SKIN CANCER PREVENTION IN YOUNG MEN:

FOSTERING PERSUASION TOWARDS SUN PROTECTION BEHAVIOUR USING GENDER AWARE HUMAN CENTRED DESIGN APPROACH

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Abstract

Skin cancer caused by exposure to sunlight and sunburn is the second biggest killer of young men aged 18 to 24 and the most preventable cancer. Skin cancer incidence and mortality have increased steadily over recent years in the UK. This thesis presents the development of strategies to foster sun protection behaviour in young men by designing new human-centred interventions. The methodological approach taken in this research is an interpretive methodology which is used to explore the underlying meaning of young men's actions and experiences in relation to their sun protection behaviour. An exploratory study was conducted involving observations and interviews in a beach location where sun protection behaviour could be observed. The pilot data highlighted a link between young men and their sun protection behaviour and the ways in which concepts of gender and masculinity were instrumental in influencing their sun protection behaviour. The results informed the main study of the research, which was carried out through participatory design sessions. This study engaged the participants in the HCD approach in a gender-aware context which resulted in a range of sun protection interventions. The results led to the inception of the final study, which verified the sun protection interventions and the facilitated gender-aware human-centred design approach. The results highlighted a constructive relationship between HCD principles and understanding gender impacts, thus opening new avenues and knowledge paths to bridge the gap between the world of designers and the world of users. This approach goes beyond the aim of the research and contributes towards two main directions: 1) It presents the development of novel gender-aware human-centred design theory (GAHCD), and 2) it demonstrates a range of sun protection interventions to increase sun protection behaviour in young men. On this basis, the key results are presented in the form of design recommendations and guidelines for sun protection interventions for young men aged 18 to 24.

Contents

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And most of all, my parents, and my brother for all their endless support, for which I am grateful.

Declaration

I declare that the research contained in this thesis, unless otherwise formally indicated within the text, is the original work of the author. The thesis has not been previously submitted to this or any other university for a degree and does not incorporate any materials already submitted for a degree.

Signed

Dated

Acronyms and Abbreviations

CRUK	Cancer Research UK
GAHCD	Gender-Aware Human-Centred Design
HCD	Human-Centred Design
HCI	Human-Computer Interaction
NHS	National Health Services
UCD	User-Centred Design
UVR	Ultraviolet Radiations
UX	User Experience
WHO	World Health Organisation

1 Introduction

This chapter introduces the motivation for researching the prevention of skin cancer in young men aged 18 to 24. It begins with a discussion about the low levels of sun protection behaviour in young men and continues with the aims of and motivation for the research, and the main research strategies adopted. Finally, the overall structure of the chapters is presented.

1.1 Background and motivation

Skin cancer is the most preventable cancer and one of fastest-growing cancer in the UK (Cancer Research UK, 2014). Excess sun exposure and sunburn are primary causes of skin cancer and only by protecting the skin from the sun can it be avoided. According to Cancer Research UK, 85% of skin cancer cases can be prevented through sun protection behaviour. The National Institute for Health and Care Excellence (NICE, 2011) has explained: "*sun protection behaviour plays a crucial role in the prevention and the treatment of skin cancer"*. To reduce the risk of developing skin cancer, attitudinal factors associated with engagement in a range of sun protection behaviours such as using sunscreen and wearing protective clothing is necessary as well as avoiding sunburn through wearing a hat and staying in the shade. The following are guidelines for engagement in sun protection behaviour by the UK Government's Health and Safety Executive (2011):

- Wearing protective clothing which prevents sunburn, including a hat which covers as much of the face and back of the neck as possible
- Staying in the shade wherever possible, especially between 11 am and 3 pm
- Wearing sunscreen with UVA and UVB protection

According to the Cancer Research UK, sunscreens reduce the risk of developing skin cancer to 40%. The important factor about the effectiveness of sunscreens is dependent on the level SPF protection, UVA protection and the reapplication of it for every 2 hours (Feldman, Tomecki, 2012). Sunscreens protect skin from the sun's UV radiation that causes sunburn and sun overexposure. However, despite the growth in the market for sun protection products produced by the cosmetics and sunscreen industries which aimed to raise awareness about the risks associated with exposure to sunlight, young

men age 18 to 24 are more at risk of developing skin cancer due to the low levels of sun protection behaviour (Cancer Research UK, 2014). To tackle this health-related problem that aims to achieve behaviour change we need to look for another position that results in the desired healthy behaviour. The latest skin cancer statistics for the UK show at least 100,000 new cases of skin cancer are diagnosed each year and kills over 2,500 people which is seven people every day (Cancer Research UK, 2014). This is an important task as the rates of skin cancer and mortality incidence can be reduced and ultimately prevented in young men through the enhancement of their sun protection behaviour.

The main reason for my involvement in this research is that my contribution as a designer can result in the design of human-centred sun protection interventions to improve young men's engagement in sun protection behaviour. Design is an important driver to promote social change and, to understand that change, designers should develop an understanding of cultural and social contexts. This research then critically reflects and looks at the social world again to determine how to improve sun protection behaviour using design. In this research, the transformation of sun protection behaviour occurs as a result of the strategic implication of a gender-aware HCD approach to developing design interventions based on addressing young men needs. The review of current design theories revealed human-centred design is the most suitable approach that adds understanding of human needs in the design of objects intended to meet user needs (Norman, 2013). This approach has the potential to result in the design of sun protection products that meets the needs of young men to improve their low levels of sun protection behaviour. However, the review of the literature revealed there is a lack of understanding of gender in the human-centred design approach. The HCD approach sees gender as a static and stable thing. This contributes to the design of products that are influenced by the designer's own stereotypical norms such as '*blue for boys*' and '*pink for girls*'. However, gender is performed and is multiple and relational and is constructed as a lived experience over time in a particular context. Gender is a set of performative acts that are socially constructed over time and understanding young men's experience requires us to move beyond traditional, stereotypical and pre-identified gendered characteristics. On this basis, instead of repeating the problem, design can address this problem through adding gender

awareness to the HCD process that understands how to improve the relationship between a person and artefacts through an understanding of how people use the knowledge that is provided in the world and combines it with their knowledge. On this basis, the gender-aware HCD (GAHCD) approach has the potential to result in the desired behaviour change in young men. This research reflects on how the combination of HCD principles and understanding gender, and particularly masculinity, results in design interventions that increase sun protection behaviour in young men. In summary, this research implements the role of design to stop the annual increase of incidence and mortality rates for skin cancers and achieve enhanced sun protection behaviour. There seems to be a gap between the world of designers on the one hand, and the world of users on the other hand. The combination of HCD with understanding gender can bridge this gap, by understanding the gender impacts and to bring the constructive relationship between the health-related interventions and the users, hence GAHCD. This would result in transforming sun protection behaviour and lower rates of skin cancer.

1.2   Research questions and aims

This research aims to foster sun protection behaviour in young men that leads to the prevention of skin cancer. Specifically, the aim of this research is to extend our understanding of the relation between sun protection behaviour and young men age 18 to 24 for the development of human-centred sun protection interventions. The following outlines the research questions raised through the review of literature outlined in Chapter 2:

1. How can we make sense of young men and their sun protection behaviour?
2. How can we improve young men's sun protection behaviour through the human-centred design approach?

The objectives of this study were developed after carrying out the literature review and investigating the methodological position of the research determines the research methods and the strategies to address the research questions. The key objectives are as follows:

- To develop an understanding of the relationship between young men's gender and masculinity and the sun protection behaviour
- To understand how gender is a factor in how people approach designed objects, and to develop an extended human-centred design approach that leads to new sun protection concepts
- To verify the design of new sun protection interventions and gender-aware HCD approach

1.3   Research strategies

The overall strategies adopted for this research include a critical review of the literature, an exploratory study, main study and finally a verification study. This research starts with 'understanding' the participants' worlds and ends with innovative and creative solutions according to young men's needs from their perspective through a robust design intervention that improves their sun protection behaviour.

Initially, a critical review of the literature highlights the existing knowledge on various design theories recognises the role of human-centred design approach with capabilities for fulfilling human needs and particularly to improve the sun protection concepts in young men.

This chapter continues with the relationship between young men health-related behaviour and gender as the most influential factor. This is through the exploration of the emerging role of masculinity in young men. In this manner, the concept of masculinity aids this research to explore the underlying reasons for understanding young men's sun protection behaviour. The key insights from the literature review provide guidance for the exploratory study to explore what fulfils the needs of young men. The methodological position of this research outlines the methods to investigate the underlying meanings of young men's sun protection behaviours on the beach where their behaviour occurs.

The exploratory study aims to understand young men's knowledge and the way they approach the world to explore how the sun protection behaviour is shaped and influenced by young men. In this context, different levels of knowledge will reveal

layers of young men's experience through spending considerable time in the field that facilitates an explicit and empathetic understanding of young men needs through the researcher's interpretation of young men's behaviour in their natural setting. The key finding that emerged from the exploratory study identified that gender and masculinity are instrumental in identifying the major contributing factors that influence young men's sun protection behaviour through understanding how and why young men behave in a particular way with low levels of sun protection. This led to an in-depth investigation of young men's gender practices and masculinity through the exploration of the accounts of their gender performances linked to their masculinity using the human-centred design approach. Finally, the final study is focused on the verification of the findings and design of the final product or service devised from the main study, ready to be implemented; this step verifies the generated sun protection interventions and gender-aware HCD approach.

1.4   Thesis structure

The following presents the structure of the thesis chapters:

Chapter 1 [Introduction]: This chapter introduces the context of the research towards the prevention of skin cancer in young men aged 18 to 24. Firstly, it begins with the discussion of the motivation for the research, followed by the identified aim and research questions, and the main research strategies adopted along with the structure of the thesis.

Chapter 2 [Literature Review]: This chapter reviews the literature that surrounds the prevention of skin cancer in regards to the low levels of sun protection in young men. Subsequently, it explores the importance of gender and masculinity and its impact on young men's health-related behaviours. This includes a detailed discussion of the role of gender and masculinity in terms of understanding young men's sun protection behaviour. Then this chapter looks at various design approaches that enable change to achieve the desired health-related behaviour. Next, this chapter takes a fundamental position and it clarifies the human-centred design approach as the most suitable approach for this research. Finally, it proposes the combination of the HCD approach

and understanding gender performances as a better model that benefits to address the identified gap in the literature.

Chapter 3 [Methodology and Methods]: This chapter discusses the specific methods by which the research and analyses were conducted. Firstly, it indicates the interpretive methodological approach adopted linked with the research design. This approach is deployed to explore the underlying meanings of young men's actions and experiences regarding their sun protection practices situated on the beach. Secondly, it discusses the research methods adopted for the research studies including 1) Exploratory study, 2) the Main study, and 3) Verification study, followed by a discussion of the data analysis method.

Chapter 4 [Exploratory Study: process and findings]: This chapter discusses the exploratory study conducted to investigate the sun protection behaviour of young men on the beach. This study was conducted through observations followed by interviews on the Brighton beach. Finally, it concludes with the key findings emerged, highlighting the importance of gender and masculinity as the major contributing factors linked with the low levels of young men's sun protection behaviour.

Chapter 5 [Main Study: process]: This chapter outlines the process of data collection for the main study of this research which was informed based on the main findings of the exploratory study. The main study is set out with the purpose of identifying and assessing the role of gender in the human-centred design process and how it can be used as a tool to address the low levels of sun protection behaviour in young men. This chapter discusses in detail, as an exemplar of the whole main study research process, one study with four participants and the design outcomes that emerged, aimed to improve young men's sun protection behaviour.

Chapter 6 [Main Study: results]: Following the main study presented in chapter 5, this chapter discusses the main study results using a thematic analysis. The results reflect the exploratory study findings discussed in Chapter 4 and it shows that gender is embedded and implicit in the HCD process.

Chapter 7 [Design Outcomes]: This chapter discusses and analyses the design outcomes developed through the design stage of the main study. This stage empowered the participants as designers to devise a sun protection intervention based on their perspectives for the improvement of sun protection practices in young men. The analysis of design outcomes is discussed in this chapter based on three stages of describe, analyse and assessment.

Chapter 8 [Design Verification Study]: This chapter presents the verification of design outcomes through a verification study carried out with a group of four male participants. The results verified the sun protection interventions along with gender-aware HCD approach, which led to a set of design recommendations and guidelines for sun protection interventions.

Chapter 9 [Conclusions]: This chapter discusses the key contributions of this research including design implications for addressing sun protection behaviours based on the verification study results. It also presents new avenues and opportunities for future research in the field of gender and design.

2 Literature review

This chapter reviews the literature that surrounds the prevention of skin cancer in regard to the low levels of sun protection in young men. Subsequently, it explores the importance of gender and masculinity and its impact on young men health-related behaviours. This includes a detailed discussion of the role of gender and masculinity in terms of understanding young men's sun protection behaviour. Then this chapter looks at various design approaches that enable change to achieve the desired health-related behaviour. Next, this chapter takes a fundamental position and it clarifies the human-centred design approach as the most suitable approach for this research. Finally, it proposes the combination of the HCD approach and understanding gender performances as a better model that benefits to address the identified gap in the literature.

2.1 Skin cancer and young men

Tanning by exposing the skin to ultraviolet radiation (UVR) is very popular among young people across the world. According to the World Health Organisation (WHO), excessive exposure to ultraviolet radiation from sunlight and sunbeds causes overexposure and sunburn, which is the primary cause of developing skin cancer. Skin cancer is the most preventable cancer due to the preventable risk factors associated with avoiding UV exposure (Reichrath, 2014, p.486). Skin cancer is an uncontrolled development of abnormal or damaged skin cells that starts in the irregular appearance of an existing mole with development in other parts of the body. Current statistics from Cancer Research UK (2016), show that the average rates of skin cancer are higher in the UK than elsewhere in the EU due to the lack of awareness in the prevention of excessive sun exposures. There are approximately 100,000 cases of skin cancer recorded every year in the UK due to continuous overexposure and sunburn (NHS, 2017).

As discussed in section 1.1, young men age 18 to 24 are more at risk of developing skin cancer due to the low levels of sun protection behaviour. According to the latest figures from Cancer Research UK, 6 in 10 skin cancer deaths are in men and 70%

more likely to develop skin cancer than women. This situation translates into a greater number of deaths amongst men primarily due to the lack of health-related beliefs and behaviours (Cancer Research UK, 2014). The impact of male gender characteristics and masculinity on health-related behaviours increases men's health risk. Masculinity is a set of attributes associated with the enactments of a feeling of superiority concerned with dominance into behavioural patterns(Courtenay, 2000). Masculinity is related to the endorsement of behaviours that indicates toughness and the opposite of vulnerability. A more detailed account of masculinity is given in section 2.17. From this perspective, an illness can be perceived as a challenge that indicates weakness or defeat (Mathewson, 2009, p.3). From this perspective, men's core masculine characteristics are centred on being strong, invulnerable, enduring, being independent, and not seeking help. Men who adopt masculine attributes are subject to engage in health-related behaviours. On this basis, men are less likely to engage in sun protection behaviour which results in the growing rates of skin cancer. In addition, the most common form of skin cancer occurs on the male torso, the part of the body most exposed to the sun.

The contribution of the current studies including 'Sun Smart UK' by the UK Health Department, Cancer Research UK, British Skin Foundation (NICE, 2012) on the health-related behaviours and prevention of skin cancer have driven considerable growth at raising awareness about the risks associated with exposure to sunlight. However, the problem is still persistent, particularly among young men. As illustrated in Figure 2.1, a recently published article by the BBC NEWS in July 2018 stated 220 people were treated in the Northern Ireland hospital due to extreme sunburn.

Figure 2.1 The BBC News article regarding extreme sunburn in Northern Ireland(BBC News, 2018)

The current campaigns and studies on exploring men's and women's attitudes towards sun protection behaviour reveal that women are more likely to use sunscreen and seek shade in an effort to protect themselves from the sun than men (Hill et al., 1993; Arthey and Clarke, 1995; Schofield et al., 2001). Also, young men are less likely to cover up their upper body parts in the sun than women (Marks et al., 1993; cited in Arthey and Clark, 1995). The current skin cancer incidence for the UK are rising by 7% between 2014 and 2035 which includes a larger increase for males than for females. The increase in the rates of skin cancer could be also attributed to the limited effectiveness of the national campaigns for sun protection awareness and skin cancer prevention in the UK (World Health Organization, 2002). Since 2000, there has been a large interest by the UK government in raising people's awareness of sun protection to decrease the rates of skin cancer cases within the UK. One of the government's main cancer awareness plans is the 'Cancer Reform Strategy' by National Health Services (NHS), which specified its goal in 2009: "Ultimately, we would like to see an end to the year-on-year rise in skin cancer incidence and mortality rates in the UK and a closing of the gap between male and female survival rates".

Cancer Research UK established in 2003 the UK's first national skin cancer campaigns including 'Sun Know How' and 'SunSmart' funded by the UK Department of Health and Social Care (Eagle, Jones, Kemp, 2010). The risks associated with sun over-exposure and sunburn were advertised through persuasive messages by leaflets and posters (Cancer Research UK, 2008). This campaign's aim is to raise people's awareness about the sun and the effective ways of protecting skin in the sun by influencing their sun-protective attitude and behaviour. Specifically, it aims to:

- Educate individuals about UV and its dangers for every type of skin
- Encourage the use of sunscreen and seek shade to prevent sun overexposure and sunburn
- Change people's attitude and behaviour towards sunbathing and tanning

The Sun Smart campaign conducted a survey between 2003 and 2008 to measure trends among sun protection awareness and the effectiveness of the UK campaigns on young men and women age 16 to 24. The result of this survey demonstrated attitudinal differences in men and women not only in terms of sun protection awareness but also

in the way in which their sun protection behaviour is influenced by the campaigns and studies. The results indicated that women are more aware of sun protection practices such as 'avoid sunburn' compared to 2003 and had changed their behaviour. In contrast, the evidence presented from this survey suggests young men's attitude towards sun protection behaviour over the period of 2003 to 2008 remained unchanged (Cancer Research UK, 2008). In addition, a study in June 2014, conducted a questionnaire to analyse the sun protection behaviour associated with skin cancer awareness of 3223 adolescents in Scotland (Kyle et al., 2014). The data were collected in relation to attitudes towards sunscreen use, tanning attitudes and skin cancer awareness. The outcome compared the result based on the gender of participants and it significantly demonstrated that young females were more willing to change their behaviour and to adopt the sun protection behaviour such as using sunscreens than young men.

According to this campaign results, there is a gap in understanding of the tanning attitudes such as using sunscreens among men that are influenced by their peers. Regarding the overall awareness, covering up, using sunscreen and reducing the time spent in the sun were the least changes in young men's behaviour despite significant changes related to their awareness of the dangers of unprotected sun exposure (Kyle RG, MacMillan I, Forbat L, et al, 2014).

In addition to the stated campaigns, there has been a considerable growth in digital wearable products that aim sun protection awareness. These products such as UV protective clothing, UV sensor bracelets and mobile phone applications monitor for safer daily UV exposure and alert the user to apply sunscreen or seek shade.

Figure 2.2 The current wearable sun awareness products from left by Netamo, SunFriend, and Spinali Design

In 2014, a French company Netatmo, specialising in connected objects, released a sun awareness bracelet, designed by Louis Vuitton designer Camille Toupet using technology that measures the level of UV exposure. This wearable product can connect to smartphones through Bluetooth to alert the user about the level of their exposure to the sun and alerts the user to protect their skin and re-apply sunscreen (Figure 1) (Netatmo, 2014).

A wearable UV meter wristband called 'SunFriend' consists of a NASA-inspired UV sensor with LED indicators to alert users the maximum sun exposure time compatible to the user's type of the skin (Figure 1) (Spinoff.Nasa, 2014). This wristband was selected as the best consumer product by NASA and their aim is to encourage people to get enough vitamin D as well as reducing the rates of skin cancer. In 2015, a French company called 'Spinali Design' designed smart swimwear for men and women that communicates levels of sun exposure with smartphones. The embedded UV sensor in the swimwear transfers data to the 'Spinali' mobile phone application to alert the user about sun over-exposure (Spinali Design, 2015).

Similarly, a research project at the University of Brighton in 2013 called the "Barrier Solutions" has been focused on the development and testing of wearable prototypes which alerts people by giving increased information of danger which in turn increases the subjects' awareness of exposure to the sun using the existed technology. The Barrier Solution is a Beach-based web and visual communication platform measuring sun safety based on the user's skin type and UV radiation. The mobile application itself has been developed in Javascript which runs on smartphones (Farrer and Goulev, 2013).
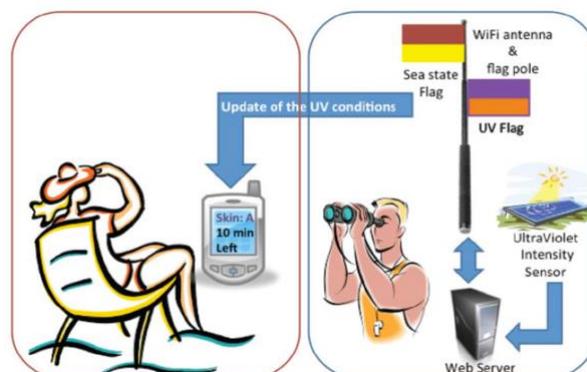
Figure 2.3 The Barrier Solution: Beach-based web and visual communication platform (Awareness magazine, 2013)

Overall, the discussed outcome of the sun protection campaigns demonstrated the current gap between awareness and actions in young men. Despite the increasing awareness of young men related to the risks associated with sun over-exposure and sunburn Kyle RG, MacMillan I, Forbat L, et al, 2014, the least changes in young men's behaviour are in terms of covering up, using sunscreen and reducing the time spent in the sun (Kyle et al., 2014). The current research links gender and masculinity with men's lack of engagement in health-related behaviours (Courtenay, 2000). The impact of men's gender characteristics and masculinity is incompatible with health-related behaviours and increases men's health risk. Masculinity is a set of attributes associated with enactments of feelings of superiority concerned with dominance into behavioural patterns that indicates toughness and is the opposite of vulnerability (Courtenay, 2000). From this perspective, men's core masculine characteristics are the enactments of being strong, invulnerable, enduring and illness can be perceived as a challenge that indicates weakness or defeat (Mathewson, 2009, p.3). This research connects design and health to develop an understanding of the cultural and social contexts to improve sun protection behaviour in young men aligned with their needs. According to Norman in the *design of everyday things,* design starts with understanding people that design is intended for based on understanding the psychology of human action (Norman, 2013, p.7).

2.2 Human action

The following discusses the psychology of human action to understand how people interact with an object and how their actions are formed. In this manner, two main concepts are introduced when interacting with a physical object based on how to execute an action and the evaluation of the performed actions. According to Norman, in the context of using an object, people face the two stages by firstly how to use it that represents discoverability as '*how do I know what I'm doing'* and secondly '*what happened'*. These two concepts are defined in the field of psychology as the '*Gulf of execution'* and the '*gulf of evaluation'* by Ed Hutchins and Jim Hollan (Norman, 2013, p.301). In this context, human actions are divided into two-stage of execution and evaluation. Norman has suggested a simplified framework for overall stages of human action that provides a guideline for designers to understand human action in the context of interaction between an object and a person. This framework consists of seven stages

of human action that help designers to bridge the gap between the *gulf of execution* and the *Gulf of evaluation* to achieve the goal they are intended.

In Norman's model of human actions, most human actions will require a similar sequence of activities for execution. Furthermore, this model shows the possible actions in order to achieve the main goal to perform an action. In addition, Norman introduces a framework that guides further understanding of human actions and behaviour through the exploration of different levels of processing human action based on human cognition and emotion (Norman, 2013, p.50). Human cognition and human emotion are the main human mind's processing system. Cognition is the perception and the mental action or process of acquiring knowledge and emotion is the feelings and experiences which according to Norman are the most important factors for designers in order to design products, objects, and systems that are usable, understandable and at the same time desirable.

There are approximately three levels of human information processing categorised into visceral, behavioural, and reflective levels based on cognition and emotion, (Norman, 2013, p.51). The lowest level, the visceral level is linked to emotion and features quick and subconscious responses in novel situations without awareness or control. The visceral responses are the immediate perception of enjoyment with no concern about the usability and understanding of the product. Similarly, the behavioural level is also based on subconscious actions and the main place for emotions. On the other hand, the behavioural level has two fundamental characteristics that each action is weighed against the perceived expectations and feedback. This level is critical as it aligns the actions with the expectations to achieve the goal. In the final, the reflective level is the highest level that entails the human cognition and is based on our conscious actions from the goal. There is a deep understanding, reasoning, and conscious decision-making taking place at the reflective level. A lot of analysis takes place at this level since it is slow, in-depth, and cognitive. As shown in Figure 2., the seven stages of action are associated with each level of the human mind's processing of information.
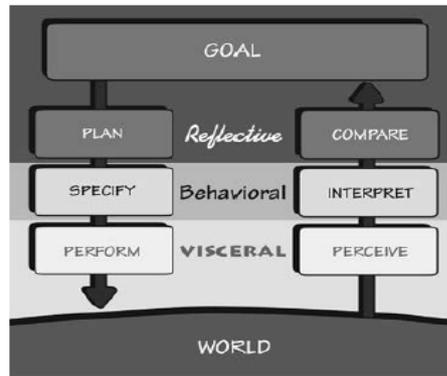
Figure 2.4 Norman's Seven Stages of Action and three Stages of Processing (Norman, 2013, p.56)

As illustrated in Figure 2., the reflective level placed in planning a goal and the outcome. However, the behavioural level is based on our perception and expectations and the lowest level that is the visceral level that is concerned with the sequence of action and perceiving the available knowledge from the world. The discussed models in understanding the stages of human actions and the levels of processing benefits HCD design principles from the branches of psychology. According to Norman, every stage of action need design strategies and structures to match human needs and capabilities. Therefore, Norman lists seven key questions in a sequence that were the insights into the HCD design principles, and it guides designers to provide the required information for the user as followings (Norman, 2013, p.71):

1.   What do I want to accomplish?
2.   What are the alternative action sequences?
3.   What action can I do now?
4.   How do I do it?
5.   What happened?
6.   What does it mean?
7.   Is that okay? Have I accomplished my goal?

2.3 Human-Centred Design

Human-centred design (HCD) is a creative approach to problem-solving that prioritises understanding human needs(IDEO, 2015). HCD is a design process that starts with understanding people based on the key principles of human psychology in

order to develop products, services, and systems that are understandable, usable and desirable for people. This chapter discusses HCD by examining its relationship with design thinking, HCD methods, and HCD key principles. This approach includes a set of procedures that can be implemented in various disciplines to uncover the issues underlying the problem through the study of human needs and motives. HCD is acknowledged as a design philosophy or a set of methods initially proposed by Donald Norman and Stephen Draper in 1986 (Norman & W.Draper, 1986). Norman defines HCD as "an approach that puts human needs, capabilities and behaviour first then design to accommodate those needs, capabilities and ways of behaving." (Norman, 1986, p.8)

The enhancement of understanding and usability in the product comes from the field of 'interaction design' that is a design field focused on understanding the communication between people and products and technologies that are embedded in the design of our everyday objects. The main focus of interaction design is to enhance interaction to remove frustration and confusion and instead add pleasure and enjoyment (Norman, 2013, p.5). HCD is a process that starts with establishing a deep empathy and understanding of people's behaviour to enhance their interaction with physical objects. This approach has six core characteristics through the adoption of multidisciplinary dimensions, explicit understanding of users, tasks, environments, user-centred strategies, user experience, iterative processes, and involvement of users in the design and development of a product (Norman, 2013, p.191).

2.4 Why HCD?

The following shows why HCD is useful as the most suitable account of design theories. HCD manifests itself both as a philosophy and a set of principles used in the design process. The theoretical frameworks and practical implementation of HCD principles are the key principles of discoverability and understanding. HCD characteristics are linked with the study of human action based on social psychology (Giacomin, 2014). The application of HCD characteristics such as offering a wide range of affordances in a product, system or service results in good interaction design that brings out commercial and business success. Based on the constructionist ontological position, the human mind interprets the world and creates a reality based on experiences and interactions around people (Bryman, 2012).Understanding

people's mind, their imagination, actions and the way that the human mind operates a wide range of tasks consciously or subconsciously is the core of HCD philosophy. The application of HCD techniques and principles of interaction design elicit good designs. For example, Norman refers to the simplest everyday objects such as doors (i.e., Norman doors) are rather confusing.

Conversely, Pullin in 2009, suggests another psychological framework for HCD with emphasis on flexibility and openness of mind towards constraints and affordances that change behaviour. Pullin believes that people have different skills and abilities besides different desires and needs that can be addressed through a flexible cognitive model of human action such as personalization of interfaces (i.e., different people receive individualised suggestions by Amazon according to the history of their research) (Pullin, 2009).

However, HCD framework by Norman is based on pre-established cognitive patterns of the user behaviour (Gasson, 2003). Therefore, the outcome results in a lack of innovation and exploration with a fixed pattern of usage. Gasson recognises this as the main weakness of Norman's HCD principles. Moreover, he points out that Norman's cognitive model of human action is limited in terms of influential forces such as social and cultural norms in society. He stated that the existing cognitive models are unable to explain human actions. On this basis, human actions can be explained in relation to the interactions between the people and the context at a particular time. Therefore, he holds the view that our interactions result in specific actions that are not fully understandable through the cognitive models of human actions.

In this manner, Gasson also critiques the implication of cognitive model of human action that is applicable in every interaction process between the user and the object. They point out that the principles of interaction are subjective to individuals and relied on the result of the communication process that is not conceivable or pre-identified. In this context, Gasson takes an opposite view to the HCD principles based on a predetermination of interaction patterns through the use of affordances and signifiers. However, the HCD approach guides the designer to understand human actions based on a broad understanding of people's shared values and actions.

The study of human action is the focus of many disciplines such as neuroscience, cognitive science, and behavioural and social science (Norman, 2013, p.45). According to Norman, the human action shares cognitive basis, clues, knowledge and experiences in approaching objects. According to Norman, this fundamental model of psychology is beneficial as none other design philosophies create an approach that is based on a broad understanding of people rather than individuals and, at the same time, is compliant with other methods from various disciplines. One of the key factors that need to be considered in the HCD approach is the application of Norman's framework for everyday actions and the understanding of knowledge of meaningful and arbitrary things that result in successful designs.

2.5 HCD and gender

As discussed earlier in this chapter, the HCD approach guides designers on a daily basis through the psychology of human action that imposes its narrative on the field of design of objects. As shown in the previous section, the HCD fundamental model of human action is based on a broad understanding of the shared values and common actions of all people. This framework holds the view that despite the given variations and experiences that affect individuals, fundamentally people approach the world in the same way regarding their perceptions, activities and the way they approach objects. Based on this model, human behaviour can be predictable on many occasions. However, the concept of masculinity makes us look at the world in a particular way. According to Connell (2005), the social world and its categories are not simply external but are built up and constituted over time and through interactions. This can be seen particularly in the dynamic patterns of our behaviour over time as human social relations, and our ideas of self and selfhood change over time, and through our lives (Connell, 2005).

The nature of design is connected with the ways of interaction between physical objects and an interacting agent such as humans, animals or machines (Norman, 2013). Norman priories' understanding human in the heart of HCD approach and suggests that understanding people is an essential component of the design process and designs to meet people's needs and wants would increase the usability of products, systems, and services. Furthermore, as products are designed to be used by the people, therefore

fulfilling people's need is at the centre of design focus that leads to the design of successful, usable and pleasurable products.

Norman refers to the term human as the person who communicates directly with the product. The term human has been used in various terms such as the user, consumer, client and the end-user (Giacomin, 2014). The term 'human' in HCD describes the potential users that the design is proposed for, and they are the exact reflection of the target population. According to Norman (2013), human beings can be defined as an interacting agent that interacts with devices, but unlike other interacting agents such as robots or animals, human beings have the capability of analysing with cognitive abilities.

The limitations in the interaction between human and machine are caused by designers and the current technological developments (Norman, 2013, p.7). This is because of the need for understanding HCD principles to improve communication between humans and machines. Norman suggests the HCD principles as guidance for designers to provide understandable knowledge of the user to reduce the probability of making errors in the process while interacting with products and machines. He provides an overview of the key challenge when humans interact with products and machines. Humans, unlike machines, are capable of making decisions based on logic and common sense which can share common experiences from the past with other people. Machines operate according to a set of actions and instructions with no flexibility and sense of reasoning based on culture, logic or common sense. Machines don't have a long account of experiences to share an understanding with other people. However, machines are very accurate in completing tasks and make people be more accurate.

The complexity in the design of objects makes people frustrated due to the design faults. However, people often blame themselves for the errors they receive when interacting with machines. In this context, as Norman suggests, designers and the machines should get blamed on poor and complex designs as the structure of how the machines work is known for the designer and the machine but unknown for the user. The effectiveness of successfully designed objects relies on the understanding of human psychology and the way human beings interact with the physical world in

general and new tools or technologies, in particular, the major methods of identifying whether a designed product corresponds to the human cognitive processes. This is how HCD techniques would be able to reach the level where it recognises the hidden needs of people.

2.6 HCD principles

The major connection between the nature of human psychology through time and the need to interact with emerging new technologies create challenges for the design of any physical object. There is an increasing need for understanding psychology and psychopathology of everyday human actions in the field of design of the physical objects, services and systems. Norman (2013, p.3), describes a set of principles and aims to guide designers to understand the way people interact with psychical objects on a daily basis. The HCD technique relies on the fact that the design process of any physical objects could incorporate both the specifics of how people interact with objects, technologies and tools, as well as the constant aspects of human psychology and cognitive processes. HCD approach is rooted in the idea to understand the fundamental model of the human mind and its relation to knowledge, meanings, and experience. An essential component of the HCD process is based on the psychological study of the human mind in order to understand human behaviour. The study of the human mind is associated with various disciplines including the behavioural and social sciences, cognitive science, neuroscience, philosophy, and the information and computer sciences (Norman, 2013, p.45). In the paradigm of cognitive neuroscience, Meister in 1999 has described HCD as "the psychological study of human beings on a scientific basis." (Giacomin, 2012, p.6)

HCD enables effective human interaction based on engineering and psychology disciplines that are concerned with 'how things work' and 'how human minds work' (Norman, 2013, p.10) The exploration of how people relate to objects and how to improve the communication process between the objects and the person is through adding two main characteristics into the design process that results in human-centred designs. These characteristics proposed by Norman are called 'discoverability' and 'understanding'.

Discoverability is based on the likelihood of determining the actions that are possible and the way to perform them when using a product (Norman, 2013, p.3). In order to examine the possible actions, it is important to define affordances and signifiers. The relationship between a physical object and a person is referred to 'affordances' initially coined by Gibson in 1979 (Norman, 2013, p.12). On this basis, he uses the term affordances to explain the way people understand the knowledge in the world that has to be easily discoverable and indicates the ways that objects can be used. Affordances can be physical cues in interacting with an object such as chairs that afford sitting and knobs that afford to turn through the communication of the object properties that are perceivable for a person without any signs or instructions. If the affordances are not visible or easily perceivable to the person, some elements of indications or signals are needed that Norman named it as signifiers (Norman, 2013, p.14). In addition, signifiers are a key element to designers for enhancing the communication between a person and an object. This is an indication of where the action is located and needed. Signifiers can be used as a sign, mark, light or sounds that signal the required way to use the object such as the door labels with a push or pull signs (Norman, 2013, p.15). As discussed earlier the appropriate use of affordances prevail to ensure that preconceived actions are possible. When used effectively, signifiers and affordances provide discoverability and proper communication through feedbacks that are important in order to perceive the results of an action that is performed. Feedback is referred to as the full and continuous array of information on the results of the actions and the prevalent condition (Mallin & Carvalho, 2015).

In other words, feedback provides crucial signals and is achieved through the consequential effect arising from the action. Having defined what is meant by discoverability, affordances, signifiers, and feedback, the next section will discuss the concepts of mappings, constraints, and conceptual models. Another significant HCD principle is 'mapping' that is defined as "the relationship between the elements of two sets of things." (Norman, 2013, p.20). In this context, Norman points out that the relationship between the actions, understanding the layout or displays and the expected result is called 'natural mapping'. Natural mapping leads to an instant understanding to perform an action. From the previous discussion, it can be seen that design principles emphasise a need to apply functions and mappings that guide the required actions.

Also, constraints are important clues that restrict the set of actions in order to help the person to perform the appropriate action (Norman, 2013, p.76).

Norman has described the four main class of constraints including 'physical', 'logical',' semantic', and 'cultural' based constraints (Norman 2013; Mallin & Carvalho 2015). In general, visible clues are referred to as physical constraints that restrict physical actions. A good illustration of physical constraints is the limited space in the scissors that provides restriction of the possible actions for the right finger. According to Norman physical constraints are instrumental in our understanding of affordances that specifies 'what to do' and 'where to do it'. Another concept of physical constraints discussed by Norman is 'forcing functions'. Forcing functions to prevent the wrong actions to take place through rules and restrictions such as alert messages that computers send to the user in order to confirm the user's performed an action. In a similar case, logical constraints limit behaviour and actions but through a person's logic and knowledge without any influence from the physical or cultural constraints. In this manner, cultural constraints are defined as a set of social restrictions that is cultural and it guides people's behaviour based on cultural rules and conventions in novel situations. Furthermore, semantic constraints are also based on people's knowledge that is associated with people's experiences and meanings that limit the possibilities of action.

The sixth HCD principle is called the 'conceptual model' of the system. The conceptual models provide a useful account of how applying the principles of HCD and provides understanding when all the information is available and perceivable along with an understanding of the expected and unexpected outcome of the action. Norman suggests the key to good and understandable conceptual models is to provide good communication between the object and the person which is the key to good design (Norman, 2013, p.14). Therefore, the good conceptual model is a principal determining factor for a good design that results in understandable, usable and enjoyable objects or products. For example, doors are important objects that people interact with every day, but most of the doors are bad designs that are rather confusing and frustrating regarding not knowing to pull or push. These doors are often referred as 'Norman doors' and link their bad design to failure in deploying HCD principles

such as perceivable affordances, visible signal or signifiers and constraints for the possible actions and therefore the correct operation of doors (Norman, 2013, p.3).

In order to improve this communication, Norman believes that the conceptual model of a system called 'system image' needs to bridge the gap between the designer and the user. As it is not possible for designers to communicate with the user directly, the system image provides all the information for the user that shows how to interact with an object such as instruction manuals, structures, signals and documentation. In summary, good conceptual models provide perceivable information through understandable and simplified system image. Norman's model of design principles is based on both characteristics of discoverability and understanding. The HCD principles synthesise the ways that designers need to transfer information in order to provide understanding when people interact with objects. This mean, HCD aims to bridge the gap between the world of designers and users which is consistent with the aim of this research.

2.7 HCD techniques

The HCD techniques discover rich data and insights from people along with their current and future needs in their everyday life context. These methods reveal different levels of knowledge about the user and the contexts. These different levels of knowledge about the context are classified into two categories: 1) explicit and observable and 2) tacit knowledge (Visser, 2009). Explicit knowledge is the knowledge that is clear and identifiable verbally, and a conscious knowledge that is recognisable through the actions of people based on facts and rules. Conversely, tacit knowledge is subconscious, personal and known to the user, but others can be expressed explicitly as it is linked to skills and experiences. Furthermore, tacit knowledge is described as "*knowledge that people can act upon but cannot readily express in words*." (Visser, 2009, p.4). This approach reveals the hidden needs of users through the exploration of their interactions and behaviour in their natural settings.

As discussed above, different levels of knowledge reveal layers of people's experience. In recent years, various design approaches have evolved to understand the

user experience, supporting the HCD approach. These approaches are identified as 1) empathic design, 2) contextual design, and 3) participatory design (Sanders, 2002). The empathic design focuses on the understanding of how it feels to be like another person and is defined as "*the ability to understand and identify with another person's context, emotions, goals, and motivations.*" (Quesenbery & Brooks, 2010)

The empathic design borrows the observation method to identify the hidden needs of the user in the early stages of design to investigate what people think, experience and feel through an interpretation of user's actions and motivations in their natural environment (Gollwitzer & Brandstatter, 1997). Similarly, the contextual design approach is mainly focused on understanding the user by adopting user study methods. This approach was proposed by Hugh Beyer and Karen Holtzblatt as a tool for the HCD approach (Beyer & Holtzblatt, 1998). Interviews are commonly used which involve direct contact with users to explore their perception, attitude, and values. Importantly, users are seen as experts and involving the user during the process of design has developed the third technique, participatory design by Schuler and Namioka in the1993 (Schuler & Namioka, 1993). This technique incorporates co-design and co-creation techniques, which involves the user in the design process to meet their needs from their perception (Holtzblatt et al., 2005). In this method, participants are actively involved during the ideation and user testing stages of the design process. These HCD techniques emphasis is on addressing people's needs and abilities in order to improve the user experience. This leads to successful and effective designs that are desirable and usable by the user. This research aligns the HCD approach towards extensive user research through understanding the patterns of the actions and habits of the user in context. The HCD process facilitates user research that incorporates intersections of design thinking methodology to problem-solving (Norman 2013, p.217).

2.8 Design thinking

Design thinking is a human-centred problem-solving approach that enables a better understanding of user needs with innovative problem-solving strategies (Brown, T & Wyatt, 2015). Businesses have embraced design thinking to boost innovation and help in differentiating their brands to address the needs of potential users of a product, service, and system in an iterative process. Design thinking process embodies three

overlapping techniques: ideation, inspiration, and implementation. Inspiration involves the identification of problems or opportunities that provoke the research for fundamental solutions. Ideation is a process that embodies user insights and seeks to generate, develop, and test ideas. Implementation is the path that designers use to transform their ideas into deliverables. Design thinking results in the development of ideas with a view of transforming them into products with understanding ability, usability, and functionality. However, this process requires adequate time and budget. The design thinking process is facilitated through the HCD approach and the British Design Council model (Norman, 2013, p.220).

