiment, 'Are you good at identifying thieves?' collected qualitative data from the participants. The participants acted as observers/ experimenters, and their reactions and expressions were collected, which are qualitative measures.

After taking part in the first experiment, I felt more conscious about a lack of recognition for issues with male health. It also exposed my personal issues. In my opinion, the direction of the experiment was efficient. The survey questions covered a majority of the topics necessary for such a kind of research.

While taking part in the second experiment, I felt conscious of being recorded, even after trying to be unaware. There is a probability that there was a bias in my data. This consciousness factor may affect the data for many other participants as well. This might compromise the degree of accuracy of the results.

Discussion & Evaluation-Relevance of experiments to web design

In Human-Computer Interaction (HCI), user-evaluation aids in understanding how usable is a web application for different groups of users. User-centred web design makes a web application more appealing to the user. Also, it influences how a user may interact with the website. It is essential to understand that usability is about combining good aesthetic design, psychology, emotions, human factors, and engineering [3].

The experiments discussed above help in understanding the relevance of user evaluation in web design. In the first experiment, there were two ways that web design might have been affected. Firstly, the design of the experiment questions influenced my engagement with the survey. The questions targeted both positive and negative emotions and incorporated a human touch to understand all mental issues that males face. It provides an example of good usable content. Secondly, the data from the experiment may aid in designing better websites. Currently, only about 1% of the mental and body image issues are attributed to males. With more accurate statistics, web designers may be conscious of reducing elements in web design that promote such problems. Examples include healthcare websites, which portray a good image for a man to be muscular, tall and eat meat to stay strong.

In the second experiment, the facial expressions captured while looking at the videos can help understand user emotions while interacting with a website. The layout of the videos in the experiment was poor and the user did not have any controls. However, the lack of any other form of aesthetics contributes to more user engagement with the videos, thus reducing any distractions. Adding more features to the screen could have resulted in the user trying to engage with them, affecting the user's facial expressions.

Conclusion



From the discussion above, we may conclude that the usability of a web application is more than just the functional elements. The inclusion of other psychological factors is just as important to increase user engagement. However, all the design decisions should keep the purpose of the application in mind. As it is evident in the second experiment, though the experiment website lacked any aesthetic elements, it aided in reducing distractions while allowing the participant to focus on the video. Sometimes, some tradeoffs are necessary to achieve the maximum efficiency of a web application. Thus, it is necessary to maintain a balance between aesthetics and cognitive elements in a web application to maximise human-computer interaction.

References

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Appendix 1 - ‘Mens Mental Health Survey’ Information Sheet

Study Information

Study Name	Mens Mental Health Survey - Body Image (Males Aged 18-30)	
Study Type	 Online Study This study is an online study on another website. To participate, sign up, and then you will be given access to the website to participate in the study.	
Credits	0.75 Credits	
Duration	35 minutes	
Abstract	Males account for less than 1% of body image research, with males perspectives on body image and eating disorders largely unknown, ANU Researchers would like to correct this imbalance & understand mens concerns surrounding eating, exercise & muscularity	
Description	<p>Eating disorders and body-image concerns have been stereotypically described as a concern exclusive to women. However, recent research has revealed that similar to women, men experience significant distress and impairment associated with body-image dissatisfaction. Similar to women, men often report counting calories, checking weight obsessively, dieting frequently, and exercising excessively. As such, men make up a considerable proportion of body image and eating disorder concerns, with statistics showing that that males account for 1 in 4 preadolescent Eating Disorders and specialist cases have shown that men represent up to 50% of cases of eating disorders.</p> <p>The purpose of this study is to understand the features of different mental health symptoms in males and what makes them similar and distinct. In particular, this study will focus on a range of topics including muscularity and appearance concerns, eating, exercise, masculinity, anxiety, and distressing thoughts. You do not need to be experiencing symptoms to be eligible for the study. This survey should take no longer than 35-40mins to complete.</p> <p>Participate in this study to add more data to an under-researched area. You will earn 0.75 course credit points.</p>	
Website	You have already participated in this study.	
Researcher	Cassidy Shaw	

Appendix 2 - ‘Are you good at identifying thieves?’ Information Sheet



Participant Information Sheet

Project Title: Are you good at identifying thieves? (online version)

Researchers:

The researchers conducting this experiment are Zi Jin, Xuanying Zhu and Professor Tom Gedeon.

