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***‘The influence of Myzone and the visual screen on gym members individual perceptions of physical effort and motivation when participating in high intensity fitness classes.’***

**Julia Stewart**

**15016794**

Text

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***‘The influence of Myzone and the visual screen on gym members individual perceptions of physical effort and motivation when participating in high intensity fitness classes.’***

Student Number : 15016794

BSc (Hons) Sport and Fitness

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# Abstract

This dissertation explores the influence of Myzone and the visual screen on users’ perceptions of physical effort and motivations. Myzone is a wearable fitness technology, that can help users identify how physically active they are and allows them to track their effort during and after workouts. Focussing on the impact of participating in a high intensity interval training class with the visual screen and a class without the visual display using a mixed methods approach. Through the use of cluster sampling, eight participants participated in this research study adhering to two high intensity fitness classes with and without the visual display and completing two post online questionnaires relating to the class. An online questionnaire was also used to reach a wider audience with two hundred and fourteen respondents taking part. Through thematical analysis, by identifying key themes of the data gathered a conclusion was reached. This dissertation argues that the influence of Myzone and the visual screen has a positive effect on physical effort and motivations to take part in physical activity. Contrarily, further research should include a broader sample size due to a lack of male representation in the findings, which could have an impact on the overall results.

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# Introduction

**Research Question**

To what extent does the influence of Myzone and the visual screen have on individuals’ perceptions of physical effort and motivations?

**Research Hypothesis**

The Myzone activity belt and visual screen will have a positive effect on the physical effort and motivation of users.

**Research Aim**

The aim of this research study is to investigate if gym members individual perceptions of physical effort and motivation change when wearing the Myzone activity belt and the influence of the visual screen.

**Research Objectives**

* To compare Myzone users’ perceptions when participating in a high intensity fitness class with the Myzone activity belt and visual display and a class without the visual display.
* To use online questionnaires to gather information on the influence of the visual public display of members Myzone data after each class.
* To obtain opinions on the use of Myzone and the impact on users’ motivation and physical effort through an online questionnaire to see if any links exist.

**Research Relevance**

This research study will help to understand what influence and impact Myzone, and the visual display has on users’ physical effort and motivation levels whilst exercising. This research study has relevance particularly to the physical activity and health sector as by understanding if Myzone does in fact have an influence on the physical effort and motivation of users to be physically active, Myzone could become part of an intervention to increase the physical activity levels of adults within the United Kingdom. Understanding the motivations to take part in physical activity are paramount for sports psychologists to be able to help create recommendations for physically inactive adults’ behaviour change. This research study is relevant right now due to the staggering figures of physical inactivity, with at least thirty eight percent of adults in the United Kingdom currently not meeting the recommended guidelines (British Heart Foundation, 2022). By taking into consideration the growing popularity of wearable fitness technology, it is important and relevant to understand if Myzone, a wearable fitness device can influence the motivation and physical effort of users to be physically active. The proposed research project sets out to answer the question; To what influence does the Myzone activity belt and visual screen have on individuals’ perceptions of physical effort and motivation amongst mixed gender adult gym Myzone members.

**Structure of Research Project**

This research project will firstly compare relevant literature through a literature review. The methodology will then be presented with guidance on how each step was carried out and ensured to be kept ethical and legal following relevant guidelines. The results section will then be presented using relevant graphs and tables to distinguish and highlight the results found from the research that has been undertaken. The results will then be discussed within the discussion section, identifying any links between the research methods used and identifying if the aim of the research and objectives have been met. The conclusion will then outline what has been found throughout the study. All relevant references and appendices will be displayed following the University of Highlands and Islands Harvard Guide.

# Literature Review

**Physical Inactivity and Health**

Physical inactivity is at a global high with one in four adults not meeting the physical activity guidelines (World Health Organisation, 2022). The current physical activity guidelines within the United Kingdom state that all adults should take part in either a minimum of seventy-five minutes of vigorous activity or one hundred and fifty minutes of moderate activity (United Kingdom Government, 2022b). The guidelines also state that adults should complete at least two strength-based sessions each week (United Kingdom Government, 2022b). The National Health Service (2022d) have suggested that women should be consuming around two thousand calories and men should consume around two thousand five hundred calories each day to maintain a healthy weight. Around one in six deaths of adults within the United Kingdom are caused by physical inactivity (United Kingdom Government, 2022a). Globally, over three million adults die due to lack of physical activity annually (World Health Organisation, 2022). Physical inactivity costs the government within the United Kingdom more than seven billion each year (United Kingdom Government, 2022a). Not only is physical inactivity a global health crisis it is also an economic crisis due to significant pressure it places on the health care system and overall economy (Pratt *et al.,*2012). It has been suggested that if physical inactivity levels could be improved by just ten percent, just over half a million deaths could be prevented each year (Lee *et al.,*2012).

**Benefits of Physical Activity**

Physical activity provides adults with an extensive number of benefits both mentally and physically (National Health Service, 2022a). Individuals who are regularly physically active are less likely of becoming an unhealthy weight leading to obesity (National Health Service, 2022b). Obesity is linked to various other diseases such as cardiovascular disease, type two diabetes, and various cancer diseases (Mcintosh *et al.,*2016). Physical activity is recommended for those of whom have these diseases to effectively manage them or prevent them (Linder *et al.,*2021). Regular physical activity will lower and or maintain a healthy blood pressure when an individual is at rest (National Health Service, 2022a). A study has evidenced that consistent physical activity at least three times a week can lower blood pressure (Nystoriak *et al.,*2018). Taking part in regular physical activity plays a part in effectively managing an individual’s mental health (Edenfield *et al.,*2011). Physical activity benefits adults mentally as studies have highlighted the positive effect it can have on anxiety levels and it can also prevent negative thoughts from occurring (Rethorst *et al.,*2009). Physical activity has been prescribed to deal with depression for individuals (National Health Service, 2022c). Taking part can positively affect an individual’s mood therefore symptoms of depression will be manageable (National Health Service, 2022c). Physical activity can have a positive influence on an individual’s quality of life, with studies highlighting the contributions that physical activity has had on emotional wellbeing and improved self-confidence (Gill *et al.,*2013). Falls can be prevented due to the improvements in balance and strength from regular physical activity participation (Hardman *et al.,*2004). A lack of physical activity can be detrimental to an individual’s sleep quality (Wang *et al.,*2021). Although it has been suggested that physical activity can improve sleep quality dependent on the intensity of the exercise (Wang *et al.,*2021).

**Wearable Fitness Technologies**

Wearable fitness technologies have evolved over the last decade, from simple pedometers that would count steps to wrist worn devices that calculate calorie expenditure, track sleep and various other capabilities. In 2022, wearable fitness technologies became recognised as the number one fitness trend (American College of Sports Medicine, 2022). The use of wearable fitness technologies to combat physical inactivity is being recognised globally (Robinson *et al.,*2020). It has been predicted that in 2023 over one hundred-million-unit shipments of wearable fitness devices will be required globally (Ubrani *et al.,*2019). This underpins the importance of understanding more about these devices and the impact they have on user’s physical activity (Ubrani *et al.,*2019). Pedometers were originally used to calculate distance travelled back in the early 1960s, where walking was the most common mode of transport (Basset *et al.,*2017). By the early 1990s pedometers were used to relate the physical activity of an individual and their health (Basset *et al.,*2017). From then on globally, individuals have become reliant on these devices to track their movements and understand how physically active they are (Basset *et al.,*2017). From the early 2000s smart phones became the next evolution of physical activity tracking (Ometov *et al.,*2021). Smart phones would use the global positioning system to track step count by considering the type of activity, the age, height, and weight of the user and by using a specific algorithm to figure out the heart rate of the users and the calories burned (Kamel Boulos *et al.,*2021; Henriksen *et al.,*2018). Shortly after the smartphone was identified to monitor physical activity levels, in the early to mid 2000s different types of wearable fitness technologies emerged (Ometov et al., 2021). These technologies ranged from wrist worn devices such as Apple watch and Fitbit to chest worn devices, such as the Actigraph and the Myzone activity belt (Ometov et al., 2021). The majority of wrist worn devices work by using light sensitive photodiodes to detect blood flow volume changes in the capillaries of the user’s wrist to detect the users heart rate through sensors (British Journal of Sports Medicine, 2017). An algorithm is then used to determine the users step count, calorie expenditure and average heart rate at rest and during physical activity (Henriksen *et al.,*2018). The device will then draw conclusions about the physical health and fitness of the user from the data gathered (Henriksen *et al.,*2018). From 2011 to 2017 over four hundred different types of wearable fitness devices were designed by over one hundred and thirty separate companies (Henriksen *et al.,*2018). Both the Apple watch and the Fitbit devices have become increasingly popular over the last decade, with research being carried out continuously on the growing market of technology and the impact and or effect on physical activity and health of users (Clinical Trials Government, 2022). In 2019, over two hundred and twenty-five million wearable fitness technologies had been sold (Costello *et al.,*2019). Due to the popularity of wearing these devices for physical activity tracking, research has shown that apple watch and Samsung devices were almost one hundred percent reliable and valid for measuring step count (Fuller *et al.,*2020). Although the study also found that Fitbit and Garmin were accurate on average around fifty percent of the time (Fuller *et al.,*2020). Each type of device can be worn differently, it has been highlighted that the Fitbit wrist device is less accurate than the Fitbit that is worn on an individual’s hip (Diaz *et al.,*2015). On the other hand, an Actigraph device has shown to have accurate results due to being worn around an individual’s chest as it has been suggested that by wearing the device around the bodies centre of mass it can provide more precise results (Chow *et al.,*2017). Although it has been advised that the results remain accurate as long as the device is worn the same way each time and it is not considered important on where it is worn whether it be wrist or chest for example (Shrack *et al.,*2015).

**‘Myzone’ Wearable Fitness Technology**

This study will be focussing in particular on the growingly popular Myzone activity belt MZ-3. The Myzone activity belt MZ-3 is worn around an individual’s chest, the strap has to be directly on the skin so that electrical signals can be picked up from the users’ heartbeat (Myzone, 2022). The Myzone activity belt MZ-3 has been shown to have an accuracy of 99.4%, which is the same as an Electrocardiography machine used by medical professionals (Myzone, 2022). Unlike most common wearable fitness technologies, the Myzone activity belt MZ-3 is predominately advertised by gyms and recommended by personal trainers (Pizzo *et al.,*2021). The Myzone activity belt MZ-3 is unlike other wearable fitness technologies as it can be set up and connected through the user’s gym and allows the user to view their real time data on the public visual display boards within the gym (Myzone, 2022). These boards also show other users’ data during a workout within the facility (Myzone, 2022). The Myzone activity belt MZ-3 works on a point-based system for the user, and rewards effort rather than physical fitness, keeping it fair between each user with data displayed tailored to the individual and specific to the user’s physical fitness level (Myzone, 2022).

