2021

Evaluation of a 'Well-Elderly' Physical Activity Programme

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Evaluation of a ‘Well-Elderly’ Physical Activity Programme

By
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A Thesis Submitted in Fulfilment of the
Requirements for
The Degree of Master of Science by Research

Research Supervisors
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Submitted to Quality and Qualifications Ireland,

June 2021

Abstract

Both in Ireland and internationally people are living longer and there is an increasing proportion of older adults in the population (Clark 2020). As such, the maintenance of health and physical function for older adults is of critical importance. Physical activity is widely acknowledged as being crucial for the maintenance of positive health, particularly for older adults (Spartano et al., 2019). Research has suggested that physical activity programmes are an effective means of engaging older adults in physical activity for the promotion of positive health (Sherrington et al., 2017). The central aim of this research project was to explore the impact of one such Physical Activity Programme on the health and wellbeing of older adults.

The study was an underpinned by an action research approach guided by Elliott's (1991) model of action research, moving through distinct phases of planning, acting, observing and reflecting (Reason and Bradbury, 2008). Two cycles of action research were completed for the present study, the first relating to the development of an Evaluation Protocol for use within the Physical Activity Programme, and the second involving a qualitative evaluation of the programme.

The researcher utilised a qualitative approach consisting of interviews and observations. The data analysis process entailed the use of thematic analysis informed by Braun and Clarke's (2006) 6-step process. Cycle 1 resulted in the development of a refined Evaluation Protocol for use as an evaluation tool by programme leaders. Cycle 2 resulted in the identification of themes related to participant's perceptions of the programme. Findings indicated that there was a perceived physical, psychosocial, and educational benefit attributed to participation in the programme, although post-programme maintenance of physical activity was low. Utilising the findings reported, the researcher recommends the implementation of a pre- and post-programme evaluation protocol in order to determine programme efficacy. Additionally, it is recommended that a greater effort be made to recruit 'hard to reach individuals' and that an emphasis be placed on post-programme maintenance of physical activity.

Key Words: *Older Adult, Physical Activity, Action Research, Evaluation.*

Acknowledgments

This study would have been impossible to complete were it not for the constant support of several people. Firstly, I thank God for providing me with this opportunity, which I feel is one of the most important experiences of my life.

I would like to thank my fantastic supervisors Dr. Jackie Gallagher and Ms. Eimear Foley, not only for being a source of knowledge and wisdom, but for their kind and supportive guidance throughout all stages of this research journey. I feel lucky to have a had a chance to work with them.

I offer my gratitude to Munster Technological University for providing me with me such an incredible opportunity as this, to conduct this research as part of a scholarship.

I am grateful for being part of the collaborative team with the two programme leaders as well as the wider team present at the day centre. My job was made that much easier through their knowledge and experience. I would like to thank them for the time and effort they put in to making this project possible.

I would like to thank all the participants who took part in the study, for their time as well as for always being obliging whatever I may request.

I am grateful to my officemates, for providing me with laughter and helping me to look on the bright side of things. I could not have asked for better people to be around.

Thank you to my family, for being there for me every day of my life. They have always supported me in everything I did with unwavering love and support. I cannot thank them enough.

Finally, I thank my partner for her love, support, and motivation. Without her I would not be where I am today and for that I owe her everything.

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Chapter 1:
Introduction

Chapter 1 Introduction

1.0 Introduction

The global population of older adults has reached an all-time high and is steadily increasing. Objective definitions of what is considered an 'older adult' are neither simple nor applicable in many cases, with 'old' often being specific to individual/cultural contexts (Schwall et al., 2012). The World Health Organisation (WHO) have proffered a definition of 'older adult' which constitutes an individual in retirement from paid work, typically understood to be either 60+ or 65+ years of age (WHO, 2017). In 2017, it was reported by the United Nations (UN) that the population of over 60s worldwide had risen to 962 million, more than double the number from 1980. It is projected that this population will double yet again by 2050 when it is expected to reach approximately 2 billion (United Nations, 2017). In Ireland, there is a growing proportion of older adults, with approximately 696 thousand people over the age of 65 being recorded in 2019 (Clark, 2020)

With this increase in population density of older adults, the need to address the health of this demographic has become more prevalent than ever. At a biological level, ageing is associated with a gradual accumulation of a variety of cellular and molecular damage (Steves et al., 2012). This damage ultimately leads to a decline in physical reserves, an increased risk of chronic disease, a reduction in functional ability and eventually death (WHO, 2015). Chronic conditions such as heart disease, stroke and chronic lung conditions cause most deaths worldwide and for over-60s account for more than 87% of disease burden across low, middle- and high-income countries (UNFPA, 2012, WHO, 2011).

In a recent systematic review Warburton and Bredin (2017) have demonstrated that there is a curvilinear relationship between health outcomes and physical activity, meaning a relatively small increase in physical activity leads to a major improvement in health. Similarly, Reiner et al. (2013) has reported that physical activity appears to have a positive influence on non-communicable diseases such as coronary heart disease and type-2 diabetes mellitus. In particular, physical activity has been shown to be beneficial for older adults with a direct relationship between increased physical activity levels and a reduced prevalence of common chronic conditions, improved

mental health, decreased cognitive decline, and reduced mortality rates (Musich et al., 2017).

The WHO, in their most recent guidelines on physical activity and sedentary behaviour, recommend that older adults older adults should do at least 150–300 minutes of moderate-intensity aerobic physical activity; or at least 75–150 minutes of vigorous-intensity aerobic physical activity; or an equivalent combination of moderate and vigorous intensity activity throughout the week, for substantial health benefits (WHO, 2020). It is further recommended that, as part of this 150-300 minutes per week, that older adults engage in multicomponent physical activity including muscle strengthening and functional balance activities. Furthermore, the WHO recommend that older adults limit the amount of time spend being sedentary, instead using this time to engage in physical activity of any intensity.

Although the importance of physical activity for older adults has been clearly demonstrated above, unfortunately, physical inactivity is prevalent for the older adult demographic. It has been widely reported that physical activity levels decrease with ageing (Batt et al., 2013). This decrease has been shown to be especially prevalent among those 65+ years of age (Hansen et al., 2012) and Murtagh et al. (2014) found that only a minority of older adults in the Republic of Ireland were meeting the recommended physical activity guidelines and that, as an individual ages, they are less likely to be physically active. To offset this level of inactivity, physical activity programmes have been shown to be an effective method of promoting physical activity for older adults (Van der Bij et al., 2002).

A number of physical activity programmes have been developed and implemented worldwide for the purpose of engaging older adults in physical activity. The focus of the present study is on one such 'Well-Elderly' Physical Activity Programme, namely the Better Balance, Better Bones (BBBB) programme. The BBBB programme aims to facilitate increased levels of physical activity for older adults in order to promote positive health outcomes for this demographic. The programme is delivered in community settings consisting of an 8-week physical activity programme, repeated several times each year, to incrementally improve strength, balance, and general aerobic fitness in older adults. The programme consists of an aerobic warm up including endurance exercises, walking and range of movement stretches. The

programme predominantly features exercises to improve balance, joint and muscle flexibility, and strength. In addition, exercises to practice at home, in the form of an 'exercise of the week' are utilised to provide education to participants regarding home-based exercise techniques.

To date, an evaluation of the 'Well-Elderly' Physical Activity Programme has not been undertaken, thus, the purpose of this research project, as will be outlined below is to perform an evaluation of the programme exploring its impact on the health and determinants of physical activity of participants. The evaluation is underpinned by an action research methodology which places an emphasis on developing solutions to practical problems through collaboration. Often the methodology is fluid and develops over time with the outcome being difficult to determine at the outset of the research (Reason and Bradbury, 2008). This idea of a fluidity of the methodology is uniquely represented within the current study. The research was completed during the Covid-19 pandemic and the effects of this pandemic are clearly evident in changes to the research aim and methodology as will be outlined I the next section.