Design thinking relates to human-centred services, products, and systems that are human-centred through the application of HCD principles. This relies on the ability of the designers to be intuitive, recognise patterns, and construct ideas that have both emotional and cognitive implications. Human-centred design process brings emphasis on two stages of finding the underlying causes of the problem and understanding of human needs and capabilities in order to ensure that the design fits human needs and capabilities. The British Design Council have named the stated process as the double-diamond design process model that includes a divergence-convergence process (Norman 2013, p.221).
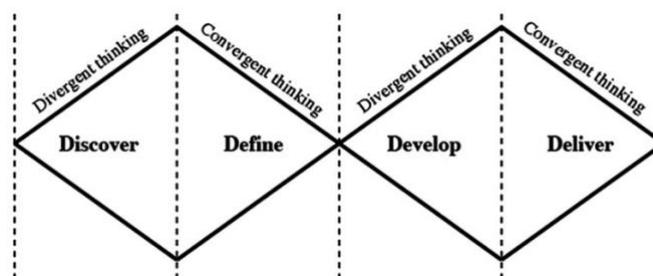
Figure 2.5 The Double Diamond Model of Design by the British Design Council, 2007 (Norman, 2013, p. 220)

As shown in Figure 2., this model of the design process involves four main stages of discovering and developing to find the right problem along with defining and refining to find the right solution. This diverge-converge design process applies to the use of the HCD process. The HCD process comprises several methods that guide designers to identify the underlying causes of the problems that match the user needs. The HCD process consists of four main activities including observation, ideation, prototyping,

and testing (Figure 2.). These four stages of the HCD process are applied in an iterative process and carried out in a repetitive cyclic manner. Iteration in human-centred design process enables a continual improvement and refinement of the product or system at all the stages of the HCD techniques.
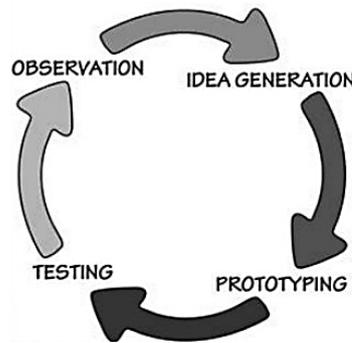
Figure 2.6 The HCD design process by Norman (Norman, 2013, p. 220)

Observation is an exploratory technique for understanding people's need in context (Norman, 2013, p.222). This approach enables understanding of the user that aids in understanding the nature of a problem. In this method, the researchers visit the user in their natural setting to understand their activities, interests, motives, and actual needs.

The main advantage of observation is the ability to observe the difference between what people say and people do. Ideation entails the generation of the idea following a dedicated identification of people's needs. This phase requires creativity and idea generation methods. The designer is encouraged to avoid criticising the thoughts of other people as they can contain creative insights that can be converted into useful products or services. Furthermore, prototyping involves putting each idea into test through a mock-up of possible solutions (Smith, 2005).

This method can be effective in the product development stage. Prototyping during the product specification stage ensures a proper understanding of the problem that matched the user's needs. Testing or User testing is the final stage of the design process through the presentation of findings to the participants and an assessment of the perceived validity of design outcomes. This method involves introducing the newly designed product or system to a small group of people from the user or target audience. This method provides the designers with an opportunity to gather information through feedback concerning the prototypes. Testing the prototype using groups or pairs of

people who can discuss their feelings and experiences can provide crucial information to the designers for modification or improvement of the design. Testing occurs at the production specification stage.

In many studies, a debate is taking place concerning design thinking as a technology-oriented approach with the ways of how a particular newly emerged technological solution could be applied. However, HCD and design thinking are related approaches that focus on uncovering the issues underlying the problem. According to Brown (2009), HCD can be a tool that facilitates the design thinking approach that promotes innovation in human interactions with the psychical objects. He describes design thinking as, "a repeatable, human-centred method for creative problem solving and innovation." (Brown, 2009, p.155)

Norman indicates that HCD facilitates design thinking and it incorporates in all phases of design thinking process (Norman, 2013, p.217). Similarly, Rinkus supports the idea that those techniques can be combined especially in the process of technology-driven designs of products to fulfil people's need (Rinkus, 2005). In such a way, design thinking is linked with HCD characteristics that incorporate technology and innovation. In the framework of HCD, the understanding of human interaction with technology and products through understanding the psychology of everyday actions is important in the process for the design. Similarly, design thinking promotes the idea of problem-solving approach by aligning the new or existing technologies to people with understanding human actions based on cognition. In such a way, design thinking results in adopting people to new products and technology. Meanwhile, Norman claims that the understanding of HCD principles is necessary to meet people's needs and desires in the design of new products and technologies that begins from the recognition of certain psychological or psychopathological patterns. Furthermore, businesses have embraced design thinking to boost innovation and help in differentiating their brands. Organisations such as Kaiser Permanente, a health care company that applies design thinking approach to the business to bring out new and innovative ways of health care for patients (Permanente, 2016).

As discussed earlier in this section, design thinking processes embody three overlapping approaches including ideation, inspiration, and implementation.

Inspiration involves the identification of problems or opportunities that provoke the search for solutions. Ideation is the process that seeks to generate, develop, and test ideas and implementation is the execution of the plan and the delivery stage.

In comparison to HCD by Norman, Brown and Wyatt (2015) Stated that HCD facilitates design thinking not only in a technology-driven way but through the use of affordances and signifiers in terms of finding a common cognitive and psychological ground between humans and objects. In such a way, Jokela et al., underline the fact that design thinking and human-centred design allow the designers to incorporate innovation in the design of product, systems and services (Jokela et al., 2003). Meanwhile, Seffah et al., view HCD from the software engineer's perspective, particularly suggesting that technology can empirically be prior to HCD for human needs and customer demand (Seffah et al., 2005). Similarly, Norman (2013) refers to the history of the development of typing keyboards, suggesting that the technology adopted in every product and not only to be more psychically convenient for humans but also to comply with human cognitive abilities. The technologies of mobile devices are now being constantly improved in terms of predictive technologies and various means to enhance the speed of typing so that it works at the same speed as human cognitive processes and thinking. Therefore, the HCD principle is a toolbox for design thinking that designers can rely on to understand the way people interact with technology psychologically.

2.9 HCD trajectory

Human-Centred Design (HCD) is a term coined by Donald Norman and Stephen Draper in 1986. This term was initially originated from the fields of Human-Computer Interaction, Human Factors and Cognitive Science underpinning that user needs are central to the design process. Over time, this term expanded rapidly and evolved beyond the field of HCI and alternative terms emerged based on the degree of user involvement. These terms are such as User-Centred Design, People-Centred Design and User Experience (UX) (Moggridge, 2007). Often the term 'user' is referred to subjects, stakeholders and consumers experiences and motivated actions and the context of use to gain an in-depth understanding of the user needs and abilities (Krippendorff, 2005).

In recent years, design approaches continued to evolve related to the importance of user involvement and a participatory mindset in design research such as Empathic Design and Participatory Design (Sanders, 2002). The empathic design focuses on the understanding of how it feels to be like another person and is defined as "the ability to understand and identify with another person's context, emotions, goals, and motivations " (Quesenbery & Brooks, 2010). The diverse nature of design approaches expanded in a range of disciplines, underpins user needs whilst understanding user experience is open to interpretation. Although the areas of application differ, there is a common underlying principle that underpins all these terms: to optimise design for human use which always stem from the human-centred design (HCD) approach.

What distinguishes this approach from the other design terms is the connection between HCD and social psychology. The HCD approach is concerned with the meanings people attach in their interactions with products. This approach has a set of principles that provides an understanding of the meanings in human interaction and how people perceive the knowledge in the world that forms meanings and experiences. Similarly, the interpretation of the meanings and values about how people products approach products are central to the research stands of gender and HCD philosophy. Donald Norman (1988), the author of *The Design of Everyday Things* explores the faults in the design of products in which the HCD approach can be applied and enhance the design. According to Norman, the faults and errors when using a product are not upon human action but it is the design problem through the lack of understanding human needs. According to him, there is no place for human error, but every error in interacting with a product is a fault in the design linked with the lack of communication (Norman, 2013, p.65).

Norman provides new guidelines and determines that the principles of design need to get modified in a way that always puts humans first and called this discipline 'Human-centred design'. In 2010, developments of HCD, have led to an additional version of HCD that is known as User-experience (UX). Accordingly, ISO 9241:210:2010 defines UX as: "User experience includes all the users' emotions, beliefs, preferences, perceptions, physical and psychological responses, behaviours and accomplishments that occur before, during and after use."

According to Krippendorff, UX is described as 'a result of a motivated action in a certain context' (2004, p. 31) which means understanding the motivation in human behaviour. Over time, HCD has shifted the emphasis from human interaction and user experience with objects and machines towards human interaction with the world and how people perceive the knowledge in the world that forms meanings and experiences (Krippendorff, 2005). This is evident through the progression of human-centred design from the field of human factors ergonomics initially towards human-computer interaction, interaction design, usability, user experience and recently towards empathic design, contextual design and participatory design (Moggridge, 2007)

According to Norman the HCD principle proposed in The Design of Everyday Things in the 1980s has remained compatible over time and it will remain relevant in the future. Although over time everything changes, products, technology, and machines change but, the human mind stays the same. Also, the psychology of people has been shown to remain the same despite the growing technological changes in the world. Therefore, the principle of psychology will remain unchanged and only the application of human-centred design principles can be modified (Norman 2013).

2.10 HCD applied in health and wellbeing

The importance of HCD and the benefits of this approach as a design process is noted in various fields such as computer science, business strategies, and health promotions. The following examples were chosen from the literature that represents the way that HCD principles have been deployed in four recent studies of promoting health and wellbeing including smoking cessation, eating disorders and obesity, diabetes and sexual health.

In 2005, a case study focused on intervention design and testing of an interactive smoking cessation assessed the significance of HCD principles in understanding the user needs intuitively in the context of smoking and quitting. The key purpose of the study was to increase the effectiveness of a smoking cessation computer program for inner-city women (McDaniel et al., 2005).

The HCD principles were applied throughout the design process including design, develop and test that results in smoking cessation. For this study, HCD based methods were used to uncover the underlying factors influencing the adoption of smoking, smoking habits, and their smoking experience in order to effectively motivate smoking cessation. The main methods used for primary data collection included observation, focus groups, participatory design and user testing. The result elicits user needs and revealed several factors to increase user satisfaction with the usability of the program. This approach was through user involvement in the design of navigation and interface of an interactive and human-centred program. The results of this study demonstrated the long-term effects of the human-centred computer program in smoking cessation.

Similarly, a study called 'user-centred design requirements for an informatics intervention to promote the sexual health of African-American youth' (Veinot et al., 2013) demonstrated the importance of prioritising user requirements. This research includes the design of information-based interventions for the prevention of sexually transmitted infections (STI) such as HIV.

This project has conducted HCD methods to explore recommendations about an informatics intervention strategy from youths aged 14 to 24 years old. This study has established ten focus groups to gain design recommendations from the users to guide a framework for informatics intervention design based on user preferences. At the final stage, the developed strategies and guidelines were applied in a network-based informatics intervention with effective engagement and higher usability based on user feedbacks (Veinot et al., 2013).

Further application of the HCD approach applied to health promotions is investigated in the field of eating disorders and obesity. Hermawati and Lawson in 2014, published an article on '*The managing of obesity through mobile phone applications from a user-centred design perspective*'(Hermawati & Lawson, 2014). Their paper indicated that obesity is considered to be a worldwide epidemic and is associated with risks for health which can be tackled using a design perspective. As discussed in the previous studies, the use of a user-centred design approach is significant in the design and development of human-centred interventions with a focal focus on the user. This study applies HCD methods to design and develop mobile phone applications that help prevent obesity,

based on understanding the user's needs and wants in the context. The key principles of HCD were adopted including an early user involvement during the design process. This study systematically designed and developed theories and guidelines for user-centred mobile phone applications and the results demonstrated an increase in the effectiveness of mobile phone applications to prevent obesity through achieving an explicit understanding of the user in the context, user needs and their experience. The research strategy included nine focus groups (46 participants) that identified the main targets' behaviour and their hidden needs and their motives. The users' preferences were the main elements in the design and development process in order to enhance user engagement. The final prototype interventions were tested by potential users and the feedback led to an improvement of the designed mobile phone apps.

Another major area of health promotion using the HCD approach is the design of self-management mobile phone applications for patients with diabetes (Cafazzo et al., 2012). A study on 'the Use of a Holistic Approach for effective adoption of User-Centred-Design Techniques in Diabetes Disease Management: experiences in User Need Elicitation' point out the importance of adopting HCD techniques for long-lasting self-health management to elicit effective user experience and usability (Fico et al., 2011). The main HCD methods used in this study included focus groups, rapid prototyping and user testing (Cafazzo et al., 2012) (LeRouge & Wickramasinghe, 2013). These methods point out the improvement of the experience of users through maximising user involvement from the earliest stage of the research (Kujala, 2003). Identification of HCD methods applied in various research studies demonstrates the benefits of understanding the user desires and needs based on user involvement in the research process and the adaptation of iterative process that facilitates successful designs with commercial success.

Initially, McKim identified the importance of recognising the needs of the user back in the early 1970s. HCD approach is also popular as 'design for users' to understand the experience of the users and the link between what people do, their knowledge and their actions. This can be seen in the case of user involvement that includes understanding the user's habits, tasks, goals and motives besides the exploration of user's behaviour in the context. This is through user involvement from an early stage and during the design process. In addition, this approach is a circular process and

iterative with continuation for improvements and refinement of the design through user involvement from the beginning until the end of the design process.

Despite the fact that the HCD approach has been applied in numerous disciplines including engineering, business, industry, and healthcare, the technology-driven procedures are not always willing to apply HCD in their strategies. For example, there is some drawback of HCD in the way that it lacks the ability to add value to the business and stakeholders besides the user (Lai et al., 2010). Similarly, Rinkus et al. (2005) claim that HCD can be used as the key approach if accompanied by other technological techniques that focus on the advancement of technology. However, in recent years, the fact is that big scales companies put more emphasis on the design that aligns with more sales and commercial success. For examples, there has been a shift of emphasis on Apple products (i.e., iPhone, iPod and iPad) towards technological advancements pulled by the market (Ebner et al., 2010). The fulfilment of the user's needs through technology is called technology-driven design that is the target of companies such as Apple. The technology-driven design is technology-oriented and differs from HCD in basis that results in distinct products and services.

The majority of debates in the literature concerning Norman's conception of HCD refers to either the lack of its orientation to technology about designs that are technology-driven. Norman pictures humans as the focal determinants of the design process. However, as the focus is based on understanding human needs and wants through HCD methods such as observations can add a certain extent of subjectivity (Giacomin, 2014).

HCD and other methodological frameworks of the design process are similar approaches that differ in certain ways. Historically, these methods have been used to understand the user's needs and want by understanding the customer's experience. The definitions of these terms are fundamentally one and the same but differ in some aspects. There is terminological confusion as to the terms user, and customer or client limits the meaning of human beings. On the other hand, the stated approaches incorporate some of the techniques of HCD and attempt to focus on the needs of clients and business rather as well as the user (Yanagida et al., 2009). The main difference is that all other approaches are either individualised or customised or trying to appeal to

certain market segments, which would not be possible in the framework of Norman's philosophy of design. In this matter, Norman shows a need to be explicit about exactly what is meant by the term human in HCD. As discussed earlier in this chapter, HCD is primarily based on the foundational aspects of human psychology in understanding human interactions with objects.

This shift in emphasis is evident in the progression of design paradigms from human-centred design to user-centred design, user-experience design, interaction design, empathic design and emotional design. While the areas of application differ, there is a common underlying principle that underpins all of design paradigms: to optimise the design for human use. Often, the term user-centred design is employed more in the alignment of the technology to the needs of a user, particularly its manifest is to mitigate multifunctioning of the technology in order to eliminate the frustration that it causes to the user (Abras et al., 2004). This approach does not rely on any framework of human cognitive or psychological specifics. An approach that is a more suitable version of HCD called 'activity-centred design' emphasises the activities that are a set of tasks towards a common goal or set of operations directed towards that goal (Norman, 2013, p. 231). This approach can be used in many circumstances that define the activity and actions based on a wide scale of people for nonhomogeneous populations.

However, it doesn't show specific guidance to measures if human-centred products are successful designs but it is possible to uncover how well they meet the needs of users. Norman does not take into account that not all HCD is successful as he points out in The Design of Everyday Things that neglecting users' needs lead to poor designs.

Additionally, it is accepted that people use the products that fill their needs and abilities; however, people often use products that do not meet these criteria. Also, most of the companies are pushed into designs based on market pressure and competition from other brands, rather than the true needs of people. This case very clearly demonstrates it is important to note that the main challenge to good design remains in uncovering the needs of the user, through exploring the actions and behaviour of the user. In this matter, many organisations have shifted their focus away from matters of technology and manufacture. Instead, they have utilised HCD approach in their organisation strategies such as Ikea, Lego, Apple, Google, LinkedIn, and eBay, Alessi, Phillips, Virgin and Facebook (Steen, 2008). These companies' strategy has shifted

their focus to target the customer needs and desires instead of only focusing on technology that suits the market (Giacomin, 2014). The shift in the businesses towards the fundamental psychological considerations instead of only physical considerations is evident in the known brands stated above. The impact of HCD used in businesses for economic benefit and achieving the market success is determined through the design of products, systems and services that are intuitively understandable physically, cognitively and perceptually.

From the relativist perspective, in the situation with complex agencies, it may not be possible to define a particular model of human action such as elements of affordance. During the passage of time everything changes, products, technology, people, culture and machines change but, the principles of human psychology stay the same (Norman, 2013, p.1).

Therefore, the principle of psychology will remain unchanged and only the application of human-centred design principles can be modified. Therefore, The HCD principles proposed by Norman in The Design of Everyday Things will remain relevant in the future. An overview of a research study by MIT Business School (2014), demonstrates that the majority of new products, systems and services fails not because of technology advancement but due to the neglecting of the user need. Therefore, it is clear that the paradigm of HCD is necessary for improving business success. In the world of business strategies, HCD differs from the concepts of 'technology push' and 'market pull'. As illustrated in Figure 2., technology push or technology-driven designs prioritise technology to people's need. Similarly, the market pull strategy is focused on the needs of the user that is based on the existing products and services (Verganti, 2009).
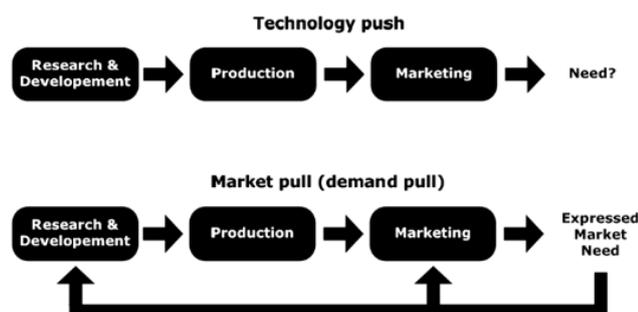
Figure 2.7 Comparison of the technology-push and market-pull business strategies (Giacomin, 2014, p.10)

2.11 HCD relationship with this research

This research adopts the HCD approach to understanding young men's needs, activities, experience, motives, and goals in relation to their sun protection behaviour on the beach. In 2003, Howcroft and Wilson indicated the importance of using the HCD approach in multidisciplinary research to understand the interactions and needs of people in their natural settings where the behaviour occurs (Howcroft & Wilson, 2003). This research follows the HCD principles and methods, in the following steps:

- Extensive user research to further understand young men with more chance of exploring the needs of the user in-depth
- Specifying the user requirements (need, wants and goals)
- Implementation through design interventions
- Evaluation of the interventions to meet the user requirements

The HCD approach starts by 'understanding' the user and ends with innovative and creative solutions according to users' needs from their perspective by considering physical, cognitive, social and cultural factors. Furthermore, exploration of these factors identifies influences the needs and experience of the user arising from the context and the user's concerns, memories, feelings and experiences of their surroundings (Visser et al., 2005).

In summary, HCD is a procedure for addressing user requirements that ensure people's needs are met through a robust design intervention that improves the relationship between human beings and objects. This research will aim to explore and consider issues associated with using design to influence sun protection and to raise users' awareness of health and wellbeing for the prevention of skin cancer.

2.12 HCD assessment

Regarding the strengths and weaknesses of existing studies from HCD perspective, Norman demonstrated certain drawbacks with this approach. One of these is that employing different designs for different needs requires a higher budget.

Another main concern is that placing users within the design process is time-consuming and may increase the project's costs. More recent arguments against HCD point out that if the specifications of the user are too broad, the outcome will be too risky, challenging and time-consuming (Steen, 2008). However, Norman does not validate such a view as he suggests that a more appropriate form of HCD called 'activity-centred design' suited to a great non-homogeneous population in which it is important to focus on the activities of the people and not only individuals. One of the key advantages of adopting the HCD process is an early focus on users and their involvement (Preece et al., 2002).

One of the significant advantages of using HCD is the adaptation of multidisciplinary skills and perspectives and user involvement during the design process. However, studies may not recognise the benefits of user participation in the design process and can be very critical of the benefits of the HCD approach (Gulliksen et al., 2003). It is also important to also consider the strengths of the HCD approach that enables good and successful designs through an increase in communication between human and physical objects to meet users' needs. Norman defines design as "an act of communication, which means having a deep understanding of the person with whom the designer is communicating". (Norman, 2013, p.8)

This association facilitates good communication through design that meets people's wants, desires and needs. Another important factor to consider is the relationship between objects and users over time. This factor may apply to the experience of the user is different through time and there is a deeper difference between humans as individuals as of now and the individuals from before. This suggestion may apply to the point that the relationship between objects and humans is linked with a deep understanding of the people and how they experience an object. This point is also sustained by the work of Battarbee and Mattelmäki (2004), in the concept of the people and objects relationship, who proposed three main categories to provide meaningful

products relationship as follows: 1) meaningful tool 2) meaningful association and 3) living object. Firstly, the meaningful tool category emphasises the meaningful functionality and usability of products that facilitate the needs of people at all levels. Secondly, the meaningful association indicates people's social, personal and cultural meanings such as identity, experience, memories, interests and style, given to the product. Thirdly, living object creates an emotional link between the person and an object that becomes a companion with characteristics, such as toys. Thus, the review of these relationships uncovers new perspectives to the design of meaningful products (Battarbee & Mattelmäki, 2004).

Although HCD seems the most comprehensive account of design principles that explores human needs, this approach is based on a broad understanding of the shared values and common actions of all people as men or women. HCD take account of gender as static and fixed based on the stereotypical norms in terms of how people are perceived as masculine or feminine about their experience.

On this basis, the followings investigate why masculinity is important in this research from the viewpoints of three key theorists of masculinity with a background in psychosocial and cultural studies in relation to HCD. As pointed out earlier in this chapter, masculinity is the core theme of understanding young men. Masculinity is defined by Connell as men's endorsement of traditional attitudes and behaviour that is socially constructed (Connell, 1987). In order to understand the concept of masculinity, we need to understand the core concept of gender. Harriet Bradley defines gender as *"the relations between women and men"* (Bradley, 2013, p.15). According to Bradley, gender is persistent, everything from TV programs to car designs is gendered artefacts, and society and the world are gendered. To understand masculinity the following section overviews the core definitions of the terms 'sex', 'gender', and 'sexuality'.

2.13 Sex, gender, and sexuality overview

Harriet Bradley, who is a sociologist and a major contributor in gender studies discussing the feminist approach and some theories of masculinity. Bradley in the book Gender (2013), provides an introduction to the sociological concept of gender as a lived experience and the nature of gender relations. This book discusses the idea that

to understand the social world we need to understand gender that provides an explanation for the social patterns by men and women in society. The implication of this is that gender is socially constructed based on the social understanding of people in relation to their gendered social groups (Bradley, 2013). More broadly, to understand gender we need to determine what is meant by sex and in particular sexuality.

The concept of sex is biologically determined and fixed at birth. Sex explains the biological sexual orientation of a person and classifies people based on their natural biological characteristics as male or female. However, expressing sexuality is embedded in our cultures that are in relation to the person's sexual orientation and the way people represent their gender that reflects different characteristics associated with gender roles that form masculinity and femininity. According to Bradley (2013), gender is described as the cultural definitions of masculinity or femininity and the power between men and women that are not stable and fixed, but it develops over time in interaction with cultural and social values (Bradley, 2013, p.3).

As a result, masculinity and femininity are constructed around specific cultural and social norms linked with gender inequalities in society. This shows the connection between sex, gender and sexuality associated with authority, power and gender inequalities and the discourses of masculinity and femininity. Therefore, the root of masculinity and femininity is formed through the gender differences associated with the social and cultural impacts in the society related to be a male or female (Bradley, 2013, p.4). The concept of gender has been challenged and widely used as social constructionism. Gender refers to the relations between men and women associated with social and cultural differences.

2.14 Feminists' accounts of masculinity

Traditionally, masculinity has been determined as natural characteristics assessed by measuring what women do not have, and men have (Bradley, 2013, p.6). Further research showed that masculinity is not natural or a social characteristic but is socially constructed (Butler, 2006). The construction of masculinity is associated with the construction of gender and the cultural positions of a particular social context which means the construction of masculinities are not fixed and are related to time, culture

and place (Bradley, 2013, p.16). We are under pressure to represent our gender by conforming to the normative sexuality accepted in the society, in particular as men or women gender roles. In this manner, the dominant modes of sexuality in the society, pressures people to represent their gender and conform their masculinity or femininity in line with the social norms accepted in society.

2.15 Young men and masculinity

To gain further understanding of masculinity as a social construct in young men, the following reviews the key theorists with a major contribution to the field of gender studies regarding the social construction of gender as a 'performance' including the leading gender theorist; Judith Butler.

It is necessary here to clarify exactly what is meant by gender as a 'performance'. Butler's theory of gender performativity is a principal determining factor that goes beyond normative gender categories established in society. According to Jackson & Mazzei (2012), Butler sees gender as a repetition of performative acts, and we enact our gender all the time. This viewpoint destabilises the normative structures on gender roles and highlights the importance of going beyond a process of repetition that produces gendered subjectivity. Butler clarifies gender is a performance reproduced all the time as subjective acts of 'doing'. The performative dimension of gender is accounted not only as a performance but as Butler suggests: "gender is performative in the sense that it constitutes as an effect the very subject it appears to express" (Butler, 2006 cited in Jackson & Mazzei, 2012,p.71).

Butler points out that the repetition related to performativity is not a set of performative acts by a subject but that it constitutes a subject that then produces subjectivities. In other words, gender is performed and produced by a subject but not by a pre-identified gendered subject who consciously directs their own activities such as actions and gestures. The act of 'doing' or gender performance is produced by the repetition of actions, body gestures which portray an individual's gender identity. For Butler, gender only exists without prior intention to perform. Gender is a set of performative acts as a lived experience produced through the interplay of acts by subjective experience. The theory of gender performativity destabilises categorizing gender performances that produce a particular normative identity being a man or women, but

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the gender performance is related to the interplay of natural, cultural and social structure in the society.

In line with the debates concerning the notion of gender and performativity by Judith Butler, Frosh et al. describe the construction of gender as not a biological sense or genetically formed but a social construction of actively 'doing gender' with a relational nature. Gender as a social and cultural construction is also what Erving Goffman (1974) describes gender as a performance of identity. According to Goffman, we perform our gender all the time through our gender roles and acting to present our gender to the world in ways such as clothing, ideology, actions, and words. In the same vein, Frosh et al. describe masculinity and femininity as new and subjective replication of actions, gestures and movements that renders one masculine or feminine. This viewpoint is influenced majorly from the theory of gender performativity discussed earlier by Judith Butler (Frosh et al., 2002).

Frosh et al. acknowledge that there are multiple modes of masculinity or approved modes of 'being men' constructed by men that are socially constructed and fluid in dynamic ways and open to reconstruction in different contexts (Frosh et al., 2002, p.12). As Frosh et al. (2002, p.55) note: "masculinities are made into, and lived as, natural or essential identities". This means masculinities in men are produced over time and enacted as the account of themselves and their experiences. Also, men reproduce masculinity and inhabit alternative ways of masculinity in relation to the dominant cultural beliefs in society. Therefore, masculinities are achieved concerning the cultural norms and ideologies of society. In this manner, the way men assert their masculinities are considered as their gender practices about a particular social and cultural context and the time. Therefore, the formation of masculinities is associated with their relational and multiple gender identities.

Various leading brands have embedded masculine or feminine attributes in their advertisements that feature female or male gender subjects. Erving Goffman in 1974 refers to these adverts in *Gender Advertisements* and he discusses the way gender advertisements portrayed popular gender representations focused on displaying gender differences between men and women based on normative gender performance in the society. In this context, the most prominent account of gender is based on portraying the culturally established feminine and masculine characteristics in society (Goffman,

1987). In holding this view, Frank Mort in the *Cultures of Consumption* (1996) also discussed the gendered process in commercial advertising in terms of objects and products aimed at men through advertising particular masculine attributes associated with young men' gender and needs. Mort refers to the transformation of men's identities and meanings of masculinities through advertising and marketing as 'the portrayal of the world as a masculine playground' (Mort, 1996).

The performative nature of masculinities mentioned above is a clear driver for conducting interpretive research in this field to understand the concepts of this phenomenon. In an ethnographic study conducted by Frosh et al. (2002), it was shown that the men's behaviour is associated with the sense of competitiveness and desire to demonstrate their strength. However, their behaviour and emotional feelings were completely different during the mixed-gender group discussions. In this case, they felt like the dominant participants and did not want to show their weaknesses. It remains evident that a commixture of these factors refers to the fact that men have a tendency to dominant modes of masculinity and popular ways to show heteronormativity. The findings by Frosh et al. (2002) demonstrate that the construction of masculinities is rooted in social phenomena such as gender, identity, sexuality, and social role that is influential in creating a range of dissimilar masculine identities. The difference between class, race, cultural background and sexuality have a critical effect on the understanding of men' traits and characteristics (Frosh et al., 2002, p.42). Other findings include the various versions of masculinity constructed in the family associated with their values and norms. Also, schools are actively involved in the formation of an individual's masculinities, and the creation of gender differences through gender divisions in the schools. Furthermore, masculinities are embedded in the features of an individual's relational experience and the social, cultural structure of their lives. In this manner, exploring peer-group relations would map out the formation of meanings and masculinities in young men.

Masculinities are asserted and performed as men's relational identities that they inhabit as their lived and natural experience. Masculinities are embedded in men actions to perform their gender enactments. In this manner, they assert their masculinities continuously in society by conducting the characteristics of hegemonic masculinity through the rejection of non-hegemonic aspects of themselves. These aspects include

emotions, anxieties and vulnerability (Frosh et al., 2002). The concept of hegemonic masculinity is further discussed in section (2.20).

These elements are crucial factors in the formation of multiple masculinities as performances asserted by individuals and open to changes. In this context, educational entities have a substantial impact on the formation of masculinities among men. In this case, exploring their masculinities and understanding the relational aspects such as peer relation and friendship reveals the construction masculinities over time. These included the notions that men struggle to resist characteristics of hegemonic masculinity, that is problematic and a struggle from the narrowness of conventional masculinities.

This section has reviewed the key aspects of masculinities and the importance of the current debates on the social construction of masculinities. Masculinity is multiple, relational and flexible that is constructed through experiences in particular social contexts. This view is also asserted by Martin Mac An Ghaill (1994). In his book, The Making of Men: Masculinities, Sexualities and Schooling, acknowledges the fluidity of masculinity that creates various ranges of masculinities lived as relational and natural identities. This book explores how young men learn to be men and perform their masculinity in schools in relation to their sexuality. In particular, he explores the ways that masculinities are inhabited by young men in relation to the role of cultural and educational institutions such as schools.

His book involves his real-life experience of how men feel about their masculinities, and he mentions that one day, one of his students gave him flowers in the middle of the schoolyard. Several days later, the same student was involved in fights while trying to prove his heterosexuality to restore his image by showing his power in the fight. In this manner, the experience of this boy, which is a typical behaviour linked to masculinity, will create misunderstandings in the society leading to the development of the conflicts (Mac An Ghaill, 1994, p.1). It is often claimed that boys cannot express their emotions clearly. Evidently, it is apparent that they have a tendency to share their feeling during individual conversations while they do not want to show their weaknesses to the community. As this case very clearly demonstrates that this aspect

might damage their image of masculinity and create difficulties restoring it in the future.

In the same line with Frosh et al. (2002), Mac An Ghaill is influenced by Judith Butler's theory of gender. As masculinity and gender are performative, it varies in relation to the peer-groups impacts. The peer-groups relations majorly influence the formation of masculinity, gender, and selfhood (Mac a Ghaill, 1994, p.12). His findings show that peer groups are a competitive place for showing and proving masculinities and gendered identities among young men for social acceptance and popularity (Mac a Ghaill, 1994, p.59). In this context, masculinities exerts a major influence on men to hide their feelings, emotions and anxieties from their peer groups which are recognised as feminine traits. Therefore, young men feel pressured by peer-groups to assert their masculinities and hide their feelings and emotions. Conversely, dominant representations of hegemonic masculinities include power, aggression, domination, hardness, sportiness and resistance (Mac a Ghaill, 1994, p.58). Overall, various factors such as the educational institutes, teachers and peer groups contribute in the cultural construct of the ideologies of masculinity in relation to the construction of gender and therefore masculinities (Mac a Ghaill, 1994, p.52). As the construction of masculinities is a continuous process and it is reconstructed continually over time, a broad range of social and cultural recourses available forms the society with gendered identities as men or women. (Mac an Ghaill, 1994, p.9). Therefore, the formation of masculine and feminine identities is not biological or fixed but is highly connected to social and cultural impacts. In general, masculine perspectives are considered pervasively dominant (Mac an Ghaill, 1994, p.2). The construction of masculine identities concerns the presence of dominant modes in culture categorised by power, heterosexuality, aggression and authority (Mac an Ghaill, 1994 p.12). In general, masculine identities are generated in relation to the position of power and gender differences and highly connected to social institutions such as schools with different curriculum. In this context, schools and families are recognised influential on the cultural formation of masculinities (Mac an Ghaill, 1994, p.52). The development of masculinities in relation to power and domination is highly dependent on the social norms altered by the educational institution and behavioural patterns common in society.

The factors highlighted above by Martin Mac an Ghaill indicates the primary relational aspects that affect the formation of various modes of masculinities driven by social and cultural interactions linked with physicality. The common masculine roles taken among men are associated with dominance, authority and strength in the society. In this context, the behavioural patterns of men demonstrate the cultural rituals that form appealing dominant modes of masculinities linked with the gender differences between men and women (Mac an Ghaill, 1994, p.19). Multiple factors indicate masculinities linked with boy's masculinities such as body shape, playing sport, and physical strength opposed to homosexuality, lack of toughness and power (Mac an Ghaill, 1994, p.12). However, these commonly accepted characteristics of young men are associated with the social expectations of the society that conflicts with their feelings and personal anxieties. This is in line with the pressure they receive from their peers and parents to perform traditional masculine behaviours.

As discussed, masculinities are socially constructed over time rooted in the social interactions between individuals in relation to a particular time, place and culture. Overall, masculinity is a performative act; gender is a performance, and it changes in relation to our interactions and the environment. Therefore, this part of the research explores the emerging role of masculinity as set of performative acts. The following section is focused on the pervasiveness of gender and the construction of masculinities in all parts of an individual's life.

2.16 The construction of masculinities

There are different modes of masculinities constructed in men that overlap with each other. In this section, the construction of masculinities has been discussed from a leading scholar's perspective in the field of masculinities. Raewyn Connell coined the term 'hegemonic masculinity' in 1982 as 'the form of masculinity that is culturally dominant in a given setting' (Connell, 2005, p.205). As Connell states: hegemonic masculinity is identified through dominant cultural modes, power and authority that prioritises the essence of dominant power and muscular men body that is opposed to the nature of femininity.

This mode of masculinity is based on the dominant social position of men in society reinforced by cultural representations and the gendered division of labour. Connell describes masculinity as a form of practice, what people do and their behaviour in the real world that is associated with the construction of gender in groups such as job-related groups and social practices that engage gender in a particular way in relation to culture, values and perspectives. Connell has adopted a broad perspective regarding defining masculinity.

This concept is reflected by portraying the leading position of men in the society that emphasises the importance of heterosexual orientation that subordinates homosexuality and gay men. Furthermore, there are different patterns of hegemonic masculinity due to various influences of cultural and social factors. One of the main characteristics of hegemonic masculinity is playing tough sports such as rugby and football. In contrast to hegemonic masculinity, another mode of masculinity referred to as subordinated masculinity often causes dissonance in the men group or community that implies the elements of feminization. For instance, men who are not complying with the 'being tough' definition of masculinity, are seen as being homosexual.

It is important to note that men prove their masculinities through these factors recognised as masculine activities for their physical appearance rather than health-related purposes. According to Connell (2005, p.116), the research on masculinity and health behaviours suggest that "the greater the men's endorsement of hegemonic masculinity, the less likely it is that they will engage in health-positive and help-seeking behaviours". In other words, the main characteristics of hegemonic masculinities impact men's health-related behaviours. Connell, importantly, emphasises that the content of these configurations of gender practice is not always and everywhere the same and is culturally specific. This is also related to the dynamic construct of gender stereotypes for men and women. The construct of gender stereotypes is derived from the normative gender roles that are changing over time. This means the changes in the social roles of men and women and beliefs for new roles in society shapes and influences the stereotypical gender norms.

 For example, men redefine their masculinities over time and express themselves in relation to their masculine roles, identities and behaviours that give access to design

opportunities for products, services and brands. In this manner, masculinities play a major role in marketing for men's products. The dominance of hegemonic masculinity is apparent in men designed products that implies constructing the concepts opposite to femininity.

Earlier attention has focused on the provision of urban men referred to as metrosexuals coined by Mark Simpson in the 1990s. Mark Simpson is a British journalist and writer in the field of masculinity, culture and media that explores the role of masculinity in sports, advertising and pornography throughout the book: Men Impersonators; Men Performing Masculinity (1994). This book explores the roles of homosexuality, self-admiration and narcissism in men in relation to the performativity of gender and therefore masculinity.

Simpson in the Men Impersonators; Men Performing Masculinity uses various examples to take account of men performing their masculinity through the advertisements that are particularly targeted towards a specific gender. In this manner, he discusses the challenges and strategies for facilitating and promoting masculinity throughout the shaving process for men(Simpson, 1994).

For example, a razor company such as Gillette prioritises the typical masculine attributes in their products that shift boys feeling for being a man and assists men consumers in retaining their masculine image while contrasting their distinct features to homosexuality and feminism. Razors are recognised as a masculine tool and the signifier of manhood that asserts masculinity in men and the act of shaving links the boundary between boys and men. Gillette employs "narcissism and homoeroticism" concepts that contribute to the admiration of oneself and physical appearance (Simpson, 1994, p.119). Furthermore, the Gillette's marketing campaigns advertise the images of football players among shaving for men, as a sport is one of the definers of masculinity in men for the purpose of the particular type of body as being toned and muscular. These marketing campaigns use the reflection of a 'successful' man in the mirror and create a perception that every male consumer can acquire a similar image through motivational mottos such as "the best shave the man can get" (Simpson, 1994, p.112). The combination of these approaches implies that every man is a winner

referred to as the dominant agent of social interactions. Overall, Gillette motivates competitiveness in men in relation to hegemonic masculinity to attract men by using associations with sports, strength, competitiveness, men dominance, and narcissism.

On this basis, the overall shaving process is personal and is linked to the experience of acting masculinity and now includes beards. There are many associations, which tend to impersonate masculinities in Men. These factors include bodybuilding, heterosexual orientation, tattoos, and sports (Simpson, 1994, p.120). This shows the behavioural patterns asserted by young men in relation to the challenge that men struggle to dissimilar feminine and masculine activities

Regarding the ways in which men perform and construct their masculinities are that men express their difference from femininity. An athletic body shape as a muscular body contributes to a positive perspective on men as being masculine in society. This entails strength and helps them to assert their masculine identity among their classmates. This means the typical masculine values will define a boy's identity as being a man. Also, it could be said that masculinity is portrayed in relation to femininity. A masculine lifestyle implies being involved in sports and as a consequence athletic body shape prevails in relation to the level of self-esteem and heterosexuality.

Culture and history contribute to the development of particular men rituals. In particular, the little boys from the early childhood inhabit the rituals their fathers endorse (Simpson, 1994, p.110). For instance, it seems that shaving and standing in front of the mirror in the morning ritual is a necessity and implies more than removing facial hair. This ritual reflects man's sexuality by demonstrating a manly love passing from fathers to sons (Simpson, 1994, p.115).

Judy Wajcman in *The social shaping of technology* (1999), demonstrates the ways that technology reflects gender and its relation to men and masculinity. Wajcman argues the links between technology, gender and society and that technology can be strongly against women and femininity. According to this determinist, the development of technology has been influenced by men's minds and interests that enable social change (MacKenzie & Wajcman, 1999). Furthermore, the influence of gender inequality and

masculinity have grown a men technological worldview that impacts the social shaping of technology. Wajcman fully acknowledges the importance of valuing technological developments based on social values and the society's need rather than masculinity or femininity to conceptualize the current technological developments with equality for both genders. Also, along with technology, design drives social change. In conclusion, the link between design, technology and science creates innovation and technological developments in society.

From the previous discussions, it can be seen that artefacts are designed in a gendered way. As discussed in this chapter HCD is concerned to attribute innovation and improve the design that aligns with what the user's wants and needs that connects to human psychology. Norman's framework of human action has an element of objectivity in defining the process of human interaction with physical objects that is a simplified model to guide designers to understand human interaction on a daily basis. In this way, new designs employing HCD techniques have the aspect of intuitive interaction and avoid the mistakes of the previous design versions. This can be achieved by taking people's difficulties as signifiers and affordances of where the product can be enhanced.

However, Norman's fundamental model of human action is based on a broad understanding of shared and common actions of all people. However, human actions are shaped by various factors including gender values in relation to the cultural impact and the environment that have not been assessed by HCD principles. Overall, human-centred design (HCD) principles see gender as static and stable regarding men or women that each technique appeals to one gender or another linking gender differences and stereotypes to the products, services and brands. However, the affordances can be influenced and designed in a way that transfers knowledge conceptualised by a male or female gender.

2.17 Overview of the gap in the literature

The following overviews the identified gap in the literature and indicates the research questions. The discussed review of literature outlined young men age 18 to 24 are more at risk of developing skin cancer due to the low levels of sun protection behaviour

(Cancer Research UK, 2014). To tackle this problem, the review of current design theories revealed human-centred design is the most suitable approach. HCD has been applied in numerous disciplines including engineering, social platforms, business and industry, and healthcare. The primary role of applying HCD in design processes is aimed at meeting the needs of people. It ensures that the product is understandable and usable. This approach has the potential to result in the design of interventions that meets the needs of young men to improve their low levels of sun protection behaviour. Norman's fundamental model of human action is the same based on a broad understanding of shared values and common actions of all people. Although people are the same, there are gender differences and cultural differences. The debates related to gender perspectives in design are often highlighted from gender studies and market segmentation towards whether the designed objects and products are associated with traditionally male or female gender norms.