The Myzone activity belt MZ-3 gives the users Myzone Effort Points (MEPs) (Myzone, 2022). It works in five zones, with each zone representing a percentage of the users’ maximum heart rate (Myzone, 2022). With the grey, blue, and green zones advising the users heart is working between fifty to seventy nine percent, users would likely be completing low intensity exercise, or warming up whilst in these zones (Myzone, 2022). The red- and yellow-coloured zones advise the users heart is working between eighty to one hundred percent, so the user will most likely be completing high intensity exercise (Myzone, 2022). The harder the user works the more MEPs they will gain, and if the users maximum heart rate changes over time, Myzone will update itself to be tailored to the user based on the change in the users’ maximum heart rate (Myzone, 2022).

Diagram

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Figure 1. Myzone Heart Rate Coloured Zones

Users will work towards gaining a ‘status’ with their Myzone activity belt MZ-3, the status is based upon how many months consecutively that you have achieved the global cardiovascular physical activity guidelines or on Myzone achieved at least one thousand three hundred MEPs (Myzone, 2022). One month of achieving this target would give the user iron status, two months the user would achieve bronze, silver for six months and all the way up to hall of fame which would be forty-eight months consecutively (Myzone, 2022). The purpose of the status rankings is to keep users’ physical activity and in line with the global physical activity guidelines, with the targets based upon these minimum guidelines.

**The Impact of Wearable Fitness Technologies**

Understanding the impact that wearable fitness technologies can have on users could be effective in interventions to promote physical activity to improve the global figures on physical inactivity (Phillips *et al.,*2018).

Wearable fitness technologies can help increase the physical activity levels of adults, in particular it has been highlighted that those of whom take part in none to very little physical activity can benefit from using the devices (Ellingson *et al.,*2019). A study shows that adults who suffer from a chronic illness can benefit from the use of wearable fitness technologies to increase physical activity and that it could actually benefit these particular users beyond the impact it can have on currently active adults (Scheid *et al.,*2019). The use of a pedometer has shown an increase of individuals physical activity levels by 27% (Bravata *et al.,*2007). With the use of new and improved wearable fitness technologies also showing increases in physical activity levels (Case *et al.,*2015; Evenson *et al.,*2015). A study also concluded that the use of wearable fitness technologies to provide objective feedback to users helped to increase the physical activity levels of users marginally (Gierisch *et al.,*2015). A study has identified an increase in users step count by an average of one thousand eight hundred and fifty steps a day (Laranjo *et al.,*2020). This shows the positive effect that wearable fitness technologies can have on the movement of users and the benefits it provides to users’ physical health (Laranjo *et al.,*2020). The feedback that most devices provide to the user will advise them of certain goals, such as if they have hit their step goal or how far off, they are to meeting this goal and some devices will advise the user to stand if they have been sedentary for a long period of time (Sullivan *et al.,*2017). This can increase the physical activity levels of users by reminding the user every so often, much like a personal trainer but much more frequently to the user (Sullivan *et al.,*2017).

The use of wearable fitness technologies can increase the motivational levels of users, as a study recognized that students felt more motivated to take part in physical activity due to the use of their wearable fitness devices (Kinney *et al.,*2019).

The automatic feedback of sessions whilst wearing a wearable fitness device can be paramount to the users’ motivations to continue staying physical activity and carrying on with sessions (Bice *et al.,*2015). Users who have taken part in physical activity regularly and those of who are just getting started have all advised that the ability to see the information of calorie expenditure, step count and other factors of their workout is crucial to their on-going success and mindset to continue (Bice *et al.,*2015). A study has explored the self-determination theory and has concluded that if wearable fitness technology devices meet the autonomy, competence, and relatedness of the user then the user would be more than likely to be motivated to take part in physical activity from using the device (Lee *et al.,*2015).

Contrarily it has been identified that individuals of whom were overweight and using the wearable fitness technology to help them lose weight and become physically active have had a negative experience (Ellis *et al.,*2018). This was due to the constant feedback that was not realistically tailored to the user and based upon an algorithm (Ellis *et al.,*2018). Although the Myzone device has provided evidence that it is based upon an individual’s physical effort (Myzone, 2022). Myzone points are tailored to the individual allowing beginners to be in classes with those who regularly go to the gym and gain more points due to the amount of effort each user is putting into the activity (Myzone, 2022).

**Myzone and Physical Activity**

A study that focuses specifically on Myzone and the influence of the experience of using the device within the gym environment has suggested that future research could look at the perceptions and influence of Myzone upon users whilst taking part in physical activity (Pizzo *et al.,*2021).

Therefore, by undertaking research to aid understanding of the influence on the perceptions of users’ motivation and physical effort will help to broaden the understanding of how effective the device is to combat physical inactivity and continue to keep users active. Myzone incorporating the global physical activity guidelines within their rewards through using the device is unlike any other current wearable fitness technologies (Myzone, 2022). This shows the importance of the aim of this research by providing a greater understanding to researchers and users of the influence that Myzone could have on the perceptions of physical effort and motivation whilst taking part in physical activity.

# Methodology

**Research Design**

This dissertation has been constructed as a mixed methods design. The use of the mixed methods design has been effective for this study. Through the researcher gathering data from different methods, the data provided a more comprehensive outlook and helped strengthen the results (Schoonenboom *et al.,*2017). It is worthwhile using more than one method as it can provide a greater validity of the overall results (Gratton *et al.,*2004).

**Sampling Procedures**

Gratton *et al.,* (2004) suggested that the sampling procedure should be completed first, in order to define the particular population that the study will be based upon. The use of cluster sampling was used within this dissertation study, members of a local gym of whom regularly use a Myzone activity belt MZ-3 were firstly approached and invited to take part in the study (Gratton *et a.,*2004). Over ten members were approached and invited  to complete the questionnaires based upon the intervention. Due to the coronavirus, it was determined that no more than ten members should be asked to participate because of  social distancing rules within the facility. The small sample size allowed the participants to take part safely and  the researcher to draw conclusions.  The researcher would then be working out any links using the online questionnaire to provide a more rounded conclusion through reaching a larger audience (Faber *et al.,*2014).

**Research Procedure - High Intensity Interval Training Class**

Firstly, the researcher under took primary research by using google scholar and the multi search on the University of Highlands and Islands online library. The researcher determined current research in order to decide how they would approach their secondary research. The secondary research involved two high intensity interval training classes followed by two relevant questionnaires based on the classes and then an online questionnaire that was sent out to the wider Myzone community. After the invitations to take part were sent out, the researcher received eight informed consent forms from the participants. Through signing the consent forms, an agreement was made with the participants on the preferred choice of days for both classes which would be at the same time on the same day approximately two weeks apart. Due to unforeseen circumstances, after the eight participants completed the first class, three were unable to attend the second class because of the coronavirus. The classes were completed on the same day of the week at the same time due to availability of the facility that was used and in order to keep results consistent. It is important that the class is exactly the same for all participants.  By keeping it on the same day at the same time a few weeks apart it provides greater validity and reliability with clients not feeling tired by doing the classes back-to-back or a day apart (Gratton *et al.,*2010).

Each class began with a warmup lasting approximately five to ten minutes, the warmup incorporated dynamic movements in order to gradually raise the participants heart rate to prevent injury (American College of Sports Medicine, 2010).

The classes took place within the gym in the studio space, each participant was provided with a mat prior to starting the classes. Both classes were exactly the same workout, a high intensity interval class consisting of bodyweight exercise. The researcher’s choice of bodyweight exercises can be justified as by using bodyweight exercises for high intensity interval training without the addition of weights, has been evidenced to be highly effective for results (American College of Sports Medicine, 2014). The classes lasted for approximately thirty minutes; this is in line with the recommendations of how long high intensity interval training classes should be in order to be perceived as worthwhile for health outcomes (American College of Sports Medicine, 2014). There were six exercises performed for four rounds, each exercise was performed for forty seconds with a twenty second rest between each. This work to rest ratio was chosen due to the positive effect it has shown on the overall physical activity and health of individuals (Baechle *et al.,*2016). The exercises that were performed were squat jumps, shoulder taps, walk outs, jumping lunge changes, burpees and russian twists. These exercises were chosen to be used as they have been identified as easy to follow with the option to be altered easily dependent on the client’s ability (American College of Sports Medicine, 2014). The order of how the exercises were performed was carefully decided, with upper body followed by a lower body exercise to ensure the participants had adequate rest periods (CIMSPA, 2021). Following on from the above the participants all took part in a cool down in order to gradually bring their heart rate down safely, in order to prevent injury (Coulson, 2017).

The class was instructed by the researcher and one of the gyms personal trainers and overseen by the gate keeper, the gym manager. The instructor holds a Level 3 Personal Training qualification and a Health and Safety qualification, allowing all participants to be kept safe throughout the process (Coulson, 2017). Each participant wore their own Myzone activity belt MZ-3, it has been highlighted that this particular model of Myzone device has proven to give precise results (CIMSPA, 2021). This is important as it provides evidence of the reliability of the Myzone device to ensure accuracy of results (Myzone, 2022).

The first class took place where the participants were able to see their real time workout information from the Myzone activity belt MZ-3 on the virtual display boards within the gym. In the second class the virtual display boards were turned off, so that the participants were unable to see any information during the workout.

After each class the participants completed an online questionnaire that was sent directly to them, the questionnaires helped to gather information on whether r or not the virtual display boards had an impact on the motivation and physical effort of the users during the workout, when they could and then could not see the information. The questionnaires asked specific questions relating to each class in regard to the motivation and physical effort of having the screen for the first class and not having it visually there for the second. The use of questionnaire was chosen over interviewing because of time factors, as the participants did not have time after each class to wait to be interviewed (Gratton *et al.,*2010). The use of the questionnaire allowed for the participant to complete their answers within their own time so that the responses were not rushed (Gratton *et al.,*2010). The use of the questionnaire also benefitted the researcher by showing all data available clearly and without the need to transcribe interviews keeping the data valid and reliable (Gratton *et al.,*2010).

