Abstract

The ability to understand why websites are designed the way they are is fundamental for web designers as it allows them to make websites more user friendly, more relevant to the topic at hand and more functional for human beings. This is because web designers need as much information as they can get before they even think about starting to code a website, and this insight is the basis of what this report will cover. Design of websites in general will be analysed thoroughly to uncover what users will respond well to on a website as well as things that keep users away. Two experiments involving web design will be discussed in detail including potential relationships with HCI. The reflective nature of this report will interpret what real world web design is about and where it can improve.

Introduction

There are many things web designers should do when it comes to creating a website that is meant for the public, yet the most important thing is to not underestimate your audience as they are generally creative and intelligent people who respond well to content that is effectively thought-out. This isn't anything new as according to Adobe, 38% of people will leave a website if they deem the structure, layout or content to be unattractive or disorganised and 66% of people want to read information that is designed beautifully (Adobe, 2015). Most of the websites people visit on the internet will just be plain HTML pages with no CSS styling of any kind yet are functional, but some of them are perfectly styled but don't take into account human use on the website. Both of these are involved in design, but it seems some only get one of them right. This report aims to find out the balance in web design between functionality for humans while not being completely devoid of artistic life.

Background

The primary experiment involves the user reading and classifying material through a web interface while having the user’s eye gaze and heart rate monitored. The user’s eye gaze is monitored by a camera which has to be first initialized to the user’s specifications and the user’s heart rate is monitored via various cables hooked up to the user’s arms. The primary aim of the experiment is to see if there is a correlation between stress and decision making. Essentially in this instance the concept is about whether or not the computer can predict the action the user will make based on their heart rate. With a large pool of volunteers classifying the same material it would definitely be possible to make judgements on how stress influenced their decisions.

The secondary experiment focused solely on the user’s eye gaze and how they found information from image maps on the screen. This is achieved by having several questions like “who lives at 23 Melville Terrace” or “how many NAB managers live in Victoria” thus allowing people to search for the content and enter it where there results are recorded. The aim of this experiment is to find out which type of map layout if best for trying to find information on a website. This is achieved by tracking where the eye moved to find the information as well as a questionnaire at the end asking the user which layout they preferred.
Experiences from participation in primary experiment

My participation in the primary experiment involved classifying certain paragraphs of text as related or not related to natural disasters. At the beginning of the experiment, the instructor Chris Chow told me to put a watch on that would assist in monitoring my heart rate and indicated that I should get into a position where I would feel comfortable for a long period of time. He then prepared to attach various wires and cables to my fingers and arms that would provide physiological feedback to his equipment. The last thing left in the preparation was the eye tracker which had me follow a ball on the screen of the laptop until the device was properly initialized.

Chris explained that all I have to do is read each paragraph of text on the laptop screen and answer whether or not it is related to natural disasters within the allotted time. Overall this was a fairly simple process that didn’t cause me any discomfort except halfway through the cables start to hurt my skin. Each question gave me 45 seconds to answer the question before presumably it moved to the next one. It even had a ticking clock for the jeopardy effect. At first I would read the whole paragraph for each question and I only experienced a mild amount of tension, nothing that would throw me off the questions. After about 10 questions, I began to skim the paragraphs because none of them had been related to natural disasters. This and the fact that I had gotten use to the interface led to that slight tension disappearing. After I continued to answer more questions with none of them being related to natural disasters I began to feel cheerful and started to lose physical sensations in my body. Basically my heart rate and my breathing were completely ignored, almost if I had an artificial rush of adrenaline which led me to answer questions faster and faster. Then I began to doubt whether I was answering questions correctly given how fast I was skimming the questions. So I slowed down and started reading the full paragraphs again. In all, I think I answered 4 paragraphs were related to natural disasters with the rest being unrelated. I ended up with a total of a little over 80% correct.

Throughout the experiment one thing was abundantly clear; the web interface had a clear design that was both functional and aesthetically pleasing. While this may not seem relevant, it was to me as it made me feel calmer knowing that nothing looked as if it would go wrong on the computer end of the interaction. Not only that but it also conformed to Jakob Nielsen’s web attributes which are learnability, efficiency, memorability, user satisfaction and few errors (Nielsen, 2012). To put this into perspective, the user can only submit “yes this is related to natural disasters” or “no this isn’t related to natural disasters” which means there is virtually no room for any errors as well as the fact that I didn’t experience any. The interface is incredibly easy to use as the main input is the mouse. The keyboard is only used for the first section where you input you name and the degree you are studying. As I continued in the experiment, I began answering questions quicker which indicates that efficiency is also present. I cannot justify memorability because I only used it during one sitting but I was satisfied using the interface as it was enjoyable to use for the 30 minute session.

