An investigation into the use of wearable technologies for wellness and health case studying young adults at CMU.

A dissertation submitted in partial fulfilment of the requirements for the degree of Bachelor of Science (Honours) in Business Information Systems.

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Declaration

I hereby declare that this dissertation entitled “An investigation into the use of wearable technologies for wellness and health case studying young adults at CMU.” is entirely my own work, and it has never been submitted nor is it currently being submitted for any other degree.

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Abstract

With the rapid growth of the wearable technology industry has come a vast array of available products to suit almost any individual’s needs. This dissertation investigates and establishes the views that people in the Cardiff area aged between 18 and 30 have on wearable technology and how this technology affects their health and well-being. Whether it is in a positive or negative way and the reasoning behind why they have these views. Research provides evidence of mixed opinions on the effects of wearable technology on its users. This dissertation has since established that the young people from Cardiff Metropolitan University aged between 18 and 30 believe that wearable technology has had very positive effects on their wellbeing and also their health and fitness. The researcher considered the different sectors that wearable technology is being used in and the findings of the research gave the researcher a good understanding of whether people in the selected age group and area believe that there is a future for this kind of technology and what form(s) they would like to see being developed further.

The researcher also looked at the advantages and disadvantages associated with wearable technologies. Primary research is presented through qualitative and quantitative means, all data collected was collated and analysed, and ensuring that the projects findings were meaningful. All primary data was gathered through the use of a questionnaire, semi-structured interviews and a focus group interview. The researcher conducted secondary research to analyse and review relevant forms of information and data that relates to Wearable Technology, different forms of Wearable Technology and their purposes and Well-being in general. The findings confirm that Wearable technology has a positive effect on its user’s health and well-being with the Fitbit and Apple Watch being the two most popular devices mentioned by participants. This paper concludes with suggestions for future research.
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1.0 Introduction

The area that the research will be focusing on are the devices that are focused on or have the option/ability to monitor and aid the fitness and wellbeing of their users. Throughout the following sections of the paper, existing research will be extensively reviewed. The paper makes use of books, journals and academic reports.

This paper will also explore the views of students in the Cardiff area aged between 18 and 30, on different forms of wearable technology and this area in general. The paper will consider well-being, what it means and whether a person’s well-being is effected by using wearable technology, positively, negatively or not at all. Any primary research involved students in Cardiff between the ages of 18 and 30 and considered several areas related to wearable technology and its effects on a person’s well-being. The research focused on how aware people were of wearable technology and what opinions they had of this form of wearable technology, whether they use this form of technology and if not they would be asked if they would consider purchasing a wearable device in the future.

A literature review and Research Methodology is presented with a strong argument as to why certain research techniques have been utilised, as well the presentation of finding from the primary research that was carried out through the use of an online questionnaire to provide qualitative information and also the use of semi structured interviews and a focus group, providing qualitative information.

The final sections of the report will analyse all of the Quantitative and Qualitative data that is collected through the use of questionnaires, semi-structured interviews and a focus group. Any patterns that become apparent in the data will be explained in detail and the researcher will give an interpretation of the results backed up with existing literature found in the Literature review section of the report.

1.1 Background

The idea behind completing research into this area of technology came about through personal interest and discussions with peers concerning how they utilise wearable technology to improve their day to day life.
The researchers desire to complete this study was due to a strong personal interest in wearable technologies and a need to understand the effects that wearable technology can have on its users, whether it be positive or negative. This study will aid individuals that are considering purchasing a wearable device but are unsure whether the expenditure is really worth it. It is hoped that it will also aid in the future development of wearable technologies by establishing the positive and negative aspects of wearable devices and compatible applications.

1.2 Aims and Objectives

The project aims to establish the opinion of students in Cardiff aged between 18 and 30 on wearable technology and the extent to which it effects a person’s well-being for better, for worse or not at all.

It is hoped that the project will assist in the development of new wearable devices and will give people a good level of understanding as to what effects they can expect from using certain forms of wearable technology in an attempt to improve their lifestyle and well-being.

The project also aims to establish what effects if any wearable technology has on the users’ health and overall fitness, quantitative and qualitative information will be used, analysed and interpreted by the researcher.

The objectives of the project are as follows:

- Review relevant literature related to the chosen topic, including statistics regarding positive and negative aspects of wearable technologies.
- Design and pilot a questionnaire, review and then modify the piloted questionnaire in or to design a completed questionnaire to be distributed.
- Design semi structured interview questions and Focus group questions that will enable the researcher to gain a good amount of qualitative information.
- Conduct face to face interviews.
- Hold Focus Group
- Analyse results once all data has been collected.
- Conclude the study and discuss the results of the research in detail, whilst stating whether the aims and objectives of the project were met.
2.0 Literature Review

The first area that will be discussed in the literature review is wearable technology in general and the many different forms and benefits of typical types of wearable technology. This chapter will look at articles, books, journals and reports.

2.1 Wearable Technology

Wearable technology is a new and expanding area, it “combines the functionality of electronics with the convenience of fabrics and clothing” (Watson, 2013), it is challenging for manufacturers to combine more advanced electronics with flexible/wearable materials, it means that the internals of the devices also have to be of a flexible nature. Wearable technology is an expanding and vast field of the technology industry and has many areas of expertise. The expansion of the wearable technology industry is also stressed by Grace College (2016), they state that the rapid growth of wearable technology products is down to the desires of the younger consumers spurring on the development. They also suggest that there is no sign of the expansion of the industry slowing down any time soon, stating that innovative advancements will make the future full of unlimited possibilities for wearable technology.

As stated by Watkins and Dunne (2015), wearable technology refers to technology that can be worn on the body. Some forms of wearable technology include smart clothing and accessories but can even be something as simple as the fibres or fabric that is used to make a piece of clothing. Watkins and Dunne go on to state that forms of technology that are described as being smart have built in sensors that enable the device to sense something like heart rate, number of steps and so on and respond appropriately. Most wearable devices will store data that can be accessed later and viewed in order to view the wearers’ progress in the amount of steps they have taken in a day for example.

There are some forms of wearable technology that are described as wearable computers, this term covers things like smart watches for example, these devices have the ability to complete tasks that are similar to those that a user can perform on a desktop. Such devices are primarily used for communication purposes and accessing information such as task reminders and so on. Watkins and Dunne also state that “Wearability is sometimes seen as the next frontier in mobile technologies because it allows access to information to be even more seamless.” This is true in the case of smart watches as they have the functionality to access information such as texts,
imessage, make and receive phone calls, email and access to other varies applications. Functionality of these devices is increasing year on year with new development being made in this sector all of the time.

It is thought that the creation of wearable forms of technology was heavily influenced by the invention of the world-wide web and have benefitting heavily from the development of devices for the armed forces in the later part of the Cold war in which time the military’s expenditure on technology grew, with a lot of devices becoming commercially available as a result of developments made in this time.

This being said, the military certainly influenced the thought process behind the development of wearable devices but did not play a very big role in the success of such. What is thought to be important is the growth of the computer industry in the 1980s, in which time computers are said to have developed to the stage where they were much more readily available to consumers and parts could be sourced with relative ease. With electrical engineering and computing being taught around the globe, it is stated that the enthusiasm for developments in computing had increased greatly.

With devices becoming must have items in households, workplaces and everyday life as a result of the rapid growth of the electronics industry, it is suggested that this had an influence on research into devices for areas such as medical and psychology. The development of the world-wide web meant that by the mid-nineties Schools and Universities in the majority of developed countries had access to the internet. Having access to the internet meant that research and studies carried out could be shared all around the world, this meant that ideas could be discussed daily and meant that research into wearable technologies benefitted greatly from this. With wearable devices utilising wireless technology to access the internet this meant that it was increasingly easy to stay in touch with friends and family and even led to companies having to change their websites in order to give wearable device users a better experience and improved functionality. Its stated the “Staner of MIT has worn a computer continuously since 1993.”. (McCann and Bryson. 2009.)

According to Havele (2014), wearable technology has emerged as a “megatrend” that is changing the way in which we “live, work and play”. Between the years of 2011 and 2012 the number of wearable devices sold tripled, 8.3 million fitness trackers, smart watches and various other forms of wearable technology were purchased be consumers in the year 2012. With
activity trackers, such as Fitbits and other devices with similar functionality, and wearable fitness devices making up the majority of the wearable technology market in 2013. It is stated that 96% of the market was made up by activity trackers, 3% by smart watches and 1% for smart glasses.

Between January and September of 2013 the total number of Tweets mentioning the phrase “Wearable tech” raised from 4,103 to 64,989, this is a rise of over 60,000 mentions in Tweets in the space of 9 months. It is expected that there will have been 64 million shipments of wearable devices by the end of 2017, this will be 8 times the amount of shipments made in 2012.

Its quoted that 82% of people that use wearable technology believe that it has made an enhancement to their lives. Worldwide spending on wearable technology is expected to reach over £15.1 billion.

Lamkin (2014) report how the wearable market was set to grow by around 125.3 million device shipments between 2013 and 2015. (9.7 million device shipments on 2013, with the prediction of 135 million in 2018). It is also mentioned that the market for wearable smartbands had grown by 684%, year on year, for the first 6 months of 2014.

Gray (2015) discusses predictions of rapid growth and success of the wearable technology industry being likely to continue and even begin to pick up pace as research has indicated that there will be a rise for the global revenue of wearable devices from around £3.17 billion per annum today to a predicted £33.72 billion per annum by 2019. This may well be down to the fact that the average cost of a wearable device has decreased over the past few years, the investment required to own an item of wearable technology that is able to monitor and analyse data in the way that these devices can, this data can be used to validate and improve wellbeing programmes.

2.1.1 Existing devices
As illustrated in Seymour’s book titled ‘Fashionable Technology’, (2008) some wearable technology devices are able to monitor certain bodily functions, some examples of these are tracking blood pressure, heart rate/pulse, temperature, sweat, motion and oximetry. Some devices can even monitor the environment, they will monitor areas such as location, illumination, ambient temperature, humidity and toxicity.
The image shown below illustrate the development of wearable technology between the year of 1975 and 2014. It shows all different forms of wearable technology, ranging from the Pulsar Calculator watch (1975) to things such as the Walkman and Hearing aids.

**Figure 1: Wearable Tech Timeline. (Lamkin. 2014.)**

Figure one gives a good idea of how far the industry has come in such a small amount of time, it illustrates the fact that in under 30 years we have gone from the Pulsar Calculator watch to the Apple watch. The development of these devices has been rapid to say the least, this is mentioned in section 2.1 of this document.
As Figure 2 illustrates, there are a number of different sectors of the wearable technology market. These sectors include, Security/Safety, Medical, Wellness, Sport/Fitness, Lifestyle Computing, Communication and Glamour. Figure 2 illustrates just how large the industry currently is and how many different areas there are for developments to be made. As mentioned earlier by Grace College (2016) this suggests a future with endless possibilities for advancements.

Havele (2014) mentions a number of different wearable devices and gives details as to how they are being used. There are a large variety of different forms of wearable technology on the market, health devices are extremely popular. Some of the most popular health focused devices being the Nike+ Fuelband, Fitbit and STRIIV. There are one billion points earned by Nike+ Fuelband users every single day. It’s quoted that the average Fitbit user is taking around 43% more steps per day than they would if they did not own such device. STRIIV boasts that users are walking an average of 60 minutes per day and climbing around 8 flights of stairs.

There are also devices classed as “Personal devices” these include the Pebble, Sony Smartwatch, Google Glass and Samsung Galaxy gear. The Sony Smartwatch and the Samsung Galaxy gear are both very similar devices although the Sony device offers a “remote link” feature which allows it to control the camera shutter on the device it is paired with, where as...
the Samsung device has the ability to take photographs. Both devices are able to receive notifications for things like texts, emails, missed calls/incoming calls and much more. Google Glass has the ability to respond to voice commands, give/display directions, search for requested information, take pictures and even send messages. The Pebble is probably the least technologically advanced wearable item out of those listed, although it does include features such as music control and an alarm.

Havele (2014) goes on to list a number of different wearable sport devices such as the Shottracker, which was created to track all basketball shot attempts, makes and misses. The Reebok Checklight is a device designed for Football, it monitors the number of hits a player takes to the head and measures the severity of the impact with the ball. They state that the Misfit Shine is a device designed with Running, Cycling and Swimming in mind, it has the functionality to track steps, activity levels and the amount/quality of sleep that the user has. Instabeat is a device specifically designed for swimming, it is able to track users’ heart rates’ calories burnt, number of flip turns made in the pool and the pattern in which the swimmer is inhaling and exhaling. The Trace is an action sports device that is able to track the speed of an individual, the distance that they cover, the height that they are able to jump and even their rotation. A device called the Push is also mentioned, it is designed for weightlifting and has the ability to track the amount of reps and sets the user completes, the force and power that their body is producing, it will monitor their balance, speed and the explosively of the users’ strength.

2.1.2 Existing Applications

Brown (2017) mentions that users are able to log into applications that are associated with their devices and share the information that their device has gathered about them. This allows users to compete with their friends, work towards common goals and view each other’s progress, and gives the user the ability to share achievements with their friends and family. This functionality ultimately mean that there is an increase in the amount of peer interaction and motivation that a person receives. Many apps are designed with the ability to share to other social media platforms such as Facebook, Twitter and the like with just a click.

Nyuyen (2015) expresses their views on what applications they believe are best for wearable fitness and the health related wearable applications.
Figure 3: Moov Now, Moov HR Burn, Moov HR Sweat and Moov App. (Moov. 2017.)

The first app that is mentioned is called Moov, it was the best loved fitness app of 2014 and incorporates 5 different programs in order to meet the needs and expectations of runners and walkers. The app has different levels meaning that it encourages the user to train harder and burn more calories. It's stated that Moov is very easy to use, the Moov application connects to the Moov wearable device. The app continually tries to encourage and motivate users by giving feedback through the users’ headphones, telling users to keep going, asking if they are okay and so on. The Moov app can also be linked with Facebook meaning that users are able to share any progress that they make. The app displays graphs and charts of all of the users runs recent runs, meaning that is made very obvious how much you are improving and so on, the app even suggests ways in which the user can improve.
The second application included was called Adidas miCoach, this app gives your smartphone the ability to be your personal trainer. It provides the user with guidance and voice coaching, giving the user advice and motivation to achieve their goals at a faster rate. The app includes hundreds of different training plans that are suited to the goals of the user, whether they want to tone their body, gain strength, lose weight or improve their flexibility. The app is connected to the users’ wearable device via Bluetooth, miCoach monitors the users heart rate, pace and distance travelled. The app automatically shares the user’s workout details to their social media pages such as Facebook, Twitter and so on. The app has the function to allow users to play their own music through the app and will also tell the user when it is time to change their shoes based on the number of miles that they have covered in a particular pair of shoes. The number of miles that each shoe lasts varies.
The third application that is featured is called Strava, this is said to be a good app for runners. This is similar to Moov and Micoach. The Strava app utilises GPS to track the runner, it provides statistics on distance, pace, speed, elevation gained and calories burned. Strava allows the user to set personal records and have competitions with friends, competing for the best time for a route for example. The app even allows the user to view when their friends are on a run or ride. The app also includes monthly challenges that are designed to challenge the user’s abilities.
Figure 6: MyFitnessPal application: Diary, Nutritional information, weight loss/gain progress and Carbohydrates, Fats and Protein split. (MyFitnessPal. 2017.)