**Research Procedure - Online Research Questionnaire**

An online questionnaire was also sent out through the gatekeeper, the manager at the gym. The gatekeeper has access to a wider audience of Myzone users through having Myzone within their gym. The questionnaire will help strengthen the information from the intervention to see if any links exist (Gratton *et al.,*2004).

The online questionnaire being used separately to the above classes in order to reach a wider audience was an effective method due to the small sample size of the intervention (Thomas *et al.,*2011). The questionnaire was developed with simple and clear questions in order to understand the influence of Myzone on physical effort and motivation (Gratton *et al.,*2004). The questionnaire used quantitative and qualitative questions, this allowed the researcher to clearly identify common patterns amongst users but also allowed for opinions from the users to strengthen the findings of the intervention (Thomas *et al.,*2011). The questionnaire was left open for three weeks in order to give participants enough time to respond (Gratton *et al.,*2010).

**Data Collection**

After receiving ethical approval by the University of Highlands and Islands Ethics Committee (2022) the researcher opened the questionnaire for a three-week period in order to collect the data required. The classes were scheduled with both of the online questionnaires left open for a week after each class, in order to give participants sufficient time to complete. The information gathered from the questionnaires was saved onto a secure account through the university approved online survey software. The information was then downloaded and saved on a secure file by the researcher.

To provide greater clarity to the information gathered by the questionnaire, the participants of the high intensity interval training classes provided the researcher with the data that their Myzone activity belt MZ-3 had collected during both classes in order to distinguish any similarities or differences. The researcher added the information given into a spreadsheet, the percentage of effort during the class on average for each user. This was kept in a secure file with participants names removed and named for example, Participant A.

**Data Analysis**

The use of thematic analysis was used so that the researcher was able to precisely understand and analyse the data to explore common themes from all questionnaires and through the information provided from the Myzone activity belt MZ-3 (Forrester *et al.,*2019). The use of this analysis will allow the researcher to draw conclusions from the information that has been gathered accurately (Gratton *et al.,*2004). All personal details will be removed from the data that has been gathered to ensure the confidentiality agreement is followed throughout (Gratton *et al.,*2004).

**Ethical Considerations**

To comply with ethical and legal guidelines, prior to any research being undertaken, the gate keeper was given an information sheet and consent form (Appendix 1) this was signed in order to use the facilities and keep the participants, researcher, and other gym members safe (University of Highlands and Islands Ethics, 2022). Each participant was given a participant information sheet (Appendix 2) along with an informed consent sheet (Appendix 3) which had to be signed prior to taking part in the study. The participants also had to be over eighteen, a Myzone user and had to complete a physical activity readiness questionnaire (Appendix 6) to ensure they were healthy and fit enough to be able to take part safely (American College of Sports Medicine, 2010).

The researcher followed the Register of Exercise Professionals code of conduct to ensure the study was carried out appropriately, to a high standard and accurately (Register of Exercise Professionals, 2022). Prior to the research being conducted within the gym facility, a risk assessment (Appendix 4) was completed by the researcher in order to minimise any risks to the gym members, participants and other members of the public (Coulson, 2017). The risk assessment also identified that the facility chosen of use was safe for the study to take place and prevent accidents (Coulson, 2017).

All information in regard to the study was kept in a password protected secured file in order to keep all participants information confidential (Register of Exercise Professionals, 2022). Through signing the informed consent form, the participants were advised that they have a right to withdraw from the study at any time should they wish (Edwards *et al.,*2005). In line with government advice, all coronavirus protocols were followed, with social distancing followed and hand sanitiser provided (United Kingdom Government, 2022c).

Prior to the online questionnaire being sent out to participants, the researcher completed the internet mediated research checklist to ensure the questionnaire complied with the university’s standards (University of Highlands and Islands 2022). At the start of the online questionnaire, informed consent (Appendix 5) had to be given before taking part and completing the questionnaire.

# Results

**High Intensity Interval Training Classes**

Ten participants were approached and invited to take part in the study, eight of which consented to taking part, with two participants declining due to work commitments. The participants of the class ranged from 23 to 56 years of age. The mean age of the participants was 38 years old. Seven participants of the class identified as female, and one participant identified as male.

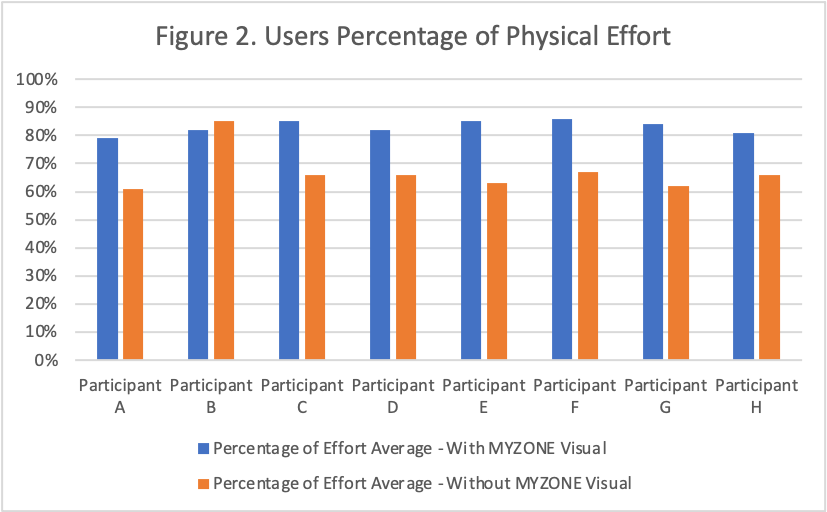


Figure 2. Users Percentage of Physical Effort

Figure 2. represents the data that has been gathered from all eight participants Myzone activity belt MZ-3 devices. Figure 2. identifies the participants percentage of physical effort during the class with the Myzone visual and the class without the Myzone visual on display. From Figure 2. you can see that the lowest percentage of effort was 40% with the highest being over 80%. The figure also shows that all participants except one had a higher physical effort percentage in the class with the Myzone visual.

Figure 3. Users Opinions from Myzone Class with Visual

Figure 3. identifies how each participant found the class with the Myzone visual on display. With the figure suggesting all participants found the class hard.

Figure 4. Users Opinions from Myzone Class without Visual

Figure 4. shows that almost all participants apart from one found the class without the Myzone visual hard, with one participant finding it somewhat hard.

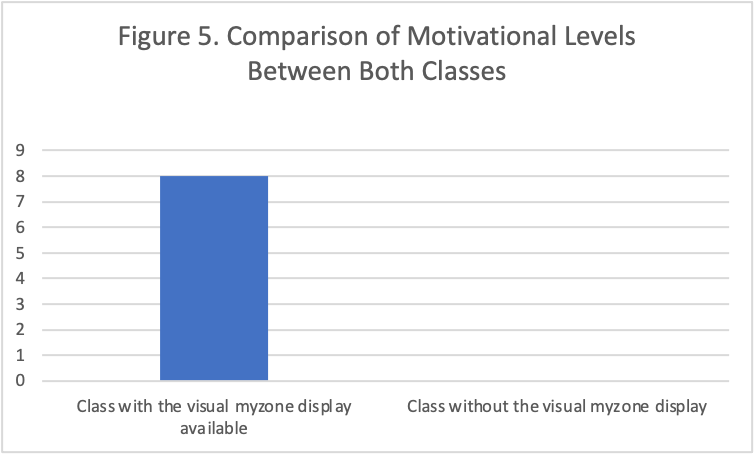


Figure 5. Comparison of Motivational Levels Between Both Classes

Figure 5. identifies that all of the participants felt more motivated during the class with the Myzone visual display board on show.

Figure 6. Impact of Other Users Myzone Data

Figure 6. identifies that the visual display of other participants Myzone data had an impact on five of the participants, and three participants identified that it did not have an impact.

Figure 7. Effort Level Differences and Other Users Myzone Data

Figure 7. represents how the participants felt when they were unable to see the other users Myzone data during the class without the visual display. Three participants identified that their effort levels remained the same. Over half of the participants identified that they had a lower level of effort during the workout.

Figure 8. Myzone Visual Display Board

Figure 8. represents how often the participants looked at the visual display board during the class with this on show. Over half identified that they looked at it periodically with three recognising that they looked at it consistently.

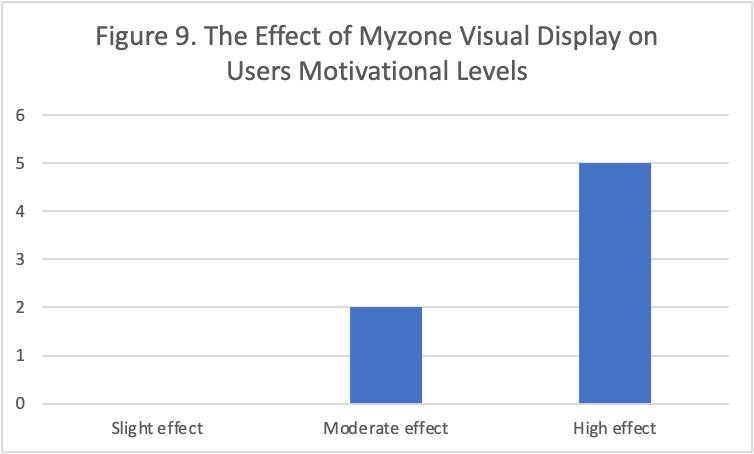


Figure 9. The Effect of Myzone Visual Display on Users Motivational Levels

Figure 9. shows that the Myzone visual display board has had a high effect on five participants and a moderate effect on two participants, with one participant not answering this question.

**Online Questionnaire**

Figures 10,11,12, 13 and 14 represent the findings from the online questionnaire which gained two hundred and forty-three responses. 78.8% of the participants of the questionnaire identified as female and 21.2% identified as male. The majority of responses came from participants of the ages between 45 and 60 years old, with 47.7%. 8.3% responses were from 18- to 30-year-olds. 26.6% of the responses were by 30- to 45-year-olds and 17.4% of responses came from 60 years old and over.

Figure 10. Influence of Myzone on Motivational Levels During Workout

Figure 10. represents the impact of Myzone on the online questionnaire participants motivational levels whilst working out. Over one hundred participants identified that Myzone has a high influence, over ninety participants identified that Myzone is very influential. It shows that under forty participants advised Myzone has a moderate influence and under ten participants identified it had a slight influence. Under ten participants also recognised that it had no influence on them.

Figure 11. Difference in Workouts Since Becoming a Myzone Member

Figure 11. represents that over two hundred participants of the online questionnaire identified that they had recognised differences within their workouts since becoming a Myzone member. The figure also shows that under twenty participants had not seen a difference within their workouts since becoming a Myzone member.