Initially the project had the aim of developing an evaluation protocol for a 'Well-Elderly' Physical Activity Programme. In the process of completing the first cycle of the research in March 2020, the Covid-19 pandemic escalated to the level where a countrywide lockdown was implemented. This lockdown had a profound impact on the research project due to restrictions placed on movement, social distance requirements, facilities closing, and exercise classes being cancelled. The pandemic was especially impactful on the present study due to the participants of the study being considered to be at high risk due to the age profile of participants (aged 65+). When the lockdown occurred, the researcher had just implemented the evaluation protocol which had been developed as per the aim of the study. Due to these restrictions the researcher was unable to continue working towards that initial aim and instead a change of methodology was required.

The new methodology proposed involved conducting telephone interviews with programme participants in order to perform an evaluation of the programme. This evaluation would relate to perceived programme outcomes, programme experience, and barriers and facilitators to physical activity. As a considerable amount of work had already been completed from Cycle 1 of the research, including the development

of an evaluation protocol, the researcher felt it unwise to abandon this information. Instead, the methodology, results and discussion chapters of this thesis are divided into two distinct cycles. Cycle 1 pertains to the initial methodology: the development of an evaluation protocol for a 'Well-Elderly' Physical Activity Programme. Cycle 2 pertains to the revised methodology post Covid-19: the qualitative evaluation of a 'Well-Elderly' Physical Activity Programme.

1.1 Rationale for the Study

As outlined previously, the aim of the 'Well-Elderly' Physical Activity Programme is to engage older adults in physical activity in order to promote positive health outcomes for participants. While the programme has been implemented since 2019, it does not include a formal evaluation methodology. As such the reason for the present for this study was to develop an Evaluation Protocol to be implemented by the physical activity leaders who deliver the programme. Evaluation is an integral part of any successful programme with periodic assessments lending to optimum efficacy. These evaluations can help to identify strengths and weaknesses within the programme which promotes a more suitable initiative (Flynn et al., 2020). Additionally, it has been suggested that programme evaluation may not only improve an individual programme, but also lead to a community-wide improvement in practice through the sharing of results (Allen et. al, 2008).

As well as the goal of programme improvement being a key motivator for conducting an evaluation, the ability to demonstrate programme impact through an assessment or evaluation cannot be ignored. Evaluation provides a decisive opportunity to effectively demonstrate a programme's success in a compelling way which may lead to several positive outcomes such as improved morale, outside support and funding (Rossi et al., 2018). Conversely, if the programme is proven to be unsuccessful or have weaknesses, feedback from the evaluation process may inform revisions which can increase the programmes efficacy.

As there was no set method of evaluation methodology utilised within the 'Well-Elderly' Physical Activity Programme, it would have been impossible to determine whether or not the programme was benefitting participants. By developing this

Evaluation Protocol, the researcher hopes to enable programme leaders to effectively measure health outcomes, meaning a change in health relating to fitness, quality of life etc., in order to ascertain the effectiveness of the programme.

Although the benefits of physical activity are widely acknowledged, research indicates that it may be difficult to convince older adults to increase and sustain physical activity levels (Resnick and Spellbring, 2000). A possible solution to this issue is the use of physical activity programmes designed for and targeted specifically at older adults. There is a large body of evidence which suggests that well-designed exercise programmes lead to positive health outcomes for older adults, particularly in relation to fall prevention (Sherrington et al., 2017). Furthermore, Van der Bij et al. (2002) in a systematic review of 57 older adult exercise interventions reported that there was evidence of high adherence rates to the programmes with 90% adhering to interventions based in the home and 84% for group-based interventions.

By performing a thorough investigation of the 'Well-Elderly' Physical Activity Programme, the researcher will be able to determine outcomes associated with engagement in the programme which may inform developments made to the programme regarding design and implementation. Additionally, this study will add to the growing body of research supporting the efficacy of older adult physical activity programmes.

1.2 Aim and Objectives

The main aim of the research project is to perform an exploration of a 'Well-Elderly Physical Activity Programme on the health and wellbeing of older adults. In order to achieve this aim, the researcher will address the following objectives:

1. To design an evaluation protocol for use in the physical activity programme.
2. To assess the experiences of programme participants.
3. To analyse the perceived physical outcomes of the programme.
4. To explore the perceived psychological outcomes of the programme.
5. To explore key determinants of engagement in physical activity.

1.3 Research Questions

In order to achieve the aforementioned objectives, the research is set forth to address the following research questions:

1. What elements constitute an effective Evaluation Protocol?
2. What are the key components to be included in the Evaluation Protocol for the 'Well-Elderly' Physical Activity Programme?
3. What are participants perceptions of their experience within the 'Well-Elderly' Physical Activity Programme?
4. What benefits do participants ascribe to their engagement in the 'Well-Elderly' Physical Activity Programme?
5. Does adherence to physical activity increase or decrease post engagement with the 'Well-Elderly' Physical Activity Programme?
6. What are the factors which influence engagement in physical activity for participants?

1.4 Study Limitations

There are several limitations present within this research project which the researcher deems prudent to disclose. These limitations include:

- The Covid-19 pandemic caused a significant disruption to the research project limiting access the participants group and requiring the researcher to adjust the research methodology.
- With the expansion in methodology to the qualitative evaluation of the programme, the researcher was unable to continue refining the evaluation protocol as originally planned.
- Pre-programme health data was gathered from participants, however, due to the pandemic, post-programme data could not be gathered and as such a comparison of pre- and post- datasets was impossible.
- The study did not use a control group and as such cannot definitively attribute any perceived changes to the programme.

- The findings in the present study were gathered from a participant group from a specific study making generalisability of results difficult.

1.5 Thesis Structure

The present thesis is structured around six chapters with this chapter, Chapter 1, focusing on an introduction to the research undertaken. The remaining five chapters are structured as follows:

Chapter Two: This chapter contains a review of pertinent literature relevant to the topic of older adult health as well as action research as a methodology. The chapter examines older adult demographics as well as the effects of ageing on the human physiology. The effects of physical activity on the components of fitness for older adults are explained in detail. An exploration of recommendations for physical activity is conducted and contextualised regarding the proportion of older adults meeting these recommendations. The principles of programme development are discussed in relation to effective physical activity programmes and how they are evaluated. Furthermore, the topic of action research is explored in detail. Action research is defined, and its applications, strengths and weaknesses are explored utilising examples from the literature.

Chapter Three: In Chapter three the research methodology utilised within the present study is presented. The chapter begins by addressing the research paradigm in order to provide clarity regarding the researchers ontological and epistemological position, that being a position of constructivism/interpretivism. The 'Well-Elderly' Physical Activity Programme is described as well as the data collection methods utilised. Finally, a thorough description of the data analysis process is presented.

Chapter Four: Due to the dual methodology present within the current study, two results and discussion chapters are presented. The first results and discussion chapter, Chapter 4, presents the findings and subsequent discussion relating to Cycle 1 of the research, the development of an Evaluation Protocol for 'well elderly' physical activity programme. Results are presented in respect of the outcomes associated with engagement in each phase of the action research cycle; planning, acting, observing, and reflecting which in turn led to led to the development of the Evaluation Protocol.

Chapter Five: Chapter five presents the findings and discussion pertaining to the qualitative evaluation of the 'Well-Elderly' Physical Activity Programme. The chapter presents the main themes identified within the interviews conducted; programme outcomes, programme experience, motivation, and barriers. For each theme subthemes were identified and discussed in relation to their significance as well as compared and contrasted to current research in the area of older adult health.

Chapter Six: This final chapter presents conclusions made and insights gained from the findings as well as the researcher's experience conducting the study. Using these insights, recommendations are made for the programme as well as for the direction of future research. A proposed Logic model will be presented in order to illustrate the cause-and-effect relationship between the proposed recommendations and their expected outcomes.