Experiment:

In this experiment, you will watch a selection of videos which record some participants being greeted and interviewed by others. These participants may or may not have taken a phone which does not belong to them prior to the interview, and your task is to estimate whether the participants in the video have conducted some deceptive behaviours.

While you perform the experiment, you need to record your video through a webcam, using any recording software you have (mp4 format is preferred, minimum screen size recorded has to be 640x360). After finishing the experiment, you need to upload the video recording to a cloud storage (details will be in the experiment website). Once you send us the video recording, your experiment participation will be considered complete and then you can receive credit for it. The total duration of the experiment will be around 60 minutes, and will gain you 1 hour experiment credit.

Devices

In this experiment, your facial expressions will be captured by a webcam.

Tasks

In this experiment, you will watch a series of videos from the computer screen and estimate whether the person involved in the videos has conducted deceptive behaviours (such as stealing a phone) or not. After completion of identification, all sensors will be removed. During the observation and identification of the experiment, you will be required to record their facial expression.

At the start of the experiment, you will:

- i) Watch the preliminary video to understand the tasks you are required to do
- ii) Sign the online consent form
- iii) Start recording your facial expression using a recording software
- iv) Fill demographic information.
- v) Read instructions and press the **Next** button.
- vi) Watch a series of videos and answer the questions. Press **Submit** to continue.
- vii) Repeat step vi) until all the videos have been displayed.
- viii) Fill in the post-experiment questionnaires and press **Submit**.
- ix) Stop recording your facial expression and upload the video to the link mentioned in the experiment website.

Use of Data and Feedback

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The data collected will be used to draw conclusions about certain interaction techniques and the nature of the tasks. Any data collected, either raw or processed, may be used research and publications. The data will be made unidentifiable so that no participant will be able to be identified from any data collected.

Voluntary Participation & Withdrawal

This usability experiment is completely voluntary. You may end the test session or ask for a break at any time. You may request that any or all data collected from you be destroyed. You have the right to completely withdraw from the experiment at any point with no explanation to the researcher. In this case, your data and personal information will be destroyed in accordance with the ANU Code of Research Conduct. You can ask that your name be deleted from our contact list for future testing at any time.

What does participation in the research request of you?

The main purpose of the user study is to collect data to enable useful information to be gained on the interface, the interaction techniques, and tasks. We will give you a pre- and post-task questionnaire that may contain some questions of an identifying nature. You do not need to complete these or any of the other questions if you have any objections to them. The task carried during the session will involve recording facial expression data.

Location and Duration

The study will take place online. The time needed to complete this user study will be about 60 minutes in one standalone session. This time will include an introduction to the tasks, setup, and completion of the tasks mentioned above.

Incentives

No incentives are provided. Participants signing up via the SONA system gain course credits.

Risks

As the study is conducted in a carefully designed lab environment, all care will be taken to make participants as comfortable as possible, given the nature of the interaction tasks. **Participants are free to request that your participation in the user study cease at any stage without explanation.**

Confidentiality

The data from the experiment will be made unidentifiable so that no participant will be able to be identified from any data collected. All results published will be in regards to the overall findings from the cohort of participants and not on an individual basis. Until that time, if you give your permission, your contact details will be retained for follow-up testing. The data may be used in follow-up research by researchers not listed on this form. All researchers that will gain access to the data collected in this research will be listed under the same human ethics protocol as the current researcher.

Data Storage

The data from the research will be stored securely at the CSIT Building, ANU. The data from the experiment will be made unidentifiable to retain privacy of each participant. The lookup for the



unidentifiable data will be kept in a separate secure location so that participants information can be found in the case of their wanting access to their data or destruction of their data.

In accordance with the ANU Code of Research Conduct all data collected for the research will be stored for at minimum 5 years from the date of publication. After this period the data will be archived for follow-up research. The data will be kept in secure storage at the Research School of Computer Science, ANU.

Queries and Concerns:

If you have any further requests for information or queries regarding the study participants should be directed to the primary investigators,

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Ethics Committee Clearance:

The ethical aspects of this research have been approved by the ANU Human Research Ethics Committee. If you have any concerns or complaints about how this research has been conducted, please contact:

Ethics Manager

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