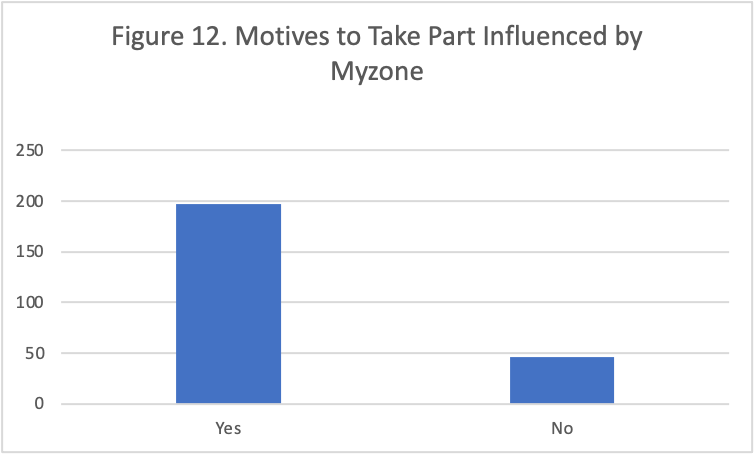


Figure 12. Motives to Take Part Influenced by Myzone

Figure 12. represents the findings from the online questionnaire, where just under two hundred participants identified that the use of Myzone influences their motivations to take part in physical activity. The figure also recognises that under fifty participants identified that it had no influence on their workout.

Diagram, text

Description automatically generated

Figure 13. Key Themes from Myzone Users Opinions

Figure 13. shows the opinions that were gathered from the online questionnaires identifying key themes and showing direct quotes from the participants. The key themes coming through for the participants opinions were the Myzone points and status feature, the competitive aspect, the visual screen and effort levels and the accountability of Myzone showing progress.

Graphical user interface, text, application, chat or text message

Description automatically generated

Figure 14. Key Themes from The Use of Myzone and Opinions Since Becoming a Myzone Member

Figure 14. identifies the opinions from Myzone users from the online questionnaire with the common themes of the change in effort and or intensity, frequency, and motivation since becoming a Myzone member.

# Discussion

This study is intended to explore the influence of the Myzone activity belt MZ-3 on individuals’ perceptions of physical effort and motivation. This chapter will discuss the findings from both high intensity interval training classes, the questionnaire results from the classes and the online questionnaire that was sent out to a wider audience. The use of thematical analysis has distinguished key themes in relation to the use of Myzone and the impact on the perceptions of physical effort and motivation of users. The key themes that have been identified and will be discussed are the Myzone point system and status ranking, the visual screen aspect, the competitive aspect, and the use of Myzone for accountability and progress. These key themes will help to provide information on how influential Myzone can be on perceptions of users’ physical effort and motivation. This will ultimately conclude how influential the device is and help to advise of any recommendations for future research.

**The Visual Screen**

When participants of the High Intensity Interval Training classes were asked to comment on how hard they found each class, the results in Figure 3. and Figure 4. have identified that all participants found the class with the Myzone visual hard and all except one found the class without the Myzone visual hard, with one participant finding it somewhat hard. When comparing Figure 2. with the results from Figures 3 and 4, you can see that participant effort levels were higher in the class with the Myzone visual, except one participant who has shown a higher effort level in the class without the visual screen. The class without the visual screen took place after the class with the visual screen, Participant B who scored higher in the second class was the only male participant in the study. Egli *et al.,*(2011) has identified that there are differences in motivations amongst genders, with results showing that males can be greater intrinsically motivated than female. Participant B could be internally driven and therefore the impact of the visual screen has not had any effect on the participants physical effort levels throughout the classes. Although Participant B was also the youngest participant taking part, it is believed that young adults are more likely to be intrinsically motivated in comparison to middle aged to older adults (Brunet *et al.,*2011). This could have an influence of why Participant B has shown higher effort levels without the visual screen on display.

Figures 5 and 9 have identified that participants of the high intensity interval training classes were motivated more to take part in physical activity through the impact of the visual screen. Figure 13, the data gathered from the online questionnaire also supports these findings, with the wider audience of Myzone users also identifying the positive impact of the visual screen on their physical activity participation. A study has identified that individuals can be influenced through positive reinforcement through a visual, impacting positively on motivations to take part in physical activity (Plante *et al.,* 2013). This may therefore be why individuals are finding the visual display screen to have a high effect on motivational levels. All participants in Figure 5. identify that they felt more motivated with the use of the visual display, this could be because of the automatic feedback that it gives the participants (Bice *et al.,*2015).

It has been highlighted that through visual display feedback, participants can see improvements in their physical fitness which in turn will result in higher levels of motivation and they will be more driven to try harder during physical activity sessions (Wilson *et al.,*2017). This relates to the results found, with Figure 13. identifying how users found the calories burned aspect motivating to keep them working hard when taking part in physical activity.

Figure 6. identifies that the visual display showing other user’s data had an impact on five participants, with three identifying they did not see any impact. Figure 7. identifies that no participants felt they worked harder when they couldn’t see another users’ data. Therefore, this concludes that by seeing the other user’s data it has a positive effect on the physical effort levels of participants, with over half of participants in Figure 7. suggesting they had a lower level of effort in the class when they were unable to see other users’ data. It has been suggested that individuals could work harder and have higher levels of motivation as they could feel the need to compete with other users if someone is working harder than them (Asimakopoulos *et al.,*2017). Three participants who identified in Figure 7. that their effort levels remained the same, this could be due to internal motivations instead of the impact of others (Jarrahi *et al.,*2018).

**Myzone Points and Status Ranking**

Figure 13. and 14. have identified through the online questionnaire that participants are motivated through the Myzone points system and the status ranking. Figure 13. has identified that many users aim to gain the minimum 1300 points required to keep their status. As discussed, this minimum point threshold is the equivalent to the user meeting the nationally recognised minimum physical activity guidelines (Myzone, 2022). By users aiming to hit this target to keep their gained status this shows that Myzone is creating a positive impact on influencing individuals to be consistently physically active. It has been suggested that those who are currently physically inactive are more likely to be motivated to a greater extent by an incentive approach from a wearable fitness device than those who are already regularly physically active (Elliott *et al.,*2019). The Myzone point system could be effective as it is an incentive approach to be physically active and therefore could have an effect on physical activity participation levels short term (Elliott *et al.,*2019).  Although this can have a negative effect on individuals’ motives to exercise with intrinsic motives such as taking part for overall health and wellbeing, being overshadowed through extrinsic rewards (Strohacker *et al.,*2013). This can be negative as results have shown long term people can just give up as the incentive of the rewards wear off (Strohacker *et al.,*2013).

**The Competitive Aspect**

Figure 7. identifies those participants of the high intensity fitness classes found that by not seeing other participants data on the visual, they felt their individual effort levels were not as high. Le Bouc *et al.,*(2013) has suggested that by having the influence of another participant completing the same activity, this can have a positive long- and short-term impact on the effort levels of an individual.

It has been identified in Figure 13. that participants of the online questionnaire have noticed that because their peers can see if they have taken part in an activity that day on the Myzone application they are more likely to take part in physical activity due to the competitiveness of wanting others to see that they are keeping active. Frederick-Recascino *et al.,*(2003) suggests that if participants feel the need to compete this will engage them further in the activity and individuals will be motivated take part more consistently. When looking at the data gathered from Figure 8. it is evident that participants looked at the visual, with over half identifying periodically and just under half identifying that they looked at the visual consistently. This could be due to the impact of other users’ data on the other participants physical effort levels, or users wanting to perform better than others (DiMenichi *et al.,*2015). However, it has been identified that due to different characteristics and age, and gender. Participants could have been looking at the visual and concentrating solely on their own data in the mindset to compete against their selves, due to extrinsic motives such as appearance (Egli *et al.,*2011).

Figure 2. identifies the participants percentages of effort when completing both classes, with the majority of participants having a higher percentage of effort during the class with the Myzone visual, these results could be due to competitive aspect of seeing the other user’s data. It has been highlighted those individuals will likely try harder and be more motivated by comparing their results to others (Zhang *et al.,*2016). Although the users could be using the screen to compete against themselves instead of others (Zhang *et al.,*2016).

Figure 13. identifies those participants have advised that Myzone and the competitions that are promoted amongst users to gain points and higher status rankings keep the users moving. It has been highlighted that competitive physical activities provide greater benefits to individuals physical health than non-competitive (Dionigi *et al.,*2011). Therefore, the results show that competition aspects of Myzone have an advantage on the improvements of physical health through the competitive influence (Dionigi *et al.,*2011). Users will try harder and be consistently motivated to strive to do better (Dionigi *et al.,*2011).

**Accountability and Progress**

Figure 13. has identified a key theme coming from the online questionnaire was the impact that Myzone has on the accountability and progress of physical activity adherence. Participants have identified that they feel like the workout didn’t count if they did not use their Myzone device. It has been identified that wearable fitness devices can have a significant influence on interventions that help promote physical activity. The accountability factors that they have, such as saving workout stats and allowing users to see how active they have been for the week are effective in keeping individuals motivated to keep active (Kokts-Porietis *et al.,*2019).

The achievement goal theory could provide greater understanding of why participants of the online questionnaire identified that the ability of tracking progress and staying accountable through the use of Myzone helps keep individuals motivated to take part in physical activity (Lochbaum *et al.,*2008). Myzone users are able to track how active they have been weekly, for how long and to what extent of effort they have worked. Therefore, by setting aims to stay within the particular coloured Myzones, this could ideally be the task they set for themselves with the impact of peers who can see their details and stats keeping them focused, motivated, and engaged to complete (Lochbaum *et al.,*2008).

Basset *et al.,*(2017) supports the findings from Figure 13. of which participants identified that they enjoy being able to identify how physically active they have been during the activity they are taking part in. These findings relate to the findings in Figure 11. as participants identified they have noticed a difference within their workouts since becoming a Myzone member. This could have been due to the fact they are able to see their progress to adjust and make improvements or to push harder. Although in Figure 12. the findings have identified that just under 200 participants felt motivated through the use of Myzone to take part in physical activity. Ball *et al.,*(2017) suggests that an incentive approach to physical activity could increase the motives of participants. Therefore, participants may actually be motivated through the status ranking and Myzone points system instead of being able to identify progress through the use of the device.