The bibliography and appendices follow the final chapter.

Before going into detail regarding the research process, the researcher will provide context for the study in the following section containing the literature review. This review will involve the presentation of the various topics in the literature that are pertinent to the present research and will establish the rationale for the current investigation.

Chapter 2:
Literature Review

Chapter 2 Literature Review

2.0 Introduction

This research project is being undertaken in order to explore the effects of an older adult 'well-elderly' exercise programme, namely, "The Better Balance, Better Bones Programme" on the physical and psychological wellbeing of the participants. In addition, the factors which promote and deter the participants from being physically active will be investigated. Adding to this area of research through this study may allow for a greater understanding of methods which can be utilised to effectively deliver programmes which increase wellbeing as well as lifelong participation in physical activity for older adults. In providing context to the research undertaken this chapter critically reviews and synthesises existing knowledge to assist in informing the research and research methodology utilised (Hart, 2018). This chapter provides an exploration of the following key areas; older adult demographics, health and physical functioning; the effects of ageing on functional fitness and the benefits association with engagement in physical activity. The final section of the chapter explores the methodologies.

Rowley and Slack (2004) concur that a literature review is required in order to effectively distil the existing literature in a subject field and go on to say that all research must be informed by existing knowledge in the area. By gaining a greater understanding of the topics discussed in the research a more comprehensive examination of the programme can be undertaken. The review will cover two main topics; the first in relation to older adult health and physical activity, the second, focusing on action research as a methodology.

2.1 Older Adult Demographics

The global population of older adults has reached an all-time high and is steadily increasing. In 2017, it was reported by the United Nations (UN) that the population of over 60s worldwide had risen to 962 million, more than double the number from 1980. It is projected that this population will double yet again by 2050 when it is expected to reach approximately 2 billion (United Nations, 2017). In Ireland, this population increase has been reflected in the census data published by the Central Statistics Office

(CSO) with a steady increase in the population of older adults since the 1980s (CSO, 2016). There was a 19.1% increase in the 65+ age group from 2011 to 2016 with 102,174 increasing to 632,567. It was reported that of the total population of 65+, 26.7% live alone. Kenny et al. (2020), in a recent report, have also highlighted a large number of over 50s living alone estimating that 126,300 live alone with 36,000 of those individuals experiencing a functional disability which impacts their activities of daily living (ADLs). The term ADLs was first used by pioneering American physician Sidney Katz in the 1950s and is used as a collective term to describe fundamental skills that are required to independently care for oneself such as eating, bathing, and mobility (Katz,1983). The CSO reports indicate that there has also been an increase in the number of adults aged 45+ from 34.4% in 2011 to 37.2% in 2016. This increase is particularly visible when compared to the proportion of 45+ adults in 1980, which was only 27.6%. It was also reported that in the 2016 census the average age of the population (37.4) rose by 1.3 years from the 2011 study.

The Irish Longitudinal Study on Ageing (TILDA) is a large prospective cohort study examining the social, economic, and health circumstances of community-dwelling adults aged 50 years and older, resident in the Republic of Ireland with a follow-up every 2 years. In the most recent report data relating to the demographics of adults aged 50+ in Ireland was published (Kenny et al., 2020). Of the population that are 70+ years of age, it was predicted that 79,851 are frail, which the World Health Organisation (WHO) describes as a clinically recognisable state in older adults who are more vulnerable due to a decline in physical function such that ADLs are compromised (WHO, 2017). As well as the large number of estimated frail older adults, 217,101 are predicted to be pre-frail (at high risk of progressing to frailty) and 43,448 are living alone and of the portion that are living alone 12,704 are frail and 18,279 are pre-frail. The report published by Kenny et al. (2020) also identified the prevalence of several chronic health conditions. In the 50+ population 51.8% have hypertension, 12.8% have asthma, 12.6% have diabetes mellitus, 11.6% have or have had cancer, 8.5% have chronic lung disease This information is visible in the form of a graph below in Table 1 (Kenny et al., 2020). 21.18% where reported as having have 3 or more comorbidities. At an international level it is estimated that a larger proportion of the older adult population, roughly 30%, have multiple chronic conditions (Hajat and Stein, 2018).

Table 1: Prevalence of chronic conditions in 50+ population of Ireland (Kenny et al., 2020).

Condition	%	Condition	%
High Cholesterol	58.5	Lung Disease	8.5
Hypertension	51.8	Angina	7.3
Arthritis	45.6	Heart Attack	6.2
Osteoperosis	22.3	Varicose Ulcers	4.8
Asthma	12.8	TIA	4.7
Diabetes	12.6	Stroke	2.5
Cancer	11.6	CHF	1.8
Thyroid	11.1	Cirrhosis	1.4

2.2 Older Adult Health and Function

At a biological level, ageing is associated with a gradual accumulation of a variety of cellular and molecular damage (Steves et al., 2012). This damage ultimately leads to a decline in physical reserves, an increased risk of chronic disease, a reduction in functional ability and eventually death (WHO, 2015). Chronic conditions such as heart disease, stroke and chronic lung conditions cause most deaths worldwide and for over-60s account for more than 87% of disease burden across low, middle- and high-income countries (UNFPA, 2012; WHO, 2011).

In Ireland chronic conditions are becoming more prevalent due to an increase in the older adult population and it is predicted that they will continue to rise (Balanda et al. 2010). TILDA (2018) highlighted evidence which supports the above research reporting an increased cardiovascular risk for older adults with roughly 50% aged 50+ having hypertension. It was also reported in the TILDA study, that 41% of those surveyed had high cholesterol. The proportion of individuals whose waist circumference increased substantially rose from 49% to 54% since the first wave test. This change was particularly evident in women aged 50-64 years where 19% had a normal and 57% had a substantially increased waist circumference at Wave 3, compared to 25% and 49% at wave 1. This statistic also highlights how obesity is an issue of growing importance in Ireland. The number of individuals reporting some amount of visual/eyesight decline was 52% which rose from 42% in the first wave.

The prevalence of individuals burdened with multiple chronic conditions in Ireland has also been shown to be associated with ageing being twice as common for over 75s as those aged 50-64 (Savva et al., 2011). These chronic conditions have displayed a significant effect on disability with individuals reporting two or more conditions nearly 20 times as likely to report disability as people with no condition (Department of Health and Children, 2008). Nunes et al. (2016) have also concluded that there is an association between multiple chronic conditions and an increases risk of mortality.

2.3 Recommendations for Physical Activity

In a recent systematic review Warburton and Bredin (2017) have demonstrated that there is a curvilinear relationship between health outcomes and physical activity, meaning a relatively small increase in physical activity leads to a major improvement in health. Similarly, Reiner et al. (2013) has reported that physical activity appears to have a positive influence on non-communicable diseases such as coronary heart disease and type-2 diabetes mellitus. In particular, physical activity has been shown to be beneficial for older adults with a direct relationship between increased physical activity levels and a reduced prevalence of common chronic conditions, improved mental health, decreased cognitive decline, and reduced mortality rates (Musich et al., 2017). Furthermore, physical inactivity is the most prevalent modifiable risk factor worldwide (Warburton et al., 2006).

In order to maintain and improve cardiorespiratory and muscular fitness, bone and functional health, reduce the risk of non-communicable diseases, depression and cognitive decline, the World Health Organisation (WHO) recommends that older adults participate in at least 150 minutes of moderate intensity or 75 minutes of vigorous intensity aerobic activity throughout the week (WHO, 2018). When compared to the WHO recommendations, the general guidelines for Ireland put forth by the Department of Health and Children (2009) are practically identical stating that adults over the age of 65 should engage in at least 30 minutes of moderate intensity physical activity on 5 days of the week (total 150 minutes). In addition, these guidelines are utilised again in the Healthy Ireland framework, which is the national strategy for improving health and wellbeing from 2013-2025 (Department of Health, 2013).