The relationship between design and gender and its implications in design research has a long history from critical gender perspectives related to the design of objects and products. In the literature on gender and design, the relative importance of gender equality in design is debated centred on power relations embedded implicitly and explicitly. This debate has grown in importance in light of recent consideration to avoid gender inequalities embedded in the products' characteristics. In recent years, there have increased strategies towards products that are targeted at both male and female genders which are advertised as gender-neutral and unisex and some of the most successful and popular companies such as Apple focus specifically on products that are unisex such as Apple Watch. The key feature of unisex products is the same properties such as colours, shapes, and attributes advertised for both male and female gender. However, the stated characteristics in products are only considered as gender-neutral where the gender of design is invisible (Ehrnberger, Räsänen, & IIstedt, 2012). In contrast, products targeted towards male gender or female gender take account of stereotypical gender norms in the product properties. This type of product language continues to result in producing designs that highlight the differences in products characteristics such as 'pink for girls' and 'blue for boys' (Moss, 2009).

Examples of such design are cosmetic products specially designed for male gender and a female gender such as Dove, Nivea and Gillette razors. The differences and codes in

the design of product properties highlight the term 'product language' inspired by Gros in 1976 (Ehrnberger, Räsänen, & IIstedt, 2012). Product language plays a significant role in the meanings we perceive in products' properties that show the possible actions through colours, shapes, and attributes. This means understanding the product and also for how we perceive the product to interact. Product language is also an important factor in marketing to create new segments to expand market growth by traditional gender stereotypes in design (Moss, 2009). However, further understanding of the relationship between design and gender and its implications for design is mostly underexplored from the design research perspective. In 2006, an exhibition called Formgivning/Normgivning displayed product categories with invisible normative gender stereotypes from perspectives of market segmentation (Jahnke, 2006). Jahnke focused on visualising gender perspective in design through the embedded marketing strategies. A range of products was presented from automotive safety design based on men's body measurements to heavy industry clothing designed towards men, where design goes beyond product categories and shift towards stereotypical gender norms in the society.

The current shift towards gender diversity and gender-neutral products are growing in the lead brand companies. However, the language embedded in these products are evoked and interpreted as normative and gendered (Moss, 2009). For example, the product line of Apple watch is designed for men and women of different sizes by Marc Newson, one of the leading designers worldwide popular for non-gender specific products (Newson, 2015). Similarly, Karim Rashid is a famous designer with a gender-neutral brand identity towards "Design should be for everyone". He attempts to minimise gender differences in his designs so they are applicable to both male and female genders (Harris, 2009). One of his successful designs is the 'Bobble' water bottle in various colours that filters tap water. His design has contributed to various leading brands for everyday products such as 'Alessi' targeting gender-neutral designs. For example, a very popular kettle by Alessi designed by Michael Groves in 1985 is still one of the most popular kettles with a specific shape and material design for both genders. However, a range of critical gender studies argues invisible meanings and values in the gender-neutral product language according to the traditionally male or female domain (Berner, 2003; Cockburn & Ormrod, 1993; Wajcman & Mackenzie, 1999). We also lack research into how designers can take advantage of such knowledge

in practice related to the ways the products can be seen and interpreted. It seems that a critical gender perspective on the design process has not so far been widely incorporated in design research. A critical perspective on gender as a social construction of performative acts and not a given fixed concept is needed to be considered in design research.

To achieve this, the methodological approach taken in this research is an interpretive methodology based on understanding the underlying meanings of young men's actions and experiences regarding their sun protection practices situated on the beach. The research methods adopted in the research are referred to the study of human behaviour in everyday context including observations, interviews and participatory design sessions. These methods reveal different levels of knowledge about young men and the way they approach the world. In this context, different levels of knowledge will reveal layers of young men's experience through spending considerable time in the field that facilitates an explicit and empathetic understanding of their needs through the researcher's interpretation of young men's behaviour in their natural setting. The identified gaps in the literature indicated the research questions followed by the objectives outlined in the following.

2.18 Research questions and aims

This research seeks to address the following questions:

- How can we make sense of young men and their sun protection behaviour?
- How can we improve young men's sun protection behaviour through the human-centred design approach?

Following the identification of a gap in the literature and the indication of the research questions, the following presents the research aims to address the outlined research questions. This is followed by an indication of the research design:

- To develop an understanding of the relationship between young men's gender and masculinity and the sun protection behaviour

- To understand how gender is a factor in how people approach designed objects, and designing objects, to develop an extended human-centred design approach that leads to new sun protection concepts
- To verify the design of new sun protection interventions and gender-aware HCD approach

2.19 Summary

This chapter reviewed the literature in regard to the low levels of sun protection in young men. It explored the importance of gender and masculinity that aids this research to explore the underlying reasons why young men behave with low levels of sun protection. Finally, it proposed the combination of the HCD approach and understanding gender performances as a better model that benefits to address the identified gap in the literature. To achieve this, HCD provides guidance to explore the elements that fulfil the needs of young men through understanding the underlying meanings of young men's attitude, behaviour, motivations and experiences on the beach where the behaviour occurs. Turning now to the research in practice, the following chapter discusses the methodological position of the research that will determine the research methods and the strategies used. Initially, it discusses the appropriate research methodology. Then, it indicates the methods used to address the research questions.

3   Methodology and methods

Following the identification of a gap in the literature, this chapter discusses the methodology and methods adopted to appropriately address the research questions and describes the research methods adopted for each phase of the research.

3.1   Introduction

The review of literature in Chapter 2 revealed low levels of sun protection behaviour in young men and the increasing rate of skin cancer. Also, it indicated the importance of gender and masculinity in young men health-related behaviours. The review of the design theories to tackle this problem established HCD as the most suitable approach for this research. However, a lack of understanding of gender in the HCD approach was identified for further research. As shown in Chapter 2, the specified research questions which drive the research are: 1) *What is significant about young men and their sun protection behaviour*, and 2) *How can we improve young men's sun protection behaviour through the human-centred design approach?*

This research can broadly be divided into two stages. Firstly, it focused on obtaining a rich understanding of young men and their sun protection behaviour. Secondly, it focused on translating and the verification of these findings into interventions that foster sun protection behaviour in young men age 18 to 24.

As discussed in Chapter 2, firstly this research aims to develop an understanding of young men's sun protection behaviour. Secondly, it moves on to explore how gender is a factor when people approach and design objects. It also seeks to develop an extended human-centred design approach that leads to sun protection interventions. Thirdly, it verifies the sun protection interventions along with gender-aware HCD approach and new sun protection interventions for young men. Before proceeding to examine suited research methods to fulfil the outlined objectives, it is important to discuss the research methodology in reference to the theoretical position of this research outlined in Chapter 2.

3.2 Interpretivism

The paradigm of interpretivism is associated with a subjective meaning of a social action that is based on the interpretation of underlying meanings of activities and is facilitated through an empathetic understanding of what is happening (Bryman, 2015, p.49). Interpretivism is a term that denotes a strategy that everything is being interpreted all the time and it relies on research participants being seen as actively constructing and making sense of their own actions. According to Neuman (2000), interpretive methodology aims at understanding a subjective experience based on the researcher's interpretation after certain investigations of interactions and contexts chosen for the study. Through interpretivism, research participants are initiating their own actions and behaviour as a guidance that leads to the establishment of their own values and meaning. Denzin (1989) suggests that to achieve an understanding of human behaviour, there is only interpretation. For this research, the interpretivism paradigm is adopted according to the nature of the research question and the theoretical position of the research. An interpretive paradigm is associated with everything being interpreted all the time and this is in line with gender performativity. Also, HCD is an interpretive process associated with understanding the meanings people attach when interacting with products through their behaviour. This is also central to my understanding of gender which is performative and needs interpreting. And to do so, an interpretive methodology is required to identify the meanings young men attach when interacting with sun protection products in relation to their sun protection behaviour.

The conversation between the researcher and the research participants is fundamental to reveal thoughts and concepts which are the product of interviews itself. In this manner, Flick (2014, p.10) highlights the importance of this relationship and says "The interaction between the researcher and the participants leads to the generation of concepts, which are a product of the research act". In this manner, the research considers the impact of the interviewer on the interviewees to assess the new concepts, thoughts, and feelings of the participants. Robson (2002) explains how the researcher's experience and intuition also play a key role in the interpretation approach that is mainly data-driven.

An interpretive approach guides the researcher in understanding the participant's personal experience and beliefs in depth. The interpretive nature of this research

allowed more freedom during data analysis and permitted the research to evolve throughout the process of interpretation. Central to this process, reflexivity is a fundamental property guiding the researcher and research selves throughout the analysis process. Positively, there are several advantages such as the impact of a female researcher investigating young men's sun protection behaviour. As a female researcher, I could distance myself from young men and recognise the differences in their actions which resulted in noticing young men's gender aspects of behaviour. The comparison here derived from knowing my own actions in the context by looking inwards while looking outwards, not having the same gender as the male participants with different sexuality and ethnicity throughout the process of interpretation. This position as a marginalised outsider guided the researcher's own participation as an interpreter to investigate and understand differences related to gender choices in young men's behaviour.

An interpretive methodology was adopted to address the research questions outlined above. As discussed earlier, the paradigm of interpretivism is concerned with a subjective meaning of a social action that is based on the underlying meanings of activities, and it facilitated an empathetic understanding of what is happening (Bryman, 2015, p.49). This methodological position benefits this research to explore the meanings of young men's actions, motivations, attitudes and their experiences in regard to sun protection behaviour. This results in exploring the layers of young men's knowledge and experience in-depth. As discussed in Chapter 2, the HCD approach is based on the interpretation of human interactions with objects and products. Also, as discussed in Chapter 2, masculinity is about performances and attaching meanings to actions. The interpretive methodology is most suited to explore the meanings attached to young men's actions and investigates their interpretations.

The interpretive approach explores how young men attach meanings to their experiences and actions. The relationship between masculinity and interpretive methodology is related to the importance of an understanding of how it feels to be a young man and explore the meanings they attach to their actions and experiences from their perspective through interpreting the performance of others. As masculinity is about a set of performative acts, interpreting the performance of the people and attaching meanings to the artefacts, the interpretive approach assists in understanding the subjectivities of masculinities in men through the interpretation of their

behavioural patterns, social values and opinions. In this manner, Uwe Flick, (2014) points out that this approach reveals the participant's beliefs and meanings attached to their actions, perceptions, and experiences that uncovers the social construction of masculinities as their everyday practice. According to Flick "*the interpretive approach centres on the way in which human beings make sense of their subjective reality and attach meaning to it*" (Flick, 2014a). This method emphasises on understanding the meanings, perceptions, experience, and language of the individuals.

Similarly, Frosh et al. (2002, p.7) pointed out the benefits of an interpretive approach to understanding young men's actions from their point of view and the ways that different modes of masculinities are asserted and performed. In his words: *"The best research on boys as active subjects is interpretive and critical, prioritising the meanings boys attach to their actions and locating these in relation to structures or institutionalised practices embodying power relations"*. Masculinities are performed and displayed in the form of ideas, notions, language, attitudes and behavioural patterns, discussed in Chapter 2. The interpretation of the participant's activities, beliefs and behaviour result in understanding the performance of their masculinities. This research aligns the methods of observing, listening, questioning and immersing in the participants' world with an inclination towards the interpretive understanding of young men's patterns of interaction and experiences. The research methodology outlined here combines a number of qualitative research methods to achieve a broad understanding of young men's sun protection behaviour and its transformation as a result of human-centred interventions. The interpretive methodological position of the research determines the specific methods and strategies to explore subjective meanings, beliefs and values that form the participant's views range of methods are adopted in this investigation. Based on the methodology employed, the researcher's role as an interpreter is to accurately understand the participant's meanings attached to their actions and experiences. The nature of interpretive methodology is concerned with the influence of the researchers' interpretation (Flick, 2014a). For this purpose, the collected data were interpreted cautiously with a time gap in between through a recursive process. This degree of reflexivity during the interpretation of data also consumed more time. According to the aim of the research, the participants' own gender reflection while interpreting the data was considered.

The interpretative findings explore young men rather than gendered common hold assumptions. As masculinities need to be continually asserted, achieved and maintained in extremely competitive settings, the addition of a gender perspective to HCD principles contributes options that men are looking for to assert and reproduce their masculinities (Green et al., 1993). As discussed in section 1.5, research suggests that men who endorse hegemonic masculine ideologies are less likely to engage in health-positive behaviours. In this case, several factors influence men to avoid health-related behaviours as part of their masculinise identity. This suggests that men are struggled to prove and maintain their masculinities because of the importance of how they feel about their physical appearance, how they are presented in the world in their body and the replication of dominant narrative masculinities. Overall, this research will reflect on how the combination of HCD principles and understanding a broad range of masculinities in young men find design opportunities for desired health behaviour change.

3.3   Methods

A range of methods adopted to firstly explore the relationship between young men and their sun protection behaviour. Secondly, the translation of findings in interventions that fosters sun protection behaviour in young men age 18 to 24. To achieve this, there are three phases of research carried out through a range of methods. An overview of mapping the adopted methods for each research study are outlined in Table 3.1: 1) systematic observations followed by interviews, 2) participatory design sessions and 3) user testing.

Research Method	Research Studies
3.3.1 Observation and Interviews	Exploratory study
3.3.2 Participatory Design sessions	Main study
3.3.3 User testing	Design verification study

Table 3.1 Mapping of the adopted methods for each study

Initially, an exploratory study conducted through systematic observations followed by interviews discussed later in section 3.3.1. This study aimed to explore young men's motives related to their sun protection experience. Subsequently, a range of participatory design sessions was conducted through the main study. This study aimed to engage the participants in gender-aware HCD process while they designed sun protection interventions to increase their engagement in this health-related behaviour. This study adopted participatory design techniques to involve the user in the design process to meet their perspectives (Holtzblatt et al., 2005). During the study, the participants were actively involved in the ideation stage of the design process to inspire human-centred design outcomes by the participants. This phase of the research facilitates the HCD approach with an inclination towards understanding the gender patterns of the actions and interactions of young men in the context of sun protection behaviour. This approach centres on a range of activities for design input discussed in section 3.3.2 with emphasis on addressing people's needs and abilities in order to improve their experience. The final stage of the research was carried out through a user testing approach. This study aimed to verify new sun protection interventions for young men, discussed in 3.3.3.

3.3.1 Observation and interviews: an exploratory study

The main aim of the exploratory study is to explore the interactions, behaviour, motivations, and activities, of young men in their natural setting. The findings from this study reveal the sun protection practices in young men to address the study aim and objectives. This study starts with what people say or think and what they do or use through systematic observations followed by interviews. Observations aim to discover what's happening in terms of young men's actions, motivations, meanings and most importantly, understanding their actual practices on the beach.

The research methods employed also reveals different levels of knowledge including explicit and observable and tacit knowledge about the user and the contexts. In general, the levels of knowledge about the context are classified into two categories: 1) explicit and observable and 2) tacit knowledge (Visser et al., 2005). The tacit knowledge is personal and known to the user but cannot be expressed explicitly as it is linked to skills and experiences. Tacit knowledge is described as "knowledge that people can act upon, but cannot readily express in words." (Visser, 2009, p.4).

Accordingly, tacit knowledge is subconscious and exposes the deep experience of people in relation to the context through the illustration of their actions in a visual form in order to use the representations as a basis for their experiences. The explicit knowledge is defined as the knowledge that is clear and identifiable verbally, and a conscious knowledge that is recognisable through the actions of people based on facts and rules.

3.3.1.1 Data collection method

Observation is an exploratory method based on understanding people's behaviour, their actions and experiences in their natural setting (Martin & Hanington, 2012, p.34). The main aim of this approach is to explore the patterns of participants' behaviour in their natural setting through systematic observations. This approach is an exploratory and observational technique for understanding people's behaviour in context (Angrosino, 2008). In this method, the researcher observes the user in their natural setting to understand their activities, interactions and behaviour. In social science, this method is referred to as the study of human behaviour in an everyday context. In this approach, the researcher as the participant-observer interpreters the interactions, activities, and the experience in the context of a continued period that facilitates understanding and empathy with the people that are studied. Alan Bryman in the book *Social Research Methods* (2012) describes main forms of observations referred as 'Overt observation' and a 'Covert observation' in a public setting (Bryman, 2012, p.433). The definitions of overt observation show that during the observations the participants are aware of the presence of the researcher. Furthermore, Colin Robson in the *Real World Research* (2011) defines this approach as observing the potential participant's behaviour in a 'naturalistic' setting, which involves observing behaviour with unknown status of the researcher (Robson, 2011). This method is one of the most practical ways of observing behaviours, including body behaviour, to collect data and identify research outcomes although it requires extended periods of time. A particular strength of this method is to observe behaviour in the research setting that is inclined to be changed by the potential impact of the research process. In this approach, the observer's influence is avoided through covert observations to gain a deep understanding of the young men's natural behaviour. The main advantage of the covert observation is the ability to observe the difference between what people do and what people say or think through followed up interviews.

Following the identification of the outline research question 1 outlined earlier in this chapter, an exploratory study was conducted to develop an understanding of young men's sun protection behaviour situated on the beach.

The exploratory study carried out observations and follow-up 30 semi-structured individual in-depth interviews of approximately 20 minutes' duration were conducted. Interviews explore the individual's beliefs, accounts and opinions about themselves from their point of view to avoid peer influence bias in the interview process(Gillham, 2000). All the data collection for observation and interviews took place on the Brighton Beach between the East Pier and West Pier where is populated the most with young men. In this manner, the research considers the impact of the interviewer on the interviewees to understand the participants' values and interactions related to their sun protection behavioural patterns (Flick, 2014, p.14). The exploration of the participants' sun protection behaviour is achieved through understanding young men's performance and the meanings they attach in relation to their sun protection practices.

3.3.1.2   Participants and sampling method

The sampling process involves an in-depth study of the case that represents the key population for the research (David & Sutton, 2011). According to Jones et al. (2013, p.35), sampling is defined as "*the purposeful selection of an element of a whole population to obtain data relevant to study*". Accordingly, selecting a sampling strategy is associated with the methods of data collection (Creswell, 2009). From the preliminary observations, the sampling method was specified in a setting that the patterns of young men's sun protection behaviour occur. The chosen sample for the exploratory study represents a particular group that shares similar characteristics that are referred to as a homogenous sampling method. Homogeneous sampling is a type of purposive sampling technique that is focused on the specific population with common characteristics and identities including common age, gender and race. The sample size is chosen relative to when the saturation size is reached (Bryman, 2012). The primary inclusion criteria for the potential participants were the age and gender. The sample consisted of 30 male participant's age between 18 and 24. The primary inclusion criteria for the potential participants were the age and gender. One source

of weakness in this exploratory study is that with a small sample size, caution must be applied, as the findings might be less generalisable and transferable to a broad understanding.

3.3.1.3 Ethical considerations

Prior to undertaking the exploratory study (covert observations and interviews), ethical clearance was obtained on April 03, 2015 from the Faculty Research Ethics and Governance Committee at the University of Brighton. This research considered the ethical implications of maintaining privacy, safety, anonymity and confidentially of the participants and followed the University's *Guidance on Good Practice in Research Ethics*. One of the main areas of concern for this study was related to the covert observation of young men's sun protection behaviour on Brighton beach. Covert observation methods are associated with ethical concerns related to the absence of informed consent prior to the study for the participants. The following steps were taken related to the potential ethical issues that might arise from covert observation. Drawing upon the ethical concerns, the researcher attempted to respect privacy and boundaries throughout the observations. In other words, the researcher respects and avoids invading personal privacy and the individuals remain protected by anonymity and confidentiality. Also, the researcher held a name badge with the University of Brighton logo in a transparent manner.

Prior to the interviews, physical copies of the consent form and participant information sheet were given to the potential participants on the beach. The information sheets indicated all the information about the purpose of research, interview procedure and the details of the study. Initially, the researcher explained the selection criteria for the study based on participants' age, gender (young men age18 to 24) and the purpose of the research to a range of potential participants. The potential participants who took part voluntarily gave their written consent before taking part in the interview study. Upon being fully debriefed about the interview process, they were informed of their right to withdraw from the study at any time. Also, the contact details of the project's first supervisor were provided, so that any concerns can be referred to the University of Brighton. The completion of each period of research on the beach was as made known to the project's supervisor who was notified by a phone call in order to confirm

the researcher's safety. Also, the researcher was accompanied by a PhD student from the University of Brighton during the observation and interviews on the beach.

Interviews were recorded in an audio format with the permission of the participant for later transcription and stored in a secure location, to be used anonymously only for this study, related publications and presentations. The recorded data were kept private, confidential on an encrypted hard drive for the researcher. The data was kept in Mr Morris's office at the University of Brighton and it will be destroyed after the completion of the research. All measures were taken to abide by the Data Protection Act, ensuring anonymity and confidentiality.

The participants who signed the consent form for their permission were photographed to capture their sun protection practices, activities, and their behavioural patterns on the beach. The photographic images exclude participants' facial features (anonymous and pixelated if there were any facial features). All the photographs from interviewees were kept on a password-protected computer and the digital photos will be deleted 6 months after the completion of the PhD research project.

3.3.1.4 Data Analysis Method

3.3.1.3.1 Thematic analysis

The data analysis is a process that involves a broad understanding of the collected data through different approaches. These strategies are specific to the type of data that is collected. Creswell (2009, p.190), suggests the process of the data analysis from the raw data into in-depth meanings of themes and descriptions. In particular, this research follows a qualitative data analysis approach that involves the interpretation of the data based on the information that is gathered from the participants. Thematic analysis is a comprehensive research analysis tool for pinpointing themes and patterns within data (Braun & Clarke, 2006). For the thesis, data were analysed using thematic analysis through different approaches to structure, re-structure and identify patterns in the data. The following summarises the steps to conducting thematic analysis, after Braun and Clarke (Figure 3.1).
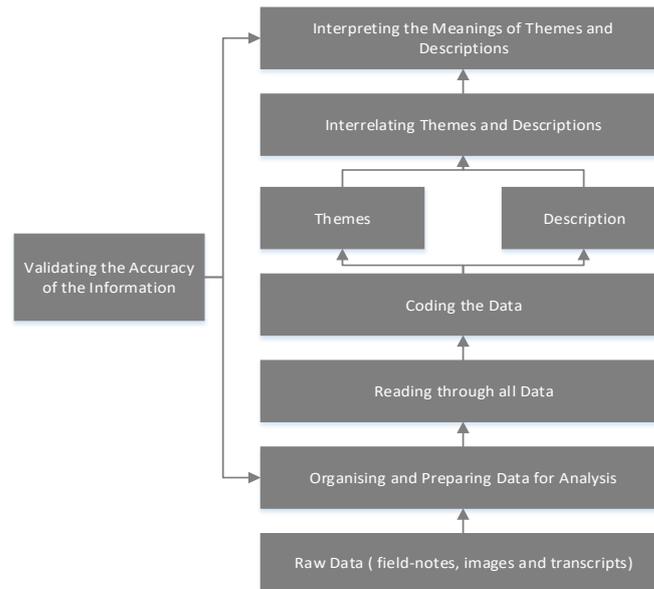
Figure 3.1 The process of qualitative data analysis (Creswell, 2009, p.185)

- Initially, the data analysis starts with the transcription of the data that provides an understanding of the patterns for the interpreter to become familiar with the data. This stage is continued with interpreting the data and requires repeated active reading of the data to search for in-depth meanings and patterns from a detailed analysis.

- Once the final set of refined codes are established, initial ideas/concepts highlight the potential patterns to develop the key themes.

- Themes should describe relevant data through a data-driven process or through the core research questions and theoretical position of research. This step is an analytical process to refine the key themes in relation to the data and the theoretical position of the research to label the emergent themes through an ongoing process.

- Then the themes with similarity with one another are extracted and the final version of themes are reviewed.

There are several approaches to conduct an analytic approach using thematic analysis including Inductive, deductive and abduction (Braun & Clarke, 2006, p.50). The inductive approach is concerned with new and general ideas and deductive is related when the key findings are directly linked with an existing theory. However, abduction

is a specific way of searching for themes along with traditional forms of deductive and inductive reasoning (Danermark et al. 2002). However, the deductive approach is aligned with the theoretical framework of the research. It emerges insights in relation to the key theories of the research (Danermark et al., 2002).

The inductive approach is not only data-driven or focused on the themes that are related to the data only but the data is gathered to identify new insights and theories emerged from the data. This approach begins with an assessment of the established themes that can contribute to data-driven findings. Also, it encourages developing new ideas and concepts that emerge based on the interpretation of the collected data. The main factor that influences what approach is conducted is related to pre-specify the data collection (Robson, 2002).

In light of the exploratory nature of this research, the final codes were determined through an inductive process and through revising and refining initial, more intuitive codes. The interviews were transcribed and coded through the inductive approach using a thematic analysis. The coding process starts with categories to meaningful segments. Robson (2011) explains how the coding process can be through a data-driven inductive process. The researcher's pre-existing experience and intuition also play a key role in the development of codes. The key patterns in the data identify the themes from the perspectives of the participants with an emphasis on understanding young men to sun protection behaviour. The key themes emerged from the coded texts describes relevant data in full details in Chapter 4.

3.3.2 Participatory design sessions: main study

3.3.2.1 Data collection method

Human-Centred Design (HCD) is a design process that seeks to put an understanding of people at the heart of design (as opposed for example to technology, or performance criteria) (Norman, 2012). Many studies have noted the importance of HCD and the benefits of this approach in various fields such as computer science, business strategies, and health promotions. Within the design process this would ultimately lead to the generation of better sun protection concepts, but within the context of this study has been used primarily as the research tool. As discussed in

chapter 2, the HCD fundamental model of human action though is based on a broad understanding of the shared values and common actions of all people. This framework holds the view that despite the given variations and experience that affect individuals, fundamentally people approach the world in the same way regarding their similarities in perception, activities and approach objects in a similar way. Based on this model, human behaviour can be predictable on many occasions. The HCD principles see gender as static and stable based on stereotypical male or female characteristics. In this context, the HCD technique adopts gender norms in the products, services and brands based on linking gender differences, gender inequalities and stereotypes as a result of the exploratory study. The next study was carried out through a series of participatory design sessions to explore the ways that participants perform their gender in the HCD design process.

This study has therefore taken a slightly different approach and is based on a combination of HCD principles combined with enhanced attention to gender and masculinity that is referred to as GAHCD in this research. This is by exploring the HCD principles based on Norman's framework of human actions and how people interact with objects. The HCD process starts with the exploration of how the users interact with the products and the exploration of how to improve the interaction between the products and the user that leads to human-centred designs. As discussed in chapter 2, this view is supported by Krippendorff (2005) relating human communication with artefacts that are concerned with the role of language that designers use in the products. This involves the physical characteristics of products as well as the signs and symbols embedded in the products that represent the language embedded in the products. The following section discusses the strategies and methods adopted for the main study that facilitates the gender-aware human-centred design process.

The research methods adopted for the main study combines a number of qualitative research methods to explore the underlying reasons, motives and barriers involved. This study takes a practical approach in the form of participatory design sessions. Although there are a number of techniques which conform to the HCD process (Norman, 2013), the adopted approach in this research uses a particular process that

includes elements of participation where the user is involved in all the stages of the design process and goes beyond the traditional concepts of design for users. This approach is known as 'Participatory Design 'or 'Design with Users 'developed in the 1970s that prioritises active user participation in the HCD process (Fischer, 2004). The primary focus of Participatory design approach is on designing with users (Schuler & Namioka, 1993).

In this approach, users are empowered and are actively engaged in activities that inspire their creative and innovative thinking. In this manner, facilitating a group dynamic by bringing the users together in the context where their experience is formed empowers their participation in developing design outcomes. In particular, the users as co-designers are empowered in the design process. In this context, placing users mainly in the design process leads to articulating new ideas, facilitates creativity through designing with users instead of designing for users (Norman & W.Draper, 1986). This leads the participants to collaborate in the design process. It also allows us to see how participants interact and behave in the design process, something that is fundamental to this research. While this study facilitates the HCD approach, it also explores how gender enactments are embedded in the participants' interactions with various products in relation to the HCD principles. In this investigation to gender awareness, the first stage of the main study is focused on the HCD principles in terms of methods of communication and interaction with physical objects while observing the participants' interactions in terms of their gender and masculinity. This stage is mainly focused on how people interact with certain objects to understand the message embedded upon the HCD principles and the participants' interactions. This is based on understanding and discovering while observing how their interaction is related to the participants' gender and masculinity in relation to the differences in the object for women and object for men that represents 'masculine' and 'feminine' attributes embedded in the objects.

The stated differences in the products through various characteristics of the products such as shape, material and colour as well as the indication of the ways to use the products are linked with masculine or feminine attributes are embedded in the language of affordances and signifiers towards a specific gender.

Also, this stage explores product language towards non-gender specific language in relation to the interpretation of the physical aspects of the products such as colours, material and shape as well as the internal meanings embedded in their interactions. As discussed in Chapter 2, the language advertised in a range of popular products such as Apple, Alessi, Dove, Nivea are advertised as gender-neutral or gender-specific towards a male or female target. Thus, this stage of the study aims to evoke the language embedded in various gender-neutral products by each participant.

Chapter 5 describes and discusses the procedure of the main study in understanding participants' attributes and their perceptions regarding their interactions in regard to the way it evokes in a particular way in relation to the participants' gender and masculinity. Initially, this study explores the interaction between the products and the participants and the language and meanings the participants perceive and interact through exploring the product language embedded in various products in relation to their gender and masculinity. This step includes group discussion to compare different compositions of product language in relation to the participants' gender and masculinity. The relevance in understanding the mode of communication between the physical objects and people in relation to the world of signifiers and symbols as the subject of a text, object or image is in evoking in a particular enactment of gender. This is focused on understanding their gender perspective, cultural norms and stereotypical motives embedded in the performance of their sexuality in relation to the HCD principles of affordances and signifiers. The interaction between the participants and the objects provides an opportunity to get participants thinking about product language, gender and how they interact and communicate with objects. This includes identifying each participant's attitudes toward each specific object and the discussion of their motives and interests. Therefore, this stage aims to explore the human product interaction in relation to 1) the attitudes toward non-gender specific products and subsequently 2) the attitudes towards the gendered product. The following questions were asked by the participants at the first stage of the main study.

- What factors attract you to this product? What are the elements of this product that you attach yourself to it or it means to you?
- Can you explain your rationale about why you would use this product

and how would you use it?

The stated questions are open-ended questions by asking 'WHY' to consecutive answers to express the underlying reasons for the participants' attitudes and to ascertain the participants' perceptions towards their interactions with various products. This aims to compare different compositions of gender norms emerged in neutral designs and gender-specific designs of products in order to evoke the language that is evoked by the participants in relation to their gender.

The main reasons in relation to the selection of products are linked with referencing young men and their popularity among young men as leading brands and explicitly representing a particular gendered language that induces language of products in a particular way such as 'gender-neutral' or 'gender-specific' for men and women. This is based on the interpretation of the products in relation to the ways people interpret the language and interact with them.

3.3.2.2   GAHCD Approach

This study also explores gender awareness in the HCD process in order to identify how the sun protection behaviour can be improved, formed and sustained through GAHCD approach generated through this research to deliver sun protection interventions. To achieve this, the next phase of the research involves participants in a participatory design study.

This phase of the research will focus on GAHCD in action and evaluate its usefulness. In this manner, the participatory design sessions would give the opportunity to the user experts' participants to generate design interventions and the evaluation of GAHCD through the exploration of how young men perform their gender practices in the design process. In this context, GAHCD is an approach using a design technique deployed in the design process. A number of design techniques would conform to the methodology adopted in this research, using a particular process that includes elements of participation and human-centred design where the user is involved in all the stages of the design process. The HCD design process includes three main stages of inspiration, ideation and implementation in an iterative process

through the divergent and convergent thinking. However, the participatory design sessions adopted particular design techniques in the HCD process using the skills of the researcher as a designer and an expert in the fields of gender and masculinity. Many design techniques aim for active user involvement to participate in the design process. These include 'Participatory design' to provide an opportunity for the user to participate in all the stages of the design process to collaborate as an expert at different levels. The conducted sessions include the stated techniques to achieve a better result through the deployment of participatory design sessions.

During the participatory design process, the researcher and the users are considered as the main experts. In the participatory design technique, the researcher will run sessions with users where the researcher who is a designer will participate equally as the users and create a group dynamic and group discussions. In this technique, users are seen as experts with active involvement as a part of the design team during the process of design to add their perspectives in knowledge development and product developments through generating ideas from their experience visually through the selection of different products in the session to inspire and integrate their ideas through a range of activities. The main advantage of this technique is to explore what is meaningful to the users. Subsequently, the co-design techniques would allow young men to take the lead and design and an opportunity to ask them why they've designed it that way. The co-design technique involves the user in the design process to meet their needs from their perception when the user is in full control and empowered in the sessions (Holtzblatt et al., 2005). In this technique, participants are actively involved that leads to successful and effective designs that are desirable by the users. Therefore, co-design sees the users as experts with their design as the final outcome of the session.

The participatory design technique incorporates co-design techniques for idea generation. On this basis, the user experts and the subject experts are able to communicate their tacit knowledge through the visual articulation of their ideas and needs. As discussed in the review of the literature, tacit knowledge is subconscious, personal and known to the user but cannot be expressed explicitly in words as it is linked to skills and experiences, "*knowledge that people can act upon, but cannot readily express in words.*" (Visser, 2009, p.4). Accordingly, tacit knowledge exposes

the deep experience of people in relation to the context through the illustration of their actions including the hidden needs that are not fully known to the user. Also, the group dynamic in the sessions will allow them to share ideas and build ideas with each other. However, a number of important challenges need to be considered in this method. Also, the impact of the moderator as a female researcher on young men's responses should be considered.

3.3.2.3 Space Preparation

The *'Creativity Centre'* at the University of Brighton was selected for this study to take place. The *Creativity Centre* is a learning space for studio-based lectures and seminars for the Product Design courses. The key theme of this space is to set out a creative space that replicates some of the experimental conditions of an environment. According to Martin et al. (2010, p.4), the Creativity Centre at University of Brighton enables the stated concepts of a creative and flexible space designed as a special space for promoting collaboration that leads to creative design outcomes. The flexibility of the Creativity Centre for the layout plan and the technology facilitates is suited to replicate an environment as close as possible (Morris, 2010). As stated in Chapter 2, one of the main factors associated with young men's natural attitude and behaviour in relation to the ways in which their gender and masculinities emerge are stimulated by the environment. Accordingly, the study space is very important for this study to replicate the environment that their sun protection behaviour occurs. This was through setting up a large curved screen projecting a beach scene created a total immersion of simulated beach environment for the participants. In this context, the combination of the space, the methods and the participants adopted for this study provides an opportunity to facilitate the HCD process with direct user involvement.

Figure 3.2 The Creativity Centre at University of Brighton (Morris, 2010)

Space has various facilities that add to its flexibility to create a setting where the patterns of sun protection behaviour occur fully engages the participants in the process as an environment where their behaviour occurs. Space provides a variety of ways that incorporate design activities into practice while the participants are able to contribute and to trace their experience in the simulated beach environment. The Creativity Centre contains movable whiteboard panels that can divide the rooms into a specific layout with chairs, tables and bean bag chairs for a relaxed environment. In addition, it contains environmental and technological features such as natural daylight coloured lighting, temperature control, interactive whiteboards, projectors, curved screen and sound system. These features simulated a 'virtual beach space' through Beach scenes projected on the walls, Beach sound and warm temperature control to immerse the participants into the beach environment and set their mindset to where their behaviour takes place.

The main layout of the space is specifically designed to stimulate the naturally occurring behaviour of the participants' performance and their interactions in a group dynamic through specific activities that enable the researcher correlates their behaviour in relation the participant's gender and masculinities. The environment is designed to make them feel comfortable and speak informally. This is very important because of the naturally occurring attitudes and behaviour in their natural setting. As Frosh, et al. (2002, p.55) note: "*masculinities are made into, and lived as, natural or essential identities*". The researcher explores what the participants think, experience and feels through the interpretation of their actions, motivations and gender enactment in their natural environment while the participants started talking informally to each other. The key element of this sage is in relation to replicate the participants' naturally occurring behaviour based on their interactions with the arranged environment and the other participants in the group linked with the designed activities for this study. The room layout was arranged and divided by the moving walls for each stage of the study.

Prior to the sessions, the researcher arranged the layout of the creativity centre space was divided into the following phases: The first phase of the study focused on obtaining the participants' perspectives related to a range of product language. As stated in chapter 2 by Norman, this stage is focused on the exploration of the interaction between the user and a physical objects through the HCD principles such as affordances and signifiers while the researcher observes the participants' interactions. This included the ways the HCD principles are perceived by exploring the gendered language that the participants attach to specific products. These products targeted at men or women are called gender-specific and the products that are targeted at both genders referred to as gender-neutral products. At this stage, similar ideas about gender were expressed by the participants. The second phase of the study is focused on the replication of a simulated beach environment where the participants can relate to their natural environment where sun protection practices occur. The thirst and final phase involve an ideation session in which the participant's design sun protection interventions. At this stage, the participants co-design new ideas and design interventions that promote sun protection. Each group engaged in the same activity arrangements and moves to the stated phases fully discussed in Chapter 5. The room layout also included yellow tone lighting, heating to keep the participants comfortable and represent a beach, sunny environment. The same space layout was arranged in advance for each session prior to the start. Also, it was considered that multiple recording cameras would be useful for recording the data-driven by the conducted sessions. The video data is beneficial for this study as it maximizes clarity to underpin the naturally occurring behaviours and interactions of the participants in the context. Each session of the study was conducted with relatively small samples (4 to 6). This has allowed the relative group dynamic discussed in Chapter 2.

The main aim of the designed space is to encourage engagement and contributions from all the participants. These activities form the basis for the researcher to observe the participants' interactions through how they engage in the activities. Each phase of the study required a range of materials for space preparation discussed in Chapter 5 and briefly outlined below:

1. Phase 1: table, chairs, camera, projector, gendered and gender-neutral products

2. Phase 2: bean bags, camera, curved screen projector, beach scene, sound system, beach equipment such as towel, flip-flop, sunglasses, hat and sun screams

3. Phase 3: table, chairs, camera, projector, moving wall whiteboards, drawing kits.

Figure 3.3 The space layout for Phase one (above), Phase two and Phase 3 of the main study from left to right (Author's photograph)

3.3.2.4 Participants and sampling method

The main criteria for selecting the participants is in relation to the demographic factors including their age and gender. Since the nature of the methods including participatory design requires small groups of participants for the more focused and in-depth result, each session of the study involves direct user involvement with 4 to 6 participants. The participants are divided into two main categories including the users who are experts in the context and the subject expert.

As the nature of the methods requires small groups of participants for the more focused and in-depth result, each session of the study will be face to face with 4 to 6 participants. The Participants will be recruited from the University of Brighton for a selection of young men and women age 18 to 24. Criteria for selecting the groups are as follows:

- **User Experts:** male-only group: male participants age between 18 and 24

- **User Experts:** male and female in the mixed-gender group: male and female participants age 18 and 24

- **Subject Experts:** male and female experts from the fields of design, gender studies and skin cancer health studies

The session with the 'Subject Experts' explores the ways the experts imbricate their gendered perspectives in the HCD process. The outcome of this session would benefit this research in reflecting the expert's perspectives towards the design of sun protection interventions for young men. For this purpose, the potential participants will be recruited from the areas of design and gender studies apart from their age and gender criteria. The subject expert group were recruited by email invitation. The email invitations were circulated to all the experts in the fields of design and gender studies at the University of Brighton. As a result, two designers (male) and one expert from the gender studies (female) consented to take part.

The sessions with 'User Experts' will include 4 to 6 young men in the male-only groups in comparison to sessions that include males and female in mixed-gender groups, focusing on how men represent their ideas while interacting in a mixed group. The difference between the male-only group and the mixed-group revealed the differences that young men account for themselves in relation to their performance of gender and masculinity. The comparison of the sessions with male-only group to the sessions with mixed-gender group will demonstrate how male participants age over 18 express their values and beliefs in relation to male-only sessions or the mixed sessions. These sessions will include 4 to 6 male participants in a male-only group in comparison to sessions that includes 2 to 3 male participants and 2 to 3 female participants in a mixed-gender group, focusing on how they represent their ideas while interacting with female participants. The difference between the single-sex male group and the mixed group is able to reveal the differences that male participants account of themselves in relation to their performance of gender and asserting their masculinity in the design outcomes. In addition, subject experts' GAHCD sessions will be conducted that aims to explore their opinion and expertise in the fields of design, gender studies and skin cancer specialist for collaboration to respond to the design outcomes developed by the participants. The outcome of this study would benefit this research in reflecting male's needs, values and experiences through the GAHCD approach that would address the sun protection as a health-related problem.

Initially, a pilot session conducted at the Creativity Centre, the University of Brighton in order to examine the process, the space with the potential participants and the required time for the sessions. The participant's sample size for this study consisted of 31 participants, segmented into eight groups. The participants were recruited through emails across students at the University of Brighton. In regard to the data saturation point, 8 sessions were conducted including 4 to 5 participants with five mixed sessions and three male-only sessions. This included 24 male participants and 7 female participants detailed in the following table (table 1). The mixed-gender groups were conducted to provide a comparison with the male-only groups that lead to the exploration of gender dynamics in terms of asserting their masculinity. This was supplemented by the researcher observing the participants interacting with the products, with each other and the environment. The concept of the environment relates to the participants' interaction with a physical space that is vital to enhance the participants' creativity, engagement, collaboration. For this study, a simulated naturalistic environment plays a key role in to adjust the participants in an environment where their beach experience takes place. It is important to acknowledge the ethical implications of the stated strategies to clarify the consideration of potential risks prior to commencing the studies.

3.3.2.5   Ethical Consideration

For this research, ethical approval was obtained from the School of Engineering, Computing and Mathematics ethics committee at the University of Brighton in January 2017. In order to address the potential risks related to the main study and the verification study, the following steps were taken prior to commencing the study (see appendix 11.4 and 11.6).