This experiment was fairly simple for myself yet it also collected useful information that can help determine how people make decisions while under pressure.
Differences between primary and secondary experiment experiences

The primary and secondary experiments were different in almost every aspect apart from the fact that they both tracked my eye movement. However, the eye movement played a far more pivotal role in the secondary experiment compared to the first. In the secondary experiment the camera was configured to track my eye just like the first except without the other equipment that Chris used in his. My job was to find information from large images that were essentially cluster maps or hierarchy charts used to connect various types of information to a central idea. The majority of the questions were easy to answer and relevant information was close together on most of the maps, however some of the questions were quite ambiguous given the information available and even the instructors agreed that they were bad questions for the experiment. I believe this will have an effect on their results but this will hopefully influence future experiments of this type to be more direct in their approach. The primary experiment didn’t suffer from this at all which means that there will be more that can be done for HCI with the results. In contrast though, the secondary experiment truly reflects the nature of figuring out good website design as it has elements of human functionality as well as aesthetic pleasing design. The questionnaire at the end of the experiment even asked which one did I think was easier to find information on and which one did I prefer the look of.

This report is meant to find out what kind of balance between functionality and appearance is possible in web design and while the secondary experiment focuses on this directly, the primary experiment does have some elements too. Because in the primary experiment, the design has already been accomplished and so has the functionality to some extent but one of the purposes was to find out whether the interface in its current state would be useful for other web aspects. The only way to find out this is by having people use the interface through a series of tasks and give feedback on it, just like how the experiment was handled. Therefore the answer lies with the user’s opinion on whether or not the software is useful. Does it provide the features you need and is it nice and simple to use? I believe the software is useful because it can be adapted to a range of other web functions while remaining useable. If the interface wasn’t useable to begin with, I might have walked out during the experiment because as a real world web user, if I find a website that isn’t functional, I leave.

The two experiments gave me two very different experiences; the primary gave me a sense of wonder especially when Chris explained why he was doing it and the secondary felt more linear with little payoff in the end. The secondary may very well help large corporate businesses structure their departments, but the primary delved deeper into the idea of how humans make decisions on websites in a closed, experimental environment. I think the idea behind both was good and they both can definitely be improved, but I’m more interested into seeing the primary being taken on a larger scale. An idea could be to make a few different websites with some looking fake and shady projecting fear of getting a virus onto the user while having others looking sleek and safe, the ideal website people want to use. The results of this would be interesting to see as designers could learn what types of design provoke certain reactions from users.
HCl and Web design

Human-computer interaction also known as HCl is “the study of how people interact with computers and to what extent computers are or are not developed for successful interaction with human beings,” and when searching for a relationship between this and web design, the answer is actually straight forward. The previous sections have highlighted experiences from the experiments and some of them show a relationship between HCI and web design, and others don’t. The relationship is that to successfully design a website, you must have an understanding of how you want humans to interact with it. The complete opposite can be said as well. If you want to make a website on the go without a single thought on how the elements of your website will work with each other, then you don’t need to know how people will use your website. Although even then some HCl is present because when designing a website, you still have to use a human-computer interface to communicate your ideas. For example, say you are programming your website in Adobe Dreamweaver. You are using what can be described as a virtual environment where the input is whatever you code or create and the output is your website. Dreamweaver is a program that can split environments side by side so that you can see your code on one side and your webpage on the other. The primary experiment deals with HCl and web design by learning how people interact with a web interface when under pressure and the secondary experiment tests what kind of image map that humans can understand works best on a webpage. This underlying relationship is the basis for many web creations, and many web designers will implement them without even knowing. It could be as simple as implementing a feedback forum on your website. The web designer has to decide how to make it easy and practical for the user to input text into the forum. An extension of this may be to make it send without the need of a 3rd party mail program because many may be turned off if it tried to open in something they simply don’t possess. The instructor at the end of the secondary experiment also gave an insight to the HCI aspect of the experiment. He stated that the camera was tracking my eye to identify the way my eyes scan a computer screen. The most common way is the ‘F’ pattern which means users mainly see information located in the top and left side of the screen. The experiment used various maps of information to see how people access information and the last one worked with the reader’s natural visual flow by going top to bottom and left to right. These may seem like simple examples, but the important thing to remember is this is how HCI and web design are connected.

Conclusion

Planning from the very beginning to strike a balance between human interaction and beautiful design for your website will not only draw users in but also keep them engaged for the long haul. People will tell you to give your website an interesting colour pallet, a purpose, an innovative navigation bar and plenty of images to make it appealing to a wide audience, but there is so much more to web design then just that. Making a website with HCI in mind combines all of this with pure functionality, and that is what separates a pretty website to a website for the real world. Go look at xbox.com, store.steampowered.com or any high profile website and you will see why they keep getting return business. These websites are the future, so it’s time to leave dull inoperable websites in the past.
Bibliography


Appendix
**Myo Experiment:** The materials are Myo, Android Phone (with recording app), Dynamometer and webcam. The first experiment is about collecting your muscle signal, using recording app, according to different gestures and put these data into a neural network, so that I can create a detection app to differentiate the action done by the user in real-time. The second experiment is to observe and analyse how muscle fatigue can be represented with Myo data (Experiment2 part 1), its accuracy, and to prove how encouragement or request could 'psychologically' change users' perception on muscle fatigue (Experiment2 part 2).