**Interim report**

**aims, objectives and literature survey**

Aims: I decided to choose this project because it is part of the computer science field that first drew me to the course and is a part of my career aspirations post university. Whilst studying A levels I took part in a week’s work experience with Sky and worked with a group of graduate front end developers on a streaming application tailored for business clients of the company. Being able to get hands on experience in the agile process of front end development is where I started thinking more about how we actually interact with computers and how much fine detail goes into making a fresh and usable interface. As well as this, my second year team project based on creating a website gave me the chance to design a user interface as part of a team. After finishing the team project and getting a better idea of how consumers want interfaces to work and look, I wanted to do something similar for the individual project in my final year. With this project I would like to incorporate one of my passions which is sport. Using sport as a focal point will open up a variety of options for design within the interfaces I will produce. Having taken part in university sport over my time at university and also being elected to be the captain for a sports team I understand that fixture management can be difficult. Therefore I would like to design some interfaces to be used by university students and staff to check fixtures, post results and view the availability of students for fixtures in each team.

Objectives:

Background Theory: Human-Computer Interaction (HCI) research began in the early 1980’s due to the rise of personal computing in the late 1970’s. Prior to the 1980’s computing was carried out by IT professionals or dedicated individuals as a hobby. As a result of this the computer science community needed to find a way to present information for a wide variety of humans. HCI theory is broken up into three parts; how humans process information, how computers store and present information to its users and the interaction that occurs between the two to address the required action. I will now discuss these parts further and explain how they come together to have an impact on interface design.

**Human**s receive information via certain channels; visual, auditory, haptic and movement. Information is then stored in classes of memory; sensory, short-term, long-term and processed via reasoning, problem solving, skill acquisition and error which can be defined as cognitive tasks. Another process which falls under the umbrella of cognition is attention, this is the procedure of selecting things to concentrate on at one point in time from a range of possibilities. This allows us to focus on the information that is relevant to the task we want to achieve at that point in time. The success of the task is based on whether we have clear goals and how easy the environmental information is to interpret. As a result dealing with human attention is paramount in dealing with HCI. Earlier I explained the classes of memory that humans use to store information, this stored information is then used respond appropriately to a certain task. However, it is not possible for humans to remember everything we ever store in memory or our brains would overload, instead information is filtered through based on how much attention that is paid to it. It is also well known that humans tend to pay more attention to colours and shapes rather than numbers, words or speech .Here we can see how parts of cognition come together to deal with information processing in our brains. Therefore when dealing with HCI we need to reduce the load on user’s memory with simple procedures and prioritise recognition using menus and icons.

The human ability to learn is another important aspect to consider when discussing HCI theory which uses the concepts of attention and memory to recall similar past experiences and use previous responses to act upon a required task. We tend to learn a lot more from doing than following a set of instructions, as a result it is important to design with exploration in mind in order to allow humans to learn the most efficient and productive solutions to problems. Learning is also about improving upon mistakes, allowing users to return to previous states will encourage learning and help guide them through the task. Overall, as humans we process information in a variety of ways and using the concepts of cognition we can employ the use of computers to deal with complex tasks much faster and easier than we could on our own.

**Computers** have similar human features that are used to process information; input/output devices, memory and processing power.

The **interaction** between a human and a computer addresses the translations between what the user wants and what the system does. Interfaces are used to deal with these interactions hence the style of an interface is determined by the style of interaction that needs to occur. Users share common capabilities but also have distinct differences to be considered when designing HCI concepts.

We also have a number of **HCI accessibility issues** that user interface designers in many countries are legally obliged to incorporate. There is a common misconception that these issues are purely related to some form of physical or mental disability however they can be any form of difficulty a user may have in being able to productively use an interface. I will now discuss several areas that should be looked at when designing with accessibility in mind.

There are different forms of visual issues that need to be catered for. For example, users can have various deficiencies in colour vision which can include perceiving colour contrasts differently than in normal sight, the inability to see certain colours or even any colour and extreme sensitivity to flickering lights (photosensitive epilepsy). We then have to think about users that have limited or no vision at all. These cases vary from tunnel vision where users can only see central elements or blurred vision where text becomes very difficult to read etc. In each case there is a number of practices we can employ; ensuring content is separate from the structure of the interface allows web browsers to interpret the information and present it in alternative ways to support user requirements, providing text substitutes for images to allow screen readers to describe them, avoid the use of colours and instead use textures and icons to differentiate between elements and avoiding harsh flashes or transition animations.

Interfaces also cater for mobility issues which for web based products can be difficult to design for. It is important that the environment in which the interface is being used in is thought about as this may affect users which will have difficulties accessing or moving around when using it. We will need to allow alternative input devices to be used such as eye tracking applications and mouth sticks to aid those without motor function in certain areas, as well as ensuring that precise mouse positioning is not required allowing keyboards to be used to traverse through links on browsers. Auditory disabilities are also tricky to design for web interfaces unless the product has a multimedia aspect to it. In these cases where a user interface (UI) requires the use of audio clips or videos, transcripts should be provided to be made available through subtitles which helps those with auditory concerns and may also benefit non-native speakers of the language used in said media.

Cognitive disabilities will also affect the accessibility of a UI in different ways. Users can have issues with spatial reasoning which affects their ability to visualise the structure of information presented to them, implementing a sitemap alongside simple and efficient navigation will aid this issue. Some users have problems reading large amounts of text, so it is wise to promote scanning of key words and links to help ease the use of the interface. Users misspell words all the time regardless of their cognitive ability so providing a spell checker or similarity search when requiring user text input is a great design idea which will benefit users from other languages as well.

Accessible Rich Internet Applications (ARIA) is a specification used for web UI’s that allows developers to implement solutions to accessibility issues that base HTML cannot solve on its own. Elements of interfaces can have specified attributes which provide extra information or checks when it is being translated into accessible formats for users. In the following example the Google developer website explains a use of ARIA for users with sight issues:

<li tabindex=”0” class= “checkbox” role=”checkbox” checked aria-checked=”true”>

Receive promotional offers

</li>

This code snippet uses the ARIA attributes “role” and “aria-checked” to explicitly identify the element as a checkbox with a Boolean check that we are verifying its use in the accessibility tree. It will now allow a screen reader to correctly report it as a checkbox.

**Conclusion**

**planning and time-scale**

**summary of completed work (SE Tools)**

**bibliography and citations**

Human-Computer Interaction (3rd Edition) (website)

Interaction Design: Beyond Human-Computer Interaction (5th Edition), Wiley 2019

Sketching User Experiences: Getting the Design Right and the Right Design, Elsevier 2007

The Encyclopedia of Human-Computer Interaction, 2nd Ed.

<https://developers.google.com/web/fundamentals/accessibility/semantics-aria>

**some form of diary.**

**Appendix (file structure)**