	Ethical risk assessment
1	The sessions will be recorded: The consent form will be distributed to participants that are interested in taking part with their permission for video recording the session. Any potentially identifying features will be

	pixelated or cropped if the recordings get publicly displayed. All the recordings will be password protected on the researcher's computer at the University of Brighton. The video recordings will be used for further analysis of the participants' actions, interactions and their body language during the sessions
2	Any damage caused by the accidental displacement of the Camera- The camera will be placed in a secured area with cables taped on the floor and a protective case.
3	The participants who are willing to know about skin cancer signs and symptoms will be advised to see a dermatologist at NHS.
4	The researcher and participant's safety: The sessions will be held at the University of Brighton (a seminar room) during the university opening times.
5	Charged mobile phone in the case of emergency for the researcher with University card and a letter from the faculty with the name of the researcher and the purpose of research. The completion of each session will be made known to the project's supervisor (Dr Mark Erickson and Mr Richard Morris) who will be notified by a phone call in order to confirm the researcher's safety.
6	A PhD researcher from the University of Brighton will assist the researcher during the sessions for notetaking.
7	It is possible that a participant in a group would know of someone with skin cancer or may have had cancer or cancer checks themselves. Raising this in a discussion group might induce some distress. Participants will be advised in the participant information sheet that this is a potential risk. Participants appearing distressed in the session are free to take a break if they wish or to withdraw their participation at any time. In this matter, a fact sheet would be ready to hand out about counselling sources (The University of Brighton and NHS) at the time and a quiet place set aside.

8	The discussion of people's gender is a sensitive topic. Other than asking participants if they would be willing to identify a gender category at the start of the research, and reminding them that this is optional, the researcher will not ask any further questions regarding the participants' gender identity and gender relations.

The potential participants will be recruited through distributing flyer at university of Brighton with details about what the study entails. The participant information sheet along with the consent form will be given to the participants who voluntarily participating in the study.

These sessions will involve the participants sitting around a table with their names labelled, the facilitator (the researcher and note taker), and video recording camera and a range of materials such as paper, scissors, pens, and pencils. All the sessions will be recorded for further analysis of the participants' actions, interactions and their body language during the sessions.

As the sessions are progressed, the researcher evaluates participants' actions through indirect questions with a range of discussions about products specifically targeted at men and women, and various sun protection products to explore different aspects of their gender enactments and its relationship to design in action. This means exploring how young men perform their gender by designing an intervention that is desirable to them. In this matter, the participant's actions, interactions, values, beliefs during the session would relieve their implicit needs in line with their gender identity.

3.3.2.6   Materials and procedure

As the sessions proceeded, the researcher evaluated the outcomes through an iterative and recursive process. The sessions included presentations, discussions and visual materials and participants presenting their design outcomes explaining their rationale and discuss their ideas with their peers. The participants will discuss their experience to design an intervention for the desired sun protection behaviour. In this context, analysing their ideas would provide guidance in evaluating GAHCD approach. These sessions will involve the participants sitting around a table with their names labelled,

the facilitator (the researcher and note taker), and video recording camera and a range of materials such as printouts, posters with images, paper, scissors, pens, pencils, clear adhesive tape, and glue stick for sketch prototyping.

As the sessions progressed, the researcher evaluates participants' actions through indirect questions with a range of discussions about gendered products specifically designed for men and women, and the sun protection products to explore different aspects of gender and its relationship to design in action. This means how young men perform their gender by designing an intervention that is desirable to them. The study structure consisted of various participatory activities with a specific environment preparation to engage the participants in the HCD process. The study environment replicated the beach environment where their sun protection practices occur. The simulated beach environment immerses the participants in their experience on the beach helping the participants to express their behaviour that naturally occurs. While they get familiarized to an environment with existing experiences, they will express their values while the researcher observes their body language, gestures and interactions with respect to their gender and masculinity. The first stage of the study aims to explore the participants' opinion on the language embedded in various products which are discussed later in this chapter. Various products were selected to prompt the language of products towards a specific gender or both genders.

The researcher presented various products targeted at both male and female genders. Meanwhile, the researcher observed the participants' interactions in a male-only group in comparison to the mixed-gender group and the experts. This led to comparing the similarities and differences of their attitude toward specific objects. The objects are specifically chosen by the researcher to understand the product language embedded in the objects that are perceived by the participants in relation to the meaning they attach to the objects and the researcher's interpretation of their meanings. These prompts are selected to reveal the behavioural indicators in relation to the participants performing their gender, sexuality and masculinity in the group. The materials needed include representational tools (inspiration cards, graphics, posters, tools for writing utensils, paper, sticky notes, whiteboards, Sketching and Prototyping), Write on walls for sketching, coloured Markers, pen and papers and scissors for sketch prototyping. This stage involves ideation, sketching and prototyping, future scenarios, ideas (35 minutes): The ideation stage empowered the

participants generating ideas using visual communication tools such as writing utensils, paper, sticky notes, and whiteboards. The participant's ideas were inspired and elicited from the participants through the materials provided in the room such as whiteboards, sketch, to design new sun protection intervention.

3.3.2.7 Data analysis method

This section moves on to discuss the analytical procedures that lead to the findings which emerged in this investigation. The study produced a range of data including images, audio, video recordings and observation notes. All the conducted sessions were recorded on the digital video recorder and an audio recorder and transcribed. The video recording of the session enables the researcher to interpret the participants' actions in full details and analysing their natural attitudes in relation to the participant's words, attitudes, perspectives, motives, and their naturalist body and gestures. As discussed in the previous section, the main layout of this study was designed to replicate the beach environment. This feature of the study stimulated the naturally occurring behaviour of the participants' performance and their interactions in their simulated natural setting in order to reveal their natural attitudes and experiences. According to Vatikus (2005), the notion of natural attitude defined by Alfred Schutz refers to the way human beings develop characteristics of the world in regards to *naturality* or as it is encountered by people living in it (Vaitkus, 2005). With this in mind, thematic analysis was conducted during the process of interpretation, the researcher shifts her role to a 'design interpreter' investigating the gendered elements through the HCD elements in relation to the participants' gender and masculinity.

3.3.3 User testing: design verification study
3.3.3.1 Data Collection method

A *"user testing"* method attempts in verifying user expectations against a designed product (Martin & Hanington, 2012, p.74). This method is focused on human expectations against the designed product as they interact with products or prototypes. Norman describes user testing an approach for evaluating products aligned with the user's needs through direct user involvement in the HCD process (Norman, 2013). This method provides an opportunity for the implications of the user's feedback

focused primarily on the elements of usability and desirability. With this in mind, the final study of the research serves a verification purpose to assess the designed sun protection interventions by the main study participants. Accordingly, the verification study was guided with a focus on the participants' reflection and evaluation of the sun protection interventions discussed in Chapter 8. The core materials and the procedure is described in Chapter 8.

3.3.3.2 Participants sampling method

According to the aim of the study, this study consisted of male participants' age 18 to 24. A small sample was chosen to facilitate a group dynamic according to the aim of the study. The primary inclusion criteria for these participants were based on their gender and age within 18 to 24. Four male participants age 18 to 24 with product design students from the University of Brighton.

The male participants for this research were recruited from young men on the beach for the 'exploratory study', and product design students at the University of Brighton for the 'main study' and the 'design verification study'. The selection criteria for the male participants were based on their gender and age. There is no significant difference between young men on the beach and undergraduate design students as the main criteria for the selection was based on their gender and age. Also, the male participants are mainly in a mixed group and male product design students won't differ to the young men on the beach. This is clearly evident from the similarities in the findings.

The envisaged product design participants were students with a design background, for the main study and the design verification study' located at the Design and Creativity Studio at the University of Brighton. This space is mainly used by product design students. The Design and Creativity Studio at the University of Brighton is the students' working space that provides a creative and collaborative environment (Morris, 2010). This space was particularly selected as so the participants feel familiar and comfortable to design, create and engage in group activities.

3.3.3.3 Data analysis method

The study produced a range of data including images, audio, and video and observation notes. The session was recorded on the digital video recorder and an audio recorder and transcribed. The video recording of the session enables the researcher to interpret the participants' interactions in full details with the sun protection interventions discussed in Chapter 8. During the analysis process, the researcher shifts her role to a 'design interpreter' investigating the gendered elements through the HCD elements in relation to the participants' gender and masculinity. With this in mind, this chapter also intends to demonstrate the design outcomes emerged from this study to improve low levels of sun protection in young men that results in the prevention of skin cancer. Chapter 8 describes and analyses the participants' response in full details using a deductive approach. The key themes emerged from the data were analysed based on the existing theoretical position of the research, discussed in Chapter 8.

3.4 Conclusion

The current HCD model is unable to consider gender relations and reproduction regarding different modes of masculinities that need to be considered. The concept of gender is not static as male or female but how people are perceived as masculine or feminine in relation to their experiences over time. As stated in this chapter, performing gender involves how individuals are perceived by others rather than how they think of themselves.

Although HCD is the most comprehensive account of design principles that explores human needs, this approach centres gender as static and fixed. In this manner, the combination of HCD with understanding gender regarding masculinities would address a different range of gender impacts. This can be achieved through the use of the interpretive approach to reveal the emerged masculinities in the perceptions, beliefs and identity of young men. As mentioned in the previous section, the interpretation of these factors reviles their performance of masculinities from perceptions and experiences of men.

3.5 Summary

This chapter discussed the interpretive methodological approach adopted to explore young men's experience sun protection behaviour. In addition, it showed the suited methods for each phase of the research studies to address the identified research questions including 1) Exploratory study, 2) Main study, and 3) Verification study. The following chapter discusses the exploratory study conducted through systematic observations followed by interviews to investigate the sun protection behaviour in young men on the beach.

4 Exploratory study

This chapter describes the exploratory study designed to investigate the sun protection behaviour of young men at the beach, using systematic observations followed by interviews. It concludes with the preliminary findings from thematic analysis.

4.1 Introduction

An exploratory study was carried out to explore young men's sun protection behaviour. The researcher went to the field where the behaviour occurs to understand the factors that impact their sun protection behaviour in this particular context. Systematic observations were conducted through the observer's record of young men's physical behaviour and how people interact and do things by taking notes and photographs. This includes understanding their practices situated in everyday life followed by speaking to them to understand the underlying reasons for their behaviour from their point of view.

The preliminary results of the exploratory study are presented in this chapter including the key themes that affect young men to behave in a particular way. The results obtained from the preliminary analysis shows the aspects of hegemonic masculinity and the fluid aspects of masculinity in young men's behaviour. This includes how they expressed their masculinity in various modes and how it's been performed through their different practices in relation to what they are doing on the beach.

4.2 Systematic observations and interviews

Observation is an exploratory technique in understanding people's need in context (Norman, 2013, p.222) and enables understanding of the nature of the problem. In this method, the researchers visit the user in their natural setting to understand their activities, interests, motives, and actual needs. The main advantage of observation is the ability to observe the difference between what people say and people do. The main aim is to explore the patterns of participant's behaviour in their natural setting through systematic observations. Systematic observation is an exploratory and observational

technique in understanding people's behaviour in the context (Angrosino, 2008). In this approach, the researcher as the observer interpreters the interactions, activities, and the experiences in the context of a continued period that facilitates understanding and empathy with the people that are studied.

Interviews give the opportunity to individuals to express their experience and the meanings attached to their intentions openly in details, it reveals the participants personal and social values, interactions and their sun protection behavioural patterns. The exploration of the participants' behavioural patterns is accessible through understanding young men's performance and the meanings they attribute in relation to their activities. In this context, the researcher's role is to interpret the participant's social practices, interactions and cultural perceptions. Also, the interviews itself give an opportunity to the participant to construct and reconstruct their gendered identities as they talk to the interviewer and provides an opportunity to the participants to produce a version of themselves and assert their emerging masculinities (Flick, 2014, p.14).

4.3   Preliminary observations

Initial scoping observations have determined the location of research on Brighton beach, this being between the East Pier and West Pier which is frequently populated by young men due to the leisure activities available such as beach sports, water sports, bars and restaurants, shops and pier attractions. In addition, according to the World Health Organization (2016), the sun exposure is more extensive on the beach due to the reflection of sun's ultraviolet radiations from sand and water, and it is highly likely that individuals have less skin protection due to the nature of clothing that is worn on a beach. According to Gilchrist et al. (2014), the beach is considered a place of liminality and leisure. A beach is a place that is neither land nor sea and is discussed as a liminal or in-between space where facilitates a flow from one moment to the next (Preston-Whyte, 2004).

This means it is considered as a social zone for personal and elusive behaviours, activities and interactions outside the everyday work-life and norms and gives access for people to form and assert their social roles.

Brighton is considered as one of the most popular seaside resorts in the United Kingdom. This place became the target for visitors and tourists as a bank holiday

destination that is associated with pleasure, glamour and excitement (Shields, 1992, p.31). The culture of beach or seaside started from the early 19th century when the beachside architecture started near the seas in the large cities. This was the beginning of the contradictory relationship between swimming and sunbaths with attractiveness and medicinal benefits. Later, Brighton beach was used for medicinal benefits of sea bathing as a part of the beach experience for health and well-being (E.g. vitamin D). The combination of nature and culture and freedom of the beach associated with leisure and joy in the beach environment encouraged people to spend more time on the beach. These factors demonstrate the transformation of the beach as an integral part of people's identity as a land with cultural, social and economic characteristics Shields, 1992).

4.4 The procedure

The systematic observations were conducted on a particular area at the Brighton Beach where is populated mostly by white-skinned young men. Initial scoping observations have determined that the beach is populated by young men with different demographic factors. These factors include their ethnicity, social class and occupation. On this basis, the division criteria include age, gender, occupation and ethnicity-based on white young men's aged 18 to 24. These include a particular group of young men that share similar characteristics such as age, ethnicity that spend time on the beach for different purposes. On this basis, three main categories of young men were selected from the preliminary observations included:

    1) Casual workers on the beach (see Figure 4.1)

    2) Students (see Figure 4.2)

    3) Leisure and sports seekers (see Figure 4.3)

Brighton Beach is a social zone for young people for sunbathing, playing sport and social activities (Figure 4.2). Participant observations (covert) were conducted at Brighton beach between 11:00 AM and 13:00 PM when the sun UV radiations are at their strongest (*Skin cancer incidence statistics*, 2016) over three weekends (6 days) between Mid-July and Mid-August 2015. Each weekend, data were collected through two-hour observations of young men's activities providing a detailed account of their sun protection behaviour. The observations were conducted based on observing small groups of people, and the observed data were recorded systematically through a framework that categorises the observed data in five categories of activities,

environments, interactions, objects and users. The interpretation of the young men's objects, application of sunscreen and their behaviour were recorded through field notes (see appendix 11.2).

Table 4.1 Group 1, casual workers on the beach such as the lifeguards (Authors' photograph)

Table 4.2 Group 2, Students on the Brighton Beach (Authors' photograph)

Table 4.3 Group 3, leisure and sports seekers (Authors' photograph)

Through the systematic observations, the research observed young men's interactions, physical representations, and their practices in terms of their behaviour and product use including sun protection concepts. Although this is the main criteria for the data collected through observations, the researcher explores other factors that explain what's happening in the research setting. This includes the exploration of the current sun protection behaviour by observing their activities and objects. The collected data were recorded through taking notes, photographs for further analysis of the gathered data and also using a framework for recording more information through the 'AEIOU' framework (Martin & Hanington, 2012). In addition to the observer's notes, this framework categorises data into five main taxonomies of activities, environments, interactions, objects and users (Figure 4.1).
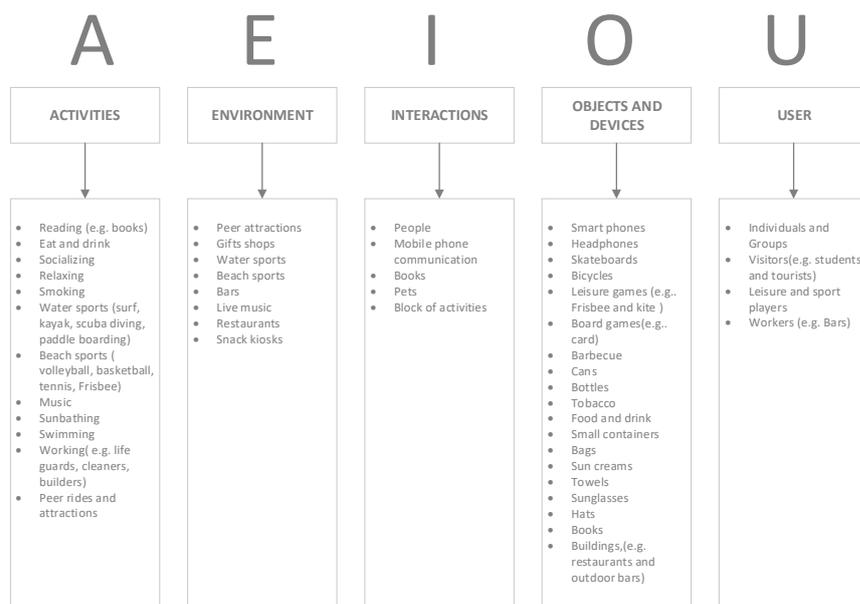
Figure 4.4 The AEIOU framework used during the observation notes

The collected data through the observations include recording each group's similarities and the differences in relation to their different practices on the beach.

Subsequently, direct observations were conducted through interviews from 1:00 PM to 3:00 pm from the observed participants. The interviews were conducted with 30 male participants age 18 to 24 on Brighton Beach to talk and explore the information about what they say and express their experience. The data were collected through 30 semi-structured interviews from 1:00 PM to 3:00 PM at Brighton Beach between the East and West Pier based on the location of observations. In particular, the participants have been selected based on the observational findings. This included 20 minutes of semi-structured interviews with the information about their experience, thoughts and feelings. The interviews were recorded with a digital voice recorder and taking photographs to capture the participant's objects, activities, and their behavioural patterns (Figure 4.5) with the participants' permissions in advance. For further information on the ethical procedure see section (4.12).

Figure 4.5 Photographs of the interviewees on the Brighton Beach (authors' photograph)

The interviews were focused on how and why factors that utilise the depth through the participant's perspective with the flexibility of response to complement observations. One of the key advantages of interviews is the transcription of the data. This process clarifies the themes and insights of what people know and how they think and feel (Robson, 2011). The fundamental question during the interviewing procedure is to ask *why* in order to identify the key insights during the process of data collection. However, there are certain limitations associated with the use of research interviews, as it requires an extended period for clarification and modifying the transcription without the researcher's reflection on the data. In addition, accurately comprehending the opinion of the participant requires a high degree of interpretation by the researcher. The collected data through interviews were transcribed and analysed during the data collection process. In addition, during this process, the researcher's thoughts, feelings and experience were recorded throughout the process for an in-depth interpretation of data.

4.5   The data analysis process

As discussed in Chapter 3, the data analysis is a process that involves a broad understanding of the collected data through different approaches. In particular, this research follows a qualitative data analysis approach that involves the interpretation of the data based on the information that is gathered from the participants. The collected data were analysed through thematic analysis (Braun & Clarke, 2006), as it is particularly suited to capturing the key themes from the interviews and the patterns of the participant's behaviour to attribute coding that establishes meaningful themes. Initially, the data from the observations and taped interviews were transcribed and coded using thematic analysis framework in order to gain insights into identifying and analysing patterns and themes from the perspectives of the participants with an emphasis on young men's lived experience of sun protection behaviour. The thematic analysis offers the most comprehensive empirical analysis of interviews. Although this method emphasis on analysing the data in detail, it can cover the broad aspects of the research themes to capture how people perceive the world. The preliminary analysis of data with the key themes emerged is demonstrated in the following section.

The key themes emerged from the data can be identified through two main approaches in the thematic analysis: 'inductive' and 'deductive'. An inductive approach is referred to as a data-driven approach that means it refers to the themes that are linked with the data itself. In this approach, the data is specifically collected to identify new insights and theories emerged from the data. On the other hand, the deductive approach links the emerged themes from the data to the existing theoretical position of the research. On this basis, the deductive process of coding the data fits into the pre-existing theoretical frame extracted from the literature. In this study, the key themes emerged from the coded texts describes relevant data using a deductive approach. The deductive coding process involved labelling the transcribed data within the patterns in relation to the literature to provide coded texts into potential themes. On this basis, the key themes emerged from the data relevant to each theme covered in each interview are exposed in five main categories outlined below.

4.6 Theme 1: peer-influence

It is apparent from the interview material that participants were concerned and feeling pressured regarding their acceptance by peers. Some participants also mentioned their main motivation that influences their sun protection behaviour is based on their friends and family. In this manner, exploring peer-group relations would map out the formation of their behaviour in relation to normative meanings that men construct by their peers. This includes the pressure they receive from their male peers to conform to their gender roles into dominant modes of masculinity. For example, as demonstrated by Frosh in chapter 2 of this thesis, peer pressure on young men makes them enact their gender differently (Frosh et al.,2002,p.86). This means popular ways of being a young male is varied in relation to the social context such as being in male peer groups. In this manner, Frosh demonstrated his findings that men self-represent themselves through '*just performing*' in relation to their peers. The role of male peer groups is essential in the formation of dominant modes of masculinity and their differences in opposition to femininity such as "*avoid doing anything that is seen as the kind of thing girls do*" (Frosh et al., 2002, p.16). In their words commented on their engagement for sun protection behaviour with direct reference to their relations with peers (Interviews):

"I don't protect myself from the sun as none of my friends cares about sun protection"

"I don't go in the shade because I follow my friends and stay in the sun all day"

"I feel uncomfortable to apply sunscreens in front of my friends"

"Everyone else wants to come to the beach and stay in the sun and I come with them"

4.7 Theme 2: hegemonic masculinity

All the participants demonstrated that they actively know over-exposure to the sun's UVR may lead to the development of skin cancer. However, it is apparent that they are in denial and consider themselves as being strong, invulnerable and enduring. In this manner, the influence of males' gender characteristics such as 'hardness' referred to hegemonic masculinity discussed in chapter 2 of this thesis. In this manner, Frosh also indicated that *"there was strong agreement among the boys we interviewed that 'popular masculinity' requires attributes such as 'hardness', antagonism, sporting prowess and fashionable style."* (Frosh et al., 2002, p.56)

On this basis the dominant cultural modes of masculinity in relation to power and feeling of superiority symbolises toughness and the ability to endure pain in men, So illnesses can be perceived as a challenge that indicates weakness or defeat (Mathewson, 2009, p.3). Therefore, young men who identify strongly as masculine will probably be less likely to engage in health-related behaviours such as sun protection. In their words from the interviews they deny the pain from their sunburned skin:

"I get sunburned every year and it's usually not painful"

"I get a sunburn once a year, in Brighton while working / Sunburn is normally mild"

"I just deal with it, it is normal to have a sunburn"

"All my colleagues get sunburn; we deal with it"

"I don't get burnt bad enough to consider doing anything differently and it goes after a few days"

"All my colleagues get sunburn we just get over it"

"Sunburn is never bad; it's just catching the sun"

> *"I know when the sun is enough for me, it won't happen to me"*
>
> *"I've been alive 21 years in the sun and I know what burns me and what doesn't"*

Sunscreen was the most common way of sun protection among the participants. The impact of hegemonic masculinity is apparent in other forms indicating that "*Boys must maintain their difference from girls*"(Frosh et al., 2002, p.16). In general, the characteristics of masculinities contradicts the use of sunscreens. The male participants stated that sunscreens are greasy, time-consuming and feminine. In their words, their gender enactments and masculinity are opposed to the application of sunscreen. As they said:

> *"I don't like a feeling of creams it makes you feel greasy and it smells girly"*
>
> *"There are no male-oriented sunscreens"*
>
> *"I prefer putting something more convenient and less time consuming and less messy as I'm just lazy to put on sunscreen"*
>
> *"Applying sunscreens on my body is not masculine and it's hard to get even coverage without others to help"*

4.8 Theme 3: physical appearance

The participants' desire for a tan indicates the recent transformation of men's physical appearance that promotes normative beliefs regarding tanning that is healthy. As masculinity is about physicality, they want to fit into the characteristics of physical toughness and self-confidence linked with the ideal masculine body. The importance of how they feel about their physical appearance is linked with the way men prove or assert their masculinities. As stated by Connell in chapter 2, if this thesis, men prove their masculinity through their physical appearance. This can be linked with tanning for their physical appearance rather than health-related purposes. In their words regarding why they want to get tan linked with their self-confidence as they mentioned that tanning makes them feel healthier and being attractive such as:

> *"It's healthy and attractive to be tanned"*
>
> *"Everyone looks better with a tanned skin"*

"Being brown is a nice bonus because it looks healthy"

"Being tanned makes you feel healthier comparing to the pale skin"

"I never go to the beach to get a suntan but I like it to get the colour that I get from the sun"

"Being pale is sickness and darker skin is healthier as I look more attractive with darker skin"

4.9 Theme 4: lack of motivation

As Frosh suggests that *"the greater the men's endorsement of hegemonic masculinity, the less likely it is that they will engage in health-positive and help-seeking behaviours"*. Therefore, the main features of hegemonic masculinity to restore the image of the male's dominance results in lack of motivation to engage in health-related behaviour such as sun protection. Also, other risk behaviours including drinking and smoking were noticeable among young men on the beach. This increases the chances of adopting added risk behaviours including alcohol consumption and tobacco use that contributes to the lack of attention, forgetfulness, unpreparedness and inconvenience. The observations show that most young men pull out their shirt and drink with their peers on the beach. This shows the desire to have freedom, joy and pleasure in the beach environment makes the area a comfort zone for young men.

"Drinking makes you forget to apply the sunscreen so I forget to put sunscreen and some time to take my sunscreen out with me"

"I'm usually not prepared when I go to the beach but when I go hiking I take my sunscreen"

"I try to remind myself to wear sunscreen but when I'm out of the water I forget it easily"

4.10 Theme 5: weather

In addition to the stated factors, the cloudy weather in the UK also contributes to people avoiding sun protection such as applying sunscreens or seeking shades. The majority of participants believed that clouds offer protection against the sun's UVR. However, according to the Cancer Research UK (2016), clouds absorb UV radiation

and reduce its strength, however, around 40%-50% of UV radiation passes through the clouds. This means the damage by the sun's UVR to the skin is also caused by the cold and cloudy weather condition. Conversely, the participants believe that clouds offer sun protection as their words are outlined as followings:

"England is always cloudy and not hot enough to put sunscreen, the sunburn is mild"

"When we go on holiday somewhere hot like Greece, I won't go out in the sun between 11 and 3 because the sun is more powerful"

"On holidays, I cover-up because the sun is stronger and puts more sunscreen if I'm in a sunny place I behave differently but not in Brighton"

"I don't feel the heat to wear sunscreen, Brighton is windy and cold"

"In the UK I never put sunscreen because it's always cloudy"

"I never seek shade in the UK because it's mostly cloudy"

"I don't like being unprotected in the sun, I will always be under the shade, but in the UK sun doesn't make me feel that hot so I would like to stay out of the shade"

"I never seek shade in the Brighton beach, because it is not sunny enough to stay in the shade"

The comparison in the similarities and commonalities in the key themes emerged through the analysed data, the similarities and commonalities among all the groups were more significant than the differences such as the external factors that contribute to the current unhealthy sun protection behaviour. The observational data suggest that tobacco use and alcohol consumptions among young men contribute towards spending excess time in the sun. According to the group 2 (students), the desire to have freedom, joy and pleasure on the beach environment makes the area a comfort zone for them that increases the chances of adopting other risk behaviours including alcohol consumption and tobacco use. In their words: "Sun makes you feel drunk quicker". This can be influencing the sun protection behaviour and it contradicts the current sun protection interventions. Also, young men's characteristics such as unpreparedness, inconvenience, and forgetfulness impacts their sun protection behaviour as the majority of the participants stated that they often forget to use sun protection and that sunscreens are greasy, time-consuming and expensive. In this manner, Group 3 which

are the leisure and sports seekers also stated that they are often unprepared for sun protection and they forget to apply sunscreens. However, the participants from group 1 (e.g. the lifeguards) provided positive factors that contribute to spending excess time in the sun including social interactions at work, and the sports activities. The gathered data shows the similarities in men enacting their 'hegemonic' masculine behaviour through inhabiting various performances.

4.11 Findings

The results obtained from the preliminary analysis of the gathered data through observations followed by interviews demonstrated that young men have shared versions of masculinities with similarities through conforming in different practices. The similarities between the groups include their values and beliefs regarding the inconvenience of using sun protection indifference, desire for a tan for their physical appearance and acceptance by peers. Such as how individuals express their masculinity in different modes and how they are perceived by their peers and others and how they think of themselves.

The findings also impact the gathered data on the researcher's understanding of masculinity. This includes the enactments of masculinity and sexuality that is relational to the context and the practices by young men on the beach. The preliminary findings demonstrate how masculinity is performed and how it becomes part of their sun protection behaviour. Their practices of being with their peers, using mobile phones, and products in relation to their gender. Therefore, the preliminary findings show the impact of various versions of masculinity on young men's sun protection behaviour. In understanding young men, it is important to understand the gender impacts on their behaviour. In this manner, the concept of masculinity aids this research to explore the underlying reasons for young men's poor sun protection behaviour.

4.12 Limitations

It is important to consider the researcher's influence during the interaction between the researcher and the participants and the interpretation of the transcripts of the interviews. The researcher's role as an interpreter specifies the major themes related

to the research abstracted from the collected data. Therefore, the data was interpreted with cautiousness because of the researcher's potential perspectives including standardised outcome, and misinterpretation may result. In this manner, the researcher ensured to interpret the data with accuracy and correctness value through an iterative process with time-lapse (Creswell, 2009, p.199). In addition, as a female researcher, I could distance myself from young men and recognise the differences in their actions which resulted in noticing young men's gender aspects of behaviour. The comparison here derived from knowing my own actions in the context by looking inwards while looking outwards, not having the same gender as the male participants with different sexuality and ethnicity throughout the process of interpretation.

4.13 Conclusion

The key themes emerged through the data transcription process from the preliminary findings suggest that participants' behavioural patterns and attitudes tend to reflect that gender and masculinity are very important. As determined earlier in chapter 2 of this thesis, hegemonic masculinity feeds into poor health-related behaviours and denial due to the main symbols of hegemonic masculinity such as independence, strength, and lack of vulnerability. The results obtained from the preliminary analysis of the interviews provide a range of viewpoints from the participants that are associated with various types of performing gender and their masculinity. The exploratory study data collected through the conversations between the interviewer and the participants while enacting different versions of masculinity through the reorientation of themselves. In this context, the discussions between the interviewer and the interviewees account for enacting the various type of masculine identities in relation to the interviewer's insights and the interviewee's response. The comparison between the interviews indicates the relation between gender performances concerning the participant's response.

The preliminary findings suggest that the difference between the participant's response and their observed behaviour is in relation to the social context and their peer relations. Furthermore, it reveals the formation of individual's gendered identities as performances in relation to the different contexts including their identity in peer groups and as their real self-associated. This is linked to perceiving male's attitude and

behaviour as much more fluid and dynamic that shapes the perceptions of masculinities. Furthermore, the preliminary findings facilitate an understanding of masculinities among the young men in relation to their gender impacts as part of the investigation of their sun-related behaviour. In order to understand young men, this study has initially analysed the beliefs and experience of the participants in-depth that reflects their performance of masculinity in a particular social context.

The main focus of the exploratory study centres on the conversational process between the interviewer and interviewees that men represent themselves and their sun protection practices in relation to the location, context and time. The study considers differing categories of gender and hegemonic masculinity that the participants produce during the interviews. The emergent themes represent young men's thinking, values and beliefs and their self-representation in relation to their gender.

The findings from the exploratory study suggest that masculinity is about performance, physicality and peer-relations, it also demonstrates various aspects of hegemonic masculinity and other versions of masculinity performed in young men's practices on the beach. Also, it suggests that masculinity is about feeling insecure in front of friends, it is about being liminal and leads to a denial that demonstrates males' gender characteristics such as 'hardness' referred to the symbols of hegemonic masculinity. Thus, gender and masculinity are significant in understanding young men's sun protection behaviour. On this basis, the pilot data leads to further investigation of young men doing their gender in developing possible insights and design opportunities that will address their sun protection behaviour from their perspectives.

4.14 Summary

This chapter described the procedures and methods used in the exploratory study to facilitate an understanding of young men's sun protection behaviour on the beach. The principal purpose of this study was to understand the sun protection behaviour and what is meant to be young men on the beach. This included exploring how sun protection behaviour can be communicated, transformed and improved, through the adopted methods to explore the key influencing factors associated with motives, drivers and barriers. The major component of this research is to address young men's needs and experience significantly with an emphasis on interaction, communication and meaning for improved sun protection behaviour through the user involvement in the entire process. This includes giving the opportunity to the participants to generate design interventions that foster sun protection behaviour in young men and the exploration of how young men performing their gender practices in the human-centred design process. The following chapter discusses in detail, as an exemplar of the whole main study research process, one study with four participants and the design outcomes that emerged, aimed to improve young men's sun protection behaviour.

5 Main Study

Following the identification of the research questions in Chapter 2, consideration of appropriate research methodology and methods in Chapter 3, and the exploratory study in Chapter 4, this chapter describes the main study. Chapter 4 established gender and masculinity as major contributing factors in the sun protection behaviour of young men. This informed the inception of the main study, which outlines GAHCD approach in action. The facilitated GAHCD approach engaged the participants in the HCD process and allowed the researcher to observe their behaviour and interactions in relation to their performances of masculinity. This process was formed through understanding the participants in their typical environment where their sun protection behaviour occurs. As discussed in Chapter 3, the study environment was designed to replicate a beach environment. This revealed participants' natural attitudes and experiences in regard to the following: 1) the replication of a social environment in which the participants perform their masculinity and sun protection behaviour, and 2) the replication of a beach environment with liminality. This led to the exploration of the participants' gendered interactions and enactments of social roles in a beach setting with fewer contextual constraints where their masculinity is displayed. In addition, this study empowered the participants as designers to generate new sun protection interventions aligned with their needs.

5.1 Introduction

The following describes the facilitated GAHCD approach through the process of participants displaying their masculinity in the HCD process. Participatory design sessions were used to engage participants in the HCD process. As stated in Chapter 3, the participatory design sessions mainly focused on the act of participation, where the user was involved in all the stages of the HCD process and went beyond the traditional concepts of 'design for users' to 'design with users'. It also involved the observation of participants in the type of environment where they typically exhibit their natural attitudes in order to gain a realistic understanding of their behaviour (Schuler & Namioka, 1993).

This study was conducted through eight participatory design sessions, each divided into three stages of data collection. The first stage of the study looked at the participants' reactions to a range of products, including the colours, language and design used on its packaging and in its advertising. The second stage of the study simulated a beach environment, and the final, third stage was the design phase where the participants themselves designed sun protection interventions. These activities empowered the participants as designers, helping them to express their creativity, while aspects of their interactions were observed in relation to their gender. This led to innovative interventions for improving the low levels of sun protection use in young men, as discussed later in this chapter.

Rather than summarising all of the sessions, this chapter takes the approach of outlining one session in detail, including excerpts from the interview transcript. Looking at a single session enables GAHCD approach to be seen in action and its inception in relation to the participants' interactions through the session and allows close examination of the process of participants acting out social roles, and the ways in which they display their masculinity or sexuality. This session, which was selected randomly, demonstrates the gendered enactments and interactions of the participants and shows how displays of gender and masculinity were present throughout the session. The final section of this chapter reflects on a summary of all of the sessions. Overall, this chapter demonstrates the major interplay of gender and masculinity embedded in participants' interactions and behaviour. It shows the hidden role of gender while the participants are engaged in the HCD process and how gender and masculinity are embedded in the participants' design outcomes.

This shows how a constructive relationship between HCD principles and understanding gender impacts can open new avenues and knowledge paths and bridge the gap between the world of designers and the world of users.

5.2 The procedure

Each session followed the same structure, had between four and six participants, and lasted for 120 minutes. The key focus was on the participants' involvement in the HCD process, while they enacted their gender performances, as embodied by their body

language, interactions and gestures. As discussed in the methodology chapter, various forms of data were collected, including images, audio and video recordings, and observation notes. The following paragraphs outline these results in a consecutive sequence linked to the order in which the three phases of activities were conducted in the session.

As discussed in Chapter 3, all the sessions took place in the Creativity Centre at the University of Brighton and involved either male-only groups, mixed-gender groups or an expert group. The purpose of this was to highlight the differences in group dynamics, as noted in Chapter 2, specifically the participants' behaviour, and the enactment of their masculinities and gender in relation to these different groups. According to Frosh, interviews provide an opportunity or social place for participants to display their masculinity (Frosh, 2002). As also discussed in Chapter 2, Frosh noted the different dynamics of male-only interviews, as opposed to mixed-gender interviews. Using both male-only and mixed-gender groups in the study, therefore, provided the opportunity to look at the group dynamics in both categories and see how this was linked with the participants' enactment of gender and masculinity.

The selected session was conducted at 10 a.m. on the 1st of February 2017 with four male participants, Anthony, Ross, Ralph and George. As anonymity and confidentiality of participants are central to this research, the participants are named through the use of pseudonyms in the thesis. The participants were between the ages of 19 and 21. Prior to the session, the facilitator and I arranged the Creativity Centre space in the layout described in Chapter 3. The four male participants, who were all dressed in grey or black tops and black jeans, entered the room and were invited to sit around a table next to the entrance. Refreshments were provided. While they had coffee and chatted together, I welcomed the participants, explained the purpose of the study.

> **[Researcher]:** *You are invited to a group interview session on sun safety behaviour. Your participation involves 120 minutes with a range of group discussion and it is recorded by an audio and video recording camera.*

In general, the participants seemed to enjoy the opportunity to have an informal chat with each other. This is significant for this study in terms of investigating the participants' natural attitudes, as discussed in Chapter 3. They expressed enthusiasm for sharing their sun protection experiences and, based on their body language (sitting posture), seemed comfortable within the environment. The participants were then guided to another part of the room which was arranged for the first phase of the study (product language).

5.3 Phase 1: product language

The participants were introduced to a number of products, as presented in the following subsections. This phase of the study aimed to explore gender values embedded in the design of products and the ways in which they were perceived by both male and (when present in other sessions) female participants. The investigation involved the exploration of product language in terms of 1) products targeted at both male and female genders, and 2) gender-specific products and advertisements. As stated in Chapter 3, this phase of the study aimed to explore the interaction between the products and the participants, and the language and meanings the participants perceived in their own observations and attached in their interactions.

Figure 5.1 The first stage of the study preparation (author's photograph)

Participants were asked to provide information about their motivation for using the products, using the following questions as prompts:

- Which characteristics of these products are desirable?
- What factors would motivate you to use these products?
- Why would you use this product and how you would use it?

As the prompts were delivered, the researcher observed the participants' interactions with the prompts and compared their interactions and behaviour as a male-only group with the responses made by the mixed-gender group and the expert group. The following sections outline the procedures followed in the session and include a transcription of the collected data, followed by the researcher's interpretation of the responses and behavioural indicators in relation to the performance of gender and masculinity.

5.3.1   Gender-neutral products

In the initial stage, various products, which were targeted towards both male and female genders and advertised as gender-neutral, were presented to the participants (Karin et al., 2012). The participants sat around a table while images of the product examples were presented to them. As described in greater detail in Chapter 3, the room was lit by yellow-coloured lighting to facilitate a warm, comfortable environment. This was noted by Anthony:

[**Anthony**]: *I should get lights like this for my room.*

Figure 5.2 Participants engaging with various products in phase 1 (author's photographs).

The researcher asked participants to share their opinions of the product images on the table. As stated previously, this included their motives for using and buying the products and their motives in order to discuss and express their thoughts.

[The researcher]: *Are these products gender-neutral to you as they are advertised?*

Figure 5.3 Apple watch and Kettle and toaster by Marc Newson (the product photos are printed with all rights reserved)

Figure 5.4 The Bobble water bottle Designed by Karim Rashid (the product photos are printed with all rights reserved)

George was the first person to start the conversation, but was interrupted by Anthony, who started sharing his own opinion:

[George]: *All these products have a look that appeals to male and female genders*

[Anthony]: *Some of them are gender-neutral*

Anthony directs his hand towards the bubble bottles and says '*because of the primary colours*'.

All the participants nodded their heads in agreement with Anthony. Anthony continued:

[Anthony]: *there is no 'this is for boys' and 'this is for girls' filter into it*

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In his response, he made a link between the product's target market and stereotypical masculine and feminine attributes. He identified primary colours as gender-neutral but expanded on his opinion by then relating primary colours to basic and minimalist designs. To Anthony, minimalist designs are seen as masculine; in his words, these products are designed in a masculine way:

> **[Anthony]:** *the actual products in here are gender-neutral, like a kettle, toaster, and a watch whereas the colours on the water bottle as basic are more gender-neutral but the minimalist design looks more masculine and manly design.*

The researcher asked **Anthony** which colours were gender-neutral.

> [**Anthony**]: *primary, like blue, red and orange*

Ross agreed, George and Ralph stayed quiet, but when Anthony said the presented products were masculine, **Ross** said:

> **[Ross]:** *yeah, because they are quite basic*

George then said:

> **[George]:** *because of the straight lines*

Anthony immediately continued:

> **[Anthony]:** *yeah, straight lines and minimalist designs are what men go for*

Then Ross points to the Apple watch and says:

> **[Ross]:** *these look like a manly design, but everyone uses them and I don't know how they got everyone into it,* [he looked at Anthony].

The researcher then asked the participants to look at the picture of Harry's razor adverts and share their opinions about it.

Figure 5.5 The Harry's shaving kit targeting both male and female genders (the product photos are printed with all rights reserved)

> [Ross]: *I don't think these products are advertised for female users, the Apple watch or the rest of the outlined products such as the razor looks very masculine. I can definitely say the razor is for men*
>
> [Researcher]: *why?*
>
> [Ross]: *the colours orange or blue are for men, also the packaging is boring, and the font is bold.*

Then they all say 'yeah, it's the simplistic design'.

> [Ralph]: *all black.*

At this point, all participants said that the gender-neutral products seemed more masculine, with Ross identifying specific features like bold fonts and dark colours, such as grey, black and orange, as being linked with the male gender. Ralph also said that dark colours, such as black, appealed to the male gender. Ross believed basic fonts and dark colours were identified as masculine and this means masculinity must be defended and was fragile. As quoted in Chapter 2, Frosh maintains that although masculinity is presented as powerful, it needs protection. The participants had therefore presented signs of behaviour that matched masculine gender norms, as opposed to the feminine norms (Frosh, Phoenix, & Pattman, 2002, p.122).

> [Ross]: *men prefer things that would not provoke in ways that people make fun of them*
>
> [Ralph]: *men are scared of buying pink razors to shave*
>
> [George]: *I would buy a pink razor if it's the cheapest, I always shop for value and very simple design and the cheapest.*

They all laughed. By this point, they were all very engaged in the conversation. George said he always shopped according to price and was more concerned about money than colours, however, the other participants disagreed and laughed when he said this. George's concern about the price of products rather than colours seemed to indicate that his masculinity was not a significant factor at this point, but his masculinity is displayed in other ways, which will be discussed later in this chapter.