Figure 10. has identified that majority of participants feel that the use of Myzone has a high influence on their motives to take part in physical activity. The term gamification means using game aspects in non-game situations (Vooris *et al.,*2019). This term has been widely acknowledged within the developments of wearable fitness technologies (Vooris *et al.,*2019). It has been suggested that the impact of game aspects within these technologies can increase motivation levels amongst users (Vooris *et al.,*2019). Therefore, the game aspects of Myzone, such as tracking progress and the automatic feedback could be why users have identified the high influence it has on their motives to be physically active (Vooris *et al.,*2019). Figure 13. identifying the positive accountability that Myzone has on users’ physical activity participation, could be due to the intrinsic and extrinsic game aspects that Myzone has (Kappen *et al.,*2017). The ability of users being able to track their heart rate, calorie expenditure and time spent being physically active can be an intrinsic factor that can help increase motives to take part (Kappen *et al.,*2017). Alongside the extrinsic factors of the status ranking and points that also lead to increased motives (Kappen *et al.,*2017).

# Conclusion and Recommendations for Future Research

**Limitations of the Research**

Although this research ascertains the influence of Myzone on users’ perceptions of physical effort and motivations, it has several limitations that merit focus in future research. The sample size for the high intensity interval classes was limited due to safety factors and current rules of coronavirus at the time of the study. If the coronavirus rules had not been in place and the class sizes capped due to social distancing, the researcher could have obtained a larger sample size which would have provided greater depth into the findings (Abt *et al.,*2020).

Furthermore, it is apparent from the findings of the research, that only one male took part in the high intensity fitness classes, this is a limitation of the study due to the over representation of woman in comparison to men (Dickinson, 2012). Alongside the online questionnaire, almost 80% of respondents were female, with low levels of male representation. This is a limiting factor to the findings, suggesting the findings cannot be generalised amongst the overall population (Dickinson, 2012).

Through the findings, it has become apparent that the researcher could have identified through use of the questionnaire, why the participants took part in physical activity, to distinguish if any were professional or competitive athletes as this could have altered their motives and effort during physical activity when wearing the Myzone activity belt. It has been suggested that professional or competitive athletes can become obsessive over physical activity and sport, therefore this could impact their motives and physical effort levels (Juwono *et al.,*2021).

Another limitation of the study would be the use of online questionnaires to gather data after both high intensity fitness classes. This was carried out due to time factors, although it has become apparent that completing interviews with each participant would have allowed the researcher to probe for more information and get further detailed answers to fully understand the impact of Myzone (Gratton *et al.,*2010).

A further limitation of the study was the very limited amount of academic work and research on influence of Myzone on individuals’ perceptions of physical effort and motivations which allowed for a lack of room to compare, contrast and substantiate the findings.

**Strengths of the Research**

A strength of this research study was the use of the online questionnaire in order to reach a wider audience. This method of data collection was effective, as the researcher was able to reach over two hundred Myzone users, which strengthened the findings due to the sizeable amount of opinions gathered.

Another strength was the use of the Myzone activity belt for both classes, this allowed the researcher to draw comparisons on the physical effort levels of both classes to see if any similarities or differences existed. This strengthened the findings from the online questionnaires as it allowed the researcher to compare opinions with real time data that had been collected.

**Conclusion and Future Recommendations**

This dissertation examined the influence of Myzone and the visual screen on users’ perceptions of physical effort and motivation. The objectives of the research were to analyze the findings from two high intensity fitness classes and the post online questionnaires in order to identify the perceptions of users when taking part in a high intensity fitness class with and without the visual screen. Another objective set out was to reach out to a wider audience of Myzone users through the online questionnaire to see if any links exist.

The findings have identified four key themes that have emerged, these are the visual screen, the Myzone points and status ranking, the competitive aspect and the accountability and progress factors from the use of Myzone.

The conclusions the researcher has reached from the findings are that the visual display has a high influence on users’ physical effort and motivations to take part in physical activity. Although it has been identified through the results and previous literature that different characteristics could impact how influential the visual display has been on effort and motives to take part in physical activity of participants (Egli *et al.,*2011). It can be concluded that different genders and ages can have different intrinsic and extrinsic motives to take part in physical activity. The online questionnaire which reached a wider audience supports these findings and identified that users find the visual display to have a positive effect on their participation in physical activity and this is due to the positive reinforcement of real time data that is shows throughout the workout. This aligns with the findings by Plante *et al.,* 2013, who found that positive reinforcement increases motivation in individuals.

Another finding is the impact of the Myzone points and status ranking on motivations to take part in physical activity and the change in physical effort levels when doing so. It has been found from this current research study that the Myzone points and status ranking positively affects the motives to take part and engages participation.

Consideration should be given to the visual screen and Myzone data that gets shared during or after each workout with peers or other gym club members which has a positive effect on motivations to take part, and physical effort whilst doing so. The online questionnaire from the wider Myzone community relates to these findings, a popular response from this was the elements of competitiveness amongst users. The use of Myzone and the visual screen has seen users become engrossed in being competitively active, with previous literature supporting these findings and identifying the impact that seeing others succeed influences stimulus and increases effort levels (Frederick-Recascino *et al.,*2003).

The findings show the influence of Myzone and the visual display on users’ accountability and progress. The results show that users find the automatic feedback from the visual display and the tracking of workouts with all the current information on calorie expenditure, time spent in each zone beneficial in seeing and making progress. Therefore, the motives to continue staying physically active due to the accountability aspects of Myzone shows the positive influence of Myzone amongst users.

In conclusion, this research fails to reject the research hypothesis. The research aims of which was to provide a greater understanding of the influence of Myzone and the Visual Screen of user’s perceptions of physical effort and motivation was met through the set-out objectives. The results have identified that Myzone and the visual screen have a positive influence on users’ perceptions of physical effort and motivation.

To better understand the implications of these results, future studies could focus in particular on gender and age of users defining any differences or similarities to gain a broader understanding of how Myzone influences these users.

Further studies should look at the use of Myzone over a sustained period of time to understand if the benefits of the Myzone points and status ranking wear off and why this could be. This could also look to specify if users are motivated through solely gaining points and rewards or are motivated through progress of the status ranking, knowing they have met the physical activity guidelines and are benefitting their overall health.

Another recommendation for future research would be specifically identifying if users are motivated by themselves or are motivated due to competition with peers or other users. These recommendations for future research should give a broader understanding of the influence of Myzone and the visual screen on user’s perceptions of motivation and physical effort.

# References

Abt, G., Boreham, C., Davison, G., Jackson, R., Nevill, A., Wallace, E. and Williams, M., (2020). Power, precision, and sample size estimation in sport and exercise science research. *Journal of Sports Sciences*, 38(17), pp.1933-1935.

American College of Sports Medicine*(*2010) Acsm's Guidelines For Exercise Testing And Prescription*. Lippincott Williams & Wilkins.*

American College of Sports Medicine (2014). [online] Available at: <[https://www.acsm.org/docs/default-source/files-for-resource-library/high-intensity-interval-training.pdf>](https://www.acsm.org/docs/default-source/files-for-resource-library/high-intensity-interval-training.pdf%3e); [Accessed 30 March 2022].

American College of Sports Medicine (2022). *ACSM Fitness Trends*. [online] Available at: <[https://www.acsm.org/education-resources/trending-topics-resources/acsm-fitness-trends>](https://www.acsm.org/education-resources/trending-topics-resources/acsm-fitness-trends%3e); [Accessed 28 March 2022].

Asimakopoulos G, Asimakopoulos S, and Spillers F. (2017) “Motivation and User Engagement in Fitness Tracking: Heuristics for Mobile Healthcare Wearables”. In: *Infor- matics.*

Baechle, T., (2016). *Essentials of strength training and conditioning*. Champaign, IL: Human Kinetics.

Ball, K., Hunter, R., Maple, J., Moodie, M., Salmon, J., Ong, K., Stephens, L., Jackson, M. and Crawford, D., (2017). Can an incentive-based intervention increase physical activity and reduce sitting among adults? the ACHIEVE (Active Choices IncEntiVE) feasibility study. *International Journal of Behavioral Nutrition and Physical Activity*, 14(1).

Bassett, D. R., Jr, Toth, L. P., LaMunion, S. R., & Crouter, S. E. (2017). Step Counting: A Review of Measurement Considerations and Health-Related Applications. *Sports medicine (Auckland, N.Z.)*, *47*(7), 1303–1315.

Bice, Matthew & Ball, James & McClaran, Steve. (2015). Technology and physical activity motivation. International Journal of Sport and Exercise Psychology. 14. 1-10. 10.1080/1612197X.2015.1025811.

Bravata, D., Smith-Spangler, C., Sundaram, V., Gienger, A., Lin, N., Lewis, R., Stave, C., Olkin, I. and Sirard, J., (2007). Using Pedometers to Increase Physical Activity and Improve Health. *JAMA*, 298(19), p.2296.

British Heart Foundation (2022). *Physical inactivity*. [online] Available at: <[https://www.bhf.org.uk/informationsupport/risk-factors/physical-inactivity>](https://www.bhf.org.uk/informationsupport/risk-factors/physical-inactivity%3e); [Accessed 3 April 2022].

British Journal of Sports Medicine (2017). Not all steps are equal: Changing algorithms in wearable trackers changes outcomes - BJSM blog - social media's leading SEM voice. [online] Available at: <[https://blogs.bmj.com/bjsm/2017/01/20/not-steps-equal-changing-algorithms-wearable-trackers-changes-outcomes/>](https://blogs.bmj.com/bjsm/2017/01/20/not-steps-equal-changing-algorithms-wearable-trackers-changes-outcomes/%3e); [Accessed 28 March 2022].

Brunet, J. and Sabiston, C., (2011). Exploring motivation for physical activity across the adult lifespan. *Psychology of Sport and Exercise*, 12(2), pp.99-105.

Case MA, Burwick HA, Volpp KG, Patel MS. (2015). Accuracy of smart- phone applications and wearable devices for tracking physical activity data. JAMA. 2015;313(6):625-626

Chow, J.J., Thom, J.M., Wewege, M.A., Ward, R.E., & Parmenter, B.J. (2017). Accuracy of step count measured by physical activity moni- tors: The effect of gait speed and anatomical placement site. Gait and Posture, 57, 199–203. PubMed ID: 28666177 doi:10.1016/j.gaitpost. 2017.06.012

CIMSPA. 2021. *Standards*. [online] Available at: <https://www.cimspa.co.uk/standards-home> [Accessed 21 April 2022].