Another application that is mentioned is MyFitnessPal, it has been rated highly for wellness and weight loss. The app contains a large food database, with more than 5,000,000 foods to choose from. The app allows the users to enter the food that they eat and the exercise that they do on a daily basis. It calculates the number of calories that the user should be eating per day and this will be altered when physical exercise is entered. Foods can be tracked simply by scanning the barcode on the packaging. (If available.) The app will recognise over 4,000,000 different barcodes and will even display what nutrients each food contains. The user can set goals for weight and even the split they want to aim for, for Fats, Carbohydrates and Protein.
Brown, A., (2015) discusses several different wearables that they believe have a good effect on a person’s mental health.

**Figure 7: Hexoskin Wearable Bluetooth shirt. (Weir. 2013.)**

These include the Hexoskin, which is a Bluetooth undershirt wearable that can be used in many ways. The Hexoskin records physiological data and displays it on a usable interface, this allows users to know more about themselves and how to live better. The devices incorporates a heart rate sensor, chest and waist breathing sensors and a 3D movement sensor. It monitors the users heart rate, breathing and activity level. It can collect data all day and even throughout the night where it can be used to monitor sleep quality. This data can then be uploaded to social media and shared with friends.
Beyond Verbal is a new form of wearable technology that decodes a person’s communication and emotions. It allows the user to know what someone really means when they are talking by monitoring their movement, emotions and words that they use. Beyond verbal has been proven to work through extensive scientific testing. This application is available for download to smart devices, and wearables.

**Figure 8: Beyond Verbal application. (Yamshon. 2014.)**
Pip is an application created to help manage stress. The device measures Electro Dermal Activity (EDA) by monitoring changes in the electrical energy on the surface of the user’s skin in order to produce “a robust, scientifically established indicator of an individual’s stress response”. By using complex mathematical algorithms and data processing technology, the user’s stress levels will be displayed, in real time via the application. This app is very good for destressing as you can check how stressed the app believes that you are and establish whether or not you need to take a break and calm yourself down.

2.1.3 Benefits of wearable technology

Wearable technology has many benefits, some of these benefits can be applied in a working environment. Bothun, et al (2017) state that wearable devices can improve “efficiency, productivity, service and engagement across industries”, in retail for example, paying for goods and services can be completed much faster, customer service can be improved and advertising can be better targeted. In the healthcare industry, it has the potential to increase the amount people exercise and improve diets, access to medical information will increase, diagnosis of health issues will be made much more accurate as things like people’s heart rates can be constantly monitored through a wearable device and finally clinical trial participation is likely to increase as wearable devices will make the monitoring of participants extremely easy. In the entertainment and media industry wearable technology will allow for a more “immersive and fun” experience for users and engagement with media and other devices will be made extremely easy.
In an article published by University of Cambridge (2017), it’s stated that a study carried out in order to establish a link between physical activity and wellbeing returned results that people that included physical exercise periods in their day had increased positive moods, regardless of what their happiness was before the study. In their article they mention that there were more than 10,000 participants in the study with the majority of those that took part showing signs of improved happiness and positivity but there are negative aspects of wearable technology as was discovered when researching, this can be read in section 2.1.4.

2.1.4 Negative aspects of wearable technology
Following on from section 2.1.3 where literature with a positive view on Wearable technology was discussed, this section will show contrast to the sources mentioned in 2.1.3, as there are authors that do not share the same views. In a report created by Ericsson Consumer Lab (2017) it’s said that a quarter of people that were surveyed stated that their expectations of wearable devices they had purchased had not been met. TheGuardian (2016) wrote an article titled “Fitness trackers do not increase activity enough to noticeably improve health”, in this article a study is mentioned where 800 people aged between 21 and 65 were monitored to see whether or not using a fitness tracker would have an impact on their health. The 800 people were split into 4 groups, there was a control group with no tracker, a group wearing Fitbit Zip devices and two other groups that were offered financial rewards. (Either cash for themselves or donations to a charity of their choice for the first six months of the experiment). Participants levels of physical activity were also measured, “as well as their weight, blood pressure and cardio-respiratory fitness” in 6 monthly intervals. The study found that in the first 6 months only the participants that had been offered cash had recorded an increase in physical activity. The differences in motivation/physical activity could be seen in the mean step counts of the groups, the cash groups mean step count was 11,010, the charity group was 9,280 and the Fitbit group’s average was 8,550. After 12 months, it could be seen that those that had received cash for the first 6 months of the trial had now returned to normal levels of physical activity, the same as those that they had shown before starting the trial. The Fitbit group were averaging an increased amount of aerobic activity per week. It is stated that the authors of the study “found no evidence of improved health outcomes, no evidence of the device promoting weight loss or improved blood pressure or cardiorespiratory fitness, either with or without financial incentives”.
There have also been concerns about the radiation that is given off by wearable devices. Mercolais states that as long as a wearable device does not have 3G connectivity as a feature then the radiation that it gives off will have minimal harmful effects if any. This implies that he believes that devices that utilise 3G connectivity can potential affect the wearers health in a negative way. A Danish team that produced a report about “cell phone subscription data rather than actual use” stated that there could be a “small to moderate” increase in the chances of heavy cell phone users getting cancer. Wearable devices utilising this technology would be expected to have similar effects after heavy usage. Although none of this has been proven to be completely accurate, health concerns related to this kind of technology cannot be ruled out. The article actually goes on to mention that the majority of radiation comes from the 3G connection on devices and so devices without this such as the Jawbone Up and Apple Watch should be “O.K.”. (Bilton. 2015.)

Besides Health issues, it has been suggested by Ciklum (2016), that there are significant security risks related to wearable technology. This is illustrated by Figure 10.

![Wearable Tech Security. (Ciklum. 2016).](image)

As you can see, Figure 10 illustrates that 70% of the firmware on a smart watch was transmitted without any encryption, devices are vulnerable to Double Direct Attacks when WIFI is enabled, 3/10 watches and the applications that they are linked with were vulnerable to account harvesting, only 50% of devices gave the option to implement a screen lock and finally 2/10 wearable devices that were stolen were able to be paired with the attack’s phone.
In this Literature, it has been stated by a number of different authors that the Wearable Technology market is predicted to grow even further than it already has, Kleinman, (2016) mentions that the amount of shipments of Smartwatches has been declining. Kleinman states that in the third quarter of 2016 Apple shipped 1 million Apple Watch units, in the same period in 2015 Apple made 3.9 million shipments of the watch. Of the top five Smart watch manufacturers, Garmin were the only ones to show growth. It suggested that this could mean that people are getting bored of this form of wearable technology.

2.2 Wellbeing

As this is an investigation that considers wearable technology users’ well-being and the effects (if any) that the users have/have not experienced, the literature review with now be looking into the meaning of well-being and its surrounding areas.

Warin (2013) stated that wellbeing is a term used to describe a persons’ mental state. Wellbeing covers how a person is feeling and how well they feel they are able to cope with day to day life. A persons’ wellbeing can change on a daily basis, someone with good mental wellbeing will feel confident in themselves, will express a good range of different emotions, they will be able to build relationships with others and feel like they are able to contribute in their community, people with good mental wellbeing are often much more productive people and are able to cope with stress and manage time very well.

Haybron (2008) supports that to fully understand what wellbeing is we must first have a clear understanding of what suffering is and the value of pleasant and unpleasant experiences.

Brown (2017) states that wearables in the workplace can make workplace wellness more efficient and practical and will eliminate the need for such things to be tracked manually as devices are able to store and display the required information. Wearable devices that are used along side wellness platforms will help to bring staff together as they will all be working towards a common goal of improving their wellness. This can lead to an increased morale amongst staff members as they will be encouraged to make connections with others and provide each other with support, should they need it. They can also aid in increasing the connection of staff that are based at different locations by giving them a goals that they can all work towards and offer each other support along the way.
2.2.1 Physical Fitness

According to Warin, (2013) a person that has a good standard of physical health is more likely to have a good standard of mental health. Factors such as the amount of sleep a person has, their diet and the amount of physical activity a person experiences all impact on mental wellbeing, in the majority of cases it is for the better.

Lack of sleep can lead to negative feelings being over exaggerated and a person being much more irritable and bad tempered whilst also experiencing a reduction in confidence. Diet is highly important when it comes to mental wellbeing, eating regularly, consuming a good balance of different foods and drinking a good amount of water can make a person feel much healthier and have a much more positive attitude on life.

It is stated that physical activity (exercise) can result in a reduction in depression and anxiety and will make a person much more confident. Exercising releases endorphins in the brain, these are known as “feel good hormones”, they can have a huge effect on a persons’ mood. It is quoted that “It doesn’t matter whether you prefer gardening, gentle walking or something more active – you will almost always feel better for having done some physical activity.”

In a study carried out on 20 participant women by Arigo (2015), to establish whether wearable technology and online social connectivity could help promote physical activity, it was established that the effects were very positive. Participants showed a large increase in the number of steps they took per day from an average of 3796 steps to 8190 by the final weeks of the project week. Across participants, the average number of days that participants managed to take 10,000 steps or more was 17.

In the research paper titled “The relationship between physical activity and mental health: a summary of evidence and policy” written by Hull (2012), some of the positive effects of physical activity on a person’s mental health. It is mentioned that physical activity has the potential to prevent mental health problems. The research from the paper discovered that physical activity had a positive impact in reducing some symptoms of mental health problems. Playing sport/staying active can be linked to lower levels of loneliness. (Hull. 2012.).

Move to section 2.3 if you’d like to read about the different effects that wearable technology has had on people’s lives.

Brown (2017) states that a user/owner of a wearable device is more likely to go walking to in order to achieve their daily goals, some functionality of wearable devices is mentioned such as
alarms that tell users when to take a deep breath or stand up should they have to sit for a long period of time, some of these devices can be set to tell users to drink water at various intervals in the day.

2.2.2 Mental health

As stated by Warin, (2013) there are times when a person will experience periods of low mental wellbeing, these can be when a person is suffering from a loss, feeling lonely, having relationship issues or when someone is worrying/stressing about work and/or money. Factors that can make someone more likely/vulnerable to experiencing poor mental health for a period of time include experiences such as things like abuse, traumatic or violent events experienced as a child, being socially isolated/lonely, living conditions (Homelessness or poor quality housing), debt, unemployment, being a care giver and finally traumatic, violent and/or serious accidents experienced in adulthood.

Experiencing low mental well-being for an extended period of time can have long lasting effects on a persons’ mental health, having low mental well-being for a sizable amount of time can lead to mental health problems. People that already suffer with mental health problems are much more likely to suffer from periods of low mental well-being, however if a person is to manage their mental health and lifestyle well then they can still experience periods of good wellbeing.

Some good ways to stay mentally healthy (good well-being) are talking to others, telling people how you are feeling, building relationships with people that have a positive mind set and are able to provide you with support, having little or no social contact with others will lead to a feeling of loneliness and so keeping in contact with friends and family is extremely important when it comes to mental well-being. (Warin. 2013.)

2.3 Effects of wearable technology

Lee, et al (2016) states that not only can wearable sensors monitor the users posture and make sure that exercises are being completed with the correct form, in some cases they can also acceleration, heart rate, location and can mean that users are able to optimise their workouts.
The report then goes on to say that Wearable technology encourages a more healthy and active lifestyle and devices can be used to keep track of physical activities that the user carries out to improve their health and strength, for users that are suffering from obesity wearable technology that has this fitness and health monitoring functionality can facilitate clinical intervention through utilising such a device to its full potential. Wearable devices can play a huge role in improving the accuracy of a diagnosis that is received from a Doctor, being able to quickly get hold of information about a patient’s health such as “heart rate, blood pressure, oxygen saturation, respiratory rate, body temperature and electrical skin reaction” can be vitally important in providing an accurate diagnosis. Constant monitoring of such values was only available in hospitals until recent years. Symptoms of patients can be much more accurately diagnosed and treated as a result of being able to monitor such parameters whilst the patient is relaxed in familiar surroundings, going about their day to day life. It is mentioned that long term rehabilitation can be a major factor in “ensuring the recovery of reduced exercise function after the onset of a stroke”. Being able to monitor patient’s levels whilst they are in their own homes means that patients are able to spend much more time recovering in the comfort of their own homes rather than visiting hospital frequently. This in turn leads to great reductions in the amount of money that it will cost hospitals to treat patients.

Some devices can also be used to alert family members of when an elderly family member, member of the family will movement disability or visual impairment has fallen over or experience a large shock. This can possibly reduce stress to family members as they will be alerted straight away, should something happen to their loved one.

2.4 Future of wearable technology

It is suggested by Sultan (2015) that the size of industries such as the health industry are motivating companies to develop more and more state of the art wearable technology as there is promise of huge potential gains should they develop an interesting, functional product that has a positive impact on its users lives.

In PWC’s report titled “The Wearable Future” it is quoted that 52% of adults surveyed agreed that devices with automated facial recognition functionality will replace a person’s need to remember names. 56% of the adult surveyed believe that the average life expectancy will increase by 10 years as a result of using wearable technology. 42% agreed that the average person’s athleticism will be dramatically increased. 46% believe that obesity rates will fall in
future years, 55% agreed that more people will be working from home part of the time and 52% said that 50% of all the television will be watched through the use of a screen on a wearable device.

The survey also brought up some negative effects that people believe wearable technology will have on people's lives in the future, these are issues such as wearable technology users very rarely engaging in face to face conversations, 52% of the adults surveyed agreed with this statement. Of the surveyed population 57% agree that users will become more reliant on their wearable devices for support than their own family and friends. And finally, it is stated that 63% of people agreed with the statement that “work and life will become inseparable”. (Bothun., et al. 2017.)

3.0 Methodology

This project regards the views of people on wearable technology and the effects that wearable technology has (or doesn’t have) on a persons’ wellbeing. To get a good level of understanding of these areas not only did the research have to conduct extensive Secondary research in order to establish what wearable technology is, what effects it is believed to have on its users, the meaning of wellbeing and an understanding of mental health, and how it can be effected, but the researcher also had to conduct Primary research following the approval of the Ethics.

![Figure 11: The Research Onion. (Saunders, et al., 2012.)](image)

The researcher made use of the Research Onion that was developed by Saunders, Lewis and Thornhill (2007). The Research Onion can be seen in Figure 11 involves an interpretive philosophy using an interpretive approach using qualitative and quantitative data.
3.1 Ethical Approach

There are a number of Ethical issues that are to be considered before beginning to conduct any research. These issues were considered in all aspects of the project, the questionnaire, semi structured interviews and the focus group.