Ralph stated that men were scared of pink-coloured things and did not buy or use pink products. As stated earlier, masculinity is fragile and needs protection, meaning that men tend to conform to attitudes and behaviours that fit gender norms and stereotypes.

Next, the researcher asked the participants to look at an image of Alessi's hob kettle and share their opinions of it.

Figure 5.6: The Alessi's hob kettle by Michael Groves (the product photos are printed with all rights reserved)

[**Anthony**]: [starts saying] *a kettle is a kitchen thing, so I don't mind the colour, I think this item is gender-neutral*

Ross responded immediately:

[**Ross**]: *as long as it looks cool, I don't care about the colour*

[**George**]: *the chrome finish or shiny metal is really gender-neutral*

Ralph and Ross agreed.

[**Anthony**]: *I think the opposite, it's very masculine, shiny metal, it's like the motorbike and perfume bottles, and shiny looks more masculine, only primary colours are gender-neutral to me, but maybe it's gender-neutral like lipsticks are shiny and chrome finish.*

Ralph and Ross stayed quiet, but George disagreed:

[**George**]: *jewellery is shiny and silver too but has a look that appeals more to the female gender*

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Anthony said silver and chrome finishes were masculine, linking them to his perfume bottle and bikes. By doing so, he was identifying these products with ones that he already used, and which were designed for his gender. Up to this point, Anthony's opinions and behaviour veered towards pre-existing accounts of masculinity in comparison with the other participants, particularly George, who appeared more flexible in his openness towards using products with bright colours, such as pink.

Anthony identified colours as being associated with specific genders, and forms of products as being gendered. He identified gender-neutral products as masculine. His world seemed associated with gender imperatives and concerns about the rules and norms of appropriate behaviour and gender stereotypes and demonstrated the hidden influences of advertising and marketing which affect the social shaping of masculinity.

This section demonstrated the meanings participants attached to the non-gender-specific products. The next section explores the embedded gender-specific language used in various products targeted towards men or women. These include advertisements and products that are used in the same way but advertised differently for each gender. The images of these products are presented below.

5.3.2 Gender-specific products

For the next stage of the study, preliminary observations were conducted and various products that were specifically marketed towards a particular gender were identified. The followings outline the chosen products related to exploring the masculine and feminine attributes embedded in the products.

Figure 5.7 Images of products considered by the researcher prior to the session on the left and the selected products on the right (author's photograph).

In this stage of the session, all the participants were asked in some detail about their motives and interests regarding the gender-specific products outlined below followed by the description of what they said. The products provided portray what should be noted immediately as gender issues embedded in the design of these products. Anthony started the conversation immediately:

> **[Anthony]:** *this is an example of pink for girls and blue for guys and it's the first thing that stands out. If you look at the packaging and shapes, all the male products look more angular and square, basic shapes, and female products are more organic shapes.*

They all nod their heads in agreement.

> **[Ralph]:** *Bic pens, I like the difference between these.*

Figure 5.8 Mack's earplugs and Bic Pen. The products on the far left and third from the left are targeted at women. The other two are targeted at men (the product photos are printed with all rights reserved)

Figure 5.9 The Dove products targeted towards women are on the left and products targeted towards men are on the right (the product photos are printed with all rights reserved)

George showed interest in products that smell fruity and feminine, but the other participants disagreed with him:

> [**George**]: *I never buy male shower gels because they don't smell as nice as the flowery ones for females, I like fruity smells like strawberries and everyone wants to smell nice*

All the participants laughed.

George said he was more flexible in choosing products that were not targeted at his gender. This might be related to his age, as he was the oldest (21) in the group. Although there were gendered values in his expressions and attitudes, he also indicated flexibility and a willingness to use products not targeted towards his gender. Anthony continued their conversation in a teasing way:

> [**Anthony**]: *I was wondering why you always smell nice and flowery*

They all laughed. As stated above, George showed interest in products that smell fruity, but the rest of the participants did not agree with him. Anthony teased George, linking smelling nice and fruity with feminine attributes. Anthony's comments were noticeably 'masculine' and his jokes seemed to be a way of expressing his masculinity. He indicated patterns of behaviour that are popularly identified as a hegemonic form of masculinity and dominance. This refers back to the concept of masculinity that can emerge linked with the group dynamic. As indicated in Chapter 2, men express views and attitudes that are influenced by peer pressure and how they present themselves in relation to the group dynamic (Frosh et al., 2002, p.86).

Ross links female products with general female characteristics such as 'taking care [of themselves]':

> [**Ross**]: *I live in a shared house and in our house, we, the guys, tend to buy cheap stuff and the girls buy all this crazy like spa, the bottle is so big sat in the shower, they buy more expensive stuff, I guess they want to get taken care of. I don't even know what it is.*

[**Anthony**]: *girls buy nice bottles, we just have shower stuff, probably three items for all three guys living together and the rest of the stuff is all girls. I think the quantity is what they go for.*

In these comments, Ross and Anthony position themselves differently in relation to the ways in which female products are used.

Later, the researcher asked the participants to share their opinions on the Gillette shaving products presented above. Anthony and Ross identified Gillette as a product for men, because of the amount of detail and information on the products. In their words:

[**Anthony**]: *Gillette is a brand that is for a bloke shaving and the girls' one has to be girly*

[**Ross**]: *if he wants to buy shaving cream, he will go for men's one because he knows it is for the face, and it's there for that job, however, for girls it's different, it's maybe for their legs.*

Anthony laughed and agreed.

[**Anthony**]: *Guys see Gillette as it shaves their face and says yeah this does the job, whereas the girl's products are full of details and it says it does this, it does that, which is intimidating.*

For Anthony and Ross, it seemed that products with less detail on the packaging were linked with masculine attributes. It seemed they positioned themselves in opposition to the feminine products. Their account of masculinity was linked with toughness and

powerfulness, in opposition to the characteristics of feminine norms (Frosh et al., 2002,p.86).

This is related to the multiplicity of ways to express hegemonic masculinity, such as being tough and not vulnerable. It is possible to assume that more details on the products can be seen as an indication of safety, protection and being vulnerable, which is against the ways in which masculinity is expressed. Ross continues:

> **[Ross]:** *yes, we know what we want, we want basic, and it's cheap, it says the basic and that's what I want. Gillette for men is an express target (shaving) whereas the women's one is for wider purposes*

> **[Ralph]:** *My shaving cream is purple but it is labelled as a masculine shaving cream because it's basic. Sometimes, I use female products because of smelling nice*

> **[Ross]:** *Gillette for men will make me look nice, whereas the female one just smells nice.*

> **[George**]: *I want to know how different they actually are, in terms of price and what is inside and buy the cheaper one*

Anthony and Ross laughed.

Like George, Ralph also said he preferred using female products because they smelt nice but then he justified himself and described his shaving cream as being labelled for men when Ross and Anthony started laughing. Ross said female products smelt nice but only Gillette for men was for his gender. Gender and masculinity were so important that even though Ross liked the smell of products for females, he was primarily interested only in products designed for his gender. The relation between his gender and using products specifically designed for that gender was clear. The dynamic and collusion were clearly 'masculinised' and Ralph attempted to protect his masculinity. It was clear that he was self-conscious when Ross and Anthony attempted to make a joke and provoke him in a dominant way. Although masculinities are dominant, they are also fragile and need protection, as discussed in Chapter 2.

As noted, Anthony repeatedly expressed hegemonic modes of masculinity in various ways. In his words, gender stereotypes such as 'pink for girls' is very important.

> [**Anthony**]: *if it's bright pink packaging it's over the top for girls and I won't buy it.*

5.5.1 Advertisements

As discussed in Chapter 3, the most successful leading brands have embedded masculine or feminine attributes in their advertisements. Advertisements portray patterns that feature specific gender subjects. This includes popular gender representations focused on displaying gender differences between males and females based on stereotypes (Goffman, 1987).

The next stage of the study was an investigation of gender patterns portrayed in product advertisements aimed towards specific genders. This was the final stage of the product language phase and focused on the participants' perception of the advertisements shown in the following section. The researcher is focused on the participants' interactions and attitudes in relation to advertisements featuring human subjects linked with their own gender and masculinity. As discussed in Chapter 2, various leading brands have embedded masculine or feminine attributes in their advertisements, with gender-specific advertisements portraying popular gender representations focused on the differences between males and females, based on stereotypes. The following section outlines the participants' responses when interacting with various advertisements.

The Dove Men+Care cosmetics advertisements featuring male subjects were discussed. As illustrated in Figure 11, the Dove brand is designed with a specific name (Dove Men+Care) and features grey coloured bottles with a bold font. This brand is very popular and successful, and its advertising campaigns are centred on using 'real' people, rather than professional models. The Dove 'Men+Care' advertisements depict ways of being a real man and promote an image of real men with real strength (Dove, 2018). This is linked to the concept of masculinity, as it portrays popular concepts associated with being a man (Frosh et al., 2002,p.17).

Figure 5.11 The Dove Men+Care cosmetics advertisement targeting males (the advertisements and product photos are printed with all rights reserved)

> **[George**]: *I like Dove Me+ Care which I always use but I never go to a shop and read or look at adverts, I automatically choose what I need, the adverts targeting being active and advertising muscly and sporty men make you feel you want to be him. I want to be that guy.*

George stated, in his own words: 'I want to be that guy'. George has an idealised concept of masculinity, acting masculine and saying, 'I want to be a real man.' This refers back to the concept of masculine attributes portrayed in advertisements (Goffman, 1987). According to Goffman, this includes the idealised performances of being a man through enacting gender roles related to their enactment of masculinity.

As George expressed his interest in Dove Men+Care products, he also expressed an interest in their advertisements. It seemed from his comments that his passive masculinity was transformed into expressive masculinity at this stage. As stated in Chapter 2, masculinity is expressed in a variety of ways.
Ross stated:

> **[Ross]**: *the Dove adverts are very good for people who play rugby, it kind of making looking after yourself is ok because it's next to a sport like rugby. Dove is focused on men's products are with basic and bold letters which makes it*

obvious what they trying to do it that, to look simple and guys can relate to it, it's very patronising that the products for men it said it's for men.

[Anthony]: *I like their packaging design because it's sporty*

Anthony, Ross and George mentioned that Dove adverts replicates being active and sporty. As stated in Chapter 2, advertisements linked with particular sports such as rugby, which reinforces dominant modes of masculinity such as hegemonic masculinity. Sporty and athletic body images symbolise physical strength, toughness and power in men (Simpson, 1994). The way in which to assert their masculine identity amongst their peers. This means their values are expressed towards being involved in sports in relation to heterosexuality. This can suggest the way the elements that motivate male participants to use the products targeted for their gender.

Another element mentioned by the participants was the way in which infographics were used on Nivea packaging to help them visualise the process of using the product.

Figure 5.12 Nivea cosmetics advertising targeting men on the left and Herbal Essences body wash advertising targeting women on the right (the advertisements are printed with all rights reserved)

In Anthony's words: **[Anthony]**: *products targeted for men incorporate minimum details, it doesn't take too much time and infographics are the best way to show instructions briefly.*

Anthony said the product adverts, which had basic, and fewer details were more practical and expressed his masculinity by showing interest in these. This relates to design stereotypes: products that are less detailed, look more rigid, and use infographics to convey information in a visual way means it takes less time for the user to read the details.

5.4   Phase 2: Simulated beach environment

In the second phase of the study, the participants moved to a simulated beach environment. Participants sat on beanbags, facing a beach scene and surrounded by other beach-related paraphernalia, such as towel, flip-flops, sunscreens, sunglasses and hats.

One of the most unique and innovative features of this study was the way the physical space was adapted to simulate a beach environment. As stated in Chapter 3, the context of a simulated natural environment was one of the most important features in terms of revealing the participants' natural attitudes and real-life experiences (Martin & Hanington, 2012, p.164). This stage engaged the participants in a simulation of the type of beach environment where sun protection behaviour would normally occur.

Figure 5.13 The simulated beach environment for phase 2 (author's photograph)

In general, the context of a beach environment is considered to be a liminal place(Gilchrist et al., 2014). The combination of nature and freedom with leisure and joy replicates a social environment for the participants to display masculinity in their

typical environment. These factors demonstrate the transformation of the beach as a liminal space. The beach environment is a zone for specific behaviours, activities and interactions which are outside the everyday work-life and norms (Shields, 1992). The innovative environmental and technological features of the Creativity Centre at the University of Brighton placed the participants in a setting that mimicked the environment in which sun protection behaviour takes place (Figure 5.13). During this stage, room dividers were used as 'walls' to separate the 'beach' space from the rest of the room. Yellow lighting and comfortable beanbags added to the beach mood, which was further enhanced by a projector being used to display a beach scene on the large curved screen, and a sound recording of sea waves being played in the background.

This phase of the study involved the investigation of the participants' experience in regard to their sun protection behaviour, while the researcher focused on observing gender practices and the ways in which young men brought their sexuality into using sun protection concepts. The participants were presented with various sunscreens from leading brands that were popular with young people, for example, Nivea, which offers sun protection for males that is designed for quick and easy application(NIVEA MEN, 2018).

The participants interacted with various sunscreens, as shown below, and shared their opinions about its packaging. These packaging characteristics were discussed in terms of colour, smell, size, material and shape. The selection of sunscreens was based on a preliminary observation of available sunscreens on the market (Boots, North Street branch, Brighton, 11th October 2017.).

Figure 5.14 An image of the sunscreens available on the market (author's photograph)

A few sun protection concepts are available on the market that is specifically targeted towards male genders, for example, NIVEA MEN (NIVEA MEN, 2018) and Banana Boat (Boat, 2018). The sunscreens demonstrated below were presented to the participants designed for men (Boots, 2018). In this stage, the participants interacted with the sunscreens and shared their experiences of and interest in sun protection concepts, including the physical characteristics of the products' packaging and the brand's popularity.

Figure 5.15 A range of sunscreens designed for men. The product photos are printed with all rights reserved (Boots, 2018)

Figure 5.16 Nivea Sunscreen for Men on the left and for both genders on the right. The product photos are printed with all rights reserved (Boots, 2018)

This stage of the study highlighted the sun protection practices of the participants. Initially, the researcher asked the participants if they spent time outdoors on the beach and, if so, the ways in which they protected themselves from the sun:

[**Researcher**]: *Do you use sunscreens and if yes which one? And why? Have you seen them before?*

[**Ross**]: *of course, yeah.*

[**Researcher**]: *on a hot day at Brighton beach?*

[**Ross**]: *no, of course not.*

Anthony laughed and looked at him, George also laughed, but Ralph remained quiet. Immediately:

[**Anthony**]: *if you are on a family holiday, your mum forced you to do it or whatever, also there is something awkward about sunscreens*

Ross interrupted him:

[**Ross**]: *it is the back and shoulder area, isn't it?*

[**Anthony**]: *yeah.*

[**Ross**]: *It is never comfortable asking friends to apply sunscreen on my back.*

George and Ralph laughed.

[**Anthony**]: *I'm not worried about what sunscreen to buy, I'm worried about how it gets applied*

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They all laughed.

As described in more detail in Chapter 4, one of the main issues around sunscreen application was how to apply it to the back of shoulders and self-consciousness about applying sunscreens to their own bodies. The participants' comments, as quoted here, validate the exploratory study key themes and show then re-emerging.

As soon as Anthony said why he didn't apply sunscreen when he was with his peers, Ross knew he was concerned about applying sunscreen to his friends' hard to reach areas such as shoulders and back. It was clear from their body gestures and laughter that they felt very self-conscious and embarrassed about this. This could be linked to their gender and the ways in which 'manliness' is perceived by society, as well as fears of being seen as gay among their male peers.

As these participants indicated, their main worry about sun protection and applying sunscreens concerned the application of sunscreen to their bodies, which is linked with peer-pressure discussed in Chapter 2. This can be understood from the ways they represent themselves while they attached gendered values to their sunscreen application. In their world, anything that threatens their gender and masculinity puts them in a difficult position. For this research, we can see a difficult task ahead as participants like Anthony and Ross consciously avoid sunscreens as they conflict with their masculine identity construction.

Compared with Anthony, Ralph seemed to be a shyer and more self-conscious member of the group. Anthony seemed to act in a way that came across as competitive and strong and made him popular in the group; from the outset of the session, he was the most outspoken. By contrast, Ralph appeared shy in the group, which was apparent from his sitting posture. This can be linked with the group dynamic and the ways in which its members' behaviour expressed their masculinities in different ways. From Anthony's sitting posture and gestures, it is possible to infer that he is dominant and popular in the group and is enacting his masculinity in a way that confirms his heterosexuality. The following image illustrates the participants' body gestures and also the ways in which Anthony and Ross laugh strongly and loudly, whereas George and Ralph smiled during this stage.

Figure 5.17   Participants engaged in the replicated beach environment (author's photograph)

[Ralph]: if my mum is there I would put sunscreen and she will make sure I have some but otherwise I don't think I need sunscreen because I don't feel the need as I never burn

> **[Anthony]**: *lucky, I always get sunburn*
>
> **[Ross]:** *yeah me too. I only put sunscreens on when I start feeling a burning pain.*
>
> **[Anthony]:** *yeah.*

It was probable that Ralph and Anthony were more likely to wear sunscreen when they were on a family holiday. Anthony's sun protection behaviour is influenced by his parents: he applies sunscreens on family holidays but not when he is with his peers. This indicates that he is influenced by peer-pressure and is self-conscious about the performative acts he employs to indicate his masculinity. The researcher asked George and Ralph:

> **[Researcher]:** *Do you go to the beach with your friends and do you wear sunscreens in the UK?*

[**George**]: *I think in this country I won't put it on, but when you're on holiday somewhere hot, I put it on.*

[**Anthony**]: I go to the beach only for *DRINKSSSSSS!!!*

Anthony laughed, Ross, laughed too. At this point, it was difficult for them to focus because of acting as lads and being masculine.

It seemed from their responses that the perception of cloudy weather influenced their use of sun protection in the UK. All participants said they did not wear sunscreens in the UK, and they related the need for sun protection to the point at which their skin started burning and getting red. As the weather is mostly cloudy in the UK, they did not feel the need to apply sunscreen, which refers back to the key themes that emerged during the exploratory study.

In general, George indicated that compared with the other male participants he was more willing to use sunscreen. However, his initial assumption about sunscreens was that it is a medicalised product. In his words:

[**George**]: *the black bottle looks like it would work, it looks very serious, but it does not look clinical and strong and stop you burning!*

According to the participants' views on the sunscreens provided, dark bottles were seen as strong, manly and powerful, as illustrated in the following quotes:

[**Ralph**]: *The dark bottle looks stronger but its lower factor for SPF (30) which means you might burn.*

Anthony disagreed, and Ralph also changed his response:

[**Anthony**]: *it looks like a bleach bottle*

[**Ralph**]: *or a shoe polish for your skin,*

They all laughed. Ross also responded in the same way as Anthony:

[**Ross**]: *it looks like trying too hard to be a man, and it is not necessary,*

[**Anthony**]: *something bright may work better.*

[Ralph]: *visible and yellow so you will see it in your bag and trustworthy, something like Sainsbury's basic is not trustworthy.*

All male participants said the colour black was a 'strong' and powerful colour. The impact of gender norms and stereotypes are clear from the participants' comments, with them particularly identifying gendered colours, such as black, as powerful and strong. All male participants attached meaning to the black packaging: to them, black was seen as strong and powerful, which would indicate the impact of marketing towards gender stereotypes. Their gendered attachment to particular colours was also visible in their choice of clothing and their technology products, such as watches and phones.

At this stage, the participants expressed their opinion regarding the physical characteristics of the sunscreen bottles. The following illustrates the participants' discussion of the application feature of the sunscreens and showed that they mostly preferred spray-on sunscreens:

[Ross]: *I like the mist sunscreen sprays*

[Anthony]: *yes, much better than the other ones, but for me and the way that I was brought up, I only see the yellow bottle as suntan lotion, I don't see the black or Nivea blue one either. It is a nice packaging but I don't see it as suntan lotion. When I go on holiday I just buy yellow bottles,*

He looks at Ross,

[Ross]: *yeah. I would never buy any other.*

Anthony said the only sunscreens he liked to use were in yellow bottles because they reminded him of his childhood. Anthony's identification of yellow as the colour for sunscreens seemed to be related to his memories and previous experiences. George immediately disagreed with Anthony and said:

[George]: *I think the other way around, I think the yellow or brown/black bottle they don't look very safe, whereas the blue bottles like Nivea and white like Garnier looks safer, blue and white associated with cold and not burn, these look more clinical like a medicine and it's actually a safety product.*

George identified blue and white as clinical colours and asserted that sunscreen bottles in these colours looked safer to use. George's concerns about safety and his identification of white and blue as safety colours seem to be linked with medical health design, but the facial expressions of the rest of the group implied that they did not agree with him.

Ralph added a demotivating reason to apply sunscreen in relation to the texture of the overall appearances of sunscreens:

> **[Ralph]:** *I avoid creams, I hate oils and don't like the cans, it doesn't remind me of sunscreens, but you don't get sticky hands whereas with the creams you get sticky hands, but I don't buy sunscreens, the can sunscreens look like deodorant*

Anthony and Ross laughed.

> **[Ross]**: *they smell very nice though, smells like a holiday*

> **[Anthony]:** *it smells like vacation, and it's very embarrassing but my mum applies sunscreen on my shoulders and back area of the body*

All the participants said they are concerned about same-sex body contact. This suggests links with the fear of being seen as gay and a desire to protect their masculinity and their sexuality. However, they all agreed that it was appropriate for their girlfriends or mums to apply sunscreen to their shoulders and back area of the body.

Ross, Ralph and Anthony said they did not like the texture of sunscreen as it was oily and left a sticky residue on the hands. Ross said this was why the spray type was best. The majority of participants, excluding George, preferred spray sunscreens as they took less time to apply and their hands would not get oily. To them, products that took less time to use and were not applied like creams were more popular. Their perceptions about applying creams seem to contradict with certain ways in which participant enact their gender role and masculinity. It was, however, clear from their responses at this stage that their gender affected their attitudes, and this was reflected in the ways in which they perceive the sunscreens.

Prior to the design phase of the study, it was important that the participants developed an understanding of the problem area. The next stage, therefore, aimed to investigate the participants' responses to current sun awareness advertisements and to raise their awareness of sun protection as a health-related problem.

5.4.1.1   Sun safety campaign advertisements

Prior to ideating possible design concepts, various sun awareness advertisements were presented to the participants to facilitate a discussion of the related health problems. The aim of this stage was to raise awareness of the dangers of tanning and to explore the participants' response to understanding skin cancer as a major public health problem. The following examples illustrated below represent advertisements by the leading global sun awareness campaigns.   The Government of New South Wales (NSW) in Australia is widely acknowledged for its role in raising awareness of the dangers of sunbathing across the world. This campaigns' contribution is rooted in various cancer prevention communities and campaigns (Cancer Institute NSW, 2017).

Figure 5.18 The NSW campaign advertisements by the Government of New South Wales, Cancer Institute. The photos are printed with all rights reserved (Cancer Institute NSW, 2017)

Figure 5.19 The NSW campaign advertisements by the Government of New South Wales, Cancer Institute. The photos are printed with all rights reserved (Cancer Institute NSW, 2017)

**Figure 5.22 Participants engaged with the provided skin cancer awareness adverts during phase 2
(author's photograph)**

The following responses by the participants were made in relation to the effectiveness of the sun awareness advertisements they were shown. The majority of participants stated their interpretations of the adverts, which were the complete opposite of the advertisements' key message, which focused on prevention. In their words:

> **[Ross]**: *I like the beach in the adverts so much and in these adverts, I prefer to be there and get melanoma*

> **[Ralph]:** *The Nivea advert is not clear what the message is, showing just freckles doesn't make you feel different about tanning, but still the ones that show before and after looks more ideal*

> **[George]:** *The colour of the avert is blue and it doesn't replicate the danger of sun*

> **[Ross]:** *why they don't use the smoking bad graphics for sunscreens, smoking adverts shows the health damage caused by smoking and when I see that, it makes me think about what I do, but these skin cancer campaigns showing they are having fun, why they don't show what is happening to their body, they don't present what is the message,*

> **[George]:** *an advert that shows healthy skin and burned skin would be very good,*

[Ralph]: *like a cigarettes packaging, showing cancer, showing the end image,*

Ross said the negative side of smoking has been successfully advertised, but these adverts showed people having fun. It seemed participants would prefer a negative persuasive message that stimulated fear and showed the dangers of the sun. The participants were very engaged in devising ideas by this point. Ralph and George faced each other and discussed which they preferred, with Ralph being talkative and Anthony, by contrast, remaining quiet. As discussed in Chapter 2, this can suggest the ways the participants shift their roles linked with the fluidity of masculinities in relation to the environment and situation (Mac an Ghaill, 1994).

The simulated beach environment had successfully engaged the participants in naturally occurring behaviour on the beach. Based on my observations on the beach during the exploratory study, as discussed in Chapter 4, the participants' enactments and behaviours reported in this chapter were identical to those of the young men on the beach. This shows persistent and significant gender performance amongst participants which highlights the importance of including gender-awareness in the HCD process.

The next section relates to the third phase of the study, which is the design phase, and ideates design concepts devised by the participants to improve sun protection practices.

5.5 Phase 3: Design

The final phase of this study was the design phase, which was facilitated through various co-design techniques such as ideation and brainstorming. As stated more fully in Chapter 3, ideation and brainstorming activities engage the participants to articulate their creativity and innovative ideas while empowering them as designers. The participants were guided through the practical activity of ideation to generate new sun protection interventions. During this stage, the writable room dividers in the Creativity Centre were used by participants to note ideas and boost their engagement.

During this stage, the participants were encouraged to ideate sun protection interventions to improve young men's sun protection behaviour. This involved them

reflecting on the information garnered from the session and applying it to new and innovative interventions.

Figure 5.23   Participants engaged in the design phase for phase 3 (author's photograph)

The participants started by brainstorming ideas as a group and identifying the specific challenges around their sun protection practices on the beach. The participants were also asked to evaluate and assess the outcomes. This stage was intended to empower the participants to become the experts and design and devise solutions based on their own reflections. The participants moved to the prepared space for this stage and were asked to design a sun protection product that appealed to them. They immediately began to brainstorm ideas about their sun protection practices, as well as talking about the particular challenges they had faced when using sunscreens. Anthony started the conversation:

> **[Anthony**]: *making something that you can apply the sunscreen easier like the dishwasher sponge with liquid attached to it without getting your hands wet, like a rollerblade that applies sunscreen*

They all smiled and agreed:

> **[George]:** *maybe something that sprays and does a better coverage, like a spray in a different direction.*

> **[Ross]:** *this is difficult*

Anthony said an applicator for sunscreens, such as a rollerball similar to deodorant, would protect hands from getting covered in cream. Anthony seemed to be concerned about the way sunscreens were applied and brainstormed ideas that were about the easy application of sunscreens.

> **[George]:** *it should look like a medicine*

> **[Ralph]:** *it should have an easy application*

> **[Anthony]:** *gender-neutral, if you are on the beach, and if I ask you* [towards Ross] *to put sun lotion on my back it's weird but if there are some hot girls on the beach to put sunscreens on your back, that will be great*

> **[Anthony**]: *I don't apply sunscreen on the hairy back of someone all macho* [laughed]

Ross laughed strongly, George and Ralph smiled.

Anthony and Ross said the application of sunscreens on their back was the problem. From their comments, they indicated patterns of behaviour concerned with peer-pressure and gender norms that are popularly identified as a hegemonic form of masculinity (Connell & Messerschmidt, 2005). Ross and Anthony seemed concerned with the pressure from peer culture and concerned about the application of sunscreen.

> **[George**]: *I think when it comes to skin safety, there shouldn't be any boundaries between products targeted specifically for men or women*

> **[Anthony]:** *that is what I'm trying to say* [he nodded his head]

> **[George]:** *if you are in a mixed-gender group on the beach and the sunscreen says this is for men, women cannot use it*

George said sunscreen should be usable by both men and women. The participants had identified products targeted at men and products targeted at women at this stage and decided to design for both genders. This could be related to the influence of skin cancer advertisements and science in general.

The researcher asked if there was any other type of intervention that they would like to use?

> **[Ralph]:** *it should be a small sunscreen that guys can take to the beach,*
>
> **[Anthony]:** *maybe something that sprays sunscreen everywhere*
>
> **[Ralph]:** *I would like a hat with a flap that protects me from the sun and lets me know when to apply sunscreen*
>
> **[Anthony]:** [interrupted Ralph] *what about free towels with advertisements on them, like beach towels with a reminder on it that says put on sunscreens*
>
> **[George]:** *or a picture of burnt skin*
>
> **[Ross]:** *a towel that could represent how much sun you have been exposed to and changes colour to alert people*

Anthony continued:

> **[Anthony]:** *it says how much suntan lotion you need and how long you have to burn, like warning prints with redness on it,*
>
> Anthony laughed.
>
> **[George]:** *it might be good if something definitely told you that you will burn, and you would apply the sunscreen because the product won't lie,*
>
> **[Ralph**]: *maybe something on the bottle that changes colour like a warning, like a timer, and goes a bright colour.*

All the male participants said they wanted a visual reminder to apply sunscreen, either through advertisements, or bottles with an awareness message or change of colours.

Ralph said warning lights were helpful as a reminder: an alarm system that would remind them to apply sunscreen. At this stage, the participants' passive masculinity was transformed, and it became clear that they had moved towards science and technology. The researcher asked the participants to take some time and think about the elements that were important to them and draw a sketch or explain their design. They all started drawing and writing down the details of their final design, using pen and paper rather than the whiteboard. Ten minutes later they were ready to discuss their ideas. The next section presents the various design outcomes driven by the participants with the aim of improving their sun protection behaviour.

Figure 5.24   Participants engaged in developing new ideas for phase 3 (author's photograph)

5.5.1   Design outcomes

The followings section outlines the developed design outcomes, including the participants' descriptions of their design in their own words. Ross immediately started the discussion:

> **[Ross**]: *I've designed one advert and one product. The product is like a spray, but I like the idea of how it applies, strong enough to spray, pocket-size like a small Lynx can, simple bottle, not too fancy, nothing shape-wise, just a square, simple colour like dark blue, really basic, nothing special about it.*
>
> **[Ralph]:** *it won't be clear that it's a sunscreen, it will be a bit strange*

Ross said his design was gender-neutral, with a square shape and dark colours. He also used an example of Lynx products in terms of shape and colour. Although Ross has designed a product aimed at both genders, it was clear from his comments about colours, shapes and the Lynx products that he had designed a product aimed at his own gender. Using HCD elements, this indicates that gender is strong and unavoidable.

The following describes Ross's design outcome, which was the '*simple and easy'* application of sunscreen by providing infographics that visually mapped the

instruction of using the sunscreen. His design utilised simple and minimalist features, such as a basic shape and simple font, clearly demonstrating a link between his gender and masculinity and his design. His design had a spray applicator. He discussed the idea of presenting scientific facts about skin cancer statistics on the bottles, saying it would encourage people to apply it. His design indicates similarities with *Nivea Men* shower gels, which had similar infographics for the visual presentation of instructions. This indicates clearly that the product language and marketing strategies embedded in *Nivea Men* products are aligned with Ross's preferences. The emerging meanings that he attaches to the products associated with his gender also impacted on his design. This is in line with constructing his masculine self and again indicates that gender is very strong and that the HCD elements in his design interventions are influenced by the construction of his masculinity.
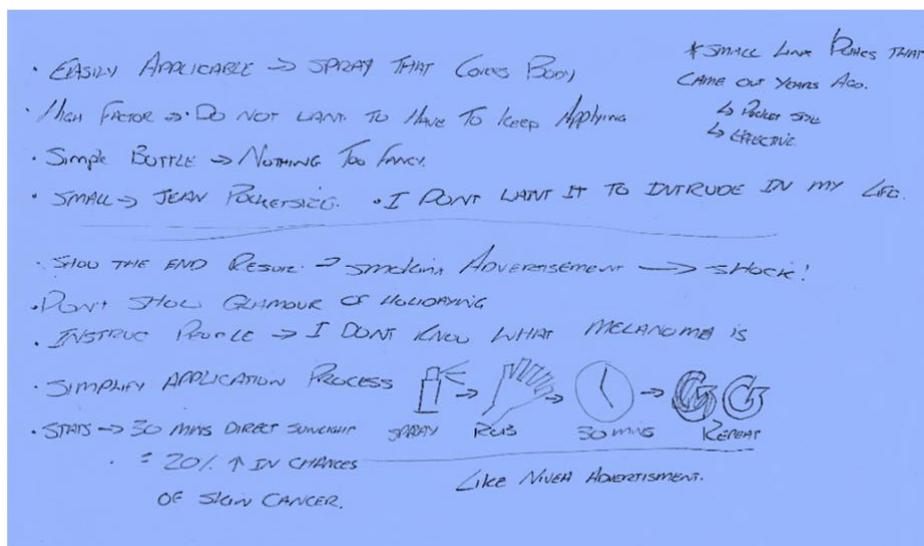
Figure 5.25 An image of Ross's final design (session one, phase 3)

[George]: *if it smells of flowers, I will use it,*

[Ross]: *my idea of advertisements instead of having a nice picture of the beach or melanoma, just showing what's happening to the body, very simple, the idea of Nivea or Dove Men infographics like spray, rub, 30 minutes, something that makes the process as simple as possible.*

[Ross]: *Possibly yeah, I don't think people really care about the colour, like people who smoke and buy lighters, I don't think they care about the colour,*

but also about the advertisements statistics will be nice like 1900 people die every day or like 20 percent of sun exposure increase your chance of developing skin cancer.

Ross said advertisements with scientific facts helped to change people's behaviour. From an analysis of his comments, it seems that scientific facts have influenced his beliefs and behaviours. As discussed previously in Chapter 2, masculinity emerges in various ways.

[Ralph]: *smoking adverts of damaged lungs that would be good to have burned skin images on a towel, graphics. I will not buy it myself, but it needs to be out there*

[George]: *something like a free towel or a gift because I don't think anyone would buy* it

These suggestions for advertisements referred to awareness messages, which tell the truth. These recommendations can lead to advertisements that would alter the impact of sun damage on health.

[Ralph]*: it would be nice to go to a room that sprays sunscreen like a carwash with suntan lotion, maybe a box with a picture of beach babes.*

[Anthony]: *It's too awkward to sit in the shade*

Anthony said it was awkward to sit in the shade and it is clear from his comment that his behaviour is affected by peer-pressure and masculinity.

[Ralph]: *maybe a bottle that you can use the bottle itself to apply your sunscreen, but you can't share them because other people can't use it, I don't like having sunscreen on my hand*

[Anthony]: *sunscreen and sand are bad. The aim is not to apply it at all* [he laughed] *or a little booth that sprays sunscreens.*

[Ralph]*: It's good for blokes, I want to avoid rubbing sunscreen, and something like a roller would be good*

Anthony jumped into the conversation:

> **[Anthony]:** *I was thinking like a stick for dogs, like that with a roll on a ball that it is soaked in sunscreen or sponge with a stick, maybe with flexible handles,*
>
> **[Ralph]:** *ok carry on* [he laughed]

Ralph and Anthony were concerned about the application of sunscreen and said they wanted to avoid applying sunscreen. Their identification of sunscreen application being an issue seems here to be related to a conflict with their construction of masculinity.

Anthony said his design was a roller or stick that applied sunscreen. This seemed to be influenced by his gender and masculinity and a desire to protect these.
Anthony laughed as well and carried on:

> **[Anthony]:** *maybe having a container with all the suntan lotions on it with different SPF or a human shape body sunscreen that would change colour,*
>
> **[Ralph]:** *That's nice*
>
> **[Anthony]:** *gender-neutral, basic shape, and change colours, and something like a sprinkler,*
>
> **[George]:** *a spongy towel that you can rollover*

Anthony's design incorporated an easy-to-use roller applicator. He designed various applicators to apply sunscreens, including a roller ball to apply sunscreen on the shoulder and back of the body. The act of applying sunscreen was Anthony's main concern and was one he repeated regularly during the session. It is clear from his design that he wished to protect his masculinity and gender. He is clearly expressing 'no body contact or sense of touch' and seemed particularly concerned about same-sex body contact. Anthony was trying to protect his gender in order to maintain his masculine position.

As stated previously in this chapter, masculinities are fragile and need protection. Anthony's gender and sexuality clearly impacted his design. The HCD elements applied in his designs such as affordances and signifiers are gendered towards his own gender.

Anthony's behaviour during the sessions up to this phase was typical of a man who used expressive ways to indicate his gender and masculinity. His body language and way of participating in the group showed a competitive edge; for example, he talked the most in the group. His design outcomes from the design phase are focused on sunscreen application providing a flexible handle for the user to apply sunscreen. His design interventions included a rollerball with a long handle that allowed the user to apply sunscreen on the back of the body and shoulders and wearable products, such as hats that spray suntan lotion. In his own words, he referred to his designs as '*it doesn't involve awkward interactions*'. It seemed that Anthony is primarily concerned about behaviours that do not conform to society's norms and gender boundaries and that the construction of his masculine self-impacts on his design and therefore the HCD principles applied in his design.

Stephen Frosh in *Masculinities* (Frosh et al., 2002, p.17) discusses the ways in which the male participants in a research study he conducted enacted various behaviours that were in accordance with gender boundaries and norms which were linked with the construction of their masculinities. This highlighted how their behaviour towards the construction of heteronormativity originated from fears of representing themselves as gay or feminine. Anthony expressed views and behaviours that differentiated him from femininity. In this context, his masculinity is exposed in relation to femininity and differentiates itself from feminine performances. In this context, maintaining gender boundaries is very important in representing dominance and masculinity in a way that reflects his sexuality. This is related to the concept of heterosexuality. He also indicated the need for instructions regarding the application of sunscreen.
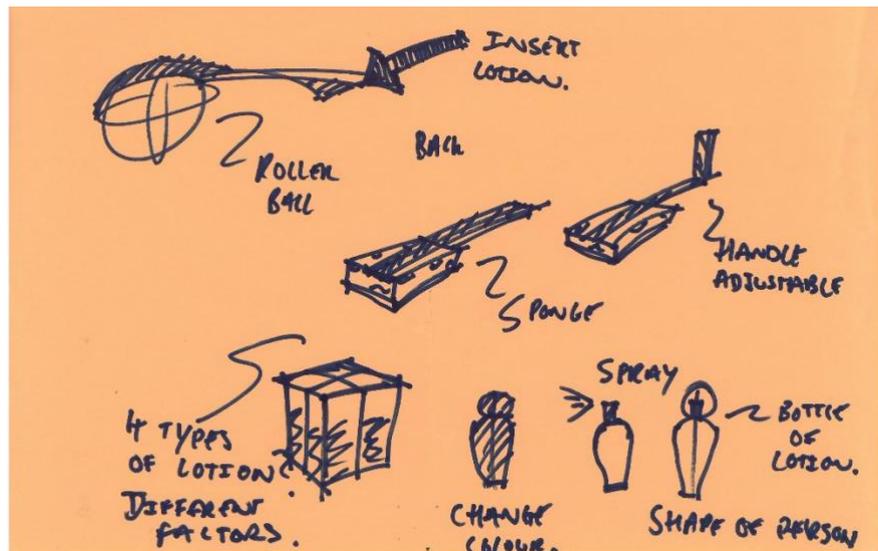
Figure 5.26 The images of Anthony's final design (session one, phase 3)

> **[Ralph]:** *it's like an ink thing, that's one of my ideas and also a clinical thing with a picture of burnt skin so nothing to glamorise it, trying to make you feel guilty for not buying it, and also a more like a cream for eczema, and showing that putting sunscreen is not a joke or anything, it actually burns your skin, the bottle will be completely white and the image on it is red with a red name for the product*

Ralph also said a clinical-looking bottle would change people's attitudes to applying sunscreen. Ralph identified clinical creams as effective for changing low levels of sun protection use, and it seemed that in his view, scientific knowledge in relation to health and medical professions was powerful.

The researcher asked why he had chosen white for the packaging.

> **[George]:** *because white is more clinical, gender-neutral and less fun, the shape is too desirable, it has to be a more natural shape like creams*
>
> **[Anthony]:** *I really like the golden beach colour*

George says the colour of the bottle should be white because it is related to health. George defined the colour white as being clinical and medical, and also identified it as gender-neutral.

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The researcher asked what the details on the bottle were.

[**Anthony**]: *the highest SPF factor because I don't know why you would go for less one, what's the point of having one that is not 50?*

[**Ralp**h]: *the only sunscreens we have in the house is 50.*

Then immediately Anthony said in a funny way:

[**Anthony**]: *you get no tan at all, mate.*

Anthony said high SPF sunscreens stop the skin from tanning. He believed all sunscreens should be more than factor 50 but identified high SPF sunscreen as stopping the tanning process.

[**Ralph**]: *I don't see much point to get less than 50,*

[**Ross**]: *it's because its thinner on the skin and you won't feel like a layer of cream,*

[**Anthony**]: *obviously there is a need to educate people about what is a correct SPF sunscreen for them to wear because some people don't wear higher numbers because they think they won't get a suntan. Some people have a different understanding.*

[**Ralph**]: *I always buy the highest* SPF.

[**Anthony**]: *there is just not enough common knowledge about what is best for sun protection*

[**Ross**]: *why they don't make just 50?*

[**Anthony**]: *some people don't wear 50 because they want to get a bit of tan*

[**Ross**]: *what are the differences between SPF numbers?*

[**Ralph**]: *a photochromic material, if it was designed like a beach is a product placement and the ones that stick out is because of the shape or colour and I*

have been using it for all my life so if it's designed in a way that is related to sunscreens because something like Nivea is ok but the others don't stand out at all as suntan lotion

[George]: *I think the white one does stand out, then*

[Anthony]: *yeah.*

All the male participants said they did not know the correct way to use sunscreens or what the SPF meant. From their comments, it was clear that they were very confused about the type of sunscreen to use in relation to the SPF number, which indicates a lack of information is available about using sunscreens.

[Anthony]: *The main reason that I cannot wear sunscreen is the awkwardness, putting it on your back,*

Anthony again refers to the problem of applying sunscreen on the upper back of the body.

[George]: *it is also the weather is not sunny enough to feel the need to put sunscreen, I usually avoid the sun, or going out when it's too hot*

[Ross]: *I always burn every time he plays football, and because we all get burnt and we forget, we all get burnt, this might be dumb, but would you put sunscreen on this weather?*

As stated above, the weather in the UK, which is mainly cloudy, is also a contributory factor in their sun protection behaviour.