Clinical Trials Government (2022). *Search of: activity tracker - List Results - ClinicalTrials.gov*. [online] Available at: <[https://clinicaltrials.gov/ct2/results?term=activity+tracker&pg=1>](https://clinicaltrials.gov/ct2/results?term=activity+tracker&pg=1%3e); [Accessed 28 March 2022].

Costello K.  (2019). Gartner Says Worldwide Wearable Device Sales to Grow 26 Percent in 2019. *Gartner, Inc.* [2020-08-17]. <https://www.gartner.com/en/newsroom/press-releases/2018-11-29-gartner-says-worldwide-wearable-device-sales-to-grow-> [Accessed 28 March 2022].

Coulson, M., (2017). The Fitness Instructor's Handbook.

Diaz KM, Krupka DJ, Chang MJ, Peacock J, Ma Y, Goldsmith J, (2015). Fitbit®: an accurate and reliable device for wireless physical activity tracking. Int J Cardiol 185:138–40. doi:10.1016/j.ijcard.2015.03.038

Dickinson, E., Adelson, J. and Owen, J., (2012). Gender Balance, Representativeness, and Statistical Power in Sexuality Research Using Undergraduate Student Samples. *Archives of Sexual Behavior*, 41(2), pp.325-327.

DiMenichi, B. C., & Tricomi, E. (2015). The power of competition: Effects of social motivation on attention, sustained physical effort, and learning. *Frontiers in psychology*, *6*, 1282. <https://doi.org/10.3389/fpsyg.2015.01282>

Dionigi, R., Baker, J. and Horton, S., (2011). Older Athletes’ Perceived Benefits of Competition. *The International Journal of Sport and Society*, 2(2), pp.17-28.

Edenfield, T. M., & Blumenthal, J. A. (2011). Exercise and stress reduction. In R. J. Contrada & A. Baum (Eds.), *The handbook of stress science: Biology, psychology, and health* (pp. 301–319). Springer Publishing Company

Edwards, S., (2005). RESEARCH PARTICIPATION AND THE RIGHT TO WITHDRAW. *Bioethics*, 19(2), pp.112-130.

Egli, T., Bland, H., Melton, B. and Czech, D., (2011). Influence of Age, Sex, and Race on College Students’ Exercise Motivation of Physical Activity. *Journal of American College Health*, 59(5), pp.399-406.

Ellingson, L., Lansing, J., DeShaw, K., Peyer, K., Bai, Y., Perez, M., Phillips, L. and Welk, G., (2019). Evaluating Motivational Interviewing and Habit Formation to Enhance the Effect of Activity Trackers on Healthy Adults’ Activity Levels: Randomized Intervention. *JMIR mHealth and uHealth*, 7(2), p.e10988.

Elliott, M., Eck, F., Khmelev, E., Derlyatka, A. and Fomenko, O., (2019). Physical Activity Behavior Change Driven by Engagement With an Incentive-Based App: Evaluating the Impact of Sweatcoin. *JMIR mHealth and uHealth*, 7(7), p.e12445.

Ellis, D. and Piwek, L., (2018). Failing to encourage physical activity with wearable technology: what next?. *Journal of the Royal Society of Medicine*, 111(9), pp.310-313.

Evenson KR, Goto MM, Furberg RD. (2015). Systematic review of the validity and reliability of consumer-wearable activity trackers. Int J Behav Nutr Phys Act. 2015;12:159.

Faber, J. and Fonseca, L., (2014). How sample size influences research outcomes. *Dental Press Journal of Orthodontics*, 19(4), pp.27-29.

Forrester, M. and Sullivan, C., (2019). *Doing qualitative research in psychology*. 2nd ed. SAGE.

Frederick-Recascino C. M., Schuster-Smith H. (2003). Competition and intrinsic motivation in physical activity: a comparison of two groups. *J. Sport Behav.* 26, 240–254.

Fuller, D., Colwell, E., Low, J., Orychock, K., Tobin, M., Simango, B., Buote, R., Van Heerden, D., Luan, H., Cullen, K., Slade, L. and Taylor, N., (2020). Reliability and Validity of Commercially Available Wearable Devices for Measuring Steps, Energy Expenditure, and Heart Rate: Systematic Review. *JMIR mHealth and uHealth*, 8(9), p.e18694.

Gierisch, J., Goode, A., Batch, B., Huffman, K., Hall, K., Hastings, S., Allen, K. D., Shaw, R. J., Kanach, F. A., McDuffie, J. R., Kosinski, A. S., Nagi, A., & Williams, J. J. (2015). The Impact of wearable motion sensing technologies on physical activity: A systematic review (VA ESP Project #09-010). <http://www.ncbi.nlm.nih.gov/pubmed/27559568>

Gill, D. L., Hammond, C. C., Reifsteck, E. J., Jehu, C. M., Williams, R. A., Adams, M. M., Lange, E. H., Becofsky, K., Rodriguez, E., & Shang, Y. T. (2013). Physical activity and quality of life. *Journal of preventive medicine and public health = Yebang Uihakhoe chi*, *46 Suppl 1*(Suppl 1), S28–S34. <https://doi.org/10.3961/jpmph.2013.46.S.S28>

Gratton, C. and Jones, I., (2004). *Research methods for sports studies*. London: Routledge.

Gratton, C. and Jones, I., (2010). *Research methods for sports studies*. London: Routledge.

Hardman, A. and Jeremy N.Morris, C., (2004). *Physical Activity and Health*. Milton: Taylor & Francis. pp. 184.

Henriksen, A., Haugen Mikalsen, M., Woldaregay, A. Z., Muzny, M., Hartvigsen, G., Hopstock, L. A., & Grimsgaard, S. (2018). Using fitness trackers and smartwatches to measure physical activity in research: Analysis of consumer wrist-worn wearables. Journal of Medical Internet Research, 20(3), e110. <https://doi.org/10.2196/jmir.9157>

Jarrahi M.H., Gafinowitz N., and Shin G. (2018) “Activity trackers, prior motivation, and perceived informational and motivational affordances.” In: *Pers Ubiquit Comput*22 (2018), pp. 433–448.

Juwono, I., Tolnai, N. and Szabo, A., (2021). Exercise Addiction in Athletes: a Systematic Review of the Literature. *International Journal of Mental Health and Addiction*,.

Kamel Boulos, M. N., & Yang, S. P. (2021). Mobile physical activity planning and tracking: a brief overview of current options and desiderata for future solutions. *mHealth*, *7*, 13. <https://doi.org/10.21037/mhealth.2020.01.01>

Kappen, Dennis L.; Mirza-Babaei, Pejman; Nacke, Lennart E. (2017). [ACM Press the Annual Symposium - Amsterdam, The Netherlands (2017.10.15-2017.10.18)] Proceedings of the Annual Symposium on Computer-Human Interaction in Play - CHI PLAY '17 - Gamification through the Application of Motivational Affordances for Physical Activity Technology. , (), 5–18.doi:10.1145/3116595.3116604

Kinney, D., Nabors, L., Merianos, A. and Vidourek, R., (2019). College Students’ Use and Perceptions of Wearable Fitness Trackers. *American Journal of Health Education*, 50(5), pp.298-307.

Kokts-Porietis, R.L., Stone, C.R., Friedenreich, C.M. (2019). Breast cancer survivors’ perspectives on a home-based physical activity intervention utilizing wearable technology. *Support Care Cancer* **27,**2885–2892 (2019). <https://doi.org/10.1007/s00520-018-4581-7>

Laranjo, L., Ding, D., Heleno, B., Kocaballi, B., Quiroz, J., Tong, H., Chahwan, B., Neves, A., Gabarron, E., Dao, K., Rodrigues, D., Neves, G., Antunes, M., Coiera, E. and Bates, D., (2020). Do smartphone applications and activity trackers increase physical activity in adults? Systematic review, meta-analysis and metaregression. *British Journal of Sports Medicine*, 55(8), pp.422-432.

Le Bouc R., Pessiglione M. (2013). Imaging social motivation: distinct brain mechanisms drive effort production during collaboration versus competition. *J. Neurosci.* 33, 15894–15902. 10.1523/JNEUROSCI.0143-13.2013

Lee, IM, Shiroma, EJ, Lobelo, F, Puska, P, Blair, SN, Katzmarzyk, (2012). PT Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. Lancet 2012; 380: 219–229.

Lee, Y., Lee, J. and Hwang, Y., (2015). Relating motivation to information and communication technology acceptance: Self-determination theory perspective. *Computers in Human Behavior*, 51, pp.418-428.

Linder, S., Abu-Omar, K., Geidl, W., Messing, S., Sarshar, M., Reimers, A. and Ziemainz, H., (2021). Physical inactivity in healthy, obese, and diabetic adults in Germany: An analysis of related socio-demographic variables. *PLOS ONE*, 16(2), p.e0246634.

Lochbaum, M. R. & Stevenson, S. J., (2008). Understanding exercise motivation: Examining the revised social-cognitive model of achievement motivation. Journal of Sport Behavior, 31(4), 389–412.

Marc, R., Emeka, T., David, C. and Zisan, K., (2008). ACHIEVEMENT GOALS AND INTENSIVITY OF PHYSICAL ACTIVITY DURING FREE PLAY IN CHILDREN: THE MODERATING ROLE OF PERCEIVED SPORT CONFIDENCE.

McIntosh, T., Hunter, D. and Royce, S., (2016). Barriers to physical activity in obese adults: A rapid evidence assessment. *Journal of Research in Nursing*, 21(4), pp.271-287.

Myzone (2022). *Group Fitness Tracking Software | Wearable Heart Rate Monitors*. [online] MyzoneMyzone.org. Available at: <https://www.myzoneMyzone.org>; [Accessed 28 March 2022].

National Health Service (2022a). *Benefits of exercise*. [online] Available at: <[https://www.nhs.uk/live-well/exercise/exercise-health-benefits/>](https://www.nhs.uk/live-well/exercise/exercise-health-benefits/%3e); [Accessed 22 March 2022].

National Health Service (2022b). *Obesity*. [online] Available at: <[https://www.nhs.uk/conditions/obesity/>](https://www.nhs.uk/conditions/obesity/%3e); [Accessed 25 March 2022].

National Health Service (2022c). *Exercise for depression*. [online] Available at: <[https://www.nhs.uk/mental-health/self-help/guides-tools-and-activities/exercise-for-depression/>](https://www.nhs.uk/mental-health/self-help/guides-tools-and-activities/exercise-for-depression/%3e); [Accessed 25 March 2022].

National Health Service (2022d). *What should my daily intake of calories be?*. [online] Available at: <[https://www.nhs.uk/common-health-questions/food-and-diet/what-should-my-daily-intake-of-calories-be/>](https://www.nhs.uk/common-health-questions/food-and-diet/what-should-my-daily-intake-of-calories-be/%3e); [Accessed 29 March 2022].

Nystoriak, M. and Bhatnagar, A., (2018). Cardiovascular Effects and Benefits of Exercise. *Frontiers in Cardiovascular Medicine*, 5.

Ometov, A., Shubina, V., Klus, L., Skibińska, J., Saafi, S., Pascacio, P., Flueratoru, L., Gaibor, D., Chukhno, N., Chukhno, O., Ali, A., Channa, A., Svertoka, E., Qaim, W., Casanova-Marqués, R., Holcer, S., Torres-Sospedra, J., Casteleyn, S., Ruggeri, G., Araniti, G., Burget, R., Hosek, J. and Lohan, E., (2021). A Survey on Wearable Technology: History, State-of-the-Art and Current Challenges. *Computer Networks*, 193, p.108074.

Phillips, S., Cadmus-Bertram, L., Rosenberg, D., Buman, M. and Lynch, B., (2018). Wearable Technology and Physical Activity in Chronic Disease: Opportunities and Challenges. *American Journal of Preventive Medicine*, 54(1), pp.144-150.

Pizzo, A., Baker, B., Jones, G. and Funk, D., (2021). Sport Experience Design: Wearable Fitness Technology in the Health and Fitness Industry.

Plante, T. G., Morisako, A., Folk, J., Kay, E., Read, C., Dunn, A., Perez, A., & Willemsen, E. (2013). The effect of visual suggestion on exercise motivation and outcomes. Psychology Journal, 10, 23-34.

Pratt, M., Norris, J., Lobelo, F., Roux, L. and Wang, G., (2012). The cost of physical inactivity: moving into the 21st century: Table 1. *British Journal of Sports Medicine*, 48(3), pp.171-173.

Register of Exercise Professionals (2022). [online] Available at: <[https://www.ukcoaching.org/fitness-insurance>](https://www.ukcoaching.org/fitness-insurance%3e); [Accessed 29 March 2022].

Rethorst, C., Wipfli, B. and Landers, D., (2009). The Antidepressive Effects of Exercise. *Sports Medicine*, 39(6), pp.491-511.

Robinson S.A., Troosters T., Moy M.L. (2020) Technology to Enhance Engagement in Physical Activity. In: Moy M., Blackstock F., Nici L. (eds) Enhancing Patient Engagement in Pulmonary Healthcare. Respiratory Medicine. Humana, Cham. <https://doi.org/10.1007/978-3-030-44889-9_8>

Scheid, J. L., & West, S. L. (2019). Opportunities of Wearable Technology to Increase Physical Activity in Individuals with Chronic Disease: An Editorial. *International journal of environmental research and public health*, *16*(17), 3124. <https://doi.org/10.3390/ijerph16173124>

Schoonenboom J, Johnson RB. (2017) How to Construct a Mixed Methods Research Design. *Kolner Z Soz Sozpsychol*. 2017;69(Suppl 2):107-131. doi:10.1007/s11577-017-0454-1

Schrack, J., Zipunnikov, V. and Crainiceanu, C., (2015). Electronic Devices and Applications to Track Physical Activity. *JAMA*, 313(20), p.2079.

Strohacker, K., Galarraga, O. and Williams, D., (2013). The Impact of Incentives on Exercise Behavior: A Systematic Review of Randomized Controlled Trials. *Annals of Behavioral Medicine*, 48(1), pp.92-99.

Sullivan, A. and Lachman, M., (2017). Behavior Change with Fitness Technology in Sedentary Adults: A Review of the Evidence for Increasing Physical Activity. *Frontiers in Public Health*, 4.

Thomas, J., Nelson, J. and Silverman, S., 2011. *Research methods in physical activity (6. ed.)*. Champaign, IL: Human Kinetics.

Ubrani, J., Llamas, R., & Shirer, M. (2019). *Worldwide Wearables market to top 300 million units in 2019 and nearly 500 million units in 2023*, IDC. Retrieved from <https://www.idc.com/getdoc.jsp?containerId=prUS45737919>.

United Kingdom Government (2022a). *Physical activity: applying All Our Health*. [online] Available at: <[https://www.gov.uk/government/publications/physical-activity-applying-all-our-health/physical-activity-applying-all-our-health>](https://www.gov.uk/government/publications/physical-activity-applying-all-our-health/physical-activity-applying-all-our-health%3e); [Accessed 14 March 2022].

United Kingdom Government (2022b). *Physical activity guidelines*. [online] Available at: <[https://www.gov.uk/government/collections/physical-activity-guidelines>](https://www.gov.uk/government/collections/physical-activity-guidelines%3e); [Accessed 14 March 2022].

United Kingdom Government (2022c). *Coronavirus (COVID-19): guidance and support*. [online] Available at: <[https://www.gov.uk/coronavirus>](https://www.gov.uk/coronavirus%3e); [Accessed 30 March 2022].

University of Highlands and Islands Ethics (2022). *Sign in is not complete*. [online] Available at: <[https://myuhi.sharepoint.com/\_forms/default.aspx>](https://myuhi.sharepoint.com/_forms/default.aspx%3e); [Accessed 29 March 2022].

Wang, F. and Boros, S., (2021). The effect of physical activity on sleep quality: a systematic review. *European Journal of Physiotherapy*, 23(1), pp.11-18.

Wilson, Kyle M.; Helton, William S.; de Joux, Neil R.; Head, James R.; Weakley, Jonathon J. S. (2017). Real-time quantitative performance feedback during strength exercise improves motivation, competitiveness, mood, and performance. Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 61(1), 1546–1550.doi:10.1177/1541931213601750

World Health Organisation (2022). *Physical activity*. [online] Available at: <<https://www.who.int/health-topics/physical-activity#tab=tab_1>>; [Accessed 11 February 2022].

Zhang, J., Brackbill, D., Yang, S., Becker, J., Herbert, N. and Centola, D., (2016). Support or competition? How online social networks increase physical activity: A randomized controlled trial. *Preventive Medicine Reports*, 4, pp.453-458

# Appendices

Appendix 1 – Gate Keeper Information Sheet and Consent Form

**Gatekeeper Consent Form**

Undergraduate Research Project

University – University of the Highlands and Islands

Course – Sport and Fitness BSC

Undergraduate Student – Julia Stewart

Supervisor – Rebekka Findlay, Sport and Fitness Lecturer

Title of Project: *The influence of Myzone and the visual screen on gym members individual perceptions of physical effort and motivation when participating in high intensity fitness classes.*

Name of Researcher and School/Faculty:

1.What is the purpose of the study/rationale for the project?

The aim of this research study is to investigate if gym members individual perceptions of physical effort and motivation change when wearing the Myzone activity belt and the influence of the visual screen.

2.What we are asking you to do?

As gatekeeper I would like to ask your permission to gain access to your gym members in order to ask them to take part in two fitness classes within your facility.

3.Why do we need access to your facilities/staff/students?

The access granted to your gym members will allow the successful completion of the

dissertation as it will provide information on the influence of Myzone of individuals perception of physical effort and motivation. The participants will also complete an online questionnaire after each class

By also granting access to your facilities, gym members will be able to participate confidentially.

4.If you are willing to assist in the study what happens next?

Once the dissertation is complete gatekeepers may request to see the research in

order to learn from the findings.

5.How we will use the Information/questionnaire?

The information will be analysed and presented in a paper and electronic format

which will be marked by the Dissertation supervisor and a UHI second marker. It will

not be available outside UHI.

6.Will the name of my organisation taking part in the study be kept confidential?

The name of the organisation will remain confidential, and the names of the Gatekeeper and the participants will not be used in the study.

Sign and return the Gatekeeper Consent Form provided

For participants who are aged 16 and over ONLY.

Should you have any comments or questions regarding this research, you may contact the researcher

Title of Project: *The influence of Myzone and the visual screen on gym members individual perceptions of physical effort and motivation when participating in high intensity fitness classes.*

Name of Gate Keeper:

Name of Organisation:

Please tick to confirm your understanding of the study and that you are happy for your organisation to take part and your facilities to be used to host parts of the project.

Please add some brief information about your project here that clarifies exactly what the gatekeeper is agreeing to

1.I confirm that I have read and understand the information provided 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 participation of our organisation and students/members in the

research is voluntary and that they are free to withdraw at any time, without giving a

reason and that this will not affect legal rights.

3.I understand that any personal information collected during the study will be anonymised and remain confidential.

4.I agree for our organisation and students/members to take part in the above study.

5.I agree to conform to the data protection act

Name of Gatekeeper:

Date:

Signature:

Name of Researcher:

Date:

Signature:

Appendix 2 – Participant Information Sheet

**Participant Information Sheet**

**Undergraduate Research Project**

**University – University of the Highlands and Islands**

**Course – Sport and Fitness BSC**

**Undergraduate Student – Julia Stewart**

**Supervisor – Rebekka Findlay, Sport and Fitness Lecturer**

You are being invited to take part in a research study. Before you decide whether or not to take part it is important for you to understand why the research is being done and what is involved. Please take time to read the following information carefully.

The purpose of the study is to find out if gym members individual perceptions of physical effort and motivation change when wearing the myzone activity belt and having the visual display of results throughout the workout.

As a current myzone user, you have been selected to take part in two of the same high intensity exercise classes. This project will look to find out if the myzone activity belt has an impact on participants perceptions of physical effort and motivation when taking part in a high intensity fitness class. The participants will take part in a class with the belt and visual display boards and then a class on a different day with the belt but without the visual display to see any noticeable differences, an online questionnaire will be used to gather information from each participant at the end of each class.

The classes will be on separate days and times will be confirmed with yourself. The class will take approximately 30 minutes. The online questionnaires will completed after each class.

It is up to you if you decide to take part or not. If you do decide to take part, you will be given this information and a consent form to be completed. If you decide to take part, you are free to withdraw at any time.

Appendix 3 – Participant Informed Consent Sheet

**Informed Consent Form**

•  I............................................. voluntarily agree to participate in this research study.

•  I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind.

•  I have had the purpose and nature of the study explained to me in writing and I have had the opportunity to ask questions about the study.

•  I understand that participation involves completing two high intensity fitness classes and completing two online questionnaires.

•  I understand that all information I provide for this study will be treated confidentially.

•  I understand that under freedom of information legalisation I am entitled to access the information I have provided at any time while it is in storage as specified above.

•  I understand that I am free to contact any of the people involved in the research to seek further clarification and information.

Conducting Research Study - Julia Stewart, Undergraduate Student

Signature of Research Participant –

Signature of Participant Date –

Signature of Researcher –

I believe the participant is giving informed consent to participate in this study

Signature of Researcher Date –

Appendix 4 – Internet Mediated Research Checklist

Internet Mediated Research (IMR) Checklist for Researchers and Supervisors.

PLEASE SUBMIT THIS CHECKLIST WITH YOUR REC1/REC1D ETHICS APPLICATION

|  |
| --- |
| Name: **JULIA STEWART** |
| Project Title: The influence of myzone on gym members individual perceptions of physical effort and motivation when participating in high intensity fitness classes. |
| Module No: UC**609005** |
| Date: **27th April 2021** |

**When planning an Internet Mediated Research (IMR) project (e.g. projects using online surveys, questionnaires, use of social media such as Facebook, online support groups, chat rooms or Skype either for the recruitment of participants or gathering of data) we recommend that you first read the UHI IMR Guidelines and BPS IMR Guidelines which can be found on the UHI Website:** [IMR Guidelines](http://www.uhi.ac.uk/en/research-enterprise/resource/ethics#wysiwygTab-content-2)

(<http://www.uhi.ac.uk/en/research-enterprise/resource/ethics#wysiwygTab-content-2>)

The following questions highlight issues that should be taken into consideration in designing and planning your IMR project. If you have answered “Yes” to this question you should work through the checklist in consultation with your Supervisor. **Double click on the box under yes or no to check or un-check.**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Yes | No |
| 1 | Are you familiar with the University’s Data Protection / Information Security policies[[1]](#footnote-1) (Link Below) and how they apply to your research proposal/ methodology in an internet mediated environment? |  |  |
| 2 | Will your research project capture personal online data and/or sensitive personal data from your participants?[[2]](#footnote-2) |  |  |
| 3 | Are participants/ respondents able to be identified? (e.g. from a University email address, student number, online pseudonym, published images, quotes or an IP address.)[[3]](#footnote-3) |  |  |
| 4 | Does your research design ensure that participant’s confidentiality and anonymity will be maintained during your study and in the dissemination of results? |  |  |
| 5 | Have you ensured the security of data (collection, storage and dissemination) in your research design? NB/Student researchers should save their data securely to their UHI storage space (My Docs/ H Drive) and not to laptops or portable devices. |  |  |
| 6 | Have you minimised the risk of data leakage in the collection and storage of data as part of your research design? (e.g. data leakage through unsecure email transmission, participants using a shared computer, quotes being traced back to the participant/ respondent through Search Engines or in the collection of IP addresses.) |  |  |
| 7 | Will it be necessary to password protect or encrypt the collection or storage of data for your study? |  |  |
| 8 | Have you considered how long your IMR project data is to be stored for and by whom? |  |  |
| 9 | Can others access your IMR project data online? (E.g. If using an online survey tool can you ensure that the results are only available to you?) |  |  |
| 10 | Is your IMR project data to be shared, transferred or stored outside of the UK? (i.e. does the server host comply with the UK Data Protection Act.?[[4]](#footnote-4)) |  |  |
| 11 | Have you provided sufficient information for participants (e.g. in the introduction to an online questionnaire / survey) to make an informed decision about taking part in your IMR study? |  |  |
| 12 | Will you be excluding partial data from participants that fail to complete online surveys or questionnaires? |  |  |
| 13 | Are participants free to opt out of the study? |  |  |
| 14 | Have you considered how valid consent will be obtained and documented in the context of your IMR project? |  |  |
| 15 | Will your research potentially involve ‘Vulnerable’ individuals or groups?[[5]](#footnote-5) |  |  |
| 16 | Are participants able to withdraw their data from the study after it is complete? |  |  |
| 17 | Have you included debrief information and / or links to services, support groups or additional information for participants in response to issues that may be raised for them by the research process? |  |  |
| 18 | Is it necessary in the context of your study to include a disclosure clause? i.e: ‘If you are at serious risk of harming yourself or others; or there are concerns for the neglect or abuse of children then we will have to share your information with agencies, this may be without your permission. If this happens we would discuss it with you first.’ (e.g. harmful behaviour being recorded during the study via social media or Skype) NB/ Depending on the nature of the study and methodology, it may not be possible in an IMR environment to readily identify the location and/or identity of participants. |  |  |
| 19 | Does your study involve gathering information from online activity? (e.g. from discussion forum archives, blog or social media posts) |  |  |
| 20 | \*If you have answered “Yes” to Qu 19 is this information likely to be considered as ‘in the public domain’ by the individuals that created the information? |  |  |
| 21 | Does your study involve the joining of an online forum or group in order to gather data? |  |  |
| 22 | Does your study involve the use of links to an external website/ webpage or the creation of a website/ webpage specifically for the research study? |  |  |
| 23 | Do you intend to publish the name and/or address of a website, online group or discussion forum and are there any risks to group members/individuals in doing so? |  |  |
| 24 | Will your research findings be disseminated online? |  |  |

Appendix 5 – Online Questionnaire Informed Consent

**Online Research Participant Information and Consent**

INVITATION

You are being asked to participate in a questionnaire to identify your perceptions of physical effort and motivation when exercising wearing a Myzone activity belt. This will be used to complete a dissertation as part of a Sport and Fitness BSC. This project has been approved by the Ethics Committee of the University of the Highlands and Islands (UHI).

PARTICIPANT’S RIGHTS

Your participation in this study is completely voluntary.

Your data cannot be withdrawn from the study once you have completed the survey as you will not be able to be identified due to

confidentiality.

You have the right to have any questions you may have about the research project answered. If you have any questions, please ask me before the research begins (methods of contacting me are listed below).

CONFIDENTIALITY/ANONYMITY

There will no personal information collected about you and your anonymity is assured. All responses will be treated in the strictest of confidence. Data will be used to complete a dissertation which will be submitted to UHI only.

FOR FURTHER INFORMATION

I will be happy to answer any questions about this project or questionnaire at any time. I can be

contacted via email at: 15016794@uhi.ac.uk

or my supervisor: kellicochransharp@uhi.ac.uk

By clicking ‘continue’, you are agreeing that:

(1) You have read and understood the Participant Information;

(2) You are taking part in this research study voluntarily.

Appendix 6 – Physical Activity Readiness Questionnaire

Text

Description automatically generated with medium confidence

Appendix 7 – Myzone Online Questionnaire for Class with Visual

Graphical user interface, text, application

Description automatically generated

Graphical user interface, text, application

Description automatically generatedGraphical user interface, text, application, email

Description automatically generated

Appendix 8 – Myzone Online Questionnaire for Class Without Visual

Myzone Online Questionnaire for Class Without Visual

Graphical user interface, application

Description automatically generated

Graphical user interface, text, application

Description automatically generated

Appendix 9 – Online Questionnaire Questions

What is your age group?

18 – 30 years old

30 – 45 years old

45 – 60 years old

60 + years old

What gender do you identify as?

Female (Including Transgender)

Male (Including Transgender)

On a scale of 1 -5, how does the myzone visual display influence your motivational levels during your workout/activity?

1 – No Influence

2 – Slight Influence

3 – Moderate Influence

4 – High Influence

5 – Very High Influence

Have you seen a difference in your workouts since becoming a Myzone member?

Yes   
No

If yes, to what extent?

How much does the Myzone belt impact your workout?

1 – Not at all

2 – To a small extent

3 – To some extent

4 – To a moderate extent

5 – To a large extent

If yes why?

If no, why not?

If you are connected through Myzone to other users, how does their Myzone data influence you?

How frequently would you say you use your Myzone belt?

Every Workout

Cardio Workout

Weight Workout

HIIT Workout

Rarely use Myzone

Do you have any comments to make regarding your personal use of Myzone?

1. [UHI\_Data\_Protection\_Policy](http://www.uhi.ac.uk/en/about-uhi/governance/policies-and-regulations/data-protection/uhiisdataprotectionpolicy.pdf) (<http://www.uhi.ac.uk/en/about-uhi/governance/policies-and-regulations/data-protection/uhiisdataprotectionpolicy.pdf>) [↑](#footnote-ref-1)
2. **Under the Data Protection Act 1998 ‘personal data’** is defined as data which relates to a living individual who can be identified;

   1. from those data or
   2. from those data and other information which is in the possession of, or is likely to come into the possession of the data controller, and includes any expression of opinion about the individual and any indication of the intentions of the data controller or any other person in respect of the individual.

   **Under the Data Protection Act ‘Sensitive Personal Data’ is personal data consisting of information as to;**

   1. the racial or ethnic origin of the data subject
   2. his/her political opinions
   3. his/her religious beliefs or other beliefs of a similar nature
   4. whether he/ she is a member of a trade union (within the meaning of the [1992 c. 52.] Trade Union and Labour Relations (Consolidation) Act 1992
   5. his/ her physical or mental health or condition
   6. his/ her sexual life
   7. the commission or alleged commission by him/her of any offence, or
   8. any proceedings for any offence committed or alleged to have been committed by him/her, the disposal of such proceedings or the sentence of any court in such proceedings.

   [↑](#footnote-ref-2)
3. The Data is only completely anonymised if it is impossible to identify the individuals from that information plus any information that the University holds or is likely to hold. For example, if you anonymise a list of participants by giving each participant a number and then keep a separate list of the numbers and names of the participants to which they refer, the data is not completely anonymised and would still qualify as personal data. If you do not keep a “key” to the identities of the participants and it is not possible for the participants to be identified from any other information then the data is anonymised. [↑](#footnote-ref-3)
4. [UK Data Protection Act](http://www.legislation.gov.uk/UKPGA/1998/29/contents) (<http://www.legislation.gov.uk/UKPGA/1998/29/contents>) [↑](#footnote-ref-4)
5. There are a number of different groups of people who are perceived to be “vulnerable persons” as research participants. These include;

   * Children under the age of 18.
   * People who lack mental capacity (for example patients with Alzheimer’s disease, adults with learning difficulties.)
   * People who may only have a basic knowledge of the language in which the research is being conducted.
   * People who may socially not be in a position to exercise unrestrained informed consent.
   * People who are in dependent relationships with research gatekeepers (for example university students, prisoners, asylum seekers)
   * People in poor health.
   * People who feel that participation in the research will result in access to better support or treatment for them.
   * People with disabilities.
   * People in insecure employment (For example agency workers or migrant workers).

   [↑](#footnote-ref-5)