All participants were informed of the purpose of the research and were told in detail what would be expected of them. They were given an information sheet that contained all the details about the project, its aims and objectives, why the interviews and questionnaires were of importance to the project and more importantly how the participants’ information would be stored, for how long and that they could withdraw from the process at any time. This would ensure that all participants were completely assured that their information would be stored in a secure location, would not be used outside of the project, would be safe at all times and that their privacy was the researcher’s main responsibility. All information received from the participants would be kept completely confidential. If for any reason a participant did not wish to be recorded during an interview, then the researcher would ensure that no recording was made and that any recording that had already taken place with the participant was destroyed. If any participants decided that they did not want any of their information to be used in the project, then this information would be removed with immediate effect. If the participants agreed with the information that the information sheet displayed then they would be given a consent form which would ask the participant to tick boxes as to whether they did or did not give consent.

3.2 Research methods

All Secondary research will include relevant information produced by Author’s from trusted sources, with non-biased approach, published in Books, Journals and online articles with evidence to back up any findings that researchers have made.

For Primary research this project will include the use of research tools such as Semi Structured Interviews and the distribution of an Online questionnaire. The Interviews will be conducted and an online questionnaire will be distributed with the aim of gaining valuable insight into their views and experiences with wearable technology. It is highly important that the participants range in the amount of experience they have with wearable devices and the amount knowledge they have on the subject. Having a good range of different levels of experience and knowledge will mean that the participants will be able to establish, not only information about
the effects and issues that people have experienced/discovered with wearable technology but also the views of people that are not familiar with this form of technology and their opinion on it. It will also allow a better insight into the effects that people perceive wearable technology to have on wearers/users. The participants will be questioned to gather information on several things, they are as follows:

- Their awareness of existing Wearable Technology devices.
- Their awareness of existing Wearable Technology Applications.
- Their views on Wearable Technology.
- Their opinion on whether or not Wearable Technology can affect a person’s wellbeing.
- Their experience with Wearable Technology and whether the experience(s) that they have had have been positive or negative and whether or not they believe that Wearable Technology has influenced their wellbeing for the better or the worse.
- Interviewees will also be asked about the Future of Wearable Technology and whether they believe that the industry will continue to grow along with the popularity of wearable devices.

### 3.3 Research Philosophy

The project uses an Interpretive philosophy. The goal of Interpretive research is to “to document and interpret as fully as possible the totality of whatever is being studied in particular contexts from the people’s viewpoint or frame of reference”. (Leininger, 1985.) This is very much suited to this project as the researcher is concerned with establishing the views that people have on wearable technology and the effects that they have experienced on their wellbeing from using wearable technology or the effects that they perceive wearable technology to have on the wellbeing of its users.

### 3.4 Research Approach

The approach that was used was primarily Inductive, although it does use elements that are considered to be deductive, such as the use and gathering of qualitative information through the use of a survey or questionnaire. As the research, has used a combination of the two and the questionnaire asks a number of very open ended questions with space for the participant to type their thoughts, the research approach used in this project can be considered Inductive. The
semi structured interviews and group interview also included open ended questions in order to get the interviewees to open up about their thoughts on wearable technology and the effects that it has on a person’s wellbeing. (Winch, et al. 2017.)

3.5 Primary Research

In this section the methods that the researcher used in order to gain qualitative and quantitative information will be explained fully. Reasoning behind why each form of information was included will also be included in this section.

3.5.1 Questionnaires – Qualitative

To gain Qualitative information about to produce this report, the research made use of online questionnaires. These questionnaires were distributed through the use of the website Qualtircs which is linked with Cardiff Metropolitan University. The link to the questionnaire was shared over social media platforms such as Facebook and Twitter with a brief description of the aim of the questionnaire, it was also expressed that the questionnaire was entirely voluntary.

Questionnaires were the main form that the research use to collect large amounts of primary data. The response rate on questionnaires is much higher than that of interviews as questionnaires do not take very much of the participants’ time and can be completed in the participants own time using their own devices. All questionnaires were completed by respondents online.

3.5.1.1 Pilot Questionnaire

The pilot questionnaire is a trial run of the questionnaire before it is distributed properly. This was distributed to students that the researcher new personally that could be trusted to give honest feedback on the questionnaires questions, structure, layout and so on. The pilot questionnaire is created with the intention of establishing and irradiating any obvious issues, this could be the wording of questions for example. If the sample group mentioned that certain questions were quite difficult to understand/interpret then the researcher would need to analyse each question and replace said questions with more easily interpretable use of language.
By trialling a pilot questionnaire, it was also a good opportunity to discover how long it would take the average person to complete the questionnaire. The researchers aim was to make the questionnaire was around 5 minutes long. If the pilot questionnaire was taking participants longer than 5 minutes to complete then the researcher would need to make changes to the questions, either by removing, merging or rewording/formatting some of them in order to reduce the amount of time that is required of the participant in order to complete the questionnaire. The longer the questionnaire is the less likely people are to finish it as they will get increasingly bored and begin to lose concentration meaning that any answers given after a certain point will not only likely be rushed but may also have been misread by the participant leading to the collation of results that may not have been the same, had the questionnaire taken slightly less time. Brent (2011) states that “The more questions you ask, the less time your respondents spend, on average, answering each question.” He then goes on to mention that the quality and reliability of the data can suffer and that participants are more likely to spend more time per question on a shorter questionnaire, potentially meaning that the quality and reliability of the information received will be much better.

3.5.1.2 Questionnaire Design

The design of a questionnaire is vitally important as it can effect a number of things such as the response rate and the consistency of the quality of the answers that the participants provide throughout the questionnaire. The design includes how questions are worded, how many questions there are and how each question is structured. Having a well structure, well worded question can dramatically increase how easily it can be understood by the participants and so increasing the relevance and quality of the responses. Saunders (2012.) included examples of questionnaire style questions in his book “Research Methods for Business Students”, the researcher was able to use this to enable him to have a better understanding of what makes an effective questionnaire.

In total the questionnaire included 27 question and took around 5 minutes to complete. Upon clicking the link to the questionnaire, the user would be shown the title of the project and information regarding the use of any information given, its storage, the users anonymity and the fact that they are fully able to with draw from the questionnaire at any point were all stressed, before giving the user the option of whether or not to give consent and continue with the questionnaire. Many the questions asked on the questionnaire are multiple choice, in order to improve the usability and reduce the time it takes for participants to complete it. Some of the options of the multiple choice questions included “Yes/No/Unsure” and “Good experience / Heard good things / No opinion / Bad/Not very useful /Very bad/Useless” for example. The questionnaire also made use of open ending questions to gain some
qualitative information that can be compared to that, that was gained from semi-structured interviews. The online site called Qualtrics will be fully utilised in the development and distribution of the questionnaire, and analysis of information received. The results will then be discussed fully in the finding section of the report and the researcher’s interpretation of said results will be discussed in detail in the Discussion section of this report. Information gathered from the completion of the questionnaire will also be compared again that of the information received from the Semi-structured interviews.

3.5.1.3 Questionnaire Advantages

The University of Surrey (2017) lists a number of advantages of using questionnaires in order to gain primary data, some of these advantages include, Practicality, the fact that large amounts of data can be collected from a vast amount of people in a relatively short period of time in comparison to face to face interviews, They can be carried out by anyone with very little affect to validation and reliability of results, results of questionnaires can usually be established very quickly and they also state that the data that is received can be analysed more scientifically than other forms of research, quantified data can be used to compare and contrast with results from other researchers and change can be measured. It is believed that quantitative data can also be used in order to “create new theories and/or test existing hypotheses”. (University of Surrey. 2017.)

3.5.1.4 Questionnaire Disadvantages

Questionnaires do also have a fair a few disadvantages, these are mentioned by The University of Surrey. It can be argued that this form of collecting primary data does no allow the researcher to understand the participants’ emotions, their behaviour and the way they are feeling. Questionnaires are quite limited in the amount of information that you can include about a certain topic; results can lack validity and there is always the chance that the respondents are not answering the questions truthfully and are just rushing through the questionnaire, putting very little effort into the completion, if the participant does not fully understand the questions then the answers that they provide will be more of less useless, people can read questions differently meaning that they will answer it from a different point if view, there is also the possibility that the researcher will not include some questions that could be important to the study, as the researcher makes his decision as to what question are going to be included leaving the possibility that some questions that may be considered of importance by another researcher else may not be included. (The University of Surrey. 2017.)
3.5.2 Semi-Structured and Group Interviews – Quantitative

The interviews followed a semi-formatted structure, this allowed the interviewees to provide their honest answer to each question and let them think about their answers. Semi-structured interviews are not very strict in the way that the interviewer is able to ask questions how and when they want to, they are rather flexible as long as the topics/questions that have been listed beforehand are covered as well as they can be. (Edwards & Holland. 2013.) Full transcripts from the interviews can be found in the appendix section of this document. Each interview will last around 10 minutes’ dependent on the amount of information that the interviewee wants to provide per question. Interviews may also last slightly longer if interviewees need to have questions further explained before answering. The interviewees experience with wearable technology will vary greatly between interviewees. In the interviews the interviewee will be questioned about things such as their awareness of wearable technology, any experience that they have had with these forms of technology, their overall opinion on wearable technology and whether or not they believe that it has an effect on its users wellbeing, they shall then be questioned about whether the effect that wearable technology has (if any) is positive or negative and if their opinion is based on experience or just how they perceive the technology to impact users lives.

Upon completion of the interviews the recordings shall be typed up as transcripts and analysed. The information gained from the interviews will be compared with that of the questionnaires and any patterns will be acknowledged. This will give us a much greater understanding of wearable technology and its effects on its users’ wellbeing. This will not only mean that readers will be better informed before they decide to purchase a wearable device but it could potentially mean that manufacturers use this information to improve existing products and implement new features within future developments, resulting in much greater customer satisfaction and potentially increased sales in the industry. Any areas that appear to require improvement or redevelopment will be discusses in detail within the recommendations section of this report.
3.5.2.1 Semi structured Interview Structure

The design of the semi-structured interview questions is of importance as it can affect how the interviewee reacts to each question quite considerably. It is not of as high importance as the structure of the questions featured on the questionnaire as the research can explain questions if the interviewee does not fully understand what they are being asked. The way each question is worded still needs to be considered as the interview will flow much better if the interviewee is able to understand what is being asked of them immediately. The questions need to be asked in such a way that someone with no previous experience or knowledge of wearable technology would be able to answer them and express their views on the concept. As stated by Saunders (2012), the first question asked in an interview will set the direction that it goes in and the style in which the interview continues.

3.5.2.2 Focus group Interview Structure

Throughout the Focus group interview the research would make use of probing questions, these are questions that are “used to explore responses that are of significance to the research topic.” (Saunders. 2012.) The wording of such questions is very much like open questions but they are worded in such a way to give focus to a particular area that the research requires information on. The Focus group interview would take around the same time as the semi-structured interview, with the possibility of lasting slightly longer, dependant on how enthusiastic and engaged in discussion the participants. The questions are worded in such a way as to start discussion in the group with occasional probing questions asked when needed to keep the group focused and on topic.

3.6 Methodology Conclusion

The research methodology contained both qualitative and quantitative research techniques for gathering primary data. A website called Qualtrics was used in the making and distribution of a questionnaire with questions designed so that the majority of the data generated from the questionnaire would be quantitative, the distribution of the questionnaire was completed via social media platforms such as Facebook and Twitter. As soon as enough qualitative data had been received semi-structured interviews were conducted followed by a Focus group, these
took place in order to gather a good amount of qualitative data to reinforce any conclusions formed from the qualitative data.

4.0 Analysis

In this section of the report the researcher will be analysing the findings made whilst collecting Primary data from Questionnaires, Semi structured interviews and a group interview. The Discussions section will discuss the researcher’s interpretation of the data and will discuss in detail what these results mean and why the project was worthwhile.

4.1 Quantitative data

The researcher gather quantitative through the use of an online questionnaire hosted by the website Qualtrics that is supported by Cardiff Metropolitan University. The questionnaire was distributed on social media platforms such as Facebook and Twitter, the results of such will be shown in this section of the report. The questionnaire generated 51 responses in total, the breakdown of the information received will be shown below.

![Figure 12: Questionnaire question 2 – Participants Age.](image-url)
Figure 12 displays the results from the second question on the questionnaire, the first being whether the participants gave consent or not. One hundred percent of the participants that accessed the questionnaire gave consent.

It’s quite clear from Figure 12 that the majority of participants were in the age brackets of 18-20 and 21-23, with 23-25 being the next closest age bracket that participants selected.

**Q3 - Gender?**

![Gender Pie Chart](image)

**Figure 13: Questionnaire question 3 – Age.**

Figure 13 illustrates the fact that there was an almost 50/50 split in participant gender, with 47.06% of participants being Female and 52.94% being male.
Figure 14: Questionnaire question 4 – Awareness of Wearable technology.

Figure 14 shows how aware the participants were of wearable technology, 88% of all participants said that they were aware of wearable technology, 6% said they were unsure of what it was and only 6% said that they were not aware of wearable technology. This shows just how much the wearable technology industry and popularity of its products has grown since its creation this reinforces what Grace College (2016) stated about the rapid growth of wearable technology in recent years.
Figure 15: Questionnaire question 5 – Awareness of popular forms of Wearable technology.

Figure 15 displays a bar chart that is aiding in the illustration of the sample population’s awareness of the most popular forms of wearable technology. As you can see the two sectors of the graph with the largest bars are “Aware” and “Own and Use” with very little people saying “Own but don’t use” any of the wearable technologies listed. It appears as though the awareness of Medical, Clothing and Eyewear sectors of wearable technology is very high. The largest bars in the “Own and use” section of the graph belongs to Earwear and Wristwear, I believe this is because of the popularity of fitness related wearable technology such as the Fitbit and others mentioned by Havele (2014) in section 2.1.1.

Figure 16: Questionnaire question 6 – Recommendations.

The graph shown above shows that the majority of the participants said that they had not been recommended any forms of wearable technology but a large portion of the participants had been recommended forms of wearable technology, 24 people stated that they had been recommended wearable technology to be exact.
Figure 17: Questionnaire question 8 – Use of wearable technology for fitness and wellbeing.

Figure 17 illustrates the fact that 53.19% of those that filled in the questionnaire had used a wearable device for fitness and wellbeing purposes, this suggests that the wearable devices are having a positive effect on peoples’ motivation to engage in fitness and wellbeing focused activities.
Figure 18: Questionnaire question 10 – Usage of fitness and wellbeing applications.

The graph shown above shows the response from the questionnaires participants when asked if they had used a smartphone/tablet application to monitor and/or aid their fitness and wellbeing. It is clear that the majority of those that completed the questionnaire had previously used an application to assist them is improving their fitness and/or wellbeing.
Figure 19: Questionnaire question 12 – Opinion on Wearable Devices used for improving wellbeing.

