2. Human Factors

'Human Factors is that field which is involved in conducting research regarding human psychological, social, physical, and biological characteristics, maintaining the information obtained from that research, and working to apply that information with respect to the design, operation, or use of products or systems for optimizing human performance, health, safety, and/or habitability.'
- Stramler[2]

What is Human Factors?

Human factors is the study of human behaviours, abilities and limitations in relation to design so as to design products which fit the needs and capabilities of the user. It covers how users interact with products and systems and considers the product, the user and also the environment in which it will be used to design a safe and effective solution. Ergonomics is a term used synonymously with human factors.[3][4] The aim of a human factors design approach is to optimise interactions between user and product and make them as safe and effective as possible.

User Centred Design Approach

When a designer is considering human factors in their design they will use a user-centred design approach - an iterative design process in which the users support the product development at every stage with user-feedback and input. This feedback can be obtained through many methods including focus groups with users, usability testing and testing with prototypes and mock-ups. It is also important to remember that users are not designers so both observational and qualitative research methods must be used to uncover what the users actually do -- how they interact with products or systems -- not just what they say they do[4].

Physical Capabilities

To obtain quantitative data on the physical capabilities and limitations of users, one can use anthropometric data. Anthropology is the measurement of the human body and together the data collected shows the dispersion of body dimensions across the population. Designers can take advantage of this data to optimise their product or system to cater to the largest audience possible -- or for a specific user group, for example the elderly.

Cognitive and Perceptual Abilities

A person's cognitive abilities relate to areas like problem solving, memory and information processing, and these affect how people use and interact with products. For example their memory could allow them to associate certain things to colours -- red mean danger etc and designers can exploit these existing conventions and incorporate them into their designs [4]. Perceptual ability is the *"ability to detect, identify and recognise sensory input"*[4]. This is important when considering the safety aspects of a product -- how information is displayed on products, where buttons are placed, the placing of lights and volume of alarms etc. Not considering such things could make the product dangerous to the user in some situations.

Emotional Factors

In order to design a product which caters for the intended users needs, the designer must look at more than just usability, and physical and mental capabilities. Looking at relationships between the user and product, and how that product affects their life in some way allows a designer to see the real benefits what they design can give a person[5]. This then leads to greater customer satisfaction as using the product is an experience for them.

Benefits of Human Factors

Using human factors not only benefits the user but also the manufacturer as well. By providing a product which gives users a pleasurable user experience, this makes the brand more desirable and can increase that products share of the market. Also by designing to fit the needs of the user, the product is more likely to comply with ergonomic standards and disability requirements, reducing the risk of people taking legal action against them.[4]

Overall considering human factors when designing a product is beneficial to both the user and the manufacturer and considering the emotional needs of the user is becoming more important in the digital age we live in, many products are screen based and in order to provide the same high quality experience, a more holistic approach to human factors is required.