The purpose of this experiment report is to identify the correlation between proper implementation of human-computer interactions (HCI) principles, and effective design and development of a piece of computer hardware in the form of an e-reader. Human-computer interactions are the area of computer science which focus on developing computer software and hardware which is designed specifically for easier and more simplified use by human beings. In order to assess the correlation between human computer interaction research and effective development of hardware, two experiments were conducted: the first of which involved utilising an array of computer hardware to record human behaviour when presented with stimulus on a screen (in this instance, blood pressure, eye movement and galvanic skin response). This information was then correlated to similar physiological behaviours recorded in a second experiment, where the participant was presented with a number of e-reader devices, asked to navigate to a particular section of a document, then record their experiences using the device.

The results of these experiment allow for an observation of the necessities of proper human-computer interaction design of computer hardware. This information was then, in turn, applied to the development of a website, highlighting how crucial proper implementation of the aforementioned HCI principles are when developing software for the web. This information allows for the two conducted experiments to serve as a benchmark for future development of computer technology using the HCI principles, and provides knowledge and insight on effective utilisation of the HCI principles.

*Having not been able to partake in any experiments myself due to timing and other commitments, this report is written from the viewpoint of myself participating in the experiments discussed in the two provided papers on the COMP1710 Wattle page. As such, this experiment is not written from a first-hand account, rather, the account of one pretending that they had partaken in the two experiments themselves initially.
**Introduction**

Human-computer interactions (HCI) are the study of effective development of computer technology in the area of computer science. Particular focus is given to designing a system which incorporates convenience and usability, allowing for easier and more streamlined use by human beings. With technology constantly evolving and changing, studying how this technology can be better designed and modified to suit the needs of human beings is becoming ever more essential in how we craft our computer systems.

The study of HCI consists of a number of principles: determination of who is to be using the developing system, early and pre-emptive tests to ensure the system works correctly (alpha and beta tests), and interactive design which involves designing the system in full, testing it, analysing results, applying changes or modifications, then testing it again, and repeating until the system has been designed to the best it can be. Following the simple principles of HCI allows both hardware and software engineers to create systems and software which are fulfil their purpose, are easy to use, and provide streamlined and effective usage to the intended user audience.

In order to observe the correlation that effective utilisation of the HCI principles has on the development of computer hardware, two experiments were conducted, a primary experiment and a secondary experiment. The experiments and their results allowed the participant to briefly observe the correlation that exists between effective use of the HCI principles, and well-developed computer technology.

The aim of these two experiments was to provide the participant with knowledge on how effective proper implementation of HCI principles can have on computer systems, and how this information can be related back to efficient website design and development.

**Method**

Two experiments constituted this lab report: the first being the primary experiment, and the second being the secondary experiment. The primary experiment involved seating the participant in a room in the ANU psychology building in front of a computer screen. Pieces of computer hardware, including a blood pressure monitor and an eye monitor were attached to the participant in order to measure their physiological reaction to the stimulus to be presented. The stimulus consisted of text displayed on the computer screen, which the participant read while the sensors recorded their physiological behaviours. After they had finished reading, the participant was given a short assessment to complete.

The secondary experiment consisted of the participant being presented with a number of e-readers, each of different brands and designs. The participant was given a scenario in which they had just opened the e-reader, and needed to navigate to a preinstalled document to learn how to properly use it. The participant navigated to the specified document on each e-reader, then completed an assessment at the end, rating each of the e-readers on factors such as their ease of design, ability to navigate and their overall user friendliness.

Upon completion of the two experiments, participants took the information learned and were able to apply it to a paper, exploring the correlation that exists between human-computer interaction research, effective design of a computer system, and how this can be applied to the development of a website.
Results, Data and Interpretation

Background

The two experiments, done in parallel, serve as a strong example which highlights the relationship between HCI and development of computer systems. This information can also be applied to the development of a website; serving as a benchmark on which one can base their work off, to ensure their website is crafted to the best it can be.

Experience from the primary experiment

The results of the first experiment, without a proper hypothesis and aim, do not serve to show much on their own. In essence, the results from the primary experiment only allow one to observe the physiological behaviours, both conscious and unconscious, that an individual exhibit while reading stimulus on a screen. This allows some indication as to how humans act while using a computer, however, as stated before, without a clear experiment aim and hypothesis, supported by a collection of data from different individuals, this information cannot be thought of as indicative of human behaviour.

Experience from the secondary experiment

The second experiment, however, provided much more insight into the necessities of proper implementation of HCI principles. By being able to use a variety of computer hardware systems, each of which differed from the others, it was easier to understand how necessary a proper implementation of HCI principles is. Being able to physically use a variety of devices, each with different designs and incorporations of HCI principles allowed for a greater understanding of how said principles work, and a greater appreciation for effective design.

Personal interpretations of both experiments

Partaking in the experiments, especially the second, I, as a voluntary participant*, was able to understand for myself just how crucial a role in design human-computer interaction research is. From the second experiment in particular, it became clear that HCI principles are fundamental in the development of successful pieces of software and hardware, and that by following the principles states previously, one is able to ensure that their computer system is crafted to optimisation.
HCI in Web Development: A Discussion

The two HCI-centred experiments showed how crucial human-computer principles can be in the design and presentation of a piece of computer hardware. This knowledge can be taken one step further, and applied to the creation of a website.

As stated previously, the principles of HCI include determination of the user base and pre-launch tests and configurations alongside iterative design. These principles can quite easily be applied to a website in the making, if the coder is careful to consider them.

Much like the e-readers used in the experiment, websites can sometimes be difficult or easy to navigate and interact with. Poor formatting of HTML, or inconsistent and poorly coded CSS can make content on websites difficult to access, find or read. Conversely, a website with good CSS and HTML is able to present its content in a clear and coherent manner, making for easy accessibility and navigation.

Personally, I believe that the secondary experiment highlights the importance of the HCI principles in an incredibly effective manner, especially when one relates them back to website design. I would not go as far as to say that website design is an embodiment of HCI, rather, that HCI and website design exist in a very close-knit relationship. Effective web design would not exist without at least some form of implementation of the HCI principles, and the HCI principles can have their importance proven by being used in effective web design. Overall, I believe that, having been able to relate HCI experiment to website development, HCI and web design essentially exist in a mutually-beneficial relationship. Both are enhanced by the other when utilised properly and efficiently, and serve to show that the principles of HCI are a fundamental aspect of the development of any good website.