Figure 19 gives a good illustration of peoples’ opinions on wearable technologies that are designed to improve the users’ wellbeing. 21 people said that they thought they were “Good/useful”, 19 people said that they were “Very good/Very useful”, only 4 people that completed the question said they had “No opinion” and incredibly only 1 person said that they believed that this form of wearable was “Bad/Not very useful” with no participants selecting “Very bad/useless”.

Q13 - What is your reason for this view? (Previous question)

Figure 20: Questionnaire question 13 – Reason for answer to question 12.

Figure 20 shows the participants reasoning behind the mostly positive responses that they gave to question 12, as expected the majority of participants that completed question 13 said that the reason for their response to question 12 was due to have a “Good experience” with wearable technology aimed at improving one’s wellbeing. 53.33% said they had had a good experience, 31.11% said they had heard good things and 15.56% said they had no opinion on this question, meaning that no one had a bad or very bad experience with these forms of wearable technology.
Figure 21: Questionnaire question 14 - Impact on a person’s wellbeing.

Very much like the responses received to previous questions, most participants stated that they believed that wearable technology had a positive impact on a person’s wellbeing with no one selecting negative impact and a very small number of people selecting that they believe that wearable technology has “No impact” on a person’s wellbeing. This is reinforced by the qualitative information collected through the use of semi structured interviews and a focus group.
Figure 22: Questionnaire question 15 – Reason for answer to question 14.

Similar to Figure 20, Figure 22 shows that the majority of people that completed question 14 gave the answer that they did because they have had a positive experience with wearable technology. 68.89% selected “Positive experience”, 28.89% selected “Other/No experience” and only 2.2% said that they had had a negative experience with wearable technology.
Figure 23 shows the responses that were received when the participants were asked what they thought the most apparent benefits of wearable technology were and to put them in order of 1-5 with 1 being the most apparent benefit.

67.44% of people chose to place “Being active (Fitness)” in first position, 48.84% of people decided that “Mentally (Thoughts, feelings, etc.)” should be in second position with most people placing “Learning (Education)” in either 3rd or 4th position, “Connecting with others (Communication)” was also placed around this area be a large portion of the participants with participants either choosing to place “Connecting with others (Communication)” or “Non-listed benefit” in 5th position. Hull (2012), stated the benefits that physically activity can have on mental health, with increased physically activity will come increased mental well being.
Question 18 asked users whether they were aware of the vast amount of applications that are available that are compatible with wearable devices. Nyuyen (2015) listed various applications that are compatible with wearable devices in an online article, these can be viewed in section 2.1.2.
Q19 - Of the UK’s most popular fitness related apps which have you heard of/do you use? (Leave blank if unaware)

![Table image]

**Figure 25: Questionnaire question 19 - Awareness of UKs most popular fitness related applications.**

As you can see from Figure 25 most participants were aware of the majority of the applications listed but only around 37.84% actually used “Apple Health” for example.

“Apple Health” and “MyFitnessPal” and “Fitbit” were the most common applications that participants “Own and use”, this could be down to the increased publicity and marketing that these applications have had as a result of working well with wearable devices such as the Apple Watch and Fitbit.
Q21 - Do you believe that wearable technology will become increasingly popular in years to come?

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**Figure 26: Questionnaire question 21 – Increase in popularity in years to come?**

86.36% of people that completed question 21 believed that wearable technology will become increasingly popular in years to come, only 2.27% stated that they didn’t agree with this statement.

Q22 - On the scale below (1 - 10) please indicate how much would you like to see more development in wearable technology?

**Figure 27: Questionnaire question 22 – Development of wearable technology.**

Figure 27 illustrates the thoughts of the participants on how much they would like to see more development into wearable technologies on a scale of 1 to 10, as you can see the
The majority of participants selected 8 on the slider meaning that they would very much like to see more development into wearable technologies.

Figure 28: Questionnaire question 23 – Reason behind answer to question 22.

Once again the reasoning behind the positive attitude that the majority of participants appear to have of wearable technology is that they have had Good or Very good experiences with wearables in the past, with 36.36% selecting “Very good experience” and 38.64% selecting “Good experience” with only 2.27% selecting “Bad experience” with the remainder being made up of participants selecting “Unsure”, once again implying that wearable technologies offer a great deal of satisfaction to their users, this goes against Ericsson Consumer Lab’s (2017) findings regarding the satisfaction of users, but backs up what the University of Cambridge (2017) states about users feeling happier and more positive as a result of using a wearable device.
When asked what sectors of wearable technology people would like to see further developments in, it appears that most of the participants would like to see improvements being made across all sectors, although a reasonable number of participants selected maybe for the Glamour sector, this could be because this sector isn’t as extensively marketed as Wellness and Sport/Fitness for example.
Figure 30: Questionnaire question 29 – Likelihood of looking further into wearable technology.

On question 29 of the questionnaire it appears most participant selected a 5 or above out of 10 this indicates that most participants would be willing to look into wearable technologies further as a result of participating in the project.
The final area that the questionnaire looked at was the amount that people would be willing to spend on the following, a Smartphone, Wearable technology, a Mobile application and other means of improving their well-being. The mean amount that was entered for smartphone was £361.52, the mean for wearable technology was £82.82, Mobile application was £32.41 and other means of improving wellbeing had a mean amount of £55.46. The maximum amount that had been entered for smartphone was £1000, for wearable technology was £300, £140 for mobile application and for any other means was £500. This shows the participants of the questionnaire are prepared to spend vast amounts of money in order to improve their own well-being.

### 4.2 Qualitative data

The qualitative data that was collected by the researcher was collected using semi-structured interviews and a group interview. 4 out of 5 of the Interviewees from the Semi structured interviews were users of wearable technology, this meant that they all had a good understanding of what Wearable technology is, its many forms and could express their own views on backed up with personal experience. These interviewees were very much daily users of wearable technology and so they were able to tell the researcher of any effects they felt that wearable technology had, had on their wellbeing. It quickly became apparent that the most popular form of wearable technology out of the 5 interviewees were wrist worn wearables, such as the Fitbit and Apple watch. The first interviewee was the only participant in the semi-structured interviews that did not currently own a wearable device but she had knowledge of what they
were and the effects that they can have, as her partner had recently purchased an Apple watch and had expressed his satisfaction with the product.

Qualitative data was also collected from the questionnaire, with the most common input being “Fitbit” when the participants were asked what forms of wearable technology they had been recommended with “Smart watch” / “Apple Watch” being the second most popular. Havele (2014) also states that Fitbit is one of the most popular forms of wearable technology and that still seems to be the case today with Apple Watch coming in a close second. When asked to specify what form of wearable technology participants had used for fitness and wellbeing purposes, the majority of participants stated that they had used a “Fitbit”, seconded by “Apple Watch” once again. When asked to specify what application(s) the participants had used to monitor/aid their fitness and wellbeing the most popular application was “MyFitnessPal” followed by “Fitbit” and “Nike running” with “Apple Health” with a similar number of responses. When asked about the benefits of wearable technology one user stated that “Wearable technology looks good and impressive” and another mentioning that “A wearable usually needs some info to determine things, this info gives the user constant awareness to their current situation e.g. Overweight, which I think helps keep them focused”.

Some applications that participants believed should have been listed in the questionnaire were “S health”, “TomTom Sports Connect” and “100% Army Fit”. When asked what other means of improving well-being participants would be willing to spend money on, the majority stated that they would pay for a “Gym membership”, “Personal trainer” followed by “Music” and “Sporting/Physical equipment”.

Fitbits and Apple watches were also mentioned a huge amount in the semi-structured interviews and in the group interview, with 2 or of 3 of the people in the group owning an Apple watch. Out of the 5 interviewees from the semi structured interviews, 3 out of 5 used a Fitbit. One used an Apple Watch and One used a smart watch. With only one of the 5 interviewees not owning any of those products that have been previously mentioned. One thing that was clear was that all of those that were interviewed believed that Wearable technology had a positive effect on the users Wellbeing, even those with very little experience with wearable devices believed that it could have positive effects on a person’s overall wellbeing. Interviewee one states their health has benefitted as a result of using a Fitbit, they say that their resting heart rate has dropped as a result of their increased physical activity. They believe that the effect that wearable technology has on a person’s wellbeing is positive, they state that “a
feature on the Fitbit that I don’t use that might help someone else’s well-being is that you can track the food you eat through the phone app and it’ll give you the food’s information like fat, protein, sugar which may help someone who is trying to lose weight.” And they also mention they have the Fitbit app on their phone and that they are aware of the variety of different applications that are available for wearables. They believe that medical/health monitoring wearable technology is the most effective in improving a person’s wellbeing, giving an example of one of their family members that has a pacemaker. Later in the interview they state that “Some form of glasses that has various features” would be the most useful form of wearable technology.

When asked if they would like to see further development in wearables, they answer yes and their reasoning behind it is that “fitness technology has already helped” them and that “new features” could help them in other ways.

Interviewee 2 didn’t have a great deal of knowledge about wearable technology but stated that it’s “too expensive to buy” and when asked if they had used any wearable technology they replied that they had seen their partner “use an Apple watch”. They also believe that “Fitness and Health wearable technologies will have a positive impact on people’s lives by helping to improve diets and fitness levels” they go on to say that wearables such as the Fitbit, “encourage people to exercise and keep track of their fitness levels” and that they may “lower obesity levels”. As they do not own any wearable technology they were unable to say whether or not wearable technology had effected their wellbeing. When asked what form of wearable technology they believe is the most effective in improving wellbeing, Interviewee 2 states that “Health focused wearable technology is the more effective, as it will have the biggest positive impact upon people’s lives through increasing exercise and therefore lowering health related problems.” They also believe that wearable technology can improve a person’s social life as they can share their fitness progress online.

Like Interviewee 1, Interviewee 3 is wearable technology user. They own an Apple watch and state that the only issue is the lack of applications. They believe that wearable technology has had a positive impact on their wellbeing as their watch sets them “fitness goals based on BMI. It also gives reminders to breathe and stand up throughout the day.” Interviewee 3 also believes that “Fitbit and other sports watches” have had the biggest impact on peoples lives. They state that they think that the fitness goals that the devices can set for the user provide motivation to
improve one’s fitness. They have been recommended a Fitbit by their friends and think that being able to track your diet is a useful feature, but they would like to see more apps available.

Interviewee 4 is also a wearable technology user and believes that their “Tom Tom GPS Cardio and Heart Rate Watch” have effected their wellbeing positively as they are able to keep track of their activity levels and stay focused. They believe that wearable technology for tracking fitness can have “a positive psychological impact and uplifting of mood”, Interviewee 4 goes on to say that their wearable devices have helped them train for half marathons and helps them keep track of their nutrition, as Bothun, et al (2017) states, Wearable technology can increase efficiency and productivity. Like Interviewee 2 and 3, Interviewee 4 believes that “Activity trackers and watches like the Fitbit” have had the biggest impact on peoples’ wellbeing. They state that wearable technology that can alert the user of any immediate health concerns could be of substantial benefit to a person’s wellbeing along with security devices that could potentially save the users life.

Interviewee 4 states that the only apps that they are aware of are “MyFitnessPal and Nike Running”, When asked about the effectiveness of wearable technology on improving wellbeing Interviewee 4 states that “it depends on the person and what needs they have.” Going on to suggest that “People more fitness orientated are more likely to benefit from activity trackers and other people may benefit from other technologies like music lovers and headphones” and finishing the interview by suggesting in the future phones could be obsolete.

Interviewee 5 is another wearable technology user, much like Interviewee 1, they use a Fitbit daily. In the interview, they mention that they believe that Medical wearable technology has had the biggest impact on peoples’ wellbeing as these wearable medical devices can make someone’s medical “condition much more manageable” in this case diabetes is mentioned. The interviewee states that they have felt improvements to their own wellbeing whilst using a Fitbit as it encourages them to breath and get up and move at regular intervals, they state that their fit bit makes the “feel better” and go on to say that they believe it is good for relieving stress.

Hull (2012) believes that physical activity has a direct impact on a person’s mental health, even just been made to do a small amount of extra physical activity per day could result in an improvement in mental health and wellbeing. Interviewee 5 also believes that wearable technology will be around for years to come and would like to see more development in Medical wearable technology.
Fitbits and Apple watches were mentioned again heavily in the Group interview, with the overall consensus being that wearable technology has a positive impact on people’s lives. 2 out of 3 of the group were Apple Watch users and the only flaw they felt that this form of wearable technology had was the lack of applications that it supports, a very similar complaint to that of Interviewee 3’s who was also an Apple watch user. They also mention that Apple watches are very expensive, Interviewee 2 had a similar complaint, but much like the others, they believe that wearable devices have an overall positive affect on users’ wellbeing. They also mention fitness devices such as the Fitbit and heartbeat sensors, suggesting that they can encourage competition between friends and can aid in improving a person’s mental and physical fitness. Everyone in the group was very aware of the different sectors of wearable technology and 2 out of 3 of the group believe that Fitness and Wellbeing technology has the biggest impact on the wellbeing of people, very much like the majority of the other interviewees and also like the results received from the questionnaire. The 3rd member of the group believes that Medical wearables have the biggest impact on a person’s wellbeing for the same reasons as Interviewees 1, 4 and 5l with these forms of wearables being able to save people’s lives.

5.0 Conclusion

Upon completion of the project, it is clear that all aims stated in the Aims and Objectives section of the report have been met and what the researcher set out to achieve has been achieved fully. The effects of wearable technology on the users’ health and overall fitness have been established and discussed in detail with evidence of research by the researcher. The relevant literature has been reviewed including statistics regarding positive and negative aspects of wearable technologies. A pilot questionnaire was design, distributed to a small group of individuals, reviewed, modified and then once completed was distributed over various social media platforms. Semi structured interview questions were created and interviews carried out, followed by Focus Group questions being created and a Focus group being interviewed enabling the researcher to gain a good amount of qualitative information. Results of research were analysed and discussed in detail with reference to existing literature, the study has been concluded and all aims and objectives have been met. After analysis of all of the primary data that was collected, many similarities have become apparent between the quantitative findings shown in 4.1 very much support the finding from
the qualitative methods of primary research shown in 4.2. For example, the clear majority of participants in the questionnaire were aware of what wearable technology was, all 8 of those that were interviewed were aware/had some understanding of what wearable technology is. It was clear throughout the questionnaire that the participants believed that the effects that wearable technology has on a person’s wellbeing are extremely positive, this was mirrored in the quantitative data, every interviewee stated that they believed that wearable technology had a positive effect on peoples’ wellbeing. One interviewee had no first-hand experience with wearable technology but had seen that their partner utilised an Apple watch and made the judgement that it had, had a positive effect on the wellbeing of said individual. Out of the users of wearable technology that were interviewed 100% stated that they believed that their wellbeing had been effected a positive way, this was very much the same pattern seen in the quantitative data. The research concludes that wearable technologies have a positive impact on users according to research carried out of young adults at CMU between the age of 18 and 30.