The national guidelines presented by the Department of Health and Children (2009) go on to recommend that included in this activity should be aerobic activity (such as walking) as well as muscle strengthening and balance exercises. Similar to this, the WHO gives recommendations on the type of physical activity to perform, however, the recommendations presented by the WHO are far more specific. The WHO recommends that bouts of aerobic exercise should last no less than 10 minutes at a time and muscle-strengthening activities, involving major muscle groups, should be done on 2 or more days a week. Conversely, the recommendations presented by the WHO differ greatly from the Irish national guidelines in that they provide specific advice for individuals with frailty or disability issues whereas the Irish guidelines do not. It is recommended that older adults, with poor mobility, should perform physical activity to enhance balance and prevent falls on 3 or more days per week. When older adults cannot do the recommended amounts of physical activity due to health conditions, they should be as physically active as their abilities and conditions allow (WHO, 2018).

2.4 Physical Inactivity

According to the World Health Organisation (WHO), being physically inactive is one of the main determinants of poor health and risk of mortality (Kohl et al., 2012). Being physically inactive is currently acknowledged as an independent risk factor for premature mortality. Lee et al. (2012) reported that 9% of all-cause premature mortality in 2008, which equates to over 5 million deaths, can be attributed to physical inactivity. Inactivity has been shown to lead to several unfavourable health outcomes and diseases such as type 2 diabetes, cardiovascular disease (CVD) and cancer making it the fourth leading cause of death worldwide. (Kohl et al., 2012). This high risk of CVD is significant as the World Health Organisation (2011) have identified CVD as one of the leading causes of premature death with one in ten of all global deaths coming as a result of the disease. As well as this, CVD is the most frequent cause of death in the European Union with approximately 2 million deaths per year (Nichols et al. 2012). Approximately 10,000 deaths occur in Ireland each year as a result of CVD and in 2009 it was reported that 6% of the national healthcare budget was spent on treating this single disease (Department of Health and Children, 2010). Acree et al.

(2006) has demonstrated that exercise can be utilised as a tool to reduce this disease risk and improve an older adult's quality of life. Sims et al. (2006) has also highlighted that older adults may stand to yield a greater benefit than any other demographic from increasing activity levels due to the fact that they are at higher risk of mortality from conditions such as were listed above.

It is widely recognized that with ageing comes a progressive reduction in an individual's physical capacity and exercise has been noted within the research as a key aspect of maintaining function and managing diseases associated with ageing. However, it has also been widely reported that physical activity levels decrease with ageing (Batt et al., 2013). This decrease has been shown to be especially prevalent among those 65+ years of age (Hansen et al., 2012). Murtagh et al. (2014) found that only a minority of older adults in the Republic of Ireland were meeting physical activity guidelines and that, as an individual ages, they are less likely to be physically active. For instance, it was found that adults aged 75+ were 1.5 to 3.4 times more likely than 60-64-year olds to be insufficiently active and thus not meet physical activity guidelines. It was also demonstrated that levels of self-reported walking decreased as age increased particularly for individuals aged 75+. The Irish Sports Monitor report (2017) produced data which further supports the association between age and declining activity levels. The ISM (2017) reports that, as a whole, 43% of the population regularly participates in physical activity, however, when this number is broken down by demographics there is a substantial difference between groups. The report highlighted that physical activity participation differs considerably by age with participation being highest among those aged 16 to 19 (80.3%) and declining to 29.5% among those aged 65 and older.

Comparable data was also published in the Healthy Ireland survey where it was suggested that 46% of the total population are meeting the physical activity guidelines. When comparing the Healthy Ireland report to the ISM report, differences are present among the respective age groups between the studies (although these age groups are not identical). For the youngest group available in the Healthy Ireland report (15-24) a considerably lower number of 61% was reported compared to the equivalent 16-19 age group in the ISM with over 80%. Similarly, for the 65-75 age group a slight difference was present with the Healthy Ireland study reporting 33% compared to the 29.5% in the ISM survey (Department of Health, 2019). Figure 1 below depicts the

percentage of each age group who meet the recommended guidelines as reported in the Healthy Ireland Study.

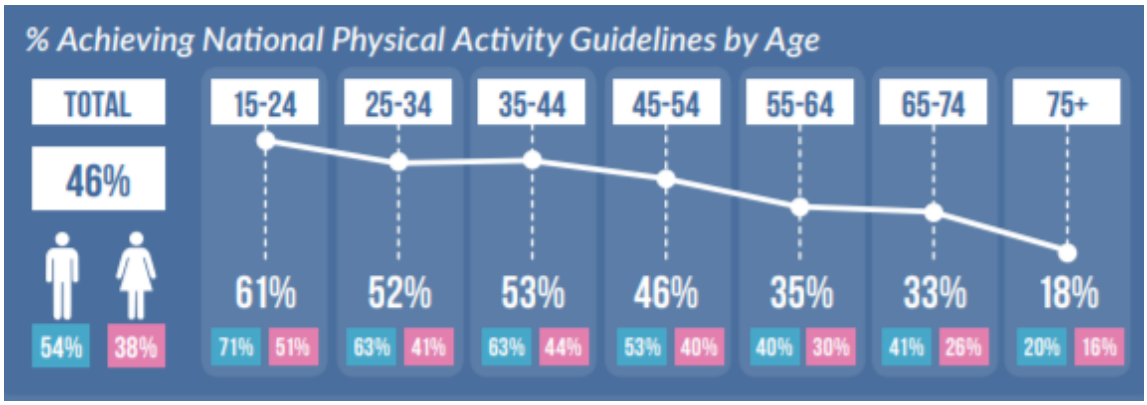

Figure 1: Age groups meeting PA guidelines (Department of Health, 2019).

As well as levels of physical activity, the Healthy Ireland survey 2019 reported other relevant data relating to physical activity. For instance, the amount of sedentary time, which was measured as the amount of time spent sitting on a weekday or workday as well as the time spent sitting on a weekend day or day off, was also discussed. It was reported that the average time spent sitting on a weekday was 5.1 hours. For the 65-74 age group the average was 4.9 hours which is slightly below average, however, for the 75+ age group this number increases to 5.9 which is the second highest of any group. The desire to change current activity levels was also reported in the survey and it was found that 64% of those not currently meeting guidelines would like to be more physically active. The proportion who desire to be more physically active decreases with age with 70% of 15-24 wishing to change decreasing to 50% and 54% for the 60-65 and 75+ age groups, respectively.

The Stay Active study (Murtagh et al., 2014) examines the physical activity levels and the health status of older adults in Ireland as well as the associations between the two. It examines data from five major population surveys: The Irish Longitudinal Study on Ageing, the Survey of Lifestyles Attitudes and Nutrition in Ireland, the Irish Sports Monitor, the Health Survey Northern Ireland and the Northern Ireland Sport and Physical Activity Survey. Between the studies data from 12,333 adults aged 60+ was examined.

The Stay Active Study has highlighted similarities and discrepancies between several of the studies which they analysed. For instance, the TILDA study data reported that 37.3% of adults in the 60-64 years age group were meeting physical activity guidelines, whereas the SLAN survey reported only 17.4% for the same group. Both the TILDA and SLAN surveys utilised the same instrument, the International Physical Activity questionnaire making the discrepancy quite unusual. However, Murtagh et al. (2014) has suggested that the disparity between these scores effectively highlights the difficulties which policy makers face when interpreting results from surveys. It should also be highlighted that although this difference was noted, the Stay Active study reinforces what the research says about declining activity levels with age, as with all five studies examined there was a clear trend of declining activity as age increases. This information highlights that, although there is agreement regarding declining PA within each study, figures tend to vary making it difficult to ascertain a baseline figure. It was also reported in the study that physical activity rates and compliance with recommendations tends to vary with gender. Across all surveys, females had lower levels of reported physical activity than males across all age groups. The authors of the Stay Active Study go on to say that due to the increased life expectancy of females in conjunction with the earlier onset of osteoporosis that there is a need for interventions which specifically target females of increasing age.