[Ralph]: *I just forget and because I'm slightly olive skinned so I get away with it but if there was a reminder on my phone, will be very good that says you should wear this factor, especially in Brighton you don't think it's that dangerous, and also, we never have seen any of these posters or adverts to apply sunscreen, my friends put sunscreen but when they burn and as long as they put it on they think they've done it,*

[George]: *if I go to the beach I might take it but if I go somewhere else I won't take it because I won't have a bag or beach bag*

Ralph and George said they forget to take sunscreens to the beach, and that they don't carry a bag to the beach. They all laughed. They asked whether I wore sunscreens and I told them that it was mixed in my foundation, and they laughed and said we should wear foundation creams then.

> **[Ralph]:** *I can see a lot of guys wearing deodorant, but no one carries sunscreens*

> **[George]:** *maybe you can have both together, for smelling nice and protecting your skin*

In the end, it seemed as if they were keen to know more about sunscreens and skin cancer facts, so they were advised to check the Cancer Research UK website for more information about sun UV radiation.

George indicated passive ways of expressing masculinity in the group. He identified science and scientific information as the main way to improve sun protection behaviour and designed a clinical look for sunscreen, using white and red colours in his design.

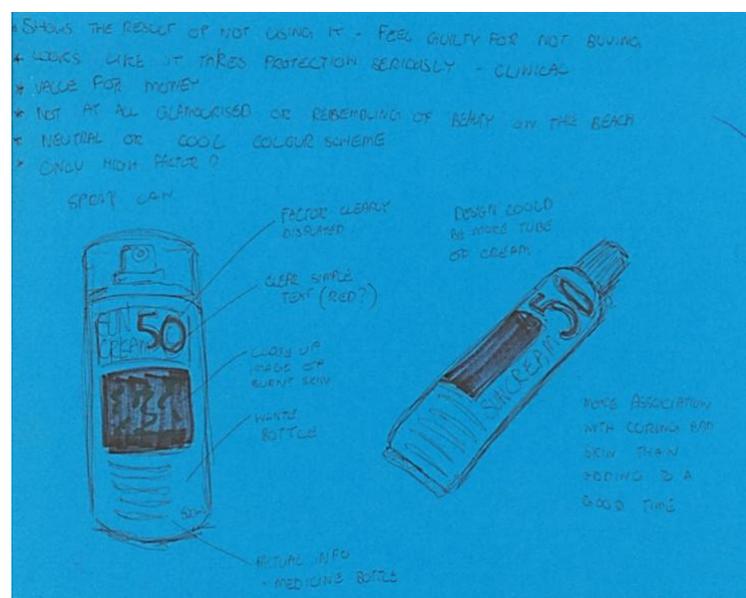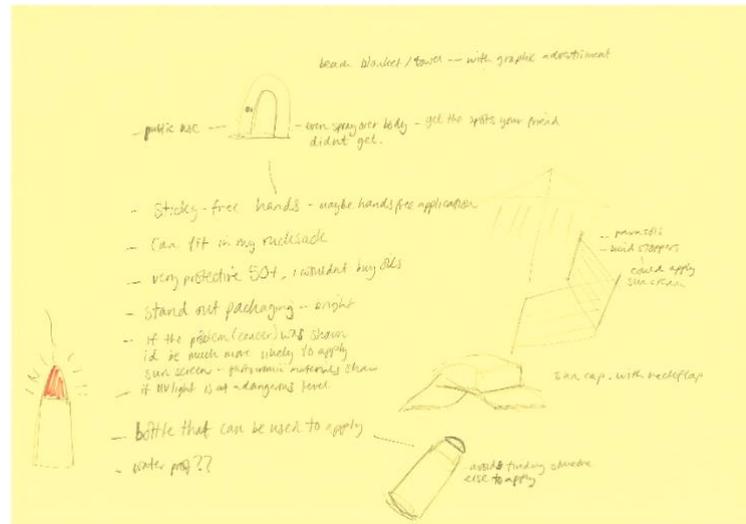**Figure 5.27 An image of George's final design (session one, phase 3)**

 Ralph discussed his design which was a sponge applicator that is the bottle itself to apply sunscreen. He also designed a hat that alerts the user about how much they have been exposed to the sun. He preferred spray sunscreens which meant there was no need for application by hand, and pocket-sized products. In the design phase of the session

Ralph's designs, like George's, demonstrated his belief in the power of scientific knowledge. This comes across related to expressing masculinity.

Figure 5.28 The image of George's final design on the left and Ralph's design on the right (session one, phase 3)

5.6   Summary

This chapter described the process of data collection for the main study through one study in details. Also, it showed how it engaged the participants in each stage of the main study and empowered them as designers. This led to design outcomes aimed at addressing the low levels of sun protection in young men. The findings indicated the hidden role of gender embedded in the HCD process. The following chapter presents the main study results from all the conducted sessions which highlight the exploratory study findings discussed in Chapter 4 and it shows that gender is an implicit factor in the HCD process.

6 Main Study Results

Following the main study presented in Chapter 5, this chapter presents and analyses the findings obtained from the main study. It highlights the findings of all the main study sessions, including the thematic analysis process. The results show the main themes discussed in Chapter 4 (the exploratory study) reoccurring.

6.1 Introduction

Chapter 5 showed the role of gender and masculinity embedded in the naturally occurring behaviour and attitudes of the participants while the participants engaged in the HCD process. This means the implementation of the HCD in practice indicated the hidden role of gender in the HCD elements. In addition, it outlines the findings emerged from the exploratory study are recurring. These include the participants' expression of gender, hegemonic masculinity, dominant positioning in the group and expression of heteronormativity. Following the methodological approach adopted discussed in chapter 3, the exploratory study in Chapter 4, and one session as an exemplar of the main study in Chapter 5, this chapter describes the main study results from all the studies. Chapter 5 outlined the reoccurring themes from the exploratory study through the facilitated GAHCD approach. This chapter presents the data gathered from all the main study sessions were transcribed and systematically coded using the six stages of thematic analysis method (Braun & Clarke, 2006). The emergent themes through the combination of the codes identified the underlying meanings of the participants' perspectives, actions, motives and experiences consistent with the exploratory study findings. The key concepts of masculinity, expression of gender and sexuality have been instrumental in the interpretation of the collated data with specific questions to identify the similarities and differences between the participants in the mixed-gender group to male-only group and the expert group. The interpretation of the data aimed to explore the ways that participants attach masculine attributes and gender through the underlying meanings of their actions.

6.2 Results

The following illustrates the results emerged from the qualitative analysis of the collected data related to the research questions around which the main study was originally organised. A summary of the transcribed data using thematic analysis was demonstrated earlier in this chapter. In total, 24 hours of group discussion were transcribed for the detailed analysis. This led to the key themes raised in line with the exploratory study themes discussed in chapter 4. Also, an analytic account of how these themes interweave was discussed. Furthermore, there is also a quantitative component to an in-depth account of the emerged themes which is outlined below. Overall, as shown in the table (4), 31 participants took part in the main study included 24 male participants and 7 female participants. This includes all the user experts (mixed-gender and male-only groups) and subject expert participants.

Number of participants for all the main study sessions	Number of male participants	Number of female participants	Date
Group 1 (User experts)	4	0	01/02/2017
Group 2 (User experts)	3	1	08/02/2017
Group 3 (User experts)	3	1	15/02/2017
Group 4 (User experts)	3	2	22/02/2017
Group 5 (User experts)	2	2	01/03/2017
Group 6 (User experts)	4	0	08/03/2017
Group 7 (User experts)	3	0	15/03/2017
Group 8 (Subject experts)	2	1	22/03/2017
n=31	n=24	n=7	

Table 6.1 Number of participants for all the main study sessions

Below outlines a summary of the results related based on the thematic analysis of the key findings categorized based on the weight of the data with particular things including participants' gender and masculinity:

- 22 male participants identified colours as associated with specific genders and identified products as being gendered. It seems that their world is

gendered, and this comes across in the defensive protection of their masculinity by choosing particular products. These male participants enacted their masculinity in a way that is clearly important to them but needs protection as it is seen as fragile and needs to be defended.

- 24 male participants expressed views and ideas associated with hegemonic masculinity
- 20 male participants changed what they said at the beginning of the session as well as their attitude across time.
- 22 male participants expressed views toward how pink is girly and feminine for them, they kept going on about how pink is for girls in a jokey laddish way.
- 19 male participants talked more in the group and made jokes in a manly way
- 28 out of 31male and female participants designed a sun protection intervention that is targeted for both genders as gender-neutral
- 22 male participants prefer sunscreens that are small, portable and they can fit their pocket (pocket size)
- 27 of male and female participants indicated a lack of knowledge regarding the danger of skin cancer
- 29 of the male participants prefer sun protection concepts with a statement of the scientific facts and statistics regarding skin cancer
- 24 male participants indicated attitudes and behaviour concerned about their masculinity and their masculinity is more fragile

The data collected from the sessions through a participatory design approach demonstrates the importance of gender awareness in the human-centred design (HCD) process facilitated by deploying a gender-aware HCD approach (GAHCD). As the current account of HCD is gender-blind from the theoretical perspectives, the collected data indicates the importance of being aware of the role of gender in the participant's actions and performances and we can be aware of it and it can be more advantageous to acknowledge it in the HCD process and the designers need to be more aware of it and take steps towards it. In addition, embedding gender awareness in the HCD process leads to a better understanding of the users and the design process.

In particular, GAHCD revealed the role of gender in the design process through the commonly reoccurring patterns of interactions collated in the sessions. As the sessions

proceeded, the process became clearer to the researcher and the data saturation was reached without requiring additional, novel or relevant ideas in the data that bring new information that indicates if in the case of obtaining new data, the key patterns/ ideas and characteristics, and the link between themes and their validity is already addressed (Creswell, 2009). In the male-only groups, it was possible to observe what male participants' attributes and behaviour were towards the other male participants. In contrast to the mixed group, their behaviour differed in terms of dominating the conversation and others became quiet, and they supported each other's experiences with agreements related to mutual concerns and collectively constructing common ways of being a man.

For this study, the data saturation point was reached when the researcher's interpretation of data was repeating with similarities and commonalities of the ideas already discussed without the necessity for further data collection through the sessions.

For example, the variations in attitudes and behaviour of the male participants in comparison with the female participants indicate their gender differences created and reacted in their responses associated with the HCD principles of affordances and signifiers. This is based on displaying patterns of masculine or feminine attitude and behaviour in relation to the characteristics of gender and masculinities embedded in their motivations(Mac An Ghaill, 1994).

Initially, the product interaction stage demonstrated that the HCD principles of interactions such as affordances and signifiers are perceived as gendered. Almost all participants identified the language that evokes the products in relation to stereotypes and gender norms in society. In particular, they identified the main characteristics of products such as colours, shapes and materials associated with specific gender and products as targeted for either male with masculine characteristics or female with feminine characteristics.

However, the participants identified the meanings attached to the products while they perceived the features of products associated with elements that are towards their own gender. Almost all the male participants feel this way and they identified the gendered features of the products as beneficial and comes across as security or protection for

them. This is a link with hegemonic masculinities that promotes the feeling of superiority concerning maintaining the image of the male's dominance and emphasises the replication of the dominant narratives into behavioural patterns. In comparison, the female participants also identify specific colours as gendered and consciously attach gendered values to the products. Although, their attitudes seem freer and more open to the rules and norms of appropriate behaviour but also more engaged in more variety of interests than the male participants. It is recognisable from the female respondents, that the way they attach meaning seems freer and more flexible than the male participants in using specific products. Almost all female participants shared their interest in using specific products targeted specifically for men.

Subsequently, as the participants identified products with gendered attributes appealing to them, during the process of being aware of the language applied in the products in terms of masculine or feminine characteristics, the simulated beach environment stage, revealed the link between the sun protection practices in young men and the way they enact their gender in relation to their sexuality. We can see a strong link from the participants comments that younger male adults and the protection of their gender were a stronger link to their masculinity. Protection of masculinity is clearly important to these participants, but also must be fragile if they need to protect it. This is also apparent from the ways they are constantly differentiating themselves from the girls. In this manner, as Frosh explains in the book *Young Masculinities*: (2002), "*Masculinities are consequently presented as powerful but fragile, asserted and constituted in opposition to each other and to versions of femininity*". (Frosh et al., 2002, p.42)

The majority of male participants are less willing to use sun protection than female participants. For the project, it appears that female participants are also more aware and cautious about sun protection and keener to use sunscreens than the male participants.

Also, almost all male participants avoid using products that are not designed for their gender. Although almost all participants recognised products targeted at their gender through stereotypical colours such as 'pink for girls' and 'blue for boys', it is something they expected to be and it's an important consideration when they use a

product. However, a few male participants indicated more flexibility in using products that are not targeted towards their gender. These participants also indicated that they are more willing to use sunscreen in comparison to the other male participants. Although these participants feel threatened by the sun and they are aware of using sunscreens to avoid overexposure and sunburn for outdoor and beach activities, they still have low levels of sun protection in the UK because of the cloudy weather. Also, they mentioned particular characteristics of sunscreens makes it less motivating and problematic to use. The majority of male participants consciously avoiding sun scream due to its application in relation to same-sex body contact.

Almost all the male participants in the group agreed with their comments. However, a few of them indicated more flexibility with body tactile. From their views and behaviour traits, it is clear that they are concerned with the pressure from peer culture and concerned about the application of sunscreen.

The variations in attitudes and behaviour of the male participants in comparison with the female participants indicate their gender differences created and reacted in their responses associated with displaying patterns of masculine or feminine attitude and behaviour. This is relevant in developing of understanding of the male participants' attitude and behaviour in relation to their gender characteristics and masculinity embedded in their motivations. At this point, we should note that almost all male participants expressed views and ideas associated with different versions of hegemonic masculinity(Connell & Messerschmidt, 2005). This analysis also indicated that understanding of the ways in which the male participants express their masculinity as the male respondents seem concerned about their masculinity as came across as defensive and it needs the protection of the male participants' masculinity through choosing particular products.

As stated in Chapter 2, hegemonic masculinity is dominant and it conflicts with their willingness to use sun protection in order to avoid the feelings of vulnerability or accepting defeat(Connell, 2005). This can suggest that they are in denial as sun protection practices conflicts with the construction of their masculinity. It is also apparent from analysing these comments that the male participants' attributes seem to possess the characteristics of wanting to be accepted by others. Their perspectives and

comments imply that few male participants are actively involved in the conversations and primarily positioning their beliefs linked with gendered values. In this case, being popular in the group indicates various ways of inserting masculinities in the group dynamic such as being popular and dominant in the group. This is linked with the ways in which they enact popular ways of being a man and heteronormative identities. In this manner, fear of being seen as gay and gender stereotypes impact young men's perception in relation to their sun protection practices.

The results obtained from the last stage of the session involving ideation to devise interventions for sun protection through the co-design method. Although the majority of the participants designed an object targeted as gender-neutral, their design outcomes indicated the way in which they have applied gendered elements in their designs.

The comments by the participants show that the elements that are perceived, highlight how gender values emerge in each product. In particular, the meanings they attach is fluid and it can be identified in relation to their gender and sexuality link with time, place, and context. Similarly, the driven results by this study indicate that the HCD process also is linked with time, context and place. In this context, the inclusion of gender awareness in design benefits both designers and users.

6.3   Key themes

The following section overviews the key themes emerged from an in-depth interpretation of the gathered data from the main study consolidating what was found in Chapter 5. All the conducted sessions produced a range of qualitative data including images, audio, video recordings, observation notes as texts. The collected data is discussed and analysed using an inductive approach as the data emerge new themes through the comparison of collected data in the mixed, male-only and expert group. The key findings from the analysed data suggest the expression of gender and the dominant discourses of masculinity (Connell, 2005)in commonly reoccurring patterns and themes collated are developed in connection with identifying the meanings, motivations, and experiences of the participants. These themes portray the ways the participants seem to be concerned with 'being' like others, young men don't want to

be seen as different(Mac an Ghaill, 1994). Their responses came across as their fear of being seen different as it seems they want to be accepted by being like others.

The following presents direct quotations from the participants' words by using their initials maintaining anonymity for the transcription. In light of the study's aim and the selection criteria, the participants' gender is presented as [M/F] along with their age.

6.3.1 Gendered responses and meanings

Almost all participants in the main study expressed their interest in the products which were targeted towards their own gender. In particular, they identified the main characteristics of products such as colours, shapes and materials associated with specific gender and products as targeted for either male with masculine characteristics or female with feminine characteristics. However, they recognized a range of features and meanings attached to the products as 'naturalized'. For them, these features of products are an important consideration when buying and using them targeted towards a particular gender. Many male participants feel this way and they recognised the gendered features of the products aligned with the construction of their masculinity. As the following participants said:

[JS, M, 21]: *Male colours are dark blue and black, female products are curvy, and I usually buy the products that are dark colours and are for men, the font and packaging of products for men are with straight lines or as a square.*

[EA, M, 20]: *I buy products that are dark colours and are for men, if a product is designed for women, it will have bright colours and will be soft and smells girly such as Nivea creams, flowery smells are for girls*

[SH, M, 24]: *I always buy Gillette shaving cream that is specifically designed for men, in general, products that are designed for men look more reliable as it's guaranteed that it will do the job.*

[EH, M, 19,]: *all the men's products are dark coloured like black and blue and women are more pink and white, if a product is for men then it's for him.*

The products were interpreted by the participants' perceptions through stereotypical differences such as 'pink for girls' and 'blue for boys'. This seems to be something

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they expect and an important consideration when they use a product. Almost all male participants avoid using products that are not designed for their gender. In some cases, this attitude was expressed repeatedly by the younger male participants aged 21 and under.

6.2.2   Masculinity

The primary motivation in choosing products by the male participants shows a link with products targeted at their gender. Here are a few examples of the way they described their unwillingness in using products that are not designed towards their gender:

[JS, M, 21]: *I would never use female shampoos because they are smelling different to male products and I don't want to walk passing someone who thinks 'he smells like a girl'*

[EA, M, 20]: *there shouldn't be any difference between male and female products because if it's the same product but I always buy men's products because it's important to me.*

[JP, M, 20,]: *James said he won't use female products because it's very different like Lynx for men and lynx for women, they are completely different and the difference is massive.*

[KE, M, 21]: *I won't buy the pink pen because it says Bic for her and its pink, I rather blue or transparent.*

[SM, M, 20]: *there is no way I wear a feminine watch, also I don't like flowery patterns products like the blender, it's cool but I won't buy it, but I will buy it for my girlfriend.*

[JP, M, 20]: *Men buy first thing it comes across to them when they want to buy something such as shampoos and they prefer something that does everything and it's less detailed and it says that it's for men so it's what they want, if it says for men so it's designed for men. The female products are very different like Lynx for men and lynx for women, they are completely different and the difference is massive, most people will think you are weird for using a female product*

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The demonstrated comments refer back to the fragility of masculinity and it needs for protection (Frosh et al., 2002) discussed in Chapter 5. However, a few male participants indicated more flexibility in using products that are not targeted towards their gender. As they explained:

> [AD, M, 22]: *I don't mind the flavour of shower gels and I usually buy the cheapest product. For example, I won't necessarily choose the boy's shaving cream as it doesn't bother me if it's marketed towards girls or products with flowery patterns.*

> [SH, M, 24]: *I don't mind wearing thin watches because it's cool, in fact, I'm wearing one now that is with thin straps and rounded screen. I think it looks friendlier as Stephen's watch looks rigid, not friendly, not welcoming, over the size, over the top and Hefty. I would buy pink tools if it works better as I have worked in the construction sites before and you can see the tools better because of the contrast.*

> [AL, M, 21]: *If there is no other pen in a shop I will buy the pink one.*

These participants explained their motivations and reasons behind their choice of objects and their openness to use products not designed specifically for their gender. Although there is an indication of appealing values and expressions towards the targeted products for their gender. These participants also indicated that they are more willing to use sunscreen in comparison to the other male participants.

It is apparent from their responses that they are keener to protect themselves from the sun. The followings indicate the ways in which they describe their willingness to sun protection:

> [SH, M, 24]: *I put sunscreens in hot countries but I never put sunscreen in this country, there is no point, I usually fall asleep under the sun and I feel bad about it.*

> [CP, M, 21]: *I use sunscreen but not in Brighton beach as it is not sunny unless is very hot and sunny, I often use the highest factors because I get sunburnt quickly because my family have a history of skin cancer, my sunscreen is usually Nivea factor above 50, the spray one and water resistance.*

[RM, M, 21]: *I use sunscreens but not in Brighton, I usually put sunscreens when it feels burning.*

[JB, M, 23]: *I am half Irish, half Indian and I put sunscreens because of my Irish side, I put sunscreens on, every few hours but I burn very easily and I put sunscreens even in Brighton, I use any brand but above factor 30, I get sunburnt every month when it's sunny and I prefer the spray and water resistance sunscreens.*

[RH, M, 22]: *I use sunscreens and if its 30 degrees I use factor 30 sunscreens.*

[RM, M, 21]: *I use sunscreens but not in Brighton.*

Although these participants feel threatened by the sun and they are aware of using sunscreens to avoid overexposure and sunburn for outdoor and beach activities (Table 1), they still have low levels of sun protection in the UK because of the cloudy weather. Therefore, despite the variations towards sun protection practices in the male participants, no patterns of sun protection are practised in the UK. On the other hand, the following male participants have low levels of sun protection and not willing to protect themselves from the sun in the UK and outside the UK.

[EM, M, 21]: *I am aware of the consequence but I'm still not concerned, as I spend a lot of time in the sun and I'm fine.*

[JS, M, 21]: *I don't feel threatened by the sun, I usually choose sunscreens that have a low SPF because as a male you pick a lower SPF like 6. I choose the lowest because if you are a male and you're worried about getting too tan then people socially don't accept it. This is because sunscreens in higher number mean you won't get tan or too tan and people perceive it as a feminine thing. Spending a couple of days in the sun won't give you skin cancer.*

[KE, M, 21]: *I won't put sunscreen as I don't care about SPF because the number is not important to me, I put oil on my body for tanning, I usually don't carry anything to the beach and I think my skin is used to the sun, if I thinks I need sunscreen, I will borrow it from someone. I won't even think about it and I go to the beach and to get vitamin D.*

[JS, M, 21]: *If I buy sunscreens, I will choose the one that has a low SPF because as a male you pick a lower SPF such as 6.*

[JP, M, 20,]: *I don't put sunscreens in the UK because it's only a few days of summer. Maybe if I'm on holiday I will buy the first sunscreen I see on the shelf, I can't connect myself to the danger of the sun and nothing that bad can happen immediately.*

Overall, the number of participants with a low level of sun protection is outlined below:

Feel threatened by the sun and buy sunscreens that have a low SPF	Male Participants N=21	Female Participants N=6	All Experts participants
No	13	1	2
Yes	8	5	1
Don't Know	0	0	0
No answer	0	0	0

Table 6.2. Attitudes towards sun protection practices- Number of the **participants** =N **(mixed and male only group) = 27, n (M) = 21, n (F) = 6** N **(expert group) = 3, n (M)= 2, n (F)= 1**

On this basis, it is important to investigate the link between the participants' masculinity and their sun protection practices in the way they enact their masculine position. We can see a strong link from these comments younger adults and the protection of their gender links to their masculinity. Protection of masculinity is clearly important to these participants, but also must be fragile if they need to protect it. This is also apparent from the ways they are constantly differentiating themselves from the girls. In this manner, as Frosh explains in the book *young masculinities* (2002), *"Masculinities are consequently presented as powerful but fragile, asserted and constituted in opposition to each other and to versions of femininity".* (Frosh et al., 2002)

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In comparison, although the female participants also identify specific colours as gendered and consciously attaching gendered values to the products, their attitudes seem freer and more flexible to the rules and norms of appropriate behaviour. Also more engaged in more variety of interests than the male participants. It is recognisable from the female respondents, the way that they attach meaning seems freer and more flexible than the male participants in using specific products. Almost all female participants shared their interest in using specific products targeted specifically for men. In their words:

> [EC, F, 24]: *I like the watch because of the large face looks very masculine and its square and I use male raisers because they are cheaper and I prefer to buy it.*

> [JS, F, 21]: *I don't think big watches are masculine because I like chunky watches.*

It appears that they are also more aware and cautious about sun protection and more keen to use high SPF sunscreens than the male participants. As they explained:

> [JS, F, 21]: *I use sunscreens in Brighton usually factor 30 plus and I take a big umbrella to the beach.*

> [EC, F, 24]: *I try to sit in the shade and apply sunscreen.*

> [KG, F, 21]: *I always use sunscreens that are factor 50, the highest.*

On the other hand, the majority of male participants are less willing to use sun protection than female participants. Almost all male participants also mentioned particular characteristics of sunscreens makes it less motivating and problematic to use. Such as:

> [JW, M, 18]: *Sunscreens are greasy, and I don't like to wash my hands on the beach, also nobody every like the mixture of sunscreen and sands.*

6.2.3 Expression of gender and hegemonic masculinity

The variations in attitudes and behaviour of the male participants in comparison with the female participants indicate their gender differences created and reacted in their responses associated with displaying patterns of masculine or feminine attitude and behaviour. This is relevant in developing of understanding of the male participants' attitude and behaviour in relation to their gender characteristics and masculinity embedded in their motivations. At this point, we should note that almost all male participants expressed views and ideas associated with different versions of hegemonic masculinity, this is not surprising as discussed in Chapter 2. This analysis also indicated that understanding of the ways in which the male participants express their masculinity as the male respondents seem concerned about their masculinity as came across as defensive and it needs the protection of the male participants' masculinity through choosing particular products.

6.2.3.1 Dominant position in the group

For the aim of this study, we can see a difficult task ahead as the male participants consciously avoiding high SPF sunscreens. As stated previously, hegemonic masculinity is very dominant and its conflicts with their willingness to use sun protection in order to avoid the feelings of vulnerability or accepting defeat. This can suggest that they are in denial as sun protection practices conflicts with the construction of their masculinity. It is also apparent from analysing these comments that they are expressing the characteristics of masculinity. Their perspectives and comments imply that few male participants are actively involved in the conversations and primarily positioning their beliefs towards their own gender. In this case, the participants enact other ways of being masculine in the group dynamic. In their words:

> [SM, M, 20]: *let me show you my watch and it's the same as our product design course leader, I don't like watches with thin straps because it looks too soft, it's rounded edges and I prefer harsh lines and no rounded lines.*

In response:

> [SH, M, 24]: it *looks Rigid, not friendly, not welcoming, over the size, over the top, robust and bulky, I don't mind wearing thin watches because it's cool.*

It is apparent from analysing these comments that they seem to possess the characteristics of being popular in the group. Their traits and comments seem to be linked with popular forms of masculine assertion and as hegemonic masculinity(Connell, 2005). In this manner, fear of being seen as gay and gender stereotypes impact young men's perception in relation to their sun protection practices.

6.2.4 Comparison

6.2.4.1 Same-sex body contact

As discussed in Chapter 5, almost all male participants indicated that their main worry for sun protection and applying sunscreens is regarding the application of sunscreen on their body. It is understandable from the ways they present themselves towards stereotypical gender boundaries related to the ways heteronormativity shapes their perceptions (Connell, 2005). This indicates an understanding of masculinities related to the participants' fear of being seen as gay and expression of heteronormativity through expressing their avoidance of same-sex body contact.

As they said:

> [RM, M, 21]: *I would never ask a guy to put sunscreen on my back. It is not a guy thing to do.*

> [JP, M, 20]: *I won't put sunscreens on his back and won't ask friends.*

> [SM, M, 20]: *if I go to the beach as just guys they won't put sunscreens on each other's back because it's sexual,*

> Then Stephen said 'do you think it's awkward' and then Sam said 'I didn't say it's awkward'.

> [EM, M, 22]: *I won't put sunscreen on guy friends back because people around us will judge and guys back is hairy.*

> [AH, M, 21]: *if I go on a family holiday I will use the sunscreen but when I'm with my friends and there is something awkward about using sunscreens, I am not worried about what suntan to buy but how to apply it and avoid body*

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contact with your friends' back, something that sprays sunscreens everywhere would be good

[RM, M, 21]: *I would never ask a guy to put sunscreen on my back*

In response to these comments, almost all the male participants in the group agreed with their comments. However, a few of them indicated more flexibility with body tactile as outlined below:

[SH, M, 24]: *you just say I just need to get through this awkward moment and you apply the sunscreen on someone's back.*

[JB, M, 23]: *My girlfriend put sunscreen on my back and because I've got tattoos on my back I don't mind anyone else put sunscreens on my back.*

Although it is apparent that they still need to justify themselves and in need to protect their gender boundaries and masculinity, they show more openness and flexibility. Overall, the table below provides the number of participants who are in need.

Positive and negative attitude to same-sex body contact	Male Participants N=21	Female Participants N=6	All Experts participants N=3
Negative attitude to same-sex body contact	20	0	2 M
Positive attitude to same sex body contact	1	6	1 F

Table 6.3: Attitudes towards same-sex body contact

In this case, in terms of ways in which they are in need to assert popular ways of being a man such as being heterosexual is important in the construction of their masculinity (Connell & Messerschmidt, 2005). From this analysis, fear of being seen as homosexual is one of the main reasons for the way young men present themselves towards the stereotypical ways of being like other men. In addition, the participants also indicated various forms of asserting their masculinity such as playing rugby.

Playing sports such as rugby are very popular among men and very significant in ways men construct their gendered identity and masculinity (Murray et al., 2016).

6.4   Similarities and differences

Comparisons between the groups were made using analysis of commonalities and differences in relation to their gender awareness. As described in the previous chapters, young men's interactions, behaviour, appearance and their body language were driven strongly by gender norms. However, the way in which masculinities are performed and enacted differed in terms of 1) passive and fragile and 2) expressive and dominant. Throughout the conducted sessions, the researcher observed these elements of contrasts embedded in the participants' attitudes, responses, behaviour and interactions.

In all the sessions, it was noticeable that the male participants' behaviour was continuously assessed and judged by other male participants in the group. This indicates the main reason in relation to selecting the stated prompts and activities shows all the participants seem to have similar ideas about gender. As discussed in Chapter 2, differences in the male participants' attitudes and behaviours are influenced by the participants' gender and masculinity. Gender in enacted and performed through the emergence of different patterns of masculinity was performed although the male participants' enacted attitudes and behaviours associated with the protection of masculinity.

Clearly, this is linked with the expression of gender and hegemonic masculinity, dominant positioning in the group. Also, performing heterosexuality is another form of performing the hegemonic version of masculinity (Connell, 2005)**.** The enactment of heterosexuality was noticed and discussed earlier in this Chapter also the male participants were imitating others in the group and more imitation and following were noticed in the mixed group than the male-only group. As stated in Chapter 2, young men imitating and acting like other men who 'pretend' to be hard. This means young men want to be accepted by imitating and acting like others(Frosh et al., 2002, p.62). The group dynamic with young men contributes in similar ways of expressing their interests and motives through exploring who's talking the most and who took the lead,

who sparking the ideas and who are enacting passive ways of masculinities such as popular forms of being a heterosexual.

6.5 Summary

This chapter discussed the main study results and concludes with various insights demonstrating the exploration of gender in the HCD process. The results reflected the exploratory study findings, indicating the ways gender played a key role in the participants' responses and behaviour as an implicit factor. The following Chapter discuss, and analyses the design outcomes emerged through the design stage of the main study through the facilitated gender-aware design process. This led to developing insights and design opportunities with, taking an account of gender in sun protection interventions for young men.

7 Design outcomes

The following chapter presents and analyses the design outcomes which emerged through the design stage of the main study. This stage empowered the participants as designers to devise an intervention, based on their own reflections, for the improvement of their sun protection practices, as discussed in Chapter 5. The analysis of design outcomes is discussed, based on three stages, namely describe, analyse and assess.

7.1 Introduction

Following the main study results outlined in Chapter 6, this Chapter discuss and analyses the design outcomes developed through the main study. As discussed in Chapter 5, the main study included three key stages: the product language, the simulated beach environment and the design stage. A total of eight groups with 31 people took part in this study including 24 male participants and seven female participants. The design stage produced a total of 13 design outcomes by the participants from all the groups including mixed-gender, male-only and the expert group. Chapter 5 outlined in detail one session of the main study with group one (four male participants) which produced four design outcomes. This chapter draws on an analysis of the eight remaining design outcomes individually.

The design outcomes are discussed and analysed using a deductive approach. This analysis is in line with the theoretical dimension of the research proposed in Chapter 2. In Chapter 2, we highlighted the importance of Norman's HCD principles through the concepts of affordances and signifiers. As discussed in Chapter 2, affordances and signifiers are fundamentally important in understanding how an object can be used by a particular actor and is the key principle of good design(Norman, 2013). Norman defined affordances and signifiers based on the interpretation of how an object is perceivable to define the possible actions for interacting with an object. He also clarified the concept of affordances and signifiers as perceivable cues related to our interpretation and our past knowledge and experiences applied to our perception. As indicated in Chapter 2, prior studies also have noted the importance of HCD principles. Giacomin added the use of affordances and signifiers related to the importance of

understanding the way people interact with physical objects (Giacomin, 2014). He indicated that the implication of HCD principles through a wide range of affordances in a product, system or service results in good interaction design that brings out commercial and business success.

The discussed elements pinpoint the participants' own gender reflections embedded in the design outcomes. Also, their reflection has influenced the design of the affordances and signifiers. This analysis is pushed further through a consideration of the male participants' accounts of their gender and masculinity expressed in their designs. A potential association is expected between the male participants and their designs, validating their gender and protecting their masculinity. The following discusses the subsequent important elements required for the analysis of the design outcomes focused on the role of gender.

As discussed in Chapter 2, gender and masculinity are central to understanding young men(Connell, 2005; Frosh et al., 2002). Returning briefly to discuss the concept of gender and masculinity indicated in Chapter 2, Bradley (2013) stated that the influence of our experiences and meanings are associated with previously lived experiences and our gender roles as male or female. Also, gender is persistent and understanding young men's experiences requires us to move beyond traditional, stereotypical and pre-identified gendered characteristics (Bradley, 2013). In line with this view, men's gender and masculinity and therefore an endorsement of traditional attitudes and behaviour are socially constructed over time (Connell, 1987; Bradley, 2013). Simpson also noted the way of understanding differences between male designed products that implies constructing the concepts opposite to femininity(Simpson, 1994). As pointed out in Chapter 2, according to Simpson men redefine their masculinities and express themselves in relation to their masculine roles, identities and behaviours that give access to design opportunities for products, services and brands. This is applied by the identification of the role of gender and masculinity embedded in each design outcome.

The following discusses the eight remaining design outcomes regarding a range of interventions for sun protection. As discussed in Chapter 5, the design brief was to *design an intervention for the improvement of young men's sun protection behaviour.* The participants were provided with the opportunity for expressing their ideas in a

group through a range of materials for brainstorming ideas including tools for sketching, utensils, pen and papers, write on walls whiteboards, coloured markers. Initially, they were encouraged to brainstorm ideas related to the challenges and barriers among their sun protection practices. This stage derived the design outcomes in the form of drawings to visually communicate their ideas by the participants.

Figure 7.1   Participants engaging in the design stage of the main study (author's photograph)

The generated design outcomes were photographed by the researcher and are presented in this Chapter. The following illustrate each outcome individually and highlight the descriptions of the participants regarding their design. This is followed by a discussion particularly focussing on the key elements of affordances, signifiers and gender identified in each design outcome.

So far we have focused on the key theories necessary to explain the course of analysis for the design outcomes. To achieve this, the following discusses and analyses the design outcomes guided by the following structure. All design outcomes are analysed through an adopted structured analysis process *describe, analyse* and *assessment* (Marton, 1986) as follows:

We first *describe* the design outcomes individually followed by the participants' discussion of their design in their own words. Second, we *analyse* the design outcome

using a deductive approach guided by the theories of the HCD and gender. Third, we draw on the *assessment* of the results in the context of design insights.

7.2 Design outcomes

7.2.1 Outcome one

Describe: The first design outcome is illustrated below (Figure 7.2), designed by a male and a female participant in a mixed-gender group. As the participants said: "*This is a convenient, portable and chunky sunscreen bottle that looks sporty and healthy*".

Figure 7.2 An image of the outcome one designed by three male and one female participant in a mixed group (author's photograph)

Analyse: The physical characteristics of both concepts illustrated above such as the clip hook snap for attachments have similarities to the existing portable bottles for hiking and cycling (MountainWarehouse, 2018). Their design is clearly influenced by the particular aesthetics of sports products which the participants show interest. Similarly, this is in line with the participants' interest in the main study (Anthony, Ross and George) related to products with sporty aesthetics and advertisements which portray popular ways of masculinity (see 5.5). As discussed in Chapter 2, there are multiple factors linked with men's performing their gender and masculinities such as body shape, playing sport, and physical strength opposed to homosexuality (Mac an Ghaill, 1994, p.12). In particular, particular sports reinforce expressing dominant modes of masculinity which symbolises physical strength, toughness and power (Murray et al., 2016). It is important to note that men prove their masculinities through factors recognised as masculine activities for their physical appearance rather than

health-related purposes (Connell, 2005). Similarly, Simpson links being involved in sports portrays a masculine lifestyle in young men (Simpson, 1994, p.120). This provides evidence for the association between sport and masculinity embedded in the characters of this design outcome. Their self-expression here is informed by sporty aesthetics in which has influenced their design.

From the HCD perspective, it is noticeable that the clip-on hook is related to the portability feature, and the bottle is thin: perhaps something that could fit in the pocket. The hook has a grip that shows it would open and close through visible affordances which indicates the possible actions (Norman, 2013). In addition, the colour of the hook signifies the location of affordances which are a mixture of straight and curvy lines with a chunky shape. Similar to the main study results, the male participants' preferences were related to the product properties described as chunky shapes, dark colours such as navy blue, grey and black, the appearance of silver chrome material. This suggests the deployment of their perceptions based on gendered tropes and gendered view of products.

Assessment: This design suggests a reflection of the elements that are important to the participants related to their perceptions derived from their gender identity informed by sport. These attributes could be influenced and contributed by the social expectations in society such as the pressure they receive from their peers and parents to perform their traditional gender roles. In addition, the shift in television sports and advertisements towards sport is also a contributing factor. For example, as discussed in Chapter 2, Gillette's marketing campaign uses images of football players to advertise the shaving experience for men. This clearly influences young men as sport is one of the definers of masculinity as being toned and muscular. These marketing campaigns use the reflection of a 'successful' man in the mirror and create a perception that every male consumer can acquire a similar image (Simpson, 1994, p.112). The combination of these approaches motivates competitiveness to attract men by using associations with sports, strength, competitiveness, heterosexual orientation and dominance which tend to impersonate hegemonic masculinity in men (Simpson, 1994, p.120). In particular, a masculine lifestyle implies being involved in sports and as a consequence athletic body shape prevails in relation to the level of self-esteem and

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heterosexuality. An athletic body shape as a muscular body contributes to a positive perspective to boys and men as being masculine in the society to express their difference from femininity. To this end, we can see particular gender attributes in line with traditional gender enactments we expect young men are more drawn and concerned to repeatedly validate their sexuality.

7.2.2 Outcome two

Describe: The following design outcome is designed by two female participants in a mixed-gender group. As the participants' said: "this is a sponge soaked in sunscreen and will be designed for men and women similar to women's makeup sponge for applying makeup foundation or moisturiser, the colour will be pink or light pink".
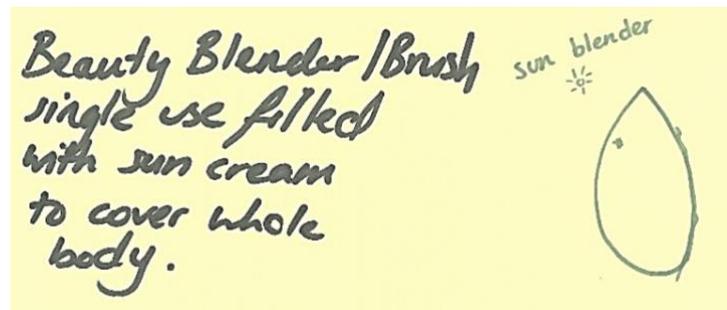

Figure 7.3 An image of the outcome two designed by two female participants in a mixed group (author's photograph)

Analyse: In their own words, this design outcome is similar to the women's makeup sponge in a bright pink colour. Although all participants were asked to design sun protection interventions for young men, yet here the female participants' portrayed their own interests and motives influenced by their gender experience with some degree of familiarity. Their design portrays a similar object that is convenient and comfortable for women associated with culturally established and feminine characteristics. As illustrated in Figure 7.3, the overall form of this concept is rounded and egg-shaped driven by their experience in the development of this design outcome. Again, the participants' own gender contributed to the physical characteristics and attributes of the affordances and signifiers emerged in their design. From the HCD perspective, the affordances in this design are rounded and egg-shaped to be held easily and the spongy characteristic signifies the sunscreen application. These characteristics show similarities with products targeted at women featuring bright colours (preferably

pink), soft material, organic, and rounded shape. In contrast, often men's products are characterised by complex, angular shapes, and dark colours (Moss, 2009). Moss relates the use of aesthetics in products that differs in terms of shape, colour and material associated with the perception of culturally established male and female gender roles in the society. Also, the same expectations follow how the product will be used. Examples of such designs are gender-specific shaving razors for men and women that differ in terms of shape, colour and material (Ehrnberger et al., 2012). For example, the bright coloured razors are designed specifically for women through specific characteristics including soft, rounded, and organic shapes. In this context, colour suggests the use of razors targeted at men or women (Goffman, 1987, p. 27). This shows how the participants' reflections are informed upon expressing their gendered experiences related to their own gender identity provoked by their designs.

Assessment: the emerged attributes expressed by the female participants are similar to the particular characteristics of popular products for everyday use targeted at women. This association reveals their motivation identified in the language of affordances and signifiers in a way that is according to their own experience. Up to this point, the comparison of these results pinpoints the significant role of gender in relation to the design outcomes and the participants' own gender perceptions. This evidence suggests the participants' gendered enactments are traced and characterised in the design of affordances and signifiers.

7.2.3   Outcome three

Describe: The next design outcome illustrated below is designed by three male participants in the expert group. As the participants' said: *"This is a sunscreen applicator, it helps men to apply sunscreen on their back without body contact for the back areas of the body and shoulders"*

Figure 7.4　An image of the outcome three designed by three male participants in the expert group (author's photograph)

Analyse: As illustrated in Figure 7.4, this design is a wearable sunscreen applicator with an image of a male body wearing the product. It is clear from the participants' comment that they are concerned about body-contact for applying sunscreen. From the HCD perspective, the handle on each side in this design outcome shows that it can be held to apply sunscreen for the back and shoulders. The combination of physical affordances here regarding the shape and the handles indicate how the object can be used. But instead of looking at the affordances and signifiers as a static thing, we need to be aware of how they also reflect the participant's concerns related to their gender and masculinity.

In particular, this design seems to be related to the experiences of the male participants regarding their protection of sexuality. Throughout all the studies, avoiding same-sex body contact was raised frequently as an important issue by the male participants. The male participants in the main study and the exploratory study also discussed how the application of sunscreens on their back was the main obstacle related to their sun protection behaviour. They linked their concern related to peer-pressure and gender norms that are popularly identified as a hegemonic form of masculinity. As discussed in Chapter 2, the construction of heteronormativity is associated with the protection of masculinity originating from fears of representing themselves as gay or feminine in line with the main study results. This shows the ways that the participants are protecting their masculinity and address it through the fear of being same-sex body contact to protect their gender that maintains their masculine position. As discussed in Chapter 2, normative masculinity is constructed and enacted through particular attributes including avoiding same-sex body contact and similar activities linked with

the fear of being seen as gay which contradicts the construction of masculinity (Connell, 2005). This design outcome also demonstrates the way in which the participants described their concerns related to their fragility of masculinity.

Assessment: The design outcome illustrated above focuses on avoiding body-contact shows the male subject experts also think that the group they are designing associated with dominant heteronormativity. The characteristics of their design including affordances and signifiers are influenced by the traditional and expected expression of gender enactments conforming their sexuality. To them, maintaining gender boundaries is very important as masculinities are fragile and needs protection. This is fundamentally about them carrying their concerns, fears, and fragility of their masculinity which reflects the participants' gender identity characterised in the design outcome. As discussed above, this suggests young men are under pressure to represent their gender by conforming to the normative sexuality accepted in the society. In this context, the enactment of heteronormativity differentiates them from feminine attributes and addresses their fear of being seen as gay to be accepted and not seen as different.

7.2.4 Outcome four and five

Describe: The following outcomes illustrated below is designed by four male participants in a male-only group. As the participants said: *"Our design started with how to remember to apply sunscreen, we designed a smart wearable product that can indicate the UV exposure level by changing colours and it's designed for men and women. Our design is in the form of a digital technology that changes colour and reminds people to apply sunscreen. This product would be in forms of the smart wristband, hat, phone case, towel and goggles"*
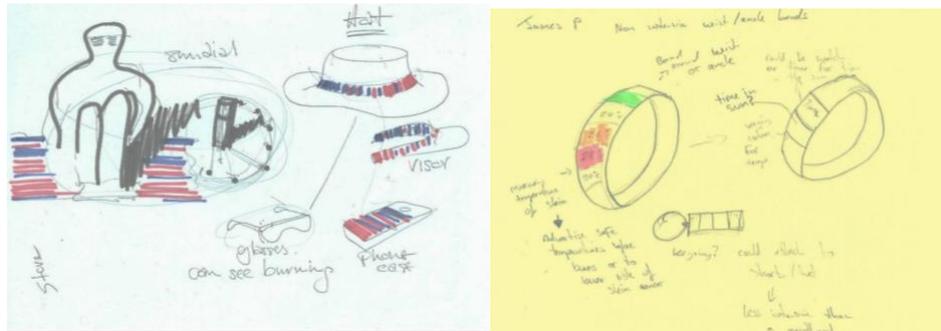
Figure 7.5 An image of the outcome four and five designed by four male participants in a male-only group (author's photograph)

Analyse: It is clear from the participants' words that their designs are inspired by smart wearables such as smart clothing that detects the sun exposure level to remind the user to apply sunscreen. From the HCD perspective, the affordances here are clearly presented as wearables with technological possibilities. The signifier here is the colour coded interface that incorporates technology to remind the user sunscreen application. This is in line with the male participants' responses in the main study regarding their interest in products that incorporates technology to remind them of sunscreen application. In particular, the main study participants said they are more willing to apply sunscreen through this because '*the product won't lie*'. At this stage, the participants' indicating their motives and reliability towards science and technology. As discussed in Chapter 2, Wajcman acknowledges the ways that technology reflects gender related to men and masculinity (Wajcman &Wheeler, 1985). This is related to the ways gender enactment to construct masculinities in relation to science and technology. We can see the participants performing their gender implicitly which has influenced the physical appearance of the design outcomes. The characteristics of their design are central for the participants to construct their identity and maintain gender boundaries as a way of expressing their masculinity.

Assessment: Up to this point, there are some variations between the design outcomes generated by the participants in the mixed-gender group, male-only group and the expert group. The male participants in the expert group expressed ideas similar to the male participants in the male-only and mixed-gender groups. This is regarding the application of sunscreen on their body inferring to avoiding same-sex body contact

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associated with young men's fragile and vulnerable masculinity. Overall, we can see traces of participants' gender enactments and the influence of stereotypical gender characteristic in their designs. The emerging meanings that they attach to the products associated with their gender are consistent with constructing their masculine self. This indicates that gender is very strong and that the HCD elements are influenced by the construction of the male participants' masculinity.

7.2.5 Outcome six

Describe: The following outcome illustrated below is designed by two male participants. As the participants said: *"our design is something that stands out like an Aqua Viae perfume bottle with natural colour such as silver and green colour scheme".*
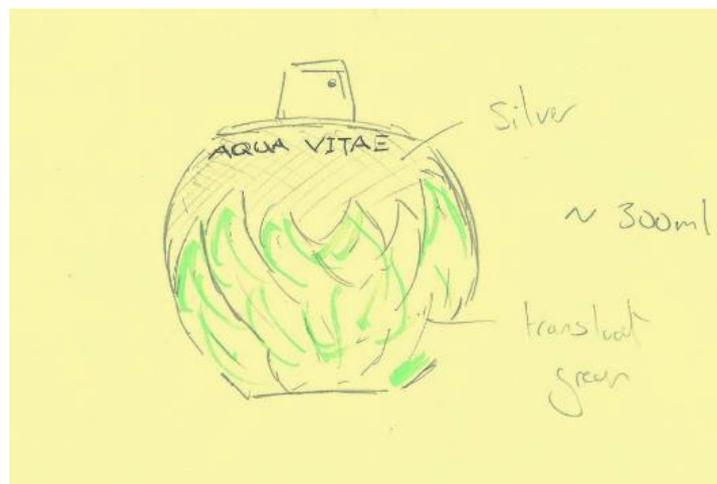
Figure 7.6 An image of the outcome six designed by two male participants in the mixed group (author's photograph)

Analyse: The participants said the physical appearance of their design is similar to the appearance of the 'AQVA VIAE' perfume bottle. This is a popular perfume brand by BVLGARI for men in a green and silver coloured bottle (BVLGARI, 2018). Similarly, the male participants in the main study showed interest in colours of silver and chrome and referred to these colours as masculine. Also, various leading cosmetic brands and advertisements such as DOVE MEN feature metallic and silver coloured attributes in their designs (Dove Men+Care, 2018). These representations are mainly focused on stereotypical and culturally established associated with the meanings of industrial, sleek, high-tech, and modern (Moss, 2009). For the male participants, the

characteristics of this design such as the colour and material are interpreted as tough and not vulnerable which is associated with the ways hegemonic masculinity is expressed. Their gendered reflection is related to conform to pre-identified gender roles from using their everyday things such as their perfume bottle reflected in the design of the affordances and signifiers. Both affordances and signifiers are identifiable through the overall physical appearance of a spray bottle which indicate similarities with their previous experiences of how to interact with an object.

Assessment: The participants own interpretation of the affordances and signifiers are gendered in their own language and shows the need for the awareness of their needs related to their masculinity. This suggests the link between the current product advertisements for men that portrays gendered characteristics and its reflection in the participants' perceptions. It is noticeable from the appearance of the illustrated design how the main features of affordances and signifiers are inspired and applied in their design based on a male participant's experience.

7.2.6   Outcome seven

Describe: Outcome seven, illustrated below, is also a perfume bottle designed by two female participants. As the participants said: *"This is a spray sunscreen that looks like a perfume bottle with brown tan and the bottle is shaped as similar to a female body shape".*
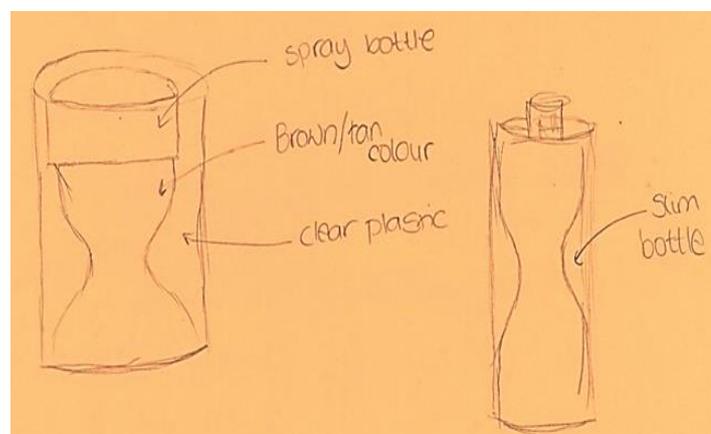

Figure 7.7 An image of the outcome seven designed by two female participants in a mixed group (author's photograph)

Analyse: As demonstrated above, the female participants said the appearance of their design is similar to female body shape. Perhaps the characteristics of this design are influenced by the participants' own experience as female participants. For the female participants, rounded and curvy lines are characterised as feminine based on a female body shape highlighted in their design. They identify lines as gendered and also link transparent and tan coloured bottle representing a female body shape. Similarly, in line with the main study results, the participants attached gendered meanings through their interaction by identifying particular characteristics of their design including colour, shape, and lines. In this context, the influence of the female participants' own gender perceptions has influenced the overall design which incorporates the design of affordances and signifiers. This can be linked to their previous experiences and the preferred characteristics emerged in the demonstrated design outcome. It is interesting to see the differences in the characteristics of this design outcome and the outcome six to see the gender enactments that projects the participants' concerns related to their gender identity. Similarly, the design outcome six was also a spray sunscreen bottle with the appearance of a perfume bottle designed by the male participants. As highlighted in the previous section, the characteristics of design outcome six reflect the male participants' own gender. From the HCD perspective, the overall physical characteristics of the illustrated designs are influenced by the participants' own gender expressed in different ways as the participants seek to conform to the normative and pre-identified gender roles.

Assessment: As discussed in Chapter 2, popular gender representations are expressed based on the stereotypical differences between men and women (Goffman, 1987). Up to this end, we can see participants' gender enactments are very strong and persistent and projected in the design outcomes. This explains how the affordances and signifiers are influenced by the characteristics of straight/curved lines or bright/dark colours related to the participants' own gender.

7.2.7   Outcome eight

Describe: The following design outcome demonstrated below is designed by a male and a female participant. As the participants said: *"our idea is a sunscreen bottle without a flowery scent that is for girls, it's designed for men and women consisting a*

mixture of the male market with straight lines and a bit of rounded and curvy lines for the female market."

Figure 7.8. An image of the outcome eight designed by a female participant and three male participants in a mixed group (author's photograph)

Analyse: According to the participants' comment, their design is a sunscreen bottle that is gender-neutral due to the combination of particular characteristics such as straight and curvy lines. To them, straight lines represent products targeted at men, while curvy and rounded lines represent products targeted at women. This is particularly interesting as the combination of a female participant with the male participants resulted in specific gendered characteristics reflected in their design based on their own perception of masculine and feminine attributes. This provides evidence regarding the ways affordances and signifiers are applied in their design and are influenced by the ways the features of their design is related to their own gender. It seems from the participants' comments another concern is regarding the scent of sunscreen with ingredients appealing to men or women. Similar to the main study and exploratory study participants, these participants also identified the scent of sunscreens with a particular gender and the flowery scent as feminine. As discussed in Chapter 2, Masculinity is constructed and enacted through particular attributes that differentiate them from women. This refers back to the popular ways of being a man and protecting their masculinity indicating that "Boys must maintain their difference from girls" (Frosh et al., 2002, p.16). The overall physical appearance of this concept seems shows the extent to which the physical affordances and signifiers are generated underlying

the gendered characteristics discussed by the participants. The HCD principles here not only identify how the object functions, but also guide people on how to interact with it in through the appearance of the object. The affordances here are clearly indicating the spray feature of the bottle with a rounded shape. The signifiers here are the signs and colours indicating the level of sun exposure and the visual instructions on the bottle. However, they are influenced by the participants' own perception of the masculine and feminine characteristics embedded in their design.

Assessment: We can see over and over that the male participants repeatedly conform to the image we expected they are more interested; acting-out normative gender stereotypes in line with the main study and exploratory study results. This also shows how the traditional and stereotypical gender enactments are expressed implicitly in the characteristics of design outcomes by the participants.

7.2.8   Summary of the outcomes

As shown in this chapter, overall the design outcomes were a range of sun protection interventions including the following categories based on the researcher's inferences:1) Sunscreen Bottles 2) Sunscreen applicators and 3) Wearable technology. The outcomes designed by each group and the participants are mapped in the following table to the discussed categories:

Main study groups	Participants (male and female)	Sunscreen Bottles	Sunscreen applicators	Wearable technology
Group 1	4 M	1M	2M	1M
Group 2	3 M,1F	2M,1F		
Group 3	3 M,1F	1F		3M
Group 4	3 M,2F	1M,2F		
Group 5	2 M,2F		2F	2M
Group 6	4 M	4M		
Group 7	4 M	3M		
Group 8	2 M,1F		1M	1M

Table 7.1 Overall design outcomes produced by each group, the number of each participant is presented numerically and indicated by their gender (Female (F) and male (M))

The design outcomes indicated a link in the outcomes designed by the male or female participants and the reflection of their own gender. The table above also shows men were more likely to develop warble technologies. The results highlighted links with the influence of gendered characteristics in each design in relation to masculine and feminine attributes. The analysis of the design outcomes outlined a range of characteristics in the participants' design related to stereotypes, expression of gender and hegemonic masculinity

As discussed in this Chapter, amongst the discussed aspects of the HCD principles, we draw out the role of gender embedded in the design of affordances and signifiers and how these elements are influenced in each design outcome. The male participants expressed their interests towards designs inked with their heteronormativity such as the sunscreen applicator in the form of a rollerball. As discussed in Chapter 6, the male participants in the expert group were also concerned with the application of sunscreen on their body and avoiding same-sex body contact. So far, avoiding same-sex body contact was often presented as something which usually the male participants are concerned about during the exploratory study and the main study. This provides evidence in the discussed material that the preferences applied in the design of affordances and signifiers towards the protection of their masculinity. It is clear from the participants' comments that their behavioural patterns are asserted in relation to their challenges of being the same as others and to conform to their gender roles. As it was shown both male and female participants portrayed their perception of masculine and feminine attributes in the design of affordances and signifiers. A possible explanation for these differences is related to the participants' general preference amongst their design with an inclination towards their own gender. This goes beyond deconstructing affordances and signifiers influenced by gender roles and developed through a range of features such as lines, material, shapes, typography, colours, labels and use of details.

7.3 Summary

This chapter discussed and analysed the design outcomes developed through the design stage of the main study. The results indicated two things: 1) the inclusion of gender has great potential to bridge the gap between the world of designers and users, and 2) the design outcomes would address the low levels of sun protection in young men. The following chapter outlines the verification of design outcomes through a conducted verification study with young men aged 18 to 24. It also presents a discussion of the analytical procedures and the findings which emerged in this investigation led to a set of design recommendations for sun protection interventions.

8 Design verification study

Following the discussion of design outcomes from one group of the main study in Chapter 5 and the design outcomes from the remaining groups in Chapter 7, this chapter presents the verification of 1) the design outcome, and 2) GAHCD approach. All the design outcomes were achieved through a verification study which sought the opinions of young men age 18 to 24. The results verify the design outcomes aimed at fostering sun protection behaviour in young men along with gender-aware-HCD approach.

8.1 Introduction

As explained in section 5.7.1, the design stage of the main study took the form of idea-generation/ideation session where the participants were asked to design sun protection interventions, individually or together for fostering sun protection behaviour in young men age 18 to 24. Subsequently, the discussion of the design outcomes in Chapter 5 and 7 draws out the role of gender embedded in the design of affordances and signifiers by the participants and how these elements are influenced in each design outcome in relation to masculine and feminine attributes. The importance of adding gender awareness in the HCD process (GAHCD), related to the design process and the design of products.

The design outcomes were now at a stage where it was considered appropriate to get evaluated from young men's perspective. As discussed in Chapter 3, a verification study is commonly known as *"user testing"* with a verification purpose through gathering participants feedback as they interact with products or prototypes (Martin & Hanington, 2012, p.74). This approach described by Norman as a procedure for evaluating products aligned with the user's needs through direct user involvement in the HCD process (Norman, 2013). This is the final stage of the HCD process which real users get to assess the design outcomes. The researcher assesses both opinion and behaviour while the participants interact with the design outcomes.

Accordingly, the verification study was guided with a focus on the participants' reflection and evaluation of the design outcomes. The briefs given to the participants

were to: *evaluate and discuss the design outcomes that would encourage them to protect themselves from the sun.* The brief for this study is strongly linked to the last research objective discussed in section 1.2 in order to verify sun protection interventions with potentials to improve the sun protection behaviour in young men. Before proceeding to the participants' thoughts and words encountered, the following table illustrates a summary of the design outcomes based on the main features of the design outcomes described by the main study participants discussed in section 5.7.1 and 7.1:

Main study Participants	Design outcomes	Design Preferences
Group 1	Spray Sunscreen bottle	Spray Simple shape/square Small Similar to cosmetic products for men by Nivea Men and Dove Men, Lynx
	Sunscreen applicator to apply sunscreen on the shoulder and back of the body	Rollerball, a sponge soaked in sunscreen with a handle, Spray bottles shape of the body,
	Sunscreen applicator	Roll on, sponge
	Sunscreen container	Medical Tube container, spray sunscreen
Group 2	Sunscreen bottle	Portable bottle with a hook or a clip Chunky, sporty. pocket size
Group 3	Sunscreen applicator	Makeup sponge Colour: Light pink
Group 4	Sunscreen applicator:	Rollerball sunscreen applicator, sponge, rolling deodorants, body bath brush for applying sunscreen for hard to reach areas of the back and shoulders

Group 5	A smart wearable product that alerts the user to apply sunscreen	Smart Hat, phone case, towel
Group 6	Sunscreen bottle	Spray perfume bottle in silver, grey, dark colours, Similar to perfume bottles for men or cosmetic brands
Group 7	Sunscreen bottle	spray perfume bottle with a Female body shape
Group 8	Sunscreen bottle	Bottle with Curvy and straight lines, No flowery scent, added aftershave smell, Dark colours, Instructions on the table

Table 8.1 List of design outcomes discussed in Chapter 5 and 7 (section 5.7.1 and 7.1)

As illustrated above in Figure 8.1, the design outcomes were designed in a range of sun protection concepts including Sunscreen bottles, Sunscreen applicators and Smart wearable products. Based on the participants' own description of the main features underpinning their preferences in terms of the application of sunscreen, the shape of the sunscreen bottles, the spray feature of sunscreen bottles and various visual elements such as colours, lines, shapes.

In accordance with the purpose of the verification study and the given brief to the participants, printed images of the design outcomes (see section 5.7.1 and 7.1) were presented to the participants. This study focuses on the participants experience through their evaluations as real users' interpretation of the images of design outcomes. In addition, to elicit the participants' interaction with the design outcomes (Kaapu & Tiainen, 2010), a range of sample products with reference to the design outcomes were selected by the researcher from the existing products available in the public domain.

The adopted visual approach increases the understanding and discoverability of the affordances and signifiers for the participants discussed by Norman (Norman, 2013). Therefore, a range of sample products was selected to present the visual appeal of the drawn design outcomes almost instantly, have the participant interact with the design

outcomes. The design outcomes outlined in Figure 8.2 provided evidence to select a range of sample products as close as possible to the design outcomes. The sample products along with the printed images of the design outcomes were presented to the participants as a communication tool and as a guiding inspiration for the participants (Kaapu & Tiainen, 2010). The selection criteria of the sample products were based on the key details described by the main study participants regarding the physical appearance of their design related to form, application, colour, lines, materials, and shape outlined above. The illustrated image below outlines the sample products presented to the participants with the labels removed in order to avoid possible biases regarding the participants' interest towards a particular brand.

Table 8.1 The outlined sample products for the verification study (author's photograph)

8.2 Procedure

The following section moves on to describe in detail the procedure of the carried out study. Initially, a session was arranged with product design students from the University of Brighton. Four male participants were chosen to take part in the study. The primary inclusion criteria for these participants were based on their age within 18 to 25. A small sample was chosen to facilitate a group dynamic according to the aim of the study. This study was conducted on the 27/10/2017 for 20 minutes with George, Zac, Ollie and Mehmet. This session was located at the Design and Creativity Studio at the University of Brighton which is mainly used by product design students. As highlighted in Chapter 3, the Design and Creativity Studio at the University of Brighton is the students' working space that provides a creative and collaborative environment (Morris, 2010). This space was particularly selected so the participants

feel familiar and comfortable as they know the space to design, create and engage in group activities.

Prior to the participant arrival, a recording camera was tested running on the computer to record the session in order to fully capture the participants both opinion and behaviour while interacting with the sample products were recorded. As the participants entered the room, they were guided to sit around the prepared table see Figure 8.1. As anonymity and confidentiality of participants are central to this research, the participants are named through the use of pseudonyms in the thesis.

Figure 8.2   the participants engaged with the sample products (author's photograph)

Initially, the researcher welcomed the participants to the study and they were introduced to the purpose of the study. The session started by briefly showing the participants the design outcomes, then asking them to describe their opinion regarding the design outcomes that are appealing to them and motivate them to use for their sun protection. They were encouraged to assess the design outcomes in terms of visual design details such as colours, shape, lines, functionality.

The researcher introduced the sample products along with the images of design outcomes placed on the table. The researcher encouraged the participants to engage

and interact with each sample product. Each participant discussed their evaluation of sample products that motivates them to protect themselves from the sun on the beach. The analysis of the participants both opinion and behaviour while interacting with the sample products guided by the key aspects of the design outcomes outlined in Figure 8.1 using a deductive approach(Braun & Clarke, 2006). This was achieved through the transcription of the participants' words encountered followed by extracting and categorising the material according to the analytic account of the design outcomes discussed in Chapter 5 and 7. The following shows an in-depth account of the way the participants discussed their opinion regarding the design outcomes. As they began to assess the spray sunscreen bottles in their words:

> **[George]:** *I like the spray sunscreen bottle more than the tubes for cream because of the easy application, also it's a simple shape*
>
> **[Mehmet]:** *I also like the spray sunscreens because I don't like applying creams on my skin*
>
> **[Ollie]:** *yea spray is good for reaching areas that you can't*
>
> **[George]:** *I like the spray concept with a simple shape or straight lines as it has a simpler shape, less curvy so it's not feminine but chunky*
>
> **[Mehmet]**: *I also prefer the simpler and chunky bottle*

All the four male participants said they prefer spray sunscreens bottles and avoid applying sunscreens by hand. Also, as discussed in chapter 6, the male participants from the expert groups also mentioned avoiding same-sex body contact related to the ways that contradict their heteronormativity.

It is clear from the outlined discussion above that gendered expressions related to hegemonic masculinity are emerging in line with the main study results discussed in Chapter 6. George and Mehmet said the ergonomic features of the bottles push them to use the bottle in a certain way but they prefer less detailed bottles and as they said chunky. As they said, they are more interested in products that are simple with chunky shapes and fewer details. This shows a link with the outcome one discussed earlier in this chapter. It seems that the male participants identified these details linked with their gender. It seems to George, less curvy bottles are more appropriate to him as illustrated above he relates curvy bottles with femininity. This refers back to outcome eight in the

ways that the male participants also linked curvy and rounded lines to the female-oriented products. As discussed in Chapter 5, this is linked with the ways they perceive these elements related to their masculinity. The affordances and signifiers applied in the products are clearly designed in line with the male participants' masculinity. The following shows the participants verify various elements that the male participants discussed through the design outcomes. In their words:

[George]: *I like the concept with an aftershave added fragrance to the sunscreen, I don't like the added fragrance of sunscreen*

[Zac]: I don't like it either, sunscreens contain *flowery scents which is for women*

As presented above, Zac said he won't use sunscreens with a flowery scent. As discussed earlier in this Chapter regarding outcome eight, the role of gender and masculinity are very strong and it's displayed in various ways such as the scents of sunscreens in a certain way. These male participants identified a flowery fragrance related to a particular gender (female). As discussed in Chapter 5, this suggests a link with the fragility of their masculinity that needs protection. Then the discussion moved towards the outcome one regarding the portable bottle with a hook. Ollie and Mehmet stated they are interested in bottles with a hook as it's easy to carry. It seems that Ollie and Mehmet are more interested in the products that are easy to carry and are portable without any need for a bag. In their words:

[Ollie]: *I prefer the portable bottle with a hook out of all the concepts, I can attach it to a key ring, I usually forget to take my bottle of sunscreen to the beach because I can't fit it to my pocket, this is a suitable item for guys who do not take bags with them.*

[Mehmet]: *yes, I agree as it's easy to carry the bottle with a hook, I try to fit everything in my pocket when I go to the beach so a portable bottle is great*

[George]: *But I like the small tubes and they can fit in my pocket*

[Mehmet]: *I can see it would be more useful because it's smaller but I prefer the sporty spray bottle with the hook, it looks like my climbing water bottle.*

Here we can see evidence related to the popular ways of being a man and gender stereotypes amongst the participants. Mehmet and George said they are interested in smaller sunscreen bottles that fit in the pocket. Smaller size sunscreens are easier to carry for Mehmet and George as they don't carry bags. It seems that they want to be accepted by 'being' like others and differentiate themselves from women. They also discussed their interest in a silver-coloured or a metal finish bottle. This refers back to the outcome six, where the male participants designed a silver perfume bottle and Mehmet also indicated his interest in the sporty appearance of the bottle. In their words:

> **[Mehmet]:** *I prefer the silver-coloured bottle on the table, metal finish, aluminium look that doesn't get damaged*
>
> **[George]:** *I agree, the normal metal textured bottle looks very good but the bottle might get too hot in the sun*
>
> **[Zac]:** *I also agree, metal won't get damaged that easy and I feel more confident taking it to the beach*

Initially, Mehmet, George and Zac discussed their interest in silver and metal coloured bottles. George also agreed but also he expressed his awareness of dark colours as a stereotypical colour designed for men. George associates colours with a particular gender, he identifies colours as gendered and also he links dark colours to the male gender. This indicates that he is still attached to the products aligned with the construction of his masculinity. In his words:

> **[George]:** *I really like the dark coloured bottle that looks like a deodorant or a shower gel, it reminds me of my moisturiser which is grey and my aftershave, and my shampoo bottle is like dark grey or black*
>
> **[Mehmet]:** *yes, I like it too, all the products for men are grey or black*

Mehmet showed his interested earlier regarding silver-coloured bottles, he also said that all the products available in the market for men are usually grey or black. It seems silver and dark colours such as black means macho and masculine to Mehmet. Zac also said the metal textured bottles won't get damaged. George's preferences are described based on the characteristics highlighted in his cosmetic products targeted for

the male market. These features reveal the characteristics and properties of the products targeted at men. These characteristics such as colour are related to the previous experiences of the participants linked with the ways product language is perceived in relation to masculinity and femininity. They want a material that is not vulnerable or damageable, strong and this is attached with the construction of masculinities through being strong. Therefore, the silver-coloured bottles attach masculine elements to the product that would result in increasing their confidence. As we saw earlier regarding outcome six, the male participants used the colour of silver in their design related to their current use of products designed specifically for men. We can infer there is a fragility about their masculinity because the male participants are constantly trying to defend it. As discussed in Chapter 2, masculinities are fragile and need to be enacted and performed all the time (Frosh et al., 2002). Then the discussion moved towards the scents of sunscreens including current blue and yellow sunscreens designed by Nivea (Figure 8.3).

[George]: *The scent of Nivea sunscreens and the other bottles reminds me of my childhood and my mum*

[Mehmet]: *always my mum buys Nivea sunscreens*

[Ollie]: *The scent of Nivea sunscreen is for parents*

[Ollie]: *the yellow, orange or blue coloured bottles are more reminding my childhood memories*

[Zac]: *I also prefer the idea of shower gel or deodorant fragranced sunscreen than the current scents of sunscreens, I also like the design of darker coloured products such as dark blue, silver or dark brown highlighted in the design*

[Mehmet]: *yessssss, I would love something that contains a scent similar to my aftershave*

Almost all the participants agreed with Mehmet, they said they are not interested in the sunscreen bottles with the contained scent of Nivea sunscreen and the packaging bottles colour scheme which is yellow and blue. It seems that they relate the scents of sunscreen such as Nivea brand to their childhood memories and their parents, however, Mehmet said that he prefers a scent similar to his aftershave. Their frequent references to parents and mothers suggest that whilst these young men are trying to maintain their independence and a masculine image they are, perhaps, conflict in this and seek the

familiar reassurance of their (protected) childhood experiences where they didn't have to perform their gender. This shows performing their masculinity could contradict the nostalgic implications of their past experiences.

Their preferences towards darker coloured bottles contrast with the design of Nivea sunscreens using the blue and yellow colour scheme. We can infer this linked with the fluidity of various ways that masculinity is performed, discussed in chapter 2 (Frosh et al., 2002).

Figure 8.3 The participants engaged with the sample products in the Creativity Centre at the University of Brighton (author's photograph)

Up to this point, we can relate the findings as expected around the purpose of the study originally organised. We can see the participants' interpretation of the design outcomes is in accordance with the description of the design outcomes by the main study participants. In addition, the expression of gender and hegemonic masculinity; some participants are imitating others in the group. It was also noticed they are intending to maintain their differences from women. As discussed earlier, a range of elements was identified which constitute links with their protection of sexuality related to the meaning they attach when interacting with a product. These elements were particularly

discussed related to the embedded language in the design of affordances and signifier through colour, a form of the bottles, the application and the scent of the sunscreens. This means the way in which affordances and signifiers are influenced by gendered meanings through differences provided in the use of details such as colours, shapes, lines. As noted above, the participants expressed their interest in the provided sample products in the form of a paint roller, lint roller, sponge and a body bath brush (Figure 11).

Figure 8.4 The sample products provided for sunscreen application (authors' photograph)

Mehmet and George said they avoid same-sex body contact for applying sunscreen on the back areas of their body. Their words below verify the concept of sunscreen applicator for the back and shoulder areas. As discussed in Chapter 5, the male participants seem to have a struggle with being accepted and they don't want to be seen as different from others. This is also mentioned in the following comments:

> **[Mehmet]:** *I would prefer to use a roller to apply sunscreen on my back, it's the whole masculine thing, and you don't want your mate to put sunscreen on your back*
>
> **[George]:** *I like it too, putting sunscreen on your back around people is very intimate and not masculine*
>
> **[Mehmet]:** *I usually stay in the water and try not asking anyone to put sunscreens on my back. Also if you are with a group of males, they will make fun of you*
>
> **[George]:** *yes, you will get some looks, you have to be a confident man*

> **[Zac]:** *I also don't like my friends applying sunscreen on my back especially in public*
>
> **[Ollie]:** *This is the main reason why I burn all the time on my back, I also like the idea of sponge or something to put it on your back because recently I went on holiday with my mates and I didn't want anyone to put sunscreens on my back so I've got sunburnt from my back, I would use the sponge or roller, or something extendable*

Then Mehmet said in a manly and 'laddish' way: "*applying sunscreen on your back is cool depending on who is applying the sunscreen!!!*"

George responded: "*Hot girls, not male friends, hahaha*"

Everybody laughed and they all seem to get distracted from the focus of the study and started joking and laughing together. Then Mehmet identified the roller application for sunscreen as useful to have it at home but not use it in front of his friends. This suggests, Mehmet is concerned about the potential sun damage, but this is overridden by pressure to conform to his gender role. In his words:

> **[Mehmet]:** *I will use the roller applicator especially in the early stage of the trend, but I won't use it when I'm on holiday with my friends, it's just better to use when you're alone*
>
> **[George]:** *definitely not in front of friends, I have to be on my own*
>
> **[Mehmet]:** *It's easy to use it in my hotel room but if I'm on my own, not in front of friends, I won't mind in front of family but not my mates*

As stated above, George and Mehmet comments infer as they want to be accepted by others and they want to protect their masculinity by not coming across as different. Mehmet continues with leading to the concept of peer-pressure and the ways he is identifying the need to conform in general:

> **[Mehmet]:** *Boys make fun of each other for any excuse*

Ollie, Mehmet and George said, they all prefer spray sunscreens similar in design to the Dove Men and LYNX deodorants. As we saw earlier, the design outcomes regarding the perfume bottle design also linked with the products designed specifically for men. As discussed in chapter 5, popular brands such as Dove Men have successfully advertised gendered products aligned with male gender and masculinity. Perhaps, this provides evidence regarding their main concern linked with being like other men and being accepted. As the participants said in their words regarding their everyday products designed for men:

> **[Mehmet]:** *I also like the applicator similar to spray deodorants like Dove or Lynx*
>
> **[George]:** *I agree, I also prefer these bottles with a simple shape and darker colours*
>
> **[Mehmet]:** *I also like them, they are chunky bottles that are Grey and blue, it looks more masculine and I prefer it*

The direction of the participants' discussion moved towards gendered products in terms of masculine and feminine attributes. Based on my inferences and as discussed in Chapter 5, their interpretation highlights that the design outcomes are appealing to them. The participants' comments also showed the role of gender and masculinity in line with the aim of this study that verifies the main study findings discussed in Chapter 6. Mehmet and George enacted idealised masculine positions by differentiating themselves from women. It looks as if these participants have similar ideas about gender to the male participants of the main study who developed the design outcomes. In addition, the account of group dynamics showed similarities with the main study group dynamic. The group provides a social environment where masculinity can be performed and enacted (Frosh et al., 2002). The themes identified in the participants' responses are in line with the main study and exploratory study results.

8.3 Conclusion

Following the participants' assessment of the design outcomes, this section discusses the results which verify the designed sun protection interventions linked with the role

of gender and masculinity. This is followed by a set of design recommendations and guidelines for the design of sun protection interventions.

As shown in this Chapter, the analysis of the design outcomes revealed the hidden role of gender embedded in various aspects of the developed sun protection interventions. Repeatedly, during the verification study participants expressed their assessment and evaluation of the design outcomes with respect to their gender and masculinity.

As the participants assessed the design outcomes, they attached gendered meanings through their interaction by identifying particular characteristics of the design outcomes. These characteristics were identified based on their interpretation of products' properties associated with their current cosmetic products for men. This verifies the ways in which gendered values and masculinities are performed across the male participants of the verification study in line with the main study participants. The similarities between the interpreted findings emerged in this chapter with the exploratory study and the main study confirms the importance of adding gender awareness in the HCD process.

An important aspect of the findings relates to participants' idealized concept of masculinity, acting masculinity implied by their actions and responses as 'I want to be a real man'. The participants' enactment of gender and masculinity were embedded in their interaction, gestures, words, and meanings. Their fear of being seen as gay and avoiding same-sex contact for applying for sunscreen shows they don't want anybody to question their sexuality. This clarifies their gendered perspectives related to their phobias and struggle to protect their masculinity and sexuality. The results also verify the gap in understanding gender in the HCD principles including affordances and signifiers. As discussed in chapter 2, the HCD process lacks understanding of gender performances and sexuality. The inclusion of gender awareness in the HCD process has great potential to bridge the gap between the world of the designer and the user. A number of elements related to the physical characteristics of the outline products were repeatedly expressed with gendered values in the participants' interactions and responses. At this point, the gendered values attached to the HCD characteristics became visible and were discussed from the participants' perspective. The differences emerged in the design outcomes related to a masculine design and a feminine design

is linked with the participants' own gendered values attached to the products' aesthetics including colour, function/application, size, shape/form, materials, and typography and product labels (Moss, 2009). The participants'' responses described in this chapter were linked with the key elements of each design outcome discussed in Chapter 5 and 7. While the aim of the verification study was primarily to explore the accounts of the participants' opinion regarding the design outcomes, it also draws the results, links to GAHCD approach and established this as evidential proof for design insights and recommendations. The presented results are in line with the main study findings and the exploratory study findings in terms of the male participants' expression of gender and hegemonic masculinity, protection of their sexuality, avoiding same-sex body contact and differentiating themselves from women. This endorses the research contributions in terms of gender-aware HCD and also the techniques used in facilitating the pilot, main and verification studies.

8.4 Summary

In summary, this chapter verified two things: the design outcomes and gender-aware HCD approach. Taken together, the results indicated the importance of adding gender awareness in the HCD process (GAHCD) which aimed to make the role of gender visible in two directions. First, it showed the production of gendered meanings identified in the design interventions embedded in the design of affordances and signifiers. Second, it showed the verification of the main study design outcomes. The following chapter discusses the overall conclusion and the key contributions which open avenues for future research. This includes recommendations for health promotion authorities and design research for increasing emphasis on the influence of the designer's own gender and their gendered perceptions in their designs.

9 Conclusion

This chapter presents the overall conclusions by bringing together the conclusions from preceding chapters, and by revisiting the aim and objectives of the thesis linked to the outcomes of each research study. It also presents recommendations aimed at designers and health promotion authorities. Finally, the chapter reflects on this research's contribution to knowledge and the opportunities for future research this affords.

9.1 Revisiting the aim and objectives

This research set out to foster sun protection behaviour in young men that leads to the prevention of skin cancer in future. Specifically, the aim of this research was to extend our understanding of the relation between sun protection behaviour and young men age 18 to 24 for the development of enhanced sun protection interventions. The research presented in this thesis addressed the following research questions, identified in section 2.20:

> *How can we make sense of young men and their sun protection behaviour?*
> *How can we improve young men's sun protection behaviour through the human-centred design approach?*

This thesis has sought to investigate and answer these research questions through three research objectives. A summarised account of how the objectives were achieved are outlined through the findings of the research studies; exploratory study, main study and the verification study.

1. To develop an understanding of the relationship between young men's gender and masculinity and the sun protection behaviour

This objective was achieved through the exploratory study discussed in Chapter 4, which explored how sun protection behaviour is shaped and influenced by young men. The results highlighted the impact of gender and masculinity as the most influential factor among sun protection behaviour in young men. This was in accord with the

previous studies discussed in Chapter 2 regarding the impact of gender and masculinity among the health-related behaviours of young men. The results also showed young men's sun protection behaviour in some ways contradicts particular ways of performing their masculinity and in this context prevents them from protecting themselves from the sun. This informed the conception of the main study (Chapter 5).

2. To understand how gender is a factor in how people approach designed objects and designing objects, and to develop an extended human-centred design approach that leads to new sun protection concepts

An integral part of the research aimed to improve sun protection behaviour in young men through sun protection design interventions. This was achieved in Chapter 5 by the main study carried out through participatory design sessions. Another aspect of this study was to identify and assess the role of gender in the human-centred design process. This study brought together various factors which engaged the participants in the HCD process. The study engaged the participants in the HCD process and allowed the researcher to observe their behaviour and interactions in relation to their performances of gender and masculinity while interacting with a range of products. The results revealed persistent and significant gender performance and awareness amongst participants, and this highlighted the importance of acknowledging gender and gender-awareness in human-centred design. Another important outcome of this study was a range of sun protection interventions designed by the participants. The results highlighted the influence of the participants' gender in the way that affordances and signifiers were designed. The way that affordances and signifiers reflect the participants' own gender was discussed in Chapter 7.

3. To verify the design of new sun protection concepts for young men and gender-aware HCD approach

The final objective was the verification of the main study design outcomes regarding new sun protection interventions for young men. This was achieved through a verification study discussed in Chapter 8. The result verified the sun protection interventions discussed in Chapter 7 through their visual appearance in terms of colour, form, functionality and usability lines by young men age 18 to 24. The verified sun

protection interventions also showed the feasibility of GAHCD which has a practical potential which is discussed later in this chapter in the form of a set of guidelines for designers and further studies that aim to improve sun protection behaviour in young men.

9.2 Original contribution

The key outcomes of this research contribute to our understanding and knowledge of this complex topic in the following direction: it presents the development of novel gender-aware design theory (GAHCD) to increase the sun protection behaviour in young men which led to new sun protection interventions targeted for towards young men. Therefore, it is important to consider GAHCD occurred as a result of the exploratory study, the main study and the verification study.

The literature discussed in Chapter 2 highlighted that men are less likely to engage in health-related behaviours (Courtenay, 2000) and that in particular young men aged 18 to 24 are more at risk of developing skin cancer due to the low levels of sun protection behaviour (Cancer Research UK, 2014); research has shown masculinity itself to be the problem here. To improve young men's engagement in sun protection behaviour, this research adopted a design with the potential to result in the desired healthy behaviour. Design and creativity are important for problem-solving and are drivers to promote change (Design Council, 2005). The design theories reviewed suggested that human-centred design would benefit this research by understanding the needs of young men in relation to their sun protection behaviour. However, the lack of understanding of, and even awareness of, gender in HCD principles were identified. So far, very little attention has been paid to the role of gender in the design process of products. As discussed in Chapter 2, HCD sees gender as static and stable regarding male or female such that each HCD technique appeals to one gender or another linking gender differences, gender inequalities and stereotypes to the products, services and brands. However, gender is multiple, dynamic, fluid and relational and is constructed over time in a particular context (Connell, 1987). As we approach the world our pre-conception, past experiences influence our performances in a gendered way, such as clothing and gesture and our interaction with objects. A static approach to gender in a design process was clearly not appropriate in the case of this research.

As reviewed in Chapter 2, Norman describes the interaction between the user and a physical object through the HCD principles such as affordances and signifiers (Norman, 2013, p.45). Affordances are the physical characteristics of objects such as size, shape, and colour which act as signifiers to show how users can interact with the objects. Objects designed specifically for a male or female gender highlight differences based on gender stereotypes targeted at men or women (Karin et al., 2012, p.88). For example, the products targeting targeted at females are using aesthetic characteristics including soft, clean, organic shapes, and bright colours (Moss, 2009). We can see this when we look at, for example, gender-specific razors for males or females; the way these differ in terms of shape, colour and material indicate the deployment of pre-existing stereotypes regarding gender and gendered norms. In this context, affordances and signifiers can be influenced by gendered based clues according to the designers' own preconceptions. Having identified this gap in the literature, this research brought together the HCD approach and understanding gender performances to address the poor sun protection behaviour in young men through design. Unlike all the other HCD applied in various studies, in this research HCD was applied aligned with an understanding of gender as performance, and outcome of the dominant discourses of gender in our society. This was demonstrated through the exploration of the account of gender in HCD principles that show how objects could possibly be used. At the same time, the application of GAHCD approach resulted in a range of sun protection interventions with the potential to foster sun protection behaviour in young men. GAHCD facilitated an understanding of meaning emerging from the participants' interactions with products, but also their designs reveal what they think is needed for their gender to maintain its identity.

The review of GAHCD approach and the sun protection interventions discussed in Chapter 8 demonstrated a great potential to bridge the gap between designers and users. Designers face many challenges when designing a product; as they try to increase the usability of products, they try to shift their focus towards understanding their users and how to influence their behaviour. From the findings in this research, the proposed contribution in answering the research questions goes beyond the initial aim of the research to foster sun protection behaviour in young men. It also contributes

knowledge to design research and practice for increasing emphasis on the influence of the designer's own gender and their gendered perceptions in their designs.

9.3   Design implications

The following design implications from this research have a number of implications for health promotion and skin cancer prevention campaigns, cosmetics and sunscreen industries, design agencies and designers. The verification of the sun protection interventions discussed in Chapter 8 provides guidance with the potential to provide specific design interventions that may help to engage young men in sun protection behaviour. The discussed design outcomes in Chapter 8 outlined the participants' gender identity influences their perception and understanding of the appearance of products related to traditional male domain. The reoccurring emphasis on the perceived characteristics of sun protection interventions showed a clear preference of male participants towards maintaining their masculine identity.

While the design outcomes are associated with predictable gendered perceptions associated with traditionally male or female gender roles, we can see that gender is socially constructed and understanding young men's experience requires us to move beyond traditional, stereotypical and pre-identified gendered characteristics. In their world, anything that threatens their gender identity contradicts the construction of their masculinity which explains the way they attach gendered values to their sunscreen application. For this research, this was a difficult task as the male participants expressed repeatedly, they avoid the application of sunscreens. However, the male participants said that it was appropriate for their girlfriends to apply sunscreen to their shoulders and back area of the body. This portrays their concerns related to the importance of sexual orientation due to the influence of social and cultural factors. This is also related to their preferences towards the appearance of popular male-targeted cosmetic products such as DOVE MEN+CARE, NIVEA MEN and LYNX FOR MEN. For our study, this shows how the male participants' values are connected to each product language associated with the masculine attributes portrayed to enact their gender roles and masculinity. Clearly, this is what matters the most to them.

They also expressed a clear preference towards the scent of sunscreens similar to their current cosmetics such as aftershave. It was notable that their frequent references to the scents of sunscreens related to their childhood memories with parents (specifically their mothers) perhaps an evocation of their seeking the familiar reassurance of their (protected) childhood experiences where they didn't have to perform their gender. In addition, further explanations of their preferences were related to the product properties including chunky shapes, dark colours such as navy blue, grey and black, the appearance of silver chrome material. This suggests the deployment of their gendered tropes to understand these objects and have a gendered view of products.

In addition, their frequent references to avoiding same-sex body contact regarding the application of sunscreen suggest that fear of being perceived as effeminate or gay was a consideration in these young men's descriptions of their world and their use of sunscreen products. In their world, anything that threatens their gender identity contradicts the construction of their masculinity which explains the way they attach gendered values to their sunscreen application. For this research, this was a difficult task as participants expressed they avoid application of sunscreens. However, they all agreed that it was appropriate for their girlfriends to apply sunscreen to their shoulders and back area of the body. This portrays their concerns related to the importance of sexual orientation due to the influence of social and cultural factors.

These young men are under pressure to represent their gender by conforming to the normative sexuality accepted in the society, in particular as men or women gender roles. In this manner, the dominant modes of sexuality in the society, pressures them to represent their gender and conform their masculinity in line with the social norms accepted in society. Therefore, maintaining gender boundaries to these young men is very important in representing their gender identity in a way that represents their sexuality.

The sunscreen applicator in the form of a roller with a handle was majorly appealing for avoiding same-sex bodily contact. Their preference towards minimum bodily contact for the application of sunscreen using spray or roller function. As suggested in Chapter 8, the link in the male participants' preferences associated with the main features of the sun protection interventions suggest links with maintaining distance from female-targeted products. As discussed in Chapter 5, the male participants' descriptions and perceptions showed their worries and even fear of being seen as

different from others, and their desire to distance themselves from feminine attributes. As shown in Chapter 8, participants showed clear expressions of their need to conform to masculine norms in general, being accepted by others through the perceived gendered values and characteristics in the design outcomes. In addition, the designers' own gender influences on how the HCD principles including affordances and signifiers are designed by thinking that the group they are designed to have those characteristics. We can see from the design outcomes discussed in Chapter 8, the influence of designer's gendered perceptions in their designs of products goes beyond the affordances and signifiers in terms of colour, forms, function and identity. In this context, affordances and signifiers guide the user to understand how to interact with an object based on the designer's gendered perceptions associated with traditionally male or female gender roles. The purpose of GAHCD is to add awareness for the influence of designer's gender perceptions in the HCD process before they are applied in the characteristic of products through affordances and signifiers. The designer's perceptions have a direct impact on how affordances and signifiers are designed and interpreted by the user which can contradict their gender identity. The language in which the participants in Chapter 8 described their perception towards the features embedded in the designed interventions that appealed to them is a reflection of the designer's own gendered reflections on the world. Male participants' perceptions of products were clearly influenced by their gender.

This clearly links with the ways the HCD characteristics including affordances and signifiers were influenced by the participants' own gender in the design outcomes. The participants' gender and masculine attributes were linked with the gendered characteristics applied in various features of sun protection interventions. We saw the interplay of gender in the way affordances and signifiers were designed in these products. Also, these characteristics were perceived by the participants in the verification study according to their gender identity.

This analysis guides to research in design towards understanding the way that gender, being a male or female designer, affects the designer's perceptions. This can suggest the way designers' gender identity play a key role in influencing affordances and signifiers which emerge in a range of physical features of design such as lines, material, shapes, colours, and labels. The implication of GAHCD approach for designers can result in addressing the gap between the world of designers and users.

Bridging this gap requires designers to go beyond their gender perceptions and focus on the users' gender identities. Making the role of gender visible in designers' perceptions broadens the design of affordances and signifiers beyond the stereotypical perceptions of gender.

To foster sun protection behaviour in young men it is important to consider how gender is implied in affordances and signifiers. We can facilitate this by combining HCD principles and practices with an increased and reflexive gender awareness. Doing this produces design outcomes for sun protection that are more appropriate to young men. Taking this kind of approach will move designers to consider affordances and signifiers in new and innovative ways, and this will have considerable implications in areas beyond sun protection design work. It is therefore important to question how the product will affect the users' behaviour that avoids conflict with the user's gender identity and address their needs. We as designers must become more aware of our responsibility and our power to make a change and avoid the influence of own perceptions, preconceptions and past experiences. This would avoid the mistakes of the previous design through an understanding of gender as a performance when designing new products.

9.4   Future work

This thesis has opened new avenues for future research in three main directions: 1) new sun protection concepts to foster sun protection behaviour, 2) using GAHCD for design outcomes to improve health-related behaviours and 3) considering the role GAHCD has for the wider design community.

The first avenue is based on participants' feedback discussed in chapter 8; the developed sun protection concepts are now at a stage for prototype development for final product release. This thesis has contributed to foster sun protection behaviour in young men through new human-centred sun protection interventions and a novel gender-aware HCD approach. As discussed in Chapter 8, the final objective of this research was addressed through the verification of new sun protection concepts for young men. But it has also opened up some new avenues to apply these to the design process in the creation of highly-resolved prototypes. While the prototypes are not part of the research question and the planned outcome, then future work could focus on

prototype testing to make them commercially available. This is an important task as the rates of skin cancer and mortality incidence can be reduced and ultimately prevented in young men through sun protection behaviour, in particular, sunscreen can effectively reduce overexposure and sunburn rates. This stage would involve low-fidelity and high fidelity prototype testing with practitioners in Health Professions such as National Health Services (NHS), British Association of Dermatologists (BAD) and Health Promotion agencies such as Cancer Research UK (CRUK) and National Institute for Health and Care Excellence (NICE). This prototype testing would be undertaken with a view to making the products commercially available. This stage is followed to identify potential manufacturers, for example, Nivea Sun to develop the sun protection concepts in accordance with European and International and industrial standards. This is an important task as the rates of skin cancer and mortality incidence can be reduced and ultimately prevented in young men through sun protection, in particular, sunscreen can effectively reduce overexposure and sunburn rates.

The second avenue for further work is the implementation of GAHCD for further development of sun protection concepts to respond to the current policy programs that cover skin cancer prevention such as 'NHS Cancer Plan' and 'Cancer Reform Strategy' by the UK government(Department of Health, 2007). Both programs are working with nine Cancer Networks across the UK with health professionals leading to improving skin cancer prevention strategies and guidelines. In addition, the implication of GAHCD approach should be considered in other areas of primary prevention involved in cancer-related research to save lives, where design has a key role in health promotion. For example, there are a number of health-related behaviours associated with preventative risks factors such as Tobacco use, obesity, and alcohol misuse (Jackson et al., 2012). GAHCD implications contribute further towards the development of interventions to influence on risk-taking behaviours. In addition, the Department of Health encourages design of new interventions and programs particularly in health promotion to stop the annual increase of incidence and mortality rates by changing attitudes and behaviour. With this in mind, desirable changes in health-related behaviours lead to the reduction of health incidence rates, therefore, less crowded health care services and subsequent costs.

The third avenue for further work and research is to consider the implications of employing GAHCD in the wider design community. This would include academic design research, design education focused on HCD (product design and industrial design), and design agencies such as IDEO (IDEO, 2015). The design community as a whole has received large amounts of investment, both financial and through institutional educational support, over the years but remains wedded to a static and outdated set of gender stereotypes. GAHCD directly addresses this lack of awareness and could promote significant shifts in the design community. This could include design research and practice to increase the emphasis on the importance of gender, helping to support and encourage gender-awareness in the HCD process to address user needs in their design solutions. Designers' reflections on the influence of the designer's own gender and their gendered perceptions in their designs is a starting point. The whole design community should consider moving away from normative gender stereotypes when developing new designs in terms of gender identity of the user to represent fluid and dynamic gender perspectives that are socially constructed in different contexts. This means consideration of gender as performances and fragility of masculinity in young men.

Human-centred design is focused to improve the communication process and interaction between the products and the user, and this could be improved by focusing on how the user interprets the product in terms of their gender. Designers perceptions based on their own preconceptions and past experiences produce products based on their perceptions can be in conflict with the user's gender identity. This lack of gender-awareness neglects the user's well-being and needs to be corrected as it is a crucial element for how the product is established as human-centred. Designers should avoid the influence of their perceptions based on gender stereotypes and enhance understanding of gender, the ways in which the designers can engage in GAHCD and understand the way their gender perceptions influence the characteristics of their design.

9.5 Summary

This chapter discussed the overall conclusion and the key contributions of this research according to the aim and objectives of the thesis. It also outlined new avenues to the health promotion authorities and the design community to implement GAHCD to avoid neglecting the influence of designer's gender role and move to a closer understanding of user's interpretations of products.

10 Bibliography

Abras, C., Maloney-Krichmar, D. & Preece, J., 2004. User-Centered Design.

Angrosino, M. V., 2008. *Doing Ethnographic and Observational Research*, Sage Publications.

Battarbee, K. & Mattelmäki, T., 2004. Meaningful product relationships. *Design and emotion: the experience of everyday things*, (July), pp.337–341. Available at: http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Meaningful+ Product+Relationships#0.

BBC News, 2018. Heatwave sunburn: 220 people treated in NI hospitals - BBC News. *BBC News NI*. Available at: https://www.bbc.co.uk/news/uk-northern-ireland-44808082 [Accessed September 7, 2018].

Beyer, H. & Holtzblatt, K., 1998. *Contextual design defining customer-centered systems*, Morgan Kaufmann.

Boat, B., 2018. Suncare Product Finder | BananaBoat. Available at: http://www.bananaboat.com/products [Accessed December 10, 2018].

Boots, 2018. Suncare Products for Face & Body | Sun Cream | Sun Screen | Aftersun | Boots. Available at: https://www.boots.com/toiletries/suncare [Accessed December 10, 2018].

Bradley, H., 2013. *Gender* Second Edi., Cambridge: Polity Press.

Braun, V. & Clarke, V., 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), pp.77–101. Available at: http://eprints.uwe.ac.uk/11735 [Accessed July 2, 2016].

Brown, T & Wyatt, J. 2009, 2015. Design thinking for social innovation. *Annual Review of Policy Design*, 3(1), pp.1–32.

Bryman, A., 2012. *Social Research Methods* Fourth edi., Oxford: Oxford University Press.

Butler, J., 2006. *Gender trouble : feminism and the subversion of identity*, Routledge.

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Cafazzo, J.A. et al., 2012. Design of an mHealth App for the Self-management of Adolescent Type 1 Diabetes: A Pilot Study. *Journal of Medical Internet Research*, 14(3), p.e70.

Cancer Institute NSW, 2017. Dark Side of Tanning campaign. Available at: https://www.cancerinstitute.org.au/how-we-help/cancer-prevention/skin-cancer-prevention/campaigns/dark-side-of-tanning-campaign [Accessed September 20, 2017].

Cancer Research UK, 2016. Skin cancer incidence statistics | Cancer Research UK. Available at: http://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/skin-cancer/incidence [Accessed November 9, 2017].

Connell, R., 1987. Gender and Power. , p.317.

Connell, R., 2005. *Masculinities* second edi., Cambridge: Polity Press.

Connell, R.W. & Messerschmidt, J.W., 2005. Hegemonic Masculinity: Rethinking the Concept. *Gender & Society*, 19(6), pp.829–859.

Courtenay, W.H., 2000. Constructions of masculinity and their influence on men ' s well-being : a theory of gender and health. *Social Science & Medicine*, 50(10), pp.1385–1401.

Creswell, J.W., 2009. *RESEARCH DESIGN*, California: SAGE.

Danermark, B. et al., 2002. *Explaining society: critical realism in the social sciences* 2nd ed., London: Routledge.

David, M. & Sutton, C.D., 2011. *Social research : an introduction* 2nd ed., Durham: SAGE.

Department of Health, 2007. *NHS Cancer Reform Strategy 2007*,

Design Council, 2005. A Study of the Design Process. *Design Council*, 44(0), pp.1–144.

Dove Men+Care, 2018. Dove Men's care products. Available at: https://www.dove.com/uk/men-care.html [Accessed August 13, 2018].

Ebner, M., Stickel, C. & Kolbitsch, J., 2010. iPhone/iPad Human Interface Design. In

Springer Berlin Heidelberg, pp. 489–492. Available at: http://link.springer.com/10.1007/978-3-642-16607-5_34 [Accessed October 26, 2016].

Ehrnberger, K., Räsänen, M. & IIstedt, S., 2012. Visualising Gender Norms in Design: Meet the Mega Hurricane Mixer and the Drill Dolphia. *International Journal of Design*, 6(3), p.17. Available at: http://www.ijdesign.org/ojs/index.php/IJDesign/article/view/1070/531.

Fico, G. et al., 2011. A User Centered Design Approach for Patient Interfaces to a Diabetes IT Platform. *Human Factors*, 2011, pp.1169–1172. Available at: http://www.ncbi.nlm.nih.gov/pubmed/22255506.

Fischer, G., 2004. Meta—Design: Beyond User-Centered and Participatory Design. Available at: https://pdfs.semanticscholar.org/db62/4cae1399fd092531829a9dc3c7b1a3dc8a24.pdf [Accessed September 3, 2017].

Flick, U., 2014a. *An introduction to qualitative research* 5th ed., Berlin: SAGE.

Flick, U., 2014b. *An introduction to qualitative research*,

Frosh, S., Phoenix, A. & Pattman, R., 2002. *Young masculinities : understanding boys in contemporary society*, Palgrave.

Gasson, S., 2003. HUMAN-CENTERED VS. USER-CENTERED APPROACHES TO INFORMATION SYSTEM DESIGN. , 5(2), pp.29–46.

Giacomin, J., 2012. What is human centred design? *Design Journal*, 17(4), pp.25–623.

Gilchrist, P., Carter, T.F. & Burdsey, D., 2014. *Coastal cultures : liminality and leisure*, Leisure Studies Association.

Gillham, B., 2000. *The research interview*, Continuum.

Goffman, E., 1987. *Gender Advertisements*, New york: HARPER TORCHBOOK. Available at: http://www.publiccollectors.org/Goffman_Gender.pdf [Accessed September 15, 2017].

Gollwitzer, P.M. & Brandstatter, V., 1997. Implementation Intentions and Effective Goal Pursuit. *Journal of Personality and Social Psychology*, 73(1), pp.186–199.

Green, E., Owen, J. & Pain, D., 1993. *Gendered By Design?: Information Technology And Office Systems (Gender and Society): Eileen Green: 9780748400928: Amazon.com: Books*, London.Washington, D.C.: Taylor & Francis. Available at: https://www.amazon.com/Gendered-Design-Information-Technology-Systems/dp/0748400923.

Gulliksen, J. et al., 2003. Key principles for user-centred systems design.

Harris, K., 2009. Designer Karim Rashid wants to bring more pink into our masculine world | Life and style | The Guardian. Available at: https://www.theguardian.com/lifeandstyle/2009/mar/21/karim-rashid-pink [Accessed October 3, 2017].

Hermawati, S. & Lawson, G., 2014. Managing obesity through mobile phone applications : a state of the art review from a user- centred design perspective. *Personal and Ubiquitous Computing*, 18(8), pp.2003–2023.

Holtzblatt, K., Wendell, J.B. & Wood, S., 2005. *Rapid contextual design : a how-to guide to key techniques for user-centered design*, Elsevier/Morgan Kaufmann.

Howcroft, D. & Wilson, M., 2003. Participation: "bounded freedom" or hidden constraints on user involvement. *New Technology, Work and Employment*, 18(1), pp.2–41. Available at: http://doi.wiley.com/10.1111/1468-005X.00107 [Accessed October 26, 2016].

IDEO, 2015. Design Kit: The Human-Centered Design Toolkit. Available at: https://www.ideo.com/post/design-kit [Accessed October 8, 2016].

Jackson, A.Y. & Mazzei, L.A., 2012. *Thinking with theory in qualitative research : viewing data across multiple perspectives*, Routledge.

Jackson, C.A. et al., 2012. An overview of prevention of multiple risk behaviour in adolescence and young adulthood. *Journal of Public Health*.

Jokela, T. et al., 2003. The Standard of User-Centered Design and the Standard Definition of Usability: Analyzing ISO 13407 against ISO 9241-11.

Kaapu, T. & Tiainen, T., 2010. User Experience : , pp.18–33. Available at: https://www.nngroup.com/videos/usability-testing-w-5-users-design-process/?lm=no-validate-in-ux&pt=article [Accessed November 17, 2018].

Karin, E., Minna, R. & Sara, I., 2012. Visualising Gender Norms in Design: Meet the Mega Hurricane Mixer and the Drill Dolphia. *International Journal of Design*, 6(3). Available at: http://www.ijdesign.org/ojs/index.php/IJDesign/article/view/1070/531.

Krippendorff, K., 2005. *The Semantic Turn: A New Foundation for Design* 1 edition., Boca Raton: CRC Press.

Kujala, S., 2003. User involvement: A review of the benefits and challenges. *Behaviour & Information Technology*, 22(1), pp.1–16. Available at: http://www.hci.otago.ac.nz/info340/Lecture4_DesignProcess/2003_Kujala_Rev iewUserInvolvement_BaIT_22_1_1_16.pdf%5Cnhttp://www.tandfonline.com/d oi/abs/10.1080/01449290301782.

Kyle, R.G. et al., 2014. Scottish adolescents' sun-related behaviours, tanning attitudes and associations with skin cancer awareness: a cross-sectional study. *BMJ open*, 4(5), p.e005137. Available at: http://www.ncbi.nlm.nih.gov/pubmed/24793258 [Accessed August 28, 2019].

Lai, J., Honda, T. & Yang, M.C., 2010. A study of the role of user-centered design methods in design team projects. *Artificial Intelligence for Engineering Design, Analysis and Manufacturing*, 24(03), pp.303–316.

LeRouge, C. & Wickramasinghe, N., 2013. A review of user-centered design for diabetes-related consumer health informatics technologies. *Journal of Diabetes Science and Technology*, 7(4), pp.1039–1056.

Mac an Ghaill, M., 1994. *The making of men : masculinities, sexualities and schooling*, Open University Press.

MacKenzie, D.A. & Wajcman, J., 1999. *The social shaping of technology*, Open University Press.

Mallin, S.S.V. & Carvalho, H.G. de, 2015. Assistive Technology and User-Centered Design: Emotion as Element for Innovation. *Procedia Manufacturing*, 3, pp.5570–5578. Available at: http://linkinghub.elsevier.com/retrieve/pii/S2351978915007398 [Accessed July 6, 2016].

Martin, B. & Hanington, B.M., 2012. *Universal methods of design 100 ways to*

research complex problems, develop innovative ideas, and design effective solutions, Rockport Publishers.

Marton, F., 1986. Phenomenography—A Research Approach to Investigating Different Understandings of Reality. *Journal of Thought*, 21, pp.28–49. Available at: https://www.jstor.org/stable/42589189 [Accessed November 18, 2018].

Mathewson, S.H., 2009. Working Paper Series Constructions of Masculinity and Health- Related Behaviours among Young Men in Dakar, Senegal. Available at: www.lse.ac.uk/depts/destin [Accessed September 6, 2016].

McDaniel, A.M. et al., 2005. Design and testing of an interactive smoking cessation intervention for inner-city women. *Health education research*, 20(3), pp.379–84. Available at: http://www.ncbi.nlm.nih.gov/pubmed/15522897 [Accessed October 26, 2016].

Moggridge, B., 2007. *Designing interactions*, MIT Press.

Morris, R., 2010. Designing a creative learning space. In P. Martin, ed. *Making space for creativity*. Brighton: Creativity Centre, University of Brighton. Available at: http://eprints.brighton.ac.uk/11265/1/Making Space for Creativity.pdf [Accessed July 27, 2017].

Mort, F., 1996. *Cultures of consumption : masculinities and social space in late twentieth-century Britain*, Routledge, pp.61. Available at: https://books.google.co.uk/books/about/Cultures_of_Consumption.html?id=R_0 NAAAAQAAJ [Accessed September 15, 2017].

Moss, G., 2009. *Gender, design and marketing : how gender drives our perception of design and marketing*, Gower.

Murray, A. et al., 2016. Constructing Masculinities in the National Rugby League's Footy Show. *Sociological Research Online*, 21(3), pp.1–14. Available at: http://journals.sagepub.com/doi/10.5153/sro.4044 [Accessed December 10, 2018].

Newson, M., 2015. Marc Newson | Marc Newson Ltd, pp.67. Available at: http://marc-newson.com/marc-newson/ [Accessed July 9, 2019].

NHS, 2017. Skin cancer (non-melanoma) - NHS.UK. *NHS Website*. Available at:

https://www.nhs.uk/conditions/non-melanoma-skin-cancer/ [Accessed July 16, 2018].

NICE, 2012. National Skin Cancer Campaigns. Available at: https://www.nice.org.uk/guidance/ph32/documents/expert-paper-2-national-campaigns-uk-and-worldwide-2 [Accessed July 16, 2018].

NIVEA, 2017. NIVEA SUN and Cancer Research UK Sun Safety Campaign. Available at: https://www.nivea.co.uk/advice/cancer-partners-uk-sun-safety-campaign [Accessed September 20, 2017].

NIVEA MEN, 2018. SUN PROTECTION FOR YOUR SKIN TYPE | NIVEA MEN. Available at: https://www.niveamen.co.uk/grooming-guides/body/sun-protection-skin-type [Accessed December 10, 2018].

Norman, D. & W.Draper, S., 1986. *User centered system design : new perspectives on human-computer interaction*, Erlbaum, pp.34.

Norman, D.A., 2013. *The Design of Everyday Things*, Available at: http://ucdwiki.chuank.com/uploads/Main/UCDReading_wk5.pdf.

Permanente, K., 2016. Kaiser Permanente. Available at: https://healthy.kaiserpermanente.org/html/kaiser/index.shtml [Accessed May 6, 2016].

Preece, J., Rogers, Y. & Sharp, H., 2002. *Interaction design : beyond human-computer interaction*, J. Wiley & Sons.

Preston-Whyte, R., *The Beach as a Liminal Space*, Available at: https://odradeksjourney.files.wordpress.com/2018/04/the-beach-as-a-liminal-space.pdf [Accessed July 9, 2019].

Pullin, G., 2009. *Design meets disability*, MIT Press.

Quesenbery, W. & Brooks, K., 2010. *Storytelling for user experience crafting stories for better design*,

Reichrath, J., 2014. *Sunlight, Vitamin D and Skin Cancer*, New York, NY: Springer New York. Available at: http://link.springer.com/10.1007/978-1-4939-0437-2 [Accessed October 26, 2016].

Rinkus, 2005. Human-centered design of a distributed knowledge management system. Available at: http://www.ncbi.nlm.nih.gov/pubmed/15694881.

Robson, C., 2011. *Real world research : a resource for users of social research methods in applied settings*, Wiley.

Sanders, E., 2002. From User-Centered to Participatory Design Approaches. *In Design and the Social Sciences. J.Frascara*.

Schuler, D. & Namioka, A., 1993. *Participatory design : principles and practices*, L. Erlbaum Associates. Available at: https://www.crcpress.com/Participatory-Design-Principles-and-Practices/Schuler-Namioka/p/book/9780805809510 [Accessed November 9, 2017].

Seffah, A., Desmarais, M.C. & Metzker, E., 2005. HCI, Usability and Software Engineering Integration: Present and Future. In pp. 37–57. Available at: http://link.springer.com/10.1007/1-4020-4113-6_3 [Accessed October 26, 2016].

Shields, R., 1992. *Places on the margin : alternative geographies of modernity* 1st ed., Lancaster: Routledge.

Simpson, M., 1994. *Male impersonators : men performing masculinity*, Routledge.

Smith, W.R., 2005. Using a Prototype-based Language for User Interface: The Newton Project's Experience. Available at: http://waltersmith.us/newton/OOPSLA95.pdf [Accessed July 6, 2016].

Spinoff.Nasa, 2014. Activity Monitors Help Users Get Optimum Sun Exposure. Available at: https://spinoff.nasa.gov/Spinoff2015/cg_5.html [Accessed August 28, 2019].

Steen, M., 2008. *The fragility of human-centred design*, Available at: http://repository.tudelft.nl/assets/uuid:2b930c09-0ad3-41f8-93f0-503eaea04ff0/steen_20081128.pdf.

Vaitkus, S., 2005. The "Naturality" of Alfred Schutz's Natural Attitude of the Life-World. In *Explorations of the Life-World*. Berlin/Heidelberg: Springer-Verlag, pp. 97–121. Available at: http://link.springer.com/10.1007/1-4020-3220-X_5 [Accessed December 10, 2018].

Veinot, T.C. et al., 2013. A question of trust: user-centered design requirements for an

informatics intervention to promote the sexual health of African-American youth. *Journal of the American Medical Informatics Association : JAMIA*, 20(4), pp.758–765.

Visser, F.S., 2009. *Bringing the everyday life of people into design*, Available at: http://www.narcis.info/publication/RecordID/oai:tudelft.nl:uuid:3360bfaa-dc94-496b-b6f0-6c87b333246c.

Visser, F.S. et al., 2005. Contextmapping: experiences from practice. *CoDesign*, 1(2), pp.119–149.

Warehouse, M., Water Bottles | Reusable Bottles | Mountain Warehouse GB. *2018*. Available at: https://www.mountainwarehouse.com/camping/eating-outdoors/water-bottles/ [Accessed November 3, 2018].

Wajcman, J., Wheeler, E., 1985. The Social Shaping of Technology *edited by Donald MacKenzie and Judy Wajcman* (Open University Press, Milton Keynesand Philadelphia, 1985) pp. vii + 237, ISBN 0-335-15027-6. *Prometheus*, 3(2), pp.466–469. Available at: http://www.tandfonline.com/doi/abs/10.1080/08109028508629013 [Accessed October 26, 2016].

World Health Organization, 2002. Global Solar UV Index. A practical Guide. *World Health Organization*. Available at: http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Global+solar+UV+index+-+A+practical+guide#4.

World Health Organization, 2016. WHO | Sun protection. *WHO*. Available at: http://www.who.int/uv/sun_protection/en/ [Accessed October 26, 2016].

11 Appendix

11.1 Participant information sheet (Exploratory study):

Project's title: Prevention of skin cancer in young men; fostering persuasion towards sun protection behaviour using gender-aware HCD approach

You are being invited to an interview on sun protection behaviour, which will take 20 minutes. Please take time to read the following information carefully. The researcher will go through the information sheet by giving you all the information that is needed.

The information sheet is divided into 2 parts:

- Part 1 tells you the purpose of this study and what will happen to you if you take part.
- Part 2 gives you more detailed information about the conduct of the study.

Ask the researcher if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Part1

1. **What is the purpose of the study?**

The purpose of this research investigation is to gain an in-depth understanding of young men's (18 to 24yrs) awareness, attitudes and behaviour are towards sun exposure. By helping us understand your attitude in relation to sun, we can understand the interventions that would change their attitude and behaviour.

2. **Why have I been chosen?**
You have been chosen randomly as the research focus is on young men with an outdoor lifestyle and you are a part of the target's group.

3. **Do I have to take part?**
No. It is up to you to decide whether or not to take part. If you do, you will be given this information sheet to keep and be asked to sign a consent form. You are still free to withdraw at any time and without giving a reason.

4. What is expected from your participation?

You will be asked to be interviewed (10 minutes) of sun safety behaviour and to take part later in the study if they were interested.

5. What are the potential disadvantages or risks of taking part?

There won't be any disadvantages or harm to take part in this study.

6. What are the potential benefits of taking part?

Becoming more aware of how to protect your skin from the sun's UV rays.

7. What happens when the research study/project/exhibition stops?

If the project stopped, all the data will be kept confidentially and will be used when the project starts again.

8. What if there is a problem?

Any complaints about the conduct of this study can be addressed through the centre of research and development at the University of Brighton.

9. Will my taking part in the study/project be kept confidential?

Yes. All the information about your participation in this study will be kept confidential.

Part2

- **What will happen if I don't want to carry on with the study?**

You may withdraw from the study at any time without explaining why and no further data will be gathered or recorded relating to you.

- **What will happen to the results of the research study?**

The anonymised results of the research study will be presented internally at meetings, they will be written and up and published in a scientific journal, and presented at scientific conferences.

- **Will my taking part in this study be kept confidential?**

All the data will be kept private, confidential and anonymised and the original records will be private between the researcher and the project's supervisors on a secured hard drive at the University of Brighton.

- **Who is organising and funding the research?**
    The research is self-funded at the University of Brighton.

- **Who has reviewed the study?**

This study has been reviewed and passed by the University of Brighton, Computing, Engineering and Mathematics, Research Ethics and Governance Committee.

Contact Information

Thank you for reading this. We hope you feel able to take part in our study.

Please do get in touch for further information or questions about the study.

Researcher:

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11.2 Consent form (Exploratory study)

Please put a circle around your answer to all the questions.

1. I confirm that I have read and understood the information sheet for the above study and have had the opportunity to ask questions.

   Yes   No

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason.
   Yes   No

3. I agree with the interview data being audio recorded.

   Yes   No

4. I agree with the use of anonymised quotes in publications.

   Yes   No

5. I agree to take part in being photographed

   Yes   No

6. I agree that photographs of me (without any facial features) be used or displayed in the researcher's project.

   Yes   No

_____   _____   _____
Name of Participant   Date   Signature

_____   _____   _____
Name of Researcher   Date   Signature

11.3 Interview questions (Exploratory study):

- How often do u go to the beach?
- What's motivates you to go to the beach?
- On average how long do you typically spend in the sun?

Attitudes towards a suntan:

- What do you think about being brown or tan?
- How important is for you to get a suntan? Why is that important?
- How does having a suntan makes you feel? Why?
- Does a suntan make you feel more attractive? Why?
- Are you concerned about the positive effects of the sun?
- Are you concerned about the negative effects of the sun?

Behaviour and awareness of actions that cause the risk of skin cancer:

- Do you protect your skin before going outside during the day?
- If 'yes', how do you protect yourself from the sun?
  - Sun protection clothing
  - Sunscreen
  - Stay in shade

- Typically, how often do you reply sunscreens?
- How often do you cover up or seek shade on the beach/spend in the sun?
- Have you ever been to a dermatologist for skin screening?
- What do you know about the sun dangers for your skin?
- If yes, where did you get that information from?
- Do you know the term 'sun-burn'?
- If 'yes', do you avoid sunburn?
- Have you ever had a sun-burn?
- What's your opinion of sunburn? Is it harmful?
- If 'yes', how many times have you got burned and how old were you?

Awareness campaigns of skin cancer in the UK:

Have you heard of any of the following awareness campaigns? 24. If yes, what do you know about them?
  - Sun Smart
  - Cancer Research UK
  - Be Clear on Cancer

11.4 Participant information sheet (Main study):

Project's title: Prevention of skin cancer in young men; fostering persuasion towards sun protection behaviour using gender-aware HCD approach

You are being invited to a group interview session on sun protection behaviour. Your participation involves a 120 minutes session at the University of Brighton. These sessions will involve the participants sitting around a table with their names labelled, the facilitator (the researcher and note taker), and video recording camera and a range of materials such as paper, scissors, pens, pencils, clear adhesive tape, and glue stick for sketch prototyping. The activities include visualisation of gender and its relation to design through the participants' drawings, and making paper prototypes. As the sessions are progressed, the researcher asks questions with a range of discussions about gendered products specifically designed for male and female, and the sun protection concepts to explore different aspects of gender and its relationship to design in action. This means how young men perform their gender by designing an intervention that is desirable to them.

Any confidential information shared in these sessions will not be taken outside of the room or discussed with anyone else without asking you first. Please take time to read the following information carefully. The researcher will go through the information sheet by giving you all the information that is needed.

The information sheet is divided into 2 parts:

- Part 1 tells you the purpose of this study and what will happen to you if you take part.
- Part 2 gives you more detailed information about the conduct of the study.

Please ask the researcher if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Part1:

1. What is the purpose of the study?
The purpose of this research is to increase sun protection behaviour in young men aged 18 to 24. In addition, the research aims to understand how sun protection behaviour is shaped and influenced, to develop possible insights and design interventions that change young men's behaviour in this particular health problem. In this research, the transformation of sun protection behaviour occurs as a result of the strategic implication of adopting gender-aware human-centred design (HCD) approach (GAHCD) to develop design interventions based on addressing young men's needs.

By helping us understand your beliefs, values and interactions, we can explore the interventions that would change their sun protection behaviour.

2. Why have I been chosen?

You have been chosen randomly as the research focus is on young men and you are a part of the target's group

3. Do I have to take part?

No. It is up to you to decide whether or not to take part. If you do, you will be given this information sheet to keep and be asked to sign a consent form. You are still free to withdraw at any time and without giving a reason. There is a potential risk that a group discussion about skin cancer might induce some distress. Participants appearing distressed in the session will be reminded that they are not required to continue participation. They will also be advised to contact the university's student support and counselling service if appropriate.

4. What is expected from your participation?

You will be asked to participate in a session about sun safety behaviour and to take part later in the study if necessary.

5. What are the potential disadvantages or risks of taking part?

There won't be any disadvantages or harm to take part in this study.

6. What are the potential benefits of taking part?

Becoming more aware of how to protect your skin from the sun's UV rays.

7. What happens when the research study/project/exhibition stops? If the project stopped, all the data will be kept confidentially and will be used when the project starts again.

8. What if there is a problem? Any complaints about the conduct of this study can be addressed through the Doctoral College at the University of Brighton.

9. Will my taking part in the study/project be kept confidential?

Yes. All the information about your participation in this study will be kept confidential.

Part2/;

- **What will happen if I don't want to carry on with the study?**

You may withdraw from the study at any time without explaining why and no further data will be gathered or recorded relating to you.

- **What will happen to the results of the research study?**

The anonymised results of the research study will be presented internally at meetings and it will be anonymously written and published in a scientific journal, and presented at scientific conferences.

- **Will my taking part in this study be kept confidential?**

All the data will be kept private, confidential and anonymised and the original records will be private between the researcher and the project's supervisors on a secured hard drive at the University of Brighton.

- **Who is organising and funding the research?**

The research is self-funded at the University of Brighton.

- **Who has reviewed the study?**

This study has been reviewed and passed by the University of Brighton, Computing, Engineering and Mathematics, Research Ethics and Governance Committee.

Contact Information

Many thanks for reading this. We hope you feel able to take part in our study. **Please do get in touch for further information or questions about the study.**

Researcher:

Miss Bahar Khayamian Esfahani
PhD student
Email: BKE10@brighton.ac.uk

Supervisor:

Mr Richard Morris
Computing, Engineering and Mathematics
Moulsecoomb
Brighton
BN2 4GJ
Email: R.D.Morris@brighton.ac.uk

11.5 Consent form (Main study):

Project's title: Prevention of skin cancer in young men; fostering persuasion towards sun protection behaviour using gender-aware HCD approach

Please put a box or circle around your answer to all the questions.

I confirm that I have read and understood the information sheet for the above study and have had the opportunity to ask questions.

 Yes   No

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason.

Yes   No

I agree with the sessions being recorded.

Yes   No

I agree with the use of anonymised quotes in publications.

Yes No

I agree that the discussions from the sessions (anonymised) to be used or displayed in the researcher's project.

Yes No

The data and the recorded sessions will be used for further analysis by the researcher (Bahar Khayamian Esfahani) and the supervisors (Dr Mark Erickson and Mr Richard Morris) at the University of Brighton.

_____   _____   _____

Name of Participant   Date   Signature

_____   _____   _____

Name of Researcher   Date   Signature

11.6 Participant information sheet (Verification study):

Project's title: Prevention of skin cancer in young men; fostering persuasion towards sun protection behaviour using gender-aware HCD approach

You are being invited to a group interview session on sun protection behaviour. Your participation involves a 20 minutes session at the University of Brighton. This session will involve the participants sitting around a table with their names labelled, the facilitator (the researcher and note taker), and video recording camera and a range of sample products such as bottles as an example of sun protection interventions. As the sessions are progressed, the researcher asks questions with a range of discussions and gathering participants' feedback as they interact with the sample products.

Any confidential information shared in these sessions will not be taken outside of the room or discussed with anyone else without asking you first. Please take time to read the following information carefully. The researcher will go through the information sheet by giving you all the information that is needed.

The information sheet is divided into 2 parts:
- Part 1 tells you the purpose of this study and what will happen to you if you take part.
- Part 2 gives you more detailed information about the conduct of the study.

Please ask the researcher if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Part1:

10. What is the purpose of the study?
The purpose of this research is to increase sun protection behaviour in young men aged 18 to 24. In addition, the research aims to understand how sun protection behaviour is shaped and influenced, to develop possible insights and design interventions that change young men's behaviour in this particular health problem. In this research, the transformation of sun protection behaviour occurs as a result of the strategic

implication of adopting gender-aware human-centred design (HCD) approach (GAHCD) to develop design interventions based on addressing young men's needs. By helping us understand your beliefs, values and interactions, we can explore the interventions that would change their sun protection behaviour.

11. Why have I been chosen?

You have been chosen randomly as the research focus is on young men and you are a part of the target's group.

12. Do I have to take part?

No. It is up to you to decide whether or not to take part. If you do, you will be given this information sheet to keep and be asked to sign a consent form. You are still free to withdraw at any time and without giving a reason. There is a potential risk that a group discussion about skin cancer might induce some distress. Participants appearing distressed in the session will be reminded that they are not required to continue participation. They will also be advised to contact the university's student support and counselling service if appropriate.

13. What is expected from your participation?

You will be asked to participate in a session about sun protection behaviour and to take part later in the study if necessary.

14. What are the potential disadvantages or risks of taking part?

There won't be any disadvantages or harm to take part in this study.

15. What are the potential benefits of taking part?

Becoming more aware of how to protect your skin from the sun's UV rays.

16. What happens when the research study/project/exhibition stops? If the project stopped, all the data will be kept confidentially and will be used when the project starts again.

17. What if there is a problem? Any complaints about the conduct of this study can be addressed through the Doctoral College at the University of Brighton.

18. Will my taking part in the study/project be kept confidential?

Yes. All the information about your participation in this study will be kept confidential.

Part2:

- **What will happen if I don't want to carry on with the study?**

You may withdraw from the study at any time without explaining why and no further data will be gathered or recorded relating to you.

- **What will happen to the results of the research study?**

The anonymised results of the research study will be presented internally at meetings and it will be anonymously written and published in a scientific journal, and presented at scientific conferences.

- **Will my taking part in this study be kept confidential?**

All the data will be kept private, confidential and anonymised and the original records will be private between the researcher and the project's supervisors on a secured hard drive at the University of Brighton.

- **Who is organising and funding the research?**

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- **Who has reviewed the study?**

This study has been reviewed and passed by the University of Brighton, Computing, Engineering and Mathematics, Research Ethics and Governance Committee.

Contact Information

Many thanks for reading this. We hope you feel able to take part in our study. **Please do get in touch for further information or questions about the study.**

Researcher:

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PhD student
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Supervisor:

Mr Richard Morris
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BN2 4GJ
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11.7 Consent form (Verification study):

Project's title: Prevention of skin cancer in young men; fostering persuasion towards sun protection behaviour using gender-aware HCD approach

Please put a box or circle around your answer to all the questions.

I confirm that I have read and understood the information sheet for the above study and have had the opportunity to ask questions.

 Yes   No

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason.

Yes   No

I agree with the sessions being recorded.

Yes   No

I agree with the use of anonymised quotes in publications.

Yes   No

I agree that the discussions from the sessions (anonymised) to be used or displayed in the researcher's project.

Yes   No

The data and the recorded sessions will be used for further analysis by the researcher (Bahar Khayamian Esfahani) and the supervisors (Dr Mark Erickson and Mr Richard Morris) at the University of Brighton.

Name of Participant	Date	Signature

Name of Researcher	Date	Signature