6.0 References


- University of Cambridge. (2017). Physical activity, even in small amounts, benefits both physical and psychological well-being. The largest-ever smartphone-based study examining the relationship between physical activity and happiness has found that even minimal levels of activity can have a positive effect on happiness. Available at: http://www.cam.ac.uk/research/news/physical-activity-even-in-small-amounts-benefits-both-physical-and-psychological-well-being. Last accessed: 4th March 2017.


7.0 Bibliography


8.0 Appendices

8.1 Questionnaire

AN INVESTIGATION INTO WEARABLE TECHNOLOGIES AND THEIR EFFECTS ON PEOPLES WELLBEING

Q1 School of Management, Cardiff Metropolitan University. The purpose of this research project is to collect primary information in relation to the views of students aged between 18 and 30 in Cardiff on wearable technologies and its effects on their well-being. An investigation into the views of students aged between 18 and 30 in Cardiff on wearable technologies and its effects on their well-being. My name is James White and I am currently a final year student at Cardiff Metropolitan University. In order to complete my third year of study I am required to complete a dissertation. The primary data collected from this questionnaire will provide me with the information to complete my dissertation. This project has received the approval of Cardiff School of Managements’ Ethics Committee, Cardiff Metropolitan University. By taking part in this questionnaire you agree to the following: I understand that my participation in this project will involve completing a questionnaire about
short description of the project aim which will take approximately 5 minutes of my time. I understand that participation in this study is entirely voluntary and that I can withdraw from the study at any time without giving a reason or I can discuss my concerns with: James White of Cardiff Metropolitan University: st20066025@outlook.cardiffmet.ac.uk Dr. Panicos Georghiades – Dissertation supervisor and lecturer at Cardiff Metropolitan University: pgeorghiades@cardiffmet.ac.uk I understand that any identifying information provided by me will be held confidentially, such that only the PI (James White) can trace this information back to me individually. I understand that my data will be stored on password protected computers, anonymity will be ensured after completion of the survey and that no one will be able to trace my information back to me. The raw data will be retained for five years when it will be deleted/destroyed. Do you consent to the terms and conditions mentioned above?

☐ Yes
☐ No

Q2 Age?

☐ <18
☐ 18 - 20
☐ 21 - 23
☐ 23 - 25
☐ 26 - 28
☐ 29 - 30
☐ >30

Q3 Gender?

☐ Male
☐ Female
Q4 Are you aware of what wearable technology is?

☐ Yes
☐ No
☐ Unsure
Q5 Are you aware of any of these popular forms and sectors of wearable technology? (Leave blank if unaware)
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<th>Thinking of buying</th>
<th>Own but don't use</th>
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</table>
Q6 Have you been recommended any forms of wearable technology?

- Yes
- No

Q7 Please specify what form(s) you have been recommended?

Q8 Have you used any form(s) of wearable technology for fitness and wellbeing purposes?

- Yes
- No
- Unsure

Q9 Please specify what form(s) of wearable technology for fitness and wellbeing purposes?
Q10 Have you ever used a smartphone/tablet application to monitor/aid your fitness and wellbeing?

☑ Yes
☑ No
☑ Unsure

Q11 Please specify what application(s) you have used to monitor/aid your fitness and wellbeing?

Q12 What is your opinion on wearable technology devices used for improving the user’s wellbeing?

☑ Very good / Very useful
☑ Good / useful
☑ No opinion
☑ Bad / Not very useful
☑ Very bad / Useless

Q13 What is your reason for this view? (Previous question)

☑ Good experience
☑ Heard good things
☑ No opinion
☑ Bad / Not very useful
☑ Very bad / Useless

Q14 What type of impact do you believe wearable technology has on a person's well-being?

☑ Positive impact
☑ Negative impact
☑ No impact
Q15 Why do you believe this? (Previous question)
☑ Positive experience
☑ Negative experience
☑ Other / No experience

Q16 Rank the following in order of what way you feel are the most apparent benefits to a person’s well-being as a result of using wearable technology? (Drag in order from 1-5)
1. Connecting with others (Communication)
2. Being active (Fitness)
3. Learning (Education)
4. Mentally (Thoughts, feelings, etc.)
5. Non-listed benefit

Q17 You ranked "Non-listed benefit" above one or more of the benefits listed, please specify below what benefit(s) you had in mind whilst making this decision?

Q18 Are you aware of the variety of different applications that are now readily available to work alongside wearable technologies?
☑ Yes
☑ No
Q19 Of the UK’s most popular fitness related apps which have you heard of/do you use? (Leave blank if unaware)

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<th>Thinking of buying</th>
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Q20 If there are any applications that you think should have been listed above then please specify below?
Q21 Do you believe that wearable technology will become increasingly popular in years to come?

☑ Yes
☑ No
☑ Unsure

Q22 On the scale below (1 – 10) please indicate how much would you like to see more development in wearable technology?

______ Would you like to see further development in wearable technology?

Q23 What is your reason behind the score you selected? (Previous question)

☑ Very good experience
☑ Good experience
☑ Unsure
☑ Bad experience
☑ Very bad experience
Q24 What form(s) would you like to see further development in?
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</table>
Q25 After taking this questionnaire how likely is it that you will look further into wearable technology?

_____ Please indicate how likely it is that you will look further into wearable technology (1 being very unlikely and 10 being very likely)

Q26 Please indicate below how much you'd be willing to spend on the following? (£s e.g. Cost of handset, etc.)

_____ Smartphone
_____ Wearable technology
_____ Mobile application (Compatible with wearable device)
_____ Other means of improving well-being

Q27 Please specify what "Other means of improving well-being" you would be willing to spend money on?

Q28 Once again thank you for taking part in the project, your input means a lot. Your answers will be kept completely anonymous and results will not be used anywhere outside of the project. All questionnaires will be kept in a secure environment and will be destroyed within 5 years of the completion of the project.
8.2 Semi-structured Interview questions

SEMI STRUCTURED INTERVIEWS

An investigation into the use of wearable technologies for wellness and health case studying young adults at CMU.

Order of semi structured Interview | Discussed
--- | ---
1) Ask respondent approval to use recording systems | 
Ask respondent to sign and acknowledge consent form | 
2) Ask Background questions | 
Confirm information about; | 
- Age | 
- University / Level of education | 
3) Discuss about Experience with wearable technology | 
Probes | 
- Do you own any wearable technology? | 
If yes, what form(s) of wearable technology do you own? | 
If no, have you used any form(s) of wearable technology? | 
- In your opinion, what are your views on wearable technology? | 
Why do you feel that? | 
4) Discuss about wearable technologies and their effects on a person’s well-being? | 
Probes | 
- Do you think wearable technology has a positive impact on a person’s well-being?
<table>
<thead>
<tr>
<th>What makes you think that?</th>
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<tbody>
<tr>
<td>• Has wearable technology had an impact on your well-being at all?</td>
</tr>
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</table>

If so, in what way? Positively or negatively?

<table>
<thead>
<tr>
<th>• What form of wearable technology has made the biggest impact on the well-being of people?</th>
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</table>

Have you had any first-hand experience with this form of wearable technology?

<table>
<thead>
<tr>
<th>• In what ways, do you think wearable technology improves a person’s well-being?</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Are you aware of the variety of different applications that are now readily available to work alongside wearable technologies?</td>
</tr>
<tr>
<td>• In your opinion, how effective do you believe wearable technology is in improving a person’s well-being?</td>
</tr>
<tr>
<td>• In your experience (if any) do you believe that wearable technology had any effect on your well-being?</td>
</tr>
</tbody>
</table>

5) Discuss the most useful / effective forms of wearable technology for improving a person’s well-being and everyday life?

Probes

| • Which form of wearable technology do you believe is most effective and useful in improving a person’s well-being? |

Why do you think that?

| • Have you been recommended any form(s) of wearable technology? |

6) Discuss the future (if any) of wearable technology?

Probes

<p>| • Do you believe that wearable technology is the way forward? |
| • What other benefits / impacts do you feel that wearable technologies have on people’s lives? |
| • What do you believe would be a useful form of wearable technology? |
| • Would you like to see more development in wearable technology? |</p>
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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<tbody>
<tr>
<td>If yes, why would you like to see this development?</td>
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<td>If no, why do feel this?</td>
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<td>- What form(s) would you like to see further development in? Why?</td>
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</table>
8.3 Group Interview questions

FOCUS GROUP

<table>
<thead>
<tr>
<th>Order of the focus group</th>
<th>Discussed</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welcome all the participants and introduce myself and the project title.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Make sure everyone has signed consent form and copies to the attendees. Remind them about recording systems.</td>
<td></td>
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</tr>
<tr>
<td>1) In your own words, what do you believe comes under the term ‘wearable technology’?</td>
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<tr>
<td>2) Have you had experience with any form(s) of wearable technology?</td>
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<tr>
<td>3) In your own opinions, what are your views on wearable technology and why?</td>
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<tr>
<td>4) Does wearable technology have any effects on a person’s well-being? Are they positive or negative? Why do you think that?</td>
<td></td>
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<tr>
<td>5) Are you aware of the variety of different applications that are now readily available to work alongside wearable technologies? Have you had any experience with such applications?</td>
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<tr>
<td>6) Discuss if there is a future in wearable technology?</td>
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<tr>
<td>7) Would you like to see more development in wearable technology? What form(s) would you like to see further developed? Why?</td>
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</tbody>
</table>
8) Are you aware of the wide variety of different sectors that wearable technology is being developed for? (Glamor, Communication, Lifecycle Computing, Sport/Fitness, Wellness, Medical and Security/Safety) Discuss some of these areas and where you think wearable technology has had the biggest effect.
8.4 Participant Information sheet

PARTICIPANT INFORMATION SHEET

(for interviews, focus groups and questionnaires)

An investigation into the use of wearable technologies for wellness and health case studying young adults at CMU.

Project summary

The purpose of this research project is to review the use of wearable devices for use in wellbeing and fitness. Your participation will enable the collection of data which will form part of a study being undertaken at Cardiff Metropolitan University.

Why have you been asked to participate?

You have been asked to participate because you fit the profile of the population being studied; that is, you are a student at Cardiff Metropolitan University and are over the age of 18.

Your participation is entirely voluntary and you may withdraw at any time.

Project risks

The research involves the completion of an online questionnaire or participation in a semi-structured interview or participation in a focus group interview which will be recorded for later analysis. We are not seeking to collect any personal sensitive data on you; this study is only concerned with your anonymous opinions and experiences with assessment feedback while you have been attending Cardiff Metropolitan University. However, if you do feel that any of the questions are inappropriate then you can stop at any time and do not have to answer them. Furthermore, you can change your mind and withdraw from the study at any time – we will completely respect your decision.

How we protect your privacy

All the information you provide will be held in confidence. We have taken careful steps to make sure that you cannot be directly identified from the information given by you. Your personal details (e.g. signature on the consent form) will be kept in a secure location by the research team. When we have finished the study, and
analysed all the information, the documentation used to gather the raw data will be destroyed except your signed consent form which will be held securely for 5 years. The recordings of the focus groups/ interview will also be held in a secure and confidential environment during the study and destroyed after 5 years.

YOU WILL BE OFFERED A COPY OF THIS INFORMATION SHEET TO KEEP

If you require any further information about this project, then please contact:

James White, Cardiff Metropolitan University

Cardiff Metropolitan University email: st20066025 @cardiffmet.ac.uk

Supervisor: Panicos Georghiades, email: pgeorghiades@cardiffmet.ac.uk
8.5 One to one interview and Group interview transcripts

8.5.1 Interview 1

Participant: Robert
Date: 12/02/2017

James: Hi Rob, are you still happy for me to interview you?

Robert: Yeah sure! Do you want me to sign a consent form?

James: Yes, please. First can you just confirm that you are between 18 and 30 and are a student? And also, if you wouldn’t mind having a quick read through the Participation information sheet and then when you are happy and want to continue, just sign on the dotted line of the consent form please.

Robert: I’m 26 and I am a student at Cardiff Met Uni. There you go. How many questions are there?

James: Thanks. There’s quite a few but it shouldn’t take too long, to get through them all.

Robert: Okay, go ahead.

James: Do you own any wearable technology?

Robert: Yes, I do.

James: What have you got?

Robert: I have a Fit Bit Charge 2.

James: The new one?

Robert: Yeah, bought it a few months ago to monitor my heart rate, steps and sleep mostly.

James: What do you think of wearable technology and why?

Robert: From the wearable technologies, I’ve looked up and read about I think they’re quite cool, I like some of the features like the contactless payment I think apple are gonna add to their watches soon, but from using my fit bit I think wearable technology can be really useful, well for me as I like that it monitors my sleep and other stuff like calories when I’m training.
James: Do you think that wearable devices actually have an effect on a person’s well-being? Why?

Robert: Yeah I think it does if it’s used properly, like I said with my fit bit I use to check my calories burned every day but my favourite feature is the sleep monitoring because I have like umm bad sleeping habits and I like to make sure I’m getting around 8 hours of sleep a night so it’s nice to monitor my sleep times.

James: Do you think your wearable device has impacted your wellbeing?

Robert: Um yeah, I’d say my fit bit has benefited my health in a way, it records my uhh resting heart rate which was a bit above which I didn’t realise before and now I’m doing a bit more walking and running I’ve noticed its gone down a bit which is good.

James: So you’d say the effect has been positive?

Robert: I would, yeah.

James: What form of wearable technology do you think has made the biggest impact on the well-being of users?

Robert: I’d guess health monitoring wearable technology.

James: Have you had any first-hand experience with those?

Robert: Yes, my Fitbit.

James: In what ways, do you think wearable technology improves a person’s well-being?

Robert: Umm kinda similar to what I already mentioned really, but a feature on the Fitbit that I don’t use that might help someone else’s well-being is that you can track the food you eat through the phone app and it’ll give you the foods information like fat, protein, sugar which may help someone who is trying to lose weight.

James: Oh fair enough, I’ve used apps such as MyFitnessPal. Is it similar to that then?

Robert: Yeah, pretty much.

James: Are you aware of the variety of different applications that are now readily available to work alongside wearable technologies?

Robert: I’m aware of the apps that are used with the watches and stuff, I have the fit bit app on my phone which is connected through Bluetooth.
James: How effective do you think wearable technology is at making improvements to a person’s well-being?

Robert: Like I said before I think it can be really effective if it’s used properly and people keep using it for every day.

James: Which form of wearable technology do you believe is most effective and useful in improving a person’s well-being?

Robert: I’m not sure if it is considered wearable technology really but a family member who had a pace maker put in had to wear a heart rate monitoring device for like a day, I think it was used to check his heart rate pattern or something which they probably needed for the pace maker

So, health monitoring wearable technology.

James: Were you recommended any forms of wearable technology?

Robert: I have not been recommended any wearable tech no, I have some friends who use fit bits as well so they can’t really recommend them to me when I already own one.

James: Coming to the end now. Do you believe that wearable technology is the forward?

Robert: I think it has its uses in the future like the contactless payment I can imagine being popular if it’s safe to use but I don’t really think it’s the way forward especially when mobiles can do so much more already.

James: Are there any benefits of wearable technology that haven’t already been mentioned?

Robert: I’m not sure out of health really.

James: Almost done. What do you believe would be a useful form of wearable technology?

Robert: Umm, I’m not really sure, maybe some form of glasses that has various features.

James: Do you think you’d want to see some further development into wearable technologies?

Robert: I think I would, yeah.

James: Why would you want to see further development?

Robert: Because fitness technology has already helped me and if its developed further then it may add new features that could help me in other ways.
James: Is it just Fitness devices you’d like to see more development into?

Robert: Yep, I don’t know much about the other forms of wearable tech.

James: Okay, well thank you very much for your time and effort.

END OF INTERVIEW

8.5.2 Interview 2

Participant: Katie

Date: 13/02/2017

James: Alright Kate, can you just confirm that you are between 18 and under 30 and that you are a student.

Katie: Yep, I’m 18 and I am in my first year at University.

James: Brilliant thanks. Could you read this information sheet and then sign this consent form to confirm that you are happy to go ahead with the interview. Thanks.

Katie: Okie dokey… there you go.

James: I am going to ask you some questions about wearable technology, I’m just hoping to find out what you know about it and so on?

Katie: Okay.

James: Right, do you own any wearable technology?

Katie: No but I think it’s good, just too expensive to buy.

James: Have you used wearable technology at all?

Katie: I’ve seen my boyfriend use an Apple watch.

James: Okay cool, what are your views on wearable technology? Do you think it has a positive impact on peoples’ wellbeing?

Katie: I think that Fitness and health wearable technologies will have a positive impact on people’s lives by helping to improve diets and fitness levels.
James: What makes you think that?

Katie: Wearable technologies such as Fitbit are useful and a good idea to encourage people to exercise and keep track of their fitness levels. I think this might lower obesity levels.

James: Has wearable technology had any effect impact on your wellbeing?

Katie: I don’t own any wearable technology, so I can’t say it has.

James: Have you had any first-hand experience with wearable technology?

Katie: I have used the Apple watch that my boyfriend bought, which is quite cool and I’ve seen them in shops.

James: In what ways, do you think that wearable technology improves a persons’ wellbeing?

Katie: I think that health and fitness related wearable technology will definitely encourage people to improve their fitness which could make them happier with their bodies.

James: Good point, are you aware of the variety of different apps that can work with some forms of wearable technology?

Katie: I’ve used a few running apps, diet planning apps and a few others. I know that some apps are available on the Apple watch.

James: Which form of wearable technology do you believe is most effective and useful in improving a person’s well-being?

Katie: Health focused wearable technology is the more effective, as it will have the biggest positive impact upon people’s lives through increasing exercise and therefore lowering health related problems.

James: Have you been recommended any form(s) of wearable technology?

Katie: I have been recommended an Apple watch by many.

James: Do you think that wearable technology is the way forward?

Katie: I believe wearable technology will become increasingly more popular as technology progresses and demand increases.

James: What other benefits / impacts do you feel that wearable technologies have on people’s lives?
Katie: I think it can improve people’s social lives as they can share their improvements in their health online. You can show your friends how far you’ve run and so on.

James: What do you believe would be a useful form of wearable technology?

Katie: Time management wearable technology.

James: Why would you like to see that?

Katie: It would have a positive impact on my life.

James: Would you like to see further development in wearable technology? If so what forms would you like to see further development in?

Katie: I would like to see development of Time management wearable technology as it would impact my life positively as it would help me use time more effectively throughout the day. Especially when revising, when I have a list of things to do in the day. It would be very useful.

James: So basically, an app that is compatible with something like an Apple watch that sets reminders and you can organise tasks on it?

Katie: Yeah basically. Just something to make me better at organising my time.

James: Do you think that wearable technology would help?

Katie: Being able to wear it, like an Apple watch makes it very easy to access.

James: Alright, thank you. Sorry for taking up some of your time.

Katie: That’s okay, glad I could help.

END OF INTERVIEW

8.5.3 Interview 3

Participant: Henry

Date: 15/02/2017

James: Hi Henry, thank you for meeting me for this interview. If you wouldn’t mind, could you just read through the Information sheet and once you are happy just sign on the dotted line of this consent form, if you still want to continue with the interview?
Henry: Okay, is it just the one signature you need?

James: Yeah, just that one. Thanks. Are you ready to start?

Henry: Yeah sure, go ahead.

James: First of can I just check that you are over 18, under 30 and are a student?

Henry: I am 19 and I’m in my first year of University.

James: Okay cool. Let’s start! Do you own any wearable technology?

Henry: Yes, I have an Apple watch series 2.

James: Oh, nice. What are your views on wearable technology?

Henry: It is handy and useful to have. However, there are not enough apps that support it.

James: Why do you think that?

Henry: I find the easy access a good thing but the lack of app functions is a bad thing.

James: Do you think wearable technology has a positive impact on a person’s well-being?

Henry: Yes, I do.

James: What makes you think that? Do you think your watch had any effect on your wellbeing?

Henry: My watch sets fitness goals based on BMI. It also gives reminders to breathe and stand up throughout the day. I would say that this has improved my wellbeing.

James: So, you’d say it’s had a positive effect then? What item of wearable technology do you think has had the biggest impact on peoples’ wellbeing in general?

Henry: Yes. I’d say that Fitbit and other sports watches have had the biggest impact.

James: I was going to ask if you’d had any personal experience with that form of wearable technology, but obviously, you’ve got a smart watch.

Henry: Yeah, the only personal experience I’ve had is with my Apple watch and have friends that have used other health focused watches and wearable bands.

James: In what ways, do you think wearable technology improves a person’s well-being?
Henry: I think that the fitness goals can really help to motivate a person to improve their fitness and with things like the Fitbit, you are able to view your progress online.

James: Are you aware of the variety of different applications that are now readily available to work alongside wearable technologies?

Henry: I’ve only really heard of Smart watches and Fitness monitoring bands.

James: I know I’ve already asked you a similar question but do you believe that they are improving peoples’ wellbeing?

Henry: I do, a lot of my friends have said how happy they are with theirs too.

James: Like I asked earlier, do you think your watch has had an effect on your wellbeing

Henry: I think that the reminders to breath and stand up have helped me to relax in stressful times.

James: Would you say that fitness bands and smart watches have been most effective in improving a person’s well-being?

Henry: Yes, I would.

James: Why?

Henry: Just from personal experience really and talking to friends that use similar devices.

James: Have you recommended any forms of wearable technology?

Henry: Yeah, a few friends have said how good the Fitbit is.

James: Would you say that wearable technology is the way forward?

Henry: Yes, more and more tech is becoming hands-free. It is all about easy accessibility.

James: What other benefits / impacts do you feel that wearable technologies have on people’s lives?

Henry: I think that being able to keep track of your diet is very useful. It is very easy to log on notes on your wrist watch.

James: Do you think that you’d like to see further development in wearable technology?

Henry: Yes I would like to see the tech develop further and apps to engage more with the market.
James: Why would you like that?

Henry: I would like to see it as more products on the market means more competitive, cheaper prices which would lead to more people using them, more people getting fitter and hopefully more apps on the store.

James: Okay, thank you! I appreciate it.

END OF INTERVIEW

8.5.4 Interview 4

Participant: Cerys

Date: 13/02/2017

James: Hi Cerys, thank you for meeting me. You doing okay?

Cerys: Yeah I’m good thanks.

James: Good. Could you give this a read for me and then sign the consent form if you still want to take part.

Cerys: Okay, done.

James: Thank you, I’m going to ask you a few questions about wearable technologies, like Fitbit’s etcetera. You use a Fitbit, don’t you?

Cerys: I do, use it for running sometimes I wear it to bed.

James: To see how you sleep?

Cerys: Yeah, it tells me how much sleep I’ve actually had in the night. Pretty cool really.

James: Yeah, I’d quite like one to be honest. Are you okay for me to start asking you these questions?

Cerys: Go on.

James: Okay, if you need me to go over anything then let me know. Number 1, How old are you and what is your level of education?

Cerys: I’m 21 and I’m in my second year of University.
James: Have you ever used any wearable technology?

Cerys: Yes, I own a TomTom GPS Cardio and a Heart Rate Watch.

James: How do you find it?

Cerys: I think they’re very beneficial and useful in tracking and keeping to a healthy, active lifestyle.

James: What makes you think that?

Cerys: Um, I use my watch to track my activity levels and it keeps me on track.

James: Okay, do you think the impact that things like your Tom Tom and watch have on wellbeing is positive?

Cerys: I think it can definitely have a positive impact and for those tracking their fitness.

James: Oh, really? Why?

Cerys: Being active and exercise causes a release of feel good hormones. It also has a positive psychological impact and uplifting of mood.

James: I go to the gym and run quite a lot myself so I can understand where you are coming from with that one.

Cerys: Oh, fair enough. It can be fun.

James: Right um, do you think wearable technology has had an impact on your wellbeing at all?

Cerys: Yes, it’s helped me in my training in the gym and outdoors for half marathons. It also helps me keep a track on my nutritional needs.

James: What form of wearable technology do you think has had the biggest impact on peoples’ wellbeing?

Cerys: Um, I think I’d say that Activity trackers and watches like the Fitbit.

James: What ways do you think it can improve someone’s wellbeing?

Cerys: It can give people some sort of focus. Some technologies I suppose can alert people of any immediate health concerns which can put people’s minds at rest and make them feel more
secure. And other wearable technologies like simple rape alarms can save lives, offering personal security.

**James:** Do you know about all the different apps that you can download that are compatible with some wearable devices like the Apple watch?

**Cerys:** Not really, I don’t use many apps other than MyFitnessPal and Nike running.

**James:** Do you think that wearable tech is effective at improving people’s wellbeing?

**Cerys:** Um, I think so... I’d say it depends on the person and what needs they have.

**James:** Whys that?

**Cerys:** People more fitness orientated are more likely to benefit from activity trackers and other people may benefit from other technologies like music lovers and headphones.

**James:** Some good answers, thank you. Have you been recommended any wearables?

**Cerys:** Nope.

**James:** Do you think wearable tech will still be around in future?

**Cerys:** I believe its advancing so, I’d say so.

**James:** Are there any other benefits of wearables that we haven’t already talked about that you can think of?

**Cerys:** I’m not sure, I think wearable technologies like apple watches are advancing so much that they make phones nearly obsolete in terms of communicating.

**James:** Are there any forms of wearable tech that you think could be useful?

**Cerys:** I think the watches are very useful.

**James:** Do you think you’d like to see more development in wearables?

**Cerys:** It would be interesting to follow the development.

**James:** Okay, thank you so much. That was really good.

END OF INTERVIEW.
8.5.5 Interview 5

Participant: Ieuan

Date: 15/03/2017

James: Alright, are you ready? All I need you to do before I start asking you the questions is, read this (Information sheet) and sign above my signature once you are ready and have ticked all those boxes.

Ieuan: How long is it going to take?

James: It won’t take long honestly.

Ieuan: Better not. (Laughs)

James: Alright, I just ask them in the order I’ve got them here and you just give me your best answer. Should be done pretty quick then. First one, how old are you?

Ieuan: I’m 22, I thought you knew that.

James: Never asked. (Laughs).

Ieuan: Hmm, you’re 21, aren’t you?

James: Nope, 20 at the moment, 21 in May. We are going off topic. (Laughs). Number 2, have you used any wearable technology?

Ieuan: Yes, I use a Fitbit every day.

James: Do you like it?

Ieuan: Yeah its good, its helped me lose a lot of weight by encouraging me to walk. My friend has a monitor for diabetes which she wears on her arm that monitors her insulin and glucose levels and when they are low or high, it tells her, Its amazing.

James: That is pretty cool, I do feel sorry for people that have to wear things like that but it’s good to know that there are things like that being made. Do you think that would have an impact on her wellbeing?

Ieuan: Um yeah, it must make her feel a little more relaxed. My Fitbit definitely makes me feel better, it is good at helping you get rid of stress too. It tells you to get up and move and when to take a big breath also.
James: I’ve heard that, I’ve been meaning to get one for a while. What form of wearable technology do you think has had the biggest impact on peoples’ wellbeing?

Ieuan: Obviously the Fitbit is very popular because of how simple and affordable it is but I think that devices like that of my friends have a huge impact on people’s lives as it makes their condition much more manageable.

James: Yeah, I agree that must make a huge difference. Are you aware of the apps you can get that can work with some devices?

Ieuan: I use the Fitbit app which is quite good but I haven’t used any others as of yet.

James: How effective would you say wearable tech is at improving wellbeing?

Ieuan: It can be very effective dependant on the device.

James: Any reason why?

Ieuan: Medical devices will make a much larger more meaning full difference in my opinion.

James: Has anyone ever recommended you wearable technology?

Ieuan: People have recommended the Apple watch but it’s too expensive.

James: They are quite a bit. Almost done. (Laughs) Do you think it’s the way forward?

Ieuan: Wearable tech?

James: Yeah, sorry.

Ieuan: I think it will definitely be around for a lot more years.

James: What’s the most useful form of wearable technology, do you think?

Ieuan: Again, I’d have to say Medic wearables.

James: That’s fair enough. Would you like to see more developments?

Ieuan: Definitely, I don’t see why not

James: And we are done. Thank you for that.

END OF INTERVIEW.
8.5.6 Group Interview

Participants: Kane, Jonathan and Thomas

Date: 02/04/2017

James: Alright guys, long time no see. Are you all still happy to take part?

Kane: Yeah of course.

Jonathan: Don’t see why not.

Thomas: Same here.

James: Right, so if you can all just read the information sheet and tick the boxes on your consent forms before signing on the line above my signature please. And then I’ll start asking the questions, I’ll try to make this quite quick, so I don’t take up too much of your time.

All done?

Jonathan: There’s mine.

Kane: And mine.

Thomas: Two seconds. Okay, there you go.

James: First topic is what comes under the term Wearable technology?

Kane: Just things like the Fitbit, Apple Watch, do headphones count?

James: Yeah, headphones count.

Jonathan: Me and Tom have both got Apple watches.

James: I noticed, how do you find them?

Jonathan: I really like mine, how do you find yours Tom?

Thomas: It really good yeah, apart from the lack of apps that you can get. I use mine for looking at messages and as a watch in general to s honest.

Kane: I feel like the odd one out here, I was actually thinking about buying an Apple watch but they are so expensive.
James: They are a lot of money, I quite like the new smart watch that Fossil make. It looks exactly like one of their normal watches but has a smart screen and obviously works similar to the Apple watch, I’m not sure if you can get apps though actually.

Thomas: I’ve seen that, me and Jonny both had good deals on our watches so it wasn’t too bad, I definitely wouldn’t buy one at full price though.

Jonathan: We did have a good deal to be fair.

Kane: Is it worth the money?

Thomas: I’d say it’s definitely worth buying if you can find one for a more sensible price.


James: So, One at a time. What are your views on wearable tech? Like, in general?

Kane: I haven’t had much experience with it but it seems like a good idea. I’ve heard good things about it from friends and family.

Thomas: I think it’s the way things are going these days; everything is getting more and more accessible and what’s more accessible than wearing it.

James: Your turn Jon.

Jonathan: Um, I agree that it will definitely become more of a thing in the next few years when it starts to become more affordable. A bit like the iPhone.

James: Do you think wearable technology can have a positive effect on a person’s wellbeing?

Thomas: I think that things like the Fitbit and other wearable bits that are for ore fitness focused can definitely make people feel better about themselves and achieve step goals and things like that give a sense of achievement.

Jonathan: Fitness related bands definitely can, I know a few people that are obsessed with them because it becomes a bit of a competition of who has walked the most steps or run the fastest.

Kane: I’ve used a heartbeat sensor in the gym before, not a wearable but on a treadmill and that definitely becomes a bit of a competition for myself because I swim being able to keep my heart rate low and breathing controlled is pretty important. I can see how Fitness bands could improve someone’s life overall if they work with it.
James: Have any of you ever used any apps that you can pair with your apple watches or Fitbit, things like that?

Kane: I haven’t but I know there are quite a lot of apps that do that kind of thing. Even games now.

Jonathan: I download apps on mine all the time, only issue is there aren’t very many. I know that Fitbit have their own app and there are heart rates apps and things like that.

Thomas: I don’t really use many of the apps other than messenger, imessage and I have used a step and heart rate monitor.

James: That’s what I wanted one for really, must be cool opening text and calls on your watch. Any of you think that there is a future in this type of technology?

Kane: Um, I think there might be but I just can’t see it lasting too long.

Thomas: I think there will be, I think analogue watches will be seen less and less.

Jonathan: I hope they are still around, would be nice to see what they can come up with next. More people using them will mean that more apps will come out too, which is the biggest flaw really.

James: What would you like to see more development in?

Jonathan: Definitely the apps for the watches, I love mine but there just enough apps.

Kane: I’d like to see development in other types of wearables like some fitness clothes that can be connected to your phone so you can watch your heart rate and things like that.

Thomas: Um, Yeah. I think clothing would be good as long as it didn’t break in the wash. (Laughs) Maybe sensors in shoes.

James: Sounds good, do you know anything about the other sectors there are of wearable technology?

Kane: There’s obviously Military and Police with radios and trackers and things like that.

Jonathan: I’ve heard of mood sensitive stuff before like tops that light up different colours based on mood.

James: That sounds pretty cool.
Thomas: Obviously there’s headphones. Radios, security stuff, Fitbits and other ones that you can wear on your wrist. I’m not really sure about any others.

James: There’s actually Glamour which is clothing and things like that, there’s Communication, Lifecycle Computing, Fitness and Wellbeing, Medical and Security/Safety. Which do you think has the biggest impact on peoples’ wellbeing?

Kane: Medical because they are obviously designed with a patient’s well-being in mind.

Thomas: I think Fitness and wellbeing if I’m honest, I’ve heard of lots of people losing lots of weight whilst using things like the Fitbit because they get a bit addicted to the result the see, with lower heart rates and things like that. Plus, I see a lot of people sharing the routes that they have run on Facebook and Instagram.

Jonathan: Um, I have no idea to be honest. (Laughs) I think maybe Fitness stuff but Medical wearables are very important as it could be a wearable that actually keeps someone alive.

James: Okay, thanks everyone. I hope that didn’t use up too much of your time. That was interesting.

END OF INTERVIEW.
8.6 Interview Agreement and Consent forms

8.6.1 Interview Agreement Forms

8.6.1.1 Interview 1

INTERVIEW AGREEMENT

For use with Individual interviews and focus groups.

Cardiff Metropolitan University Ethics Reference Number: 2016D0250

Participant name:

Title of Project: An investigation into the use of wearable technologies for wellness and health case studying young adults at CMU.

Name of Researcher: James White

Participant to complete this section: Please initial each box.

1. I confirm that I am happy to take part in the project and am willing to participate in an interview with the researcher [ ]

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.

3. I agree to take part in the above study.

4. I agree to the interview / focus group / consultation being recorded [ ]

5. I agree to the use of anonymised quotes in publications [ ]

6. I would like to be anonymised in all publications [ ] Yes [ ] No [ ]

Signature of Participant

Date

Name of person taking consent

Date

James White

Signature of person taking consent

Date

03/11/2016
8.6.1.2 Interview 2

INTERVIEW AGREEMENT

For use with Individual interviews and focus groups.

Cardiff Metropolitan University Ethics Reference Number: 2016D0260

Participant name: [Name]

Title of Project: An investigation into the use of wearable technologies for wellness and health case studying young adults at CMU.

Name of Researcher: James White

____________________________________________________

Participant to complete this section: Please initial each box.

1. I confirm that I am happy to take part in the project and am willing to participate in an interview with the researcher [✓]

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. [✓]

3. I agree to take part in the above study. [✓]

4. I agree to the interview / focus group / consultation being recorded [✓]

5. I agree to the use of anonymised quotes in publications [✓]

6. I would like to be anonymised in all publications [Yes [✓] No [ ]]

Signature of Participant ______________________________ Date 07/11/2016

Name of person taking consent __________________________ Date 07/11/2016

Signature of person taking consent ________________________ Date 07/11/2016
8.6.1.3 Interview 3

INTERVIEW AGREEMENT

For use with individual interviews and focus groups.

Cardiff Metropolitan University Ethics Reference Number: 2016D0250

Participant name: Henry

Title of Project: An investigation into the use of wearable technologies for wellness and health case studying young adults at CMU.

Name of Researcher: James White

Participant to complete this section: Please initial each box.

1. I confirm that I am happy to take part in the project and am willing to participate in an interview with the researcher [ ]

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. [ ]

3. I agree to take part in the above study. [ ]

4. I agree to the interview / focus group / consultation being recorded [ ]

5. I agree to the use of anonymised quotes in publications [ ]

6. I would like to be anonymised in all publications [ ] Yes [ ] No [ ]

Signature of Participant

Date 07/11/2016

Name of person taking consent

Date 07/11/2016

Signature of person taking consent

Date 07/11/2016
8.6.1.4 Interview 4
INTERVIEW AGREEMENT

For use with Individual interviews and focus groups.

Cardiff Metropolitan University Ethics Reference Number: 2016D0260

Participant name: Copy

Title of Project: An investigation into the use of wearable technologies for wellness and health case studying young adults at CMU.

Name of Researcher: James White

Participant to complete this section: Please initial each box.

1. I confirm that I am happy to take part in the project and am willing to participate in an interview with the researcher [ ]

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. [ ]

3. I agree to take part in the above study. [ ]

4. I agree to the interview / focus group / consultation being recorded [ ]

5. I agree to the use of anonymised quotes in publications [ ]

6. I would like to be anonymised in all publications Yes [ ] No [ ]

Signature of Participant: ___________________________ Date: 03/03/2017

Name of person taking consent: James White Date: 03/03/2017

Signature of person taking consent: ___________________________ Date: 03/03/2017

8.6.1.5 Interview 5
INTERVIEW AGREEMENT

For use with Individual interviews and focus groups.

Cardiff Metropolitan University Ethics Reference Number: 2016D0260

Participant name: Juan

Title of Project: An investigation into the use of wearable technologies for wellness and health case studying young adults at CMU.

Name of Researcher: James White

Participant to complete this section: Please initial each box.

1. I confirm that I am happy to take part in the project and am willing to participate in an interview with the researcher [✓]

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. [✓]

3. I agree to take part in the above study. [✓]

4. I agree to the interview / focus group / consultation being recorded [✓]

5. I agree to the use of anonymised quotes in publications [✓]

6. I would like to be anonymised in all publications Yes [ ] No [✓]

Signature of Participant ___________________________ Date 02/11/2016

Name of person taking consent James White Date 02/11/2016

Signature of person taking consent ___________________________ Date 02/11/2016
8.6.1.6 Group Interview

INTERVIEW AGREEMENT

For use with Individual interviews and focus groups.

Cardiff Metropolitan University Ethics Reference Number: 2016D0260

Participant name: Jonathan

Title of Project: An investigation into the use of wearable technologies for wellness and health case studying young adults at CMU.

Name of Researcher: James White

__________________________________________________________

Participant to complete this section: Please initial each box.

1. I confirm that I am happy to take part in the project and am willing to participate in an interview with the researcher [ ]

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. [ ]

3. I agree to take part in the above study. [ ]

4. I agree to the interview / focus group / consultation being recorded [ ]

5. I agree to the use of anonymised quotes in publications [ ]

6. I would like to be anonymised in all publications Yes [ ] No [ ]

__________________________________________________________

Signature of Participant: _______________ Date: 12/11/2016

Name of person taking consent: _______________ Date: 12/11/2016

Signature of person taking consent: _______________ Date: 12/11/2016
INTERVIEW AGREEMENT

For use with Individual interviews and focus groups.

Cardiff Metropolitan University Ethics Reference Number: 2016D0260

Participant name: 

Title of Project: An investigation into the use of wearable technologies for wellness and health case studying young adults at CMU.

Name of Researcher: James White

Participant to complete this section: Please initial each box.

1. I confirm that I am happy to take part in the project and am willing to participate in an interview with the researcher [✓]

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. [✓]

3. I agree to take part in the above study. [✓]

4. I agree to the interview / focus group / consultation being recorded [✓]

5. I agree to the use of anonymised quotes in publications [✓]

6. I would like to be anonymised in all publications Yes [✓] No [ ]

Signature of Participant

K. Jones ____________________________ Date 12/11/2016

Name of person taking consent

James White ____________________________ Date 9/14/2016

Signature of person taking consent

______________________________ Date 12/9/2016
INTERVIEW AGREEMENT

For use with Individual interviews and focus groups.

Cardiff Metropolitan University Ethics Reference Number: 2016D0260

Participant name: Thomas

Title of Project: An investigation into the use of wearable technologies for wellness and health case studying young adults at CMU.

Name of Researcher: James White

Participant to complete this section: Please initial each box.

1. I confirm that I am happy to take part in the project and am willing to participate in an interview with the researcher [ √ ]

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. [ ]

3. I agree to take part in the above study. [ √ ]

4. I agree to the interview / focus group / consultation being recorded [ √ ]

5. I agree to the use of anonymised quotes in publications [ √ ]

6. I would like to be anonymised in all publications [ ] Yes [ √ ] No [ ]

Signature of Participant: ___________________________ Date: 12/11/2016

Name of person taking consent: ______________________ Date: 12/11/2016

Signature of person taking consent: __________________ Date: 12/11/2016
8.6.2 Consent Forms

8.6.2.1 Interview 1

---

**Interview 1**

PARTICIPANT CONSENT FORM / Confirmation of Participation

(for interviews, focus groups and questionnaires)

Cardiff Metropolitan University Ethics Reference Number: 2016D0260

Participant name or Study ID Number: Robert

Title of Project: An investigation into the use of wearable technologies for wellness and health case studying young adults at CMU.

Name of Researcher: James White

Cardiff Metropolitan University email: st20066025 @cardiffmet.ac.uk

Supervisor: Panicos Georgiades, email: pgeorgiades@cardiffmet.ac.uk

---

Participant to complete this section: Please tick each box.

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. [ ]

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. [ ]
3. I agree to take part in the above study.

4. I agree to the interview / focus group / being recorded

5. I agree to the use of anonymised quotes in publications

_________________________  04/12/2016
Signature of Participant       Date

_________________________  02/13/2016
James White                   Date

Name of person taking consent  Date

_________________________
Signature of person taking consent

* When completed, 1 copy for participant & 1 copy for researcher site file
8.6.2.2 Interview 2

PARTICIPANT CONSENT FORM / Confirmation of Participation

(for interviews, focus groups and questionnaires)

Cardiff Metropolitan University Ethics Reference Number: 2016D0260

Participant name or Study ID Number: Katie

Title of Project: An investigation into the use of wearable technologies for wellness and health case studying young adults at CMU.

Name of Researcher: James White

Cardiff Metropolitan University email: st20066025 @cardiffmet.ac.uk

Supervisor: Panicos Georghiades, email: pgeorghiades@cardiffmet.ac.uk

Participant to complete this section: Please tick each box.

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.
3. I agree to take part in the above study.

4. I agree to the interview / focus group / being recorded

5. I agree to the use of anonymised quotes in publications

_________________________  13/02/2017
Signature of Participant      Date

_________________________  13/02/2017
Name of person taking consent Date

_________________________
Signature of person taking consent

* When completed, 1 copy for participant & 1 copy for researcher site file
Interview 3

PARTICIPANT CONSENT FORM / Confirmation of Participation
(for interviews, focus groups and questionnaires)

Cardiff Metropolitan University Ethics Reference Number: 2016D0260

Participant name or Study ID Number: Henry

Title of Project: An investigation into the use of wearable technologies for wellness and health case studying young adults at CMU.

Name of Researcher: James White

Cardiff Metropolitan University email: st20066025@cardiffmet.ac.uk

Supervisor: Panicos Georgiades, email: pgeorghiades@cardiffmet.ac.uk

Participant to complete this section: Please tick each box.

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ( )

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. ( )
3. I agree to take part in the above study.

4. I agree to the interview / focus group / being recorded

5. I agree to the use of anonymised quotes in publications

_________________________  15/02/2017
Signature of Participant      Date

_________________________  15/02/2017
Name of person taking consent Date

_________________________
Signature of person taking consent

* When completed, 1 copy for participant & 1 copy for researcher site file
8.6.2.4 Interview 4

PARTICIPANT CONSENT FORM / Confirmation of Participation

(for interviews, focus groups and questionnaires)

Cardiff Metropolitan University Ethics Reference Number: 2016D0260

Participant name or Study ID Number:  

Title of Project: An investigation into the use of wearable technologies for wellness and health care studying young adults at CMU.

Name of Researcher: James White

Cardiff Metropolitan University email: st20066025 @cardiffmet.ac.uk

Supervisor: Panicos Georghiades, email: pgeorghiades@cardiffmet.ac.uk

Participant to complete this section:  

Please tick each box.

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.
3. I agree to take part in the above study. ✓

4. I agree to the interview / focus group / being recorded ✓

5. I agree to the use of anonymised quotes in publications ✓

_________________________  20/11/2016
Signature of Participant     Date

_________________________  20/11/2016
James Wise                   Date

Name of person taking consent Date

_________________________
Signature of person taking consent

* When completed, 1 copy for participant & 1 copy for researcher site file
8.6.2.5 Interview 5

PARTICIPANT CONSENT FORM / Confirmation of Participation
(for interviews, focus groups and questionnaires)

Cardiff Metropolitan University Ethics Reference Number: 2016D0260

Participant name or Study ID Number: [Redacted]

Title of Project: An investigation into the use of wearable technologies for wellness and health case studying young adults at CMU.

Name of Researcher: James White

Cardiff Metropolitan University email: st20066025@cardiffmet.ac.uk

Supervisor: Panicos Georgiades, email: pgeorgiades@cardiffmet.ac.uk

Participant to complete this section: Please tick each box.

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. [ ]

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3. I agree to take part in the above study.

4. I agree to the interview / focus group / being recorded

5. I agree to the use of anonymised quotes in publications

Signature of Participant

Date

Name of person taking consent

Date

Signature of person taking consent

* When completed, 1 copy for participant & 1 copy for researcher site file
8.6.2.6 Group Interview

PARTICIPANT CONSENT FORM / Confirmation of Participation
(for interviews, focus groups and questionnaires)

Cardiff Metropolitan University Ethics Reference Number: 2016D0260

Participant name or Study ID Number: Jonathan

Title of Project: An investigation into the use of wearable technologies for wellness and health case studying young adults at CMU.

Name of Researcher: James White

Cardiff Metropolitan University email: st20066025 @cardiffmet.ac.uk

Supervisor: Panicos Georgiades, email: pgeorgiades@cardiffmet.ac.uk

Participant to complete this section: Please tick each box.

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactory.

✓

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.

✓
3. I agree to take part in the above study.

4. I agree to the interview / focus group / being recorded

5. I agree to the use of anonymised quotes in publications

Signature of Participant

Date

James White

02/04/2017

Name of person taking consent

Date

Signature of person taking consent

* When completed, 1 copy for participant & 1 copy for researcher site file
PARTICIPANT CONSENT FORM / Confirmation of Participation

(for interviews, focus groups and questionnaires)

Cardiff Metropolitan University Ethics Reference Number: 2016D0260

Participant name or Study ID Number: 

Title of Project: An investigation into the use of wearable technologies for wellness and health case studying young adults at CMU.

Name of Researcher: James White

Cardiff Metropolitan University email: st20066025 @cardiffmet.ac.uk

Supervisor: Panicos Georghiades, email: pgeorghiades@cardiffmet.ac.uk

Participant to complete this section: Please tick each box.

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2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. 

3. I agree to take part in the above study.

4. I agree to the interview / focus group / being recorded

5. I agree to the use of anonymised quotes in publications

K. James
Signature of Participant
02/04/2017
Date

James White
Name of person taking consent
02/04/2017
Date

Signature of person taking consent

* When completed, 1 copy for participant & 1 copy for researcher site file
PARTICIPANT CONSENT FORM / Confirmation of Participation

(for interviews, focus groups and questionnaires)

Cardiff Metropolitan University Ethics Reference Number: 2016D0260

Participant name or Study ID Number: 

Title of Project: An investigation into the use of wearable technologies for wellness and health case studying young adults at CMU.

Name of Researcher: James White

Cardiff Metropolitan University email: sa20066025@cardiffmet.ac.uk

Supervisor: Panicos Georgiades, email: pgeorgiades@cardiffmet.ac.uk

Participant to complete this section:  

Please tick each box.

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. [✓]

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. [✓]
3. I agree to take part in the above study.

4. I agree to the interview / focus group / being recorded

5. I agree to the use of anonymised quotes in publications

[Signature]
Signed: [Name]
Date: 02/04/2017

*When completed, 1 copy for participant & 1 copy for researcher site file*
8.7 Approved Ethics Form

<table>
<thead>
<tr>
<th>To be completed by student and supervisor before submission to Ethics Approval Panel</th>
<th>Student Signature</th>
<th>Supervisor Signature</th>
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<tbody>
<tr>
<td>James White</td>
<td>Panicos Georgiades</td>
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<tr>
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<th>Student</th>
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<tr>
<td>Application for ethics approval</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Participant information sheet</td>
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<td>Participant consent form</td>
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<td>Pilot interview/s</td>
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<td>Letter/s to participating organisation/s</td>
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<tr>
<td>Confirmation of interviewee participation</td>
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When undertaking a research or enterprise project, Cardiff Met staff and students are obliged to complete this form in order that the ethics implications of that project may be considered.

**If the project requires ethics approval from an external agency (e.g., NHS),** you will not need to seek additional ethics approval from Cardiff Met. You should however complete Part One of this form and attach a copy of your ethics letter(s) of approval in order that your School has a record of the project.

The document *Ethics application guidance notes* will help you complete this form. It is available from the [Cardiff Met website](#). The School or Unit in which you are based may also have produced some guidance documents, please consult your supervisor or School Ethics Coordinator.
Once you have completed the form, sign the declaration and forward to the appropriate person(s) in your School or Unit.

**PLEASE**

**NOTE:**

Participant recruitment or data collection MUST NOT commence until ethics approval has been obtained.

**PART ONE**

| Name of applicant:                  | James White                        |
| Supervisor (if student project):    | Dr Panicos Georghiades             |
| School / Unit:                      | Cardiff School of Management        |
| Student number (if applicable):     | ST20066025                         |
| Programme enrolled on (if applicable): | BSc (Hons) Business Information Systems |
| Project Title:                     | An investigation into the use of wearable technologies for wellness and health case studying young adults at CMU. |
| Expected start date of data collection: | 15/01/2017                        |
| Approximate duration of data collection: | 6 weeks                            |
| Funding Body (if applicable):      | N/A                                |
| Other researcher(s) working on the project: | N/A                               |
| Will the study involve NHS patients or staff? | No                               |
| Will the study involve human samples and/or human cell lines? | No                               |

Does your project fall entirely within one of the following categories:

| Paper based, involving only documents in the public domain | No |
| Laboratory based, not involving human participants or human samples | No |
| Practice based not involving human participants (e.g. curatorial, practice audit) | No |
Compulsory projects in professional practice (e.g. Initial Teacher Education) | No
---|---
A project for which external approval has been obtained (e.g., NHS) | No

If you have answered YES to any of these questions, expand on your answer in the non-technical summary. No further information regarding your project is required.

If you have answered NO to all of these questions, you must complete Part 2 of this form.

In no more than 150 words, give a non-technical summary of the project:

The project aims to investigate the views of young adults (18-30) in the Cardiff area have on wearable technology and how this technology effects their well-being, in a positive or negative way and the reasoning behind why they have these views. The author will collect primary research from one to one interviews, focus groups and the completion of questionnaires by individuals matching the criteria previously mentioned. The researcher will look into the different sectors that wearable technology is being used in and the findings of the research will give the researcher a good understanding of whether or not people in the selected age group and area believe that there is a future for this kind of technology and what form(s) they would like to see being developed further. All data collected will be collated and analysed, and will ensure that the projects findings are meaningful.

DECLARATION:

I confirm that this project conforms with the Cardiff Met Research Governance Framework.

I confirm that I will abide by the Cardiff Met requirements regarding confidentiality and anonymity when conducting this project.

STUDENTS: I confirm that I will not disclose any information about this project without the prior approval of my supervisor.
<table>
<thead>
<tr>
<th>Signature of the applicant:</th>
<th>Date: 23rd November 2016</th>
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<td>J A White</td>
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**FOR STUDENT PROJECTS ONLY**

<table>
<thead>
<tr>
<th>Name of supervisor:</th>
<th>Date: 25th November 2016</th>
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<tr>
<td>Dr. Panicos Georgiades</td>
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<th>Signature of supervisor:</th>
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<td>P Georgiades</td>
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**Research Ethics Committee use only**

| Decision reached: | Project approved
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<td>Project not approved</td>
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<td>Project rejected</td>
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Project reference number: Click here to enter text.

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<th>Details of any conditions upon which approval is dependant:</th>
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**PART TWO**

**A RESEARCH DESIGN**
A1 Will you be using an approved protocol in your project?  
No

A2 If yes, please state the name and code of the approved protocol to be used\(^1\)  
N/A

A3 Describe the research design to be used in your project

This research involves an interpretive philosophy using an inductive research strategy using qualitative and quantitative data. Data analysis will be done using a thematic approach.

Questionnaire:

- The researcher aims to gather the completion of around 30-35 questions per questionnaire around 70 times using online questionnaires and also through handing them out in person, this will ensure that there is a large amount of data to analyse and will aid in the validation of the conclusion.

- The researcher will hand out questionnaires to students in and around the Cardiff Metropolitan University campuses. The researcher will also hand out consent forms to make sure that all participants are happy to fill out a questionnaire and are aware that their details will not be used anywhere outside of the project.

- It will take the participants around 4-5 minutes to complete a questionnaire.

Sample:

- A sample of available participants in and around the Cardiff Metropolitan University campuses will be asked to complete the questionnaire. The researcher will only ask individuals that are between the ages of 18 and 30.

- Further participants may also be found using Snowballing Techniques, by asking participants to recommend someone else who may be appropriate for the study.

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\(^1\) An Approved Protocol is one which has been approved by Cardiff Met to be used under supervision of designated members of staff; a list of approved protocols can be found on the Cardiff Met website here
Online Questionnaire posted on qualtrics website (https://cardiffmet.eu.qualtrics.com/ControlPanel/).

- As previously mentioned the researcher will aim to have 70 questionnaires completed between the use of online questionnaires and also through handing them out in person.

- The researcher has uploaded a questionnaire online and the link will be shared in order to gain participants.

- The participants will be told the details of the project and will complete a consent form before completing the questionnaire.

- The questionnaire will take 4-5 minutes to complete.

Sample:

- This is convenience sampling as the participants will be taking part in the research because they have seen and clicked the link. Equally, the sample is also purposive as the researcher has been provided with the website by Cardiff Metropolitan University, the majority of students studying at the University will fit the criteria. (18 – 30, students and in Cardiff).

Semi Structured interviews:

- Open ended questions to collect qualitative information.

- Freedom of response will allow the researcher to gain opinions and thoughts of the participant on wearable technology and its effects on their well-being.

- The researcher intends to have face-to-face interview with 10 people between the age of 18 and 30.

- Contact with the interviewees will begin in January and the interview is forecasted to take place soon after.

- Each interview will be recorded and will be around 15-20 minutes in length.
Sample:
- A quota sample of 10 people will be selected that fit the criteria.

Focus Groups:
- Open ended questions to collect qualitative information.
- Freedom of response will allow the researcher to gain opinions and thoughts of the participant on wearable technology and its effects on their well-being.
- The researcher intends to have face-to-face interview with 5 focus groups made up of interviewees between the age of 18 and 30.
- Contact with the interviewees will begin in January and the interview is forecasted to take place soon after.
- Each focus group will be recorded and will be around 20 minutes in length.

Sample:
- A quota sample of 5 focus groups made up of interviewees that fit the criteria.

Analysis:
- The quantitative data from the questionnaires will be analysed through the use of Microsoft Excel by creating graphs, tables and charts in order to make patterns more apparent.
- The qualitative data from the semi structured interviews and the focus groups will be through observer impression of the data collected.

Consent:
Consent from participants is required from the interviewees by the completion of the consent form before they can take part in either an interview or complete a questionnaire.

Security:

All participants details and information will be kept separate from the answers/information relevant to the project that they provide will be stored in a secure environment (Encrypted storage device), will not be used anywhere outside of the project and will be destroyed within 5 years of the completion of the project.

<table>
<thead>
<tr>
<th>A4 Will the project involve deceptive or covert research?</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>A5 If yes, give a rationale for the use of deceptive or covert research</td>
<td>N/A</td>
</tr>
<tr>
<td>A6 Will the project have security sensitive implications?</td>
<td>No</td>
</tr>
<tr>
<td>A7 If yes, please explain what they are and the measures that are proposed to address them</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**B PREVIOUS EXPERIENCE**

B1 What previous experience of research involving human participants relevant to this project do you have?

None

<table>
<thead>
<tr>
<th>B2 Student project only</th>
</tr>
</thead>
<tbody>
<tr>
<td>What previous experience of research involving human participants relevant to this project does your supervisor have?</td>
</tr>
<tr>
<td>30 years of experience in research and supervision of Dissertation students.</td>
</tr>
</tbody>
</table>
## C POTENTIAL RISKS

### C1 What potential risks do you foresee?

#### Questionnaires

1. Interviewees not wanting to share their details.
2. Interviewees taking offence to questions.
3. Aggressive behaviour.
4. Interviewees may have concerns about the security of their information.

#### Semi Structured Interviews

1. The interviewee may refuse/not want to answer some of the questions.
2. The interviewee may take offense to some of the questions.
3. The interviewee may not want to provide personal information.
4. Running out of time for research.
5. Aggressive behaviour.
6. Interviewees may have concerns about the security of their information.

#### Focus Groups

1. The focus group may refuse/not want to answer some of the questions.
2. The focus group may take offense to some of the questions.
3. The focus group may not want to provide personal information.
4. Running out of time for research.
5. Aggressive behaviour from the focus group.
6. The focus group may have concerns about the security of their information.
C2 How will you deal with the potential risks?

Questionnaires

1. All participants will be notified that the researcher will have sole access to the data collected. Data used in the written report will be anonymised. A consent form and description of the project will be attached to every questionnaire; participants will have to read this to make sure that they are fully aware of what they are participating in and that their details will not be used or shared outside of the project.

2. The researcher will ensure that all questions asked will be suitable and appropriate.

3. The researcher will be in a safe environment and will be sensitive when approaching potential participants.

4. A consent form and description of the project will be attached to every questionnaire, participants will have to read this to make sure that they are fully aware of what they are participating in and that their details will not be used or shared outside of the project. All participants’ details and information will be kept separate from the answers/information relevant to the project that they provide will be stored in a secure environment (Encrypted storage device) and will not be used anywhere outside of the project and will be destroyed within 5 years of the completion of the project.

Semi Structured Interviews

1. Interviews will be arranged in advance with a confirmed location and timeframe. The researcher will record the interview using a mobile phone.

2. A copy of the interview questions will be sent to the participants prior to meeting.

3. The researcher will attach a consent form to the questionnaire and will state that all details provided will be kept private and will not be used outside of the dissertation. All interviewees will be kept anonymous.

4. Interviews will be arranged in advance with a confirmed location and timeframe. The researcher will record the interview using a mobile phone. The researcher will make a detailed plan of action which will be followed in order to complete the work in the timescale decided upon.
5. The researcher will be in a safe environment and will be sensitive when approaching potential participants.

6. All participants’ details and information will be kept separate from the answers/information relevant to the project that they provide will be stored in a secure environment (Encrypted storage device) and will not be used anywhere outside of the project and will be destroyed within 5 years of the completion of the project. All participants will be notified that the researcher will have sole access to the data collected. Data used in the written report will be anonymised.

Focus Groups

1. A copy of the interview questions will be sent to the participants of the focus group prior to meeting.

2. The researcher will ensure that all questions asked will be suitable and appropriate.

3. The researcher will attach a consent form to the questionnaire and will state that all details provided will be kept private and will not be used outside of the dissertation.

4. Focus groups will be arranged in advance with a confirmed location and timeframe. The researcher will record the interview using a mobile phone. The researcher will make a detailed plan of action which will be followed in order to complete the work in the timescale decided upon.

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