The issue of physical inactivity extends beyond Ireland and research suggests that many countries have a similar issue with declining levels of physical activity with age (Hamrik et al., 2013). This reduction has been highlighted in several prominent studies such as the British Heart Foundation survey in 2012 where it was demonstrated that only 27% of men in the United Kingdom aged 55-74 years met the suggested guidelines for physical activity. Again, this study illustrated further drop off with increasing age as for males over the age of 75 years, only 12.5% were achieving the recommended amount of activity (Townsend et al., 2012). This number was even lower for females as only 23% were sufficiently active in the 55-74 category with a further reduction to 8%.

2.5 Health Benefits of Physical Activity for Older Adults

Due to the reduction of physical capacity and increased risk of disease which is associated with ageing it is especially important for older adults to utilise strategies to offset these issues. The most widely recognised strategy for the maintenance of health as one ages is physical activity. It is widely acknowledged that, for older adults, physical activity is crucial for maintaining positive health (Ekelund et al., 2019). It has been demonstrated in the research that increasing the volume of physical activity which an older adult undertakes has a positive effect on their health and the maintenance of functionality. Fortes et al. (2013) has shown that older adults who are more physically active have a significantly decreased risk of premature mortality. Studies have also indicated that there is a significant association between increasing physical activity and an increase in health-related quality of life (Mello et al., 2010).

CVD accounts for a huge proportion of all deaths in developed countries, particularly for older adults, with 80% of the deaths occurring in people aged 65+ being attributed to these diseases (World Health Organisation, 2011). However, several studies indicate that there is evidence for an inverse association between the mortality risk associated with CVD and increased levels of physical activity (Sherman et al., 1994, Sattelmair et al., 2011). Patel et al. (2013) has shown that older adults who begin even lower levels of physical activity after the age of 65 may significantly reduce their risk of mortality in relation to CVD. There is a known association between four specific inflammatory biomarkers (fibrinogen, C-reactive protein, albumin and leukocyte) and risk of CVD (Danesh et al., 1998). Geffken et al. (2001), in a study which examined the relationship between being physically active and the presence of these biomarkers, demonstrated that higher levels of activity led to lower concentrations in these biomarkers which further reinforces the association between increased physical activity and reduced risk of CVD.

Research also suggests that older adults who commenced an exercise programme that encouraged them to comply with current PA guidelines and obtain sufficient aerobic exercise could expect to increase their life expectancy by an additional 1-2 years even if they started as late as 60 years of age (Thurston and Green, 2004). Furthermore, findings from the US suggest that increasing physical activity in this population has the potential to reduce healthcare costs (Martinson et al., 2003). Several

epidemiological studies have suggested that walking speed is a factor which predicts survival in older adults. Stanaway et al. (2011) in a cohort study of men aged 70+ demonstrated that individuals who were able to walk at 2 miles per hour or greater were at lower risk of mortality than those who walked slower.

2.6 Functional Fitness for Older Adults

An individual's fitness level is important at any age, however, as one gets older the focus shifts towards maintaining independence and functionality in order to perform ADLs (Rikli and Jones, 2013). The concept of successfully ageing and maintaining one's independence through the maintenance of physical function is often discussed in the literature (Anton et al., 2015). Although it is possible to maintain function as one ages, due to natural biological processes the body deteriorates and functional impairment or frailty becomes a common issue (De Vriendt et al., 2016). As such the maintenance of function as one ages and the concept of 'functional fitness' are of crucial importance. Functional fitness is a concept which represents the optimum physical capacity, which is needed to renew normal everyday activities, independently and without the early onset of fatigue (Rikli and Jones, 2013). It is assumed that the level of functional fitness depends on one's lifestyle, the level of physical activity and one's health status (Kostic et al, 2011). Research has indicated that the development of functional disability in older adults is a complex issue encompassing several physical and environmental factors (Duba et al., 2012). Lin et al. (2012) has stated that there is a considerable proportion of older adults experiencing some form of frailty or condition which affects ADLs as explored previously in section 2.2. Lin et al. (2016) has also reported that lower levels of physical fitness in older adults is directly associated with increased functional impairment.

2.7 Effects of Ageing on Functional Fitness and Health

2.7.1 Muscular Strength

One of the primary characteristics of muscular fitness, and a key health-related component of fitness, is muscular strength. Muscular strength represents a skeletal muscle's capacity to voluntarily develop force in a single contraction (Abernethy et al., 1995). Rikli and Jones (2013) described the maintenance of muscular strength as the number one fitness priority for people as they grow older. The American College of Sports Medicine (2009) in their most recent position stand on exercise and physical activity for older adults found that, after the age of 50, muscular strength declines on average 15% to 20% per decade. This lack of strength has an extremely detrimental effect on a person's ability to perform ADLs. Rikli and Jones (2013) outlined how lower-body strength was important for common activities such as climbing stairs, walking distances and getting out of a chair. Upper-body strength was also shown to be important for activities such as carrying groceries, lifting a suitcase, picking up a pet or grandchild etc. Goodpaster et al. (2006) further reinforce the importance of maintaining muscular strength, reporting that muscle weakness is consistently cited as an independent risk factor for high mortality in older adults. Rikli and Jones (2013) have also highlighted the importance of maintaining muscular strength due to its role in fall prevention as well as its importance in reducing the risk of fall-related injuries. Muscular strength can be maintained for older adults by performing muscle-strengthening resistance exercises involving major muscle groups as referenced earlier in the WHO recommendations for physical activity. Peterson et al. (2010) produced further evidence to support this in a comprehensive meta-analysis on the effects of resistance training on the muscular strength of older adults. The study demonstrated that resistance training was an effective method for maintaining and even improving muscular strength in older adults. Similarly, it has been demonstrated that short-term (8 to 10 week) exercise programs that target lower extremity training have resulted in significant improvements in strength of the lower body and in balance among older adults (Yates & Dunnagan, 2001).

When discussing the effects of physical activity on each of the components of fitness for older adults, it is important to understand how these effects can be evaluated. In the measurement of muscular strength /endurance, the Arm Curl test is commonly used. The Arm Curl test is a test of upper body strength involving curling a dumbbell whilst seated. The Arm Curl test has yielded reliability score of (0.80-0.98) (Rikki and Jones, 2002).

2.7.2 Aerobic Endurance

Aerobic endurance (also known as cardiorespiratory endurance) refers to the ability of the cardiovascular and respiratory systems to sustain large-muscle activity over extended periods of time. This relates to the ability of the circulatory and respiratory systems to supply oxygen during sustained physical activity. It is crucial for an individual to maintain aerobic endurance as they age due to its association with health-related quality of life (Knowles et al., 2015). Furthermore, low levels of aerobic endurance are reported as being strongly linked to several common illnesses and, in particular, may lead to myocardial infarction (heart attack) (Wang and Xu, 2017). As a person ages many of the systems in the body begin to deteriorate leading to a decrease in the capacity of each of these components. The ageing process has a profound effect on the cardiovascular system as arterial walls become stiff and thickened due to collagen deposition, elastin loss, and hypertrophy of the smooth muscle cells which typically leads to higher blood pressure and hypertrophy of the heart muscle (Wan & Wong, 2014). As such, Fletcher et al. (1996) found that V02 Max (the most commonly used measure of aerobic fitness describing the maximum rate that the body can effectively use oxygen during exercise) reduced at a rate at between 5-15% per decade beginning from roughly the age of 30. Fleg et al. (2005) has also found evidence which suggests this reduction in V02 Max may increase to 20-25% per decade for those aged over 70. However, the American College of Sports Medicine (2009) has demonstrated that older adults can achieve a 10-30% increase in V02 Max as a result of aerobic training which is the same increase which a younger adult would expect to see. It has also been demonstrated by numerous sources that increasing aerobic endurance can lead to improvements in regard to fall prevention (Chang et al., 2017).

Again, tests from the SFT battery are commonly used in assessing the cardiovascular endurance of older adults. The Six-Minute Walk test is the primary measure of cardiovascular endurance utilised within the SFT, when time and space allow. The Two-Minute Step Test (TMST) is included in Rikli and Jones' (2002) Senior Fitness Test (SFT) battery and is proposed as an alternate means of testing aerobic endurance when space or time is limited. It is a sub maximal test of aerobic capacity meaning it causes little stress to the individual. Construct validity has been shown to be strong for the TMST by correlating scores with 1-mile walk time (r = 0.73) and time on a treadmill at 85% of maximal heart rate (r = 0.74) (Langhammer and Stanghelle, 2015). Reliability has been demonstrated by Hesseberg at al. (2015) using the Intraclass Correlation Coefficient (ICC) model to measure relative reliability. The ICC reflected very high reliability (0.93–0.98) in all SFT items.

2.7.3 Flexibility

Flexibility refers to the range of movement that an individual possesses in their joints and the ability of these joints to move freely (Corbin et al., 2000). The term is also used in relation to the mobility one has in the muscle itself, which allows for more movement around the joints. Flexibility is specific to each joint of the body, thus there is no general measurement of flexibility as there is for cardiovascular fitness (Corbin et al., 2000). Because the aging process affects the bone and all connective tissues, including muscle, joint flexibility decreases significantly with advancing age, and thus motor function is reduced making it more difficult to perform ADLS (American College of Sports Medicine, 2009). Guimaraes and Farinatti (2005) found association between flexibility decrease (especially in hip and ankle muscle) and the frequency of falling in older adults. This association is believed to be due to the lower extremity flexibility being related to changes in walking pattern which may increase the fall risk. However, Stathokostas et al. (2012) produced evidence which contrasts this point reporting that there is not enough evidence to support the effect of flexibility improving functional ability in older adults. Although it is difficult to determine the effect of flexibility on functional ability for older adults, flexibility training has been consistently shown to improve joint flexibility (Seco et al., 2013).

The Chair Sit and Reach test (Rikli and Jones, 2002) is a test of flexibility of older adults. It is the test of flexibility use in the SFT battery of tests. Flexibility has been demonstrated to be crucial for older adults for performing several ADLs such as reaching something on a low shelf, putting on socks and shoes etc. (Rikli and Jones, 2002). Again, as this is one of the SFT items reliability has been shown to be high for all items in the battery (0.8-0.98) (Rikli and Jones, 2002).

2.7.4 Agility/Dynamic Balance

The term agility is defined as the ability to move and change the direction and position of the body quickly and effectively while under control. Dynamic balance is related to the individual's ability to maintain postural stability while moving (Winter et al., 1990). Although these are two separate components of fitness, Rikli and Jones (2013) argue that it is useful to analyse them as one composite measure as they work together in order to successfully perform several common daily activities which, in relation to older adults, is more relevant. Gregg et al. (2000) identified poor balance as one of the main contributing factors that leads to older adults' increased risk of falling. Older adults with impaired balance and gait are three times more likely to sustain a fall than older adults with no such impairments (Rose and Hernandez, 2010). Agility is an important aspect of mobility which is required in obstacle avoidance. When performing activities of daily living (ADLs), such as walking around the home, older adults are often required to manoeuvre around such obstacles as furniture and other objects about the house. These obstacles require the older adults to change their walking pattern by stepping over or around them. During obstacle avoidance, an individual is forced to modify ongoing movement patterns using available visual, vestibular, and somatosensory information (Patala, 1997). Older adults are at great risk of object collision due to reduced agility which stems from increased visual processing time and decreased reaction time (Reed-Jones et al., 2012). It may be possible for older adults to maintain dynamic balance by improving leg strength (Kim and O'Sullivan, 2013).

The Timed Up and Go test (Podsiadlo and Richardson, 1991) is a test of dynamic balance and gait speed. Developed by Podsiadlo and Richardson (1991) the test is primarily used in a home care setting in order to predict fall risk in older adults. Podsiadlo and Richardson (1991) found that the test results correlate well with log-transformed scores on the Berg Balance Scale (r = 0.81) which is the gold standard measurement of balance. Podsiadlo and Richardson (1991) also found that the results could be used to predict how safely the individual could perform activities of daily living (ADLs). It has been demonstrated that the TUG results indicate how likely an individual is to experience a fall (Vicarro et al., 2011). As well as this, Studenski et al. (2011) has posited that the TUG can be used to estimate an individual's physical wellbeing and risk of mortality. Intratester and intertester reliability (ICC) have been reported as high with the TUG test, in elderly populations, with an ICC of between 0.92-0.99 (Steffen et al.,2002).

2.7.5 Body Mass Index

Body Mass Index (BMI) relates to the composition of a person's body particularly in relation to the ratio of fat to lean tissue. Overweight (BMI:25-30) and Obesity (BMI .30) is an increasing problem internationally. Worldwide the prevalence of overweight and obesity has been steadily increasing since the 80s (Roberto et al., 2015). High levels of BMI (in the overweight and obese categories) have often been found to increase risk and raise mortality rates as is commonly seen in the research (Rodgers, 2004). In 2015, high BMI accounted for 4.0 million deaths globally with more than two thirds of deaths attributed to cardiovascular disease (The GBD 2015 Obesity Collaborators, 2017). For older populations, research has indicated that being overweight is not associated with an increased risk of mortality; however, there was an increased risk for those at the lower end of the recommended BMI range for adults (Winter et al. 2014). Because of multiple factors such as physiological changes associated with aging, chronic disease, polypharmacy, and psychosocial changes, older adults have an increased risk of undernutrition (Morley, 1997). This undernutrition may lead to increased mortality rates as research has indicated that older adults with a BMI of less than 23 are at higher risk of all-cause mortality than those with higher BMI, even those in the overweight category (BMI 25-29.9) (Winter

et al., 2014). However, although the association between body mass index (BMI) and all-cause mortality for older adults is unclear, studies have indicated that obesity is associated with chronic disease, functional limitation, and poor life quality making it an important area to observe for the older adult population (Jensen and Hsiao, 2010).

2.8 Physical Activity for Fall Prevention

Falls are often associated with several negative outcomes such as injury, disability, hospitalisation, and reduced quality of life for older adults (Thompson et al., 2011). Due to the reduction in muscular strength, balance and coordination typically caused by ageing, falls are more prevalent among the elderly population (Ambrose et al., 2013). In Ireland, falls are common in community-dwelling adults aged 50+ with almost 2 in 5 reporting a fall during the 4-year follow-up from wave 1 to 3 of TILDA and 1 in 5 reporting recurrent falls and injurious falls (Connell and Kenny, 2016). Similarly, in a study in the United States the prevalence of individuals aged 65+ who had experienced a recurrent fall was almost 20% (Patel et al., 2014).

The most recent ACSM (2009) position stand relating to older adult physical activity reported a large amount of evidence indicating that physical activity was beneficial for decreasing fall risk in older adults. Mounting evidence from randomized controlled trials shows that falls can be reduced through exercise (Li et al., 2016). Clemson et al. (2012) has demonstrated that a two-pronged approach of strength and balance training may be highly effective for reducing the rate of falls for older adults. However, Merom et al. (2012) reported that older adult participation in best practice fall prevention activities is extremely low with only 12% of older adults aged 65+ participating in strength training and only 6% participating in balance training activities. This highlights the need for more dedicated strength and balance programmes for older adults, that also promote general physical activity for health benefits.

2.9 Physical Activity for Bone Health

Osteoporosis, which is the most prevalent bone disorder for older adults, is characterised by a low bone mass which leads to increased frailty of the bone as well as increased fracture risk (Cosman et al.,2014). Currently it is estimated that there are 200 million people worldwide who have osteoporosis (Sozen et al., 2017). Injury related to osteoporosis causes significant morbidity and mortality worldwide with 1 in 3 women over the age of 50 years and 1 in 5 men experiencing osteoporotic fractures in their lifetime (Sozen et al., 2017). At a national level, the prevalence is also similarly high with roughly 20% of Irish adults over 50 having osteoporosis (Kenny et al., 2020).

The decrease of bone mass is an unavoidable process as an individual ages as there is a significant increase in bone resorption at around age 50 for men and post menopause for women which leads to a reduction in bone mass (Tomlinson et al., 2019). Due to the ever-increasing proportion of older adults in the population the incidence of osteoporosis is predicted to increase (Grob, 2014). Lifestyle choices across the lifespan impact osteoporosis and fracture risk. Minimising the amount of age-related bone loss is one of the most effective methods of prevention for osteoporosis. Research suggests that increased bone mass is associated with a decreased risk of fracture (Kemmler et al., 2013). Physical activity is a recognised as an effective way of preventing the loss of bone mass. In particular, weight bearing physical activity is essential for maintenance of bone health due to the stress on the bone stimulating extra deposits of calcium and bone-forming cells. (American College of Sports Medicine, 2009).

2.10 Psychological Benefits of Physical Activity

It has often been acknowledged in the literature that as well as the apparent physical benefits to physical activity there are several psychological benefits which may also be achieved (Brymer and Davids, 2016). Anderson and Brice (2011) have produced evidence to indicate that even short bouts of physical activity may have a positive impact on an individual's mood. Studies suggest that due to biological mechanisms such as endorphins, physical activity leads to an overall reduction in stress (Mikkelsen

et al., 2017). There is strong evidence to support an association between physical activity and a reduction in depression and anxiety, especially for individuals in clinical populations (Rebar et al., 2015).

As an individual ages the focus on positive psychological health is just as important. Research indicates that physical activity is effective at maintaining positive psychological health for older adults (Windle et al., 2010). Schuch et al., (2016) demonstrated that physical activity is extremely effective at improving mood and decreasing depression for older adults suggesting that physical activity should be considered a routine component in the management of depression in older adults. Physical activity has also been shown to offset deterioration of cognitive function for older adults and even improve cognitive performance (Langlois et al., 2013).

Studies continue to support that exercise, physical activity and physical activity interventions have beneficial effects across several mental-health outcomes. Participants in randomized clinical trials of physical activity interventions show better general and health-related quality of life, better functional capacity, and better mood states (Penedo and Dahn, 2005).

2.11 Social Benefits of Physical Activity

Humans are, at their core, social creatures. Maslow and Lewis (1987), in their seminal 'hierarchy of needs' position the need to feel loved and a sense of belonging as one of the highest priorities with only basic physiological and safety needs taking precedence. For older adults, these social needs are even more important with research highlighting the prevalence of social isolation apparent in the elderly community due to changing circumstances such as retirement, physical impairment etc. (Nicholson, 2012). This 'social disconnectedness', and the perceived isolation which comes in tow with it, have been shown to be related to lower levels of self-reported physical and mental health for older adults (Cornwell and Waite, 2009).

With this in mind, it is important to consider the effect which physical activity, in particular, group-based activity has on improving social connections for older adults. Physical activity provides older adults with a valuable opportunity to meet people and increase their social network. Indeed, research has indicated that, for older adults,

engagement in activity is often motivated by this desire to be social (Hartley and Yeowell, 2015). Furthermore, research has demonstrated that older adults who are considered to have a larger social network, meaning the amount of people they are in contact with day to day have a higher likelihood of positive health outcomes (Rodríguez-Artalejo et al., 2006). It has also been suggested that higher levels of social support from peers correlates with lower levels of mortality for older adults (Zhao et al., 2017) while Stathi et al. (2010) postulates that the psychological benefits gained from physical activity are a result of increased social contact experienced by the older adult.

2.12 Older Adult Physical Activity Programmes

Although the benefits of physical activity are widely acknowledged, research indicates that it may be difficult to convince older adults to increase and sustain physical activity levels (Resnick and Spellbring, 2000). A possible solution to this issue is the use of physical activity programmes designed for and targeted specifically at older adults. There is a large body of evidence which suggests that well-designed exercise programmes lead to positive health outcomes for older adults, particularly in relation to fall prevention (Sherrington et al., 2017).

Van der Bij et al. (2002) in a systematic review of 57 older adult exercise interventions reported that there was evidence of high adherence rates to the programmes with 90% adhering to interventions based in the home and 84% for group-based interventions. However, it was also reported that these high levels of participation where not sustained over long term (greater than 1 year), however, it is unclear whether this long-term reduction in adherence to exercise programmes is exclusive to older adults. This is consistent with much of the research in the area which suggests that adherence to physical activity typically declines over time for older adults (Findorff et al., 2009). Taylor et al. (2004) concurred that although exercise interventions are typically effective in the short term that they were ultimately ineffective regarding a long-term increase in physical activity levels. Kendrick et al. (2018) concluded that older adults, and in particular females, are less likely to maintain exercise following a physical activity programme than other groups.

When one considers the apparent benefits of physical activity programmes for older adults in addition to the evidence of their declining efficacy over time it is appropriate to explore the factors that are affecting the adherence levels of older adults in order to understand how to effectively maintain higher levels of physical activity for the older members of the population. Studies have highlighted several factors which influence the adherence of older adults to exercise programmes. Stineman et al. (2011) has reported that lower levels of mental wellbeing in older adults leads to decreased adherence to exercise programmes to an even greater extent than decreased physical wellbeing. Mullen et al. (2013) agrees stating that psychological distress caused by depression or loneliness is a predictor of attrition and low adherence rates. It has been suggested that increased encouragement and feedback during the delivery of a programme may be effective in order to mitigate lower adherence due to psychological factors (Jancey et al., 2007). McAuley et al. (2011) has suggested that self-efficacy, especially an individual's belief that they can comply with the exercise programme, has a profound effect on exercise adherence for older adults. Flegal et al. (2007) has also highlighted the importance of self-efficacy for adherence to exercise programmes stating that belief that an individual is capable of following the requirements of the intervention promotes greater adherence. Picorelli et al. (2014) has suggested that older adult physical activity interventions which foster a sense of self-efficacy in their participants will promote greater adherence to exercise in the long-term.

2.13 Programme Development for Older Adults

Research has demonstrated that group exercise interventions involving resistance and balance training are effective, and offer a cost-effective, population-based approach for falls prevention (Sherington et al, 2019). When programmes are being developed for older adults, several factors must be taken into account. Firstly, the type of activity being performed in the programme must be considered. Due to the natural decline of physical function that occurs with ageing such as deteriorating cardiovascular fitness, muscular strength and increasing fall risk (as discussed in section 2.7), programmes which incorporate exercises which mitigate these detrimental effects will be more effective. Research has indicated that lower extremity strength training programmes appear to be beneficial in maintaining balance and preventing falls (Sawyer et al.

2016). For instance, the Home-based Older People's Exercise (HOPE) programme is a 12-week-exercise intervention for older people based in the United Kingdome with a core focus on muscular strength training. A study conducted on the HOPE programme indicated that the deterioration of function experienced by older adults may be diminished through participation physical activity programmes (Clegg et al., 2014).

The duration of the programme and frequency of sessions must also be considered. For instance, as already stated in section 2.3 regarding guidelines for older adult physical activity, approximately 150 minutes of moderate intensity physical activity is recommended per week for older adults (WHO, 2018; Department of Health and Children, 2009). With these guidelines in mind, programmes that involve 1-2 sessions per week will lead towards more older adults meeting physical activity recommendations. However, some studies have reported that programmes that involve more frequent sessions (2 or more per week) may lead to higher levels of adherence although this may involve selection bias as programmes that advertise more intensive programs are more likely to recruit people who are interested and familiar with exercise which could lead to higher adherence rates (Russell at al., 2009). In regard to programme duration, research has indicated that programmes with an extended duration (20 or more weeks) are associated with lower levels of adherence which may be due to boring or overwhelming the participants (McPhate et al., 2013).

As discussed in section 2.12 exercise programmes are often effective in the short term, however, research indicates adherence to programmes and maintenance of physical activity declines over time. It is possible to increase adherence by developing programmes that are delivered in a holistic manner in order to reduce factors which lower adherence rates for older adults such as psychological distress and low-self efficacy (Picorelli et al., 2014). Holistic programme development can also be extremely effective for improving adherence and post-programme maintenance by including education throughout the programme as studies suggest education regarding exercise and, in particular, fall prevention strategies may be an effective motivator for older adults (Dikinson et al., 2011). For example, the never2old Active Ageing programme in New Zealand is primarily a physical activity programme, however it is delivered in a holistic, multifaceted manner that includes education as well as exercise. A study was conducted on the programme, and it was found that this holistic approach

led to many improvements in objective and subjective health measures such as increased muscular endurance, as well as high adherence rates (Keogh et al., 2014).

2.14 Evaluation of Older Adult Physical Activity Programmes

Physical activity programmes have been shown to be highly effective for improving health outcomes and functional fitness for older adults (Sherington et al., 2019). However, research has also indicated that there are several factors, such as the exercise types included and programme delivery, which affect the effectiveness of the programme (ACSM, 2009; Picorelli et al., 2014). As such, evaluating programmes is an important task in order to determine the effectiveness and potentially improve the efficacy of the programme. Evaluation is the process by which a programme is critically examined by analysing information regarding its characteristics, activities, and outcomes in order to judge the efficacy of, make alterations to, and ultimately inform the programme going forward (Patton, 1987). Evaluation is an integral part of any successful programme with periodic assessments lending to optimum efficacy. These assessments can help to identify strengths and weaknesses within the programme which promotes a more suitable initiative (Moos, 1979). Additionally, it has been suggested that programme evaluation may not only improve an individual programme, but also lead to a community-wide improvement in practice through the sharing of results (Allen et. al, 2008). As well as the goal of programme improvement being a key motivator for conducting an evaluation, the ability to demonstrate programme impact through an assessment cannot be ignored. Evaluation provides a decisive opportunity to effectively demonstrate a programme's success in a compelling way which may lead to several positive outcomes such as improved morale, outside support and funding (Rossi et al., 2018).

One of the most commonly used methods of programme evaluation is comparing participants in the programme to a control group and testing for differences in a particular area eg. muscular strength or balance. Sherington et al. (2019) in a large-scale systematic review relating to fall prevention programmes, highlighted the popularity of this evaluation method with 81 of the 108 trials included utilising this form of evaluation. Another commonly used and effective evaluation method is the FITT principle. FITT is an acronym for various components of an exercise programme

which can be used to evaluate effective ranges for each component (Gibson et al., 2018). Frequency is the first element evaluated using the FITT principle. It is crucial to evaluate frequency of exercise as research has indicated that there is a desirable frequency (2 or more sessions per week) which may be utilised to gain benefits from a programme (Huang et al., 2010). Intensity of the exercise being performed is then examined. Again, it is of upmost importance to investigate the intensity of exercise being utilised in a programme as there are guidelines as to what is appropriate exercise for older adults whilst also providing the desired health benefits (Nelson et al., 2007). Time is the next component which is evaluated, and it can be used to describe both the duration of each individual bout as well as the total duration of the programme. The research is inconclusive with regards time spent during each individual session and it is difficult to determine the optimum duration of each bout (Power and Clifford, 2013). The most effective programme duration is less divisive within the research with most programmes lasting between 15 weeks and 12 months with roughly 4 months seen as being potentially the most effective (Fitzharris et al., 2010). Type of exercises being performed during the programme is the final component which is investigated. The types of exercise must be reviewed as there are some methods of exercise which facilitate a greater improvement in several components of fitness for older adults which it is necessary to include in a programme. For instance, the ACSM recommend a mixture of cardiovascular fitness, resistance and balance training in order to achieve optimum results (ACSM, 2009). By utilising the FITT principle it is possible to evaluate each element of a programme and determine whether it falls into the optimum ranges as designated by the literature.

Another useful way of addressing a programme evaluation is through the analysis of impacts and outcomes. Rossi and Freeman (1993) describe an ‘impact theory’ which addresses the relationship between the intervention, i.e. the programme activities, and the impact which it has. In this theory, impact refers to the short-term effects of the intervention. In essence the impact theory is used as a method of understanding the immediate cause and effect relationship which the intervention has on the participants (White, 2009). Having an impact theory can have a huge benefit within a programme as it enables programme leaders to be explicitly aware of the programme activities are expected to affect the participants.

Often used in conjunction with the impact theory is the outcome theory. Rossi and Freeman (1993) describe the outcome theory as a means of assessing how the impacts, as described above, lead to outcomes. In the context of this theory, outcomes refer to the long-term effects of the intervention which are usually much broader and fewer in number than impacts. Sometimes the outcomes of a programme are described as the ultimate goal of the programme (Issel, 2004). Outcome theories are especially useful within a programme for the purpose of describing how the programme objectives are utilised to reach the programme goal.

When discussing impact, outcomes, and the cause-effect relationship which a programme has on participants, it would be remiss not to mention logic models. Logic models are a visual method of organising information and serve the purpose of describing how the planned actions of an intervention are expected to impact the participants (Epstein and Klerman, 2012). The logic model presents a snapshot into the thinking behind how a programme is likely to work (Knowlton and Phillips, 2012). Logic models are used in a wide array of contexts but are particularly effective regarding programme planning and evaluation. Within a programme context logic models are useful due to their ability to effectively convey the influence of actions on results (Holiday, 2014). This understanding of the expected cause and effect relationship between actions and the impact which they are expected to produce helps to facilitate an understanding of the progression which the programme leaders should expect and the outcomes which they can work towards. From an evaluation perspective by understanding the expected outcomes, practitioners are aware of what markers need to be assessed in order to determine progress. Figure 2 provides an outline of the headings typically used in a Logic Model.

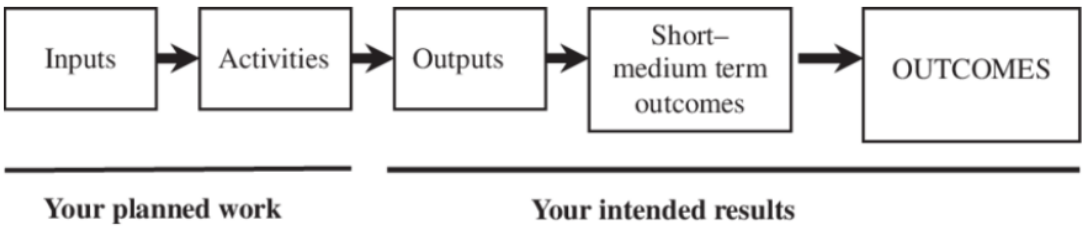

Figure 2: Logic Model Headings (Kaplin and Garrett, 2005)

2.15 Elements of an Effective Evaluation Protocol

Action research is a method of doing research which involves a practical approach to solving real world problems through collaboration (Johnson, 2008). As well as being a research methodology, action research may also be effectively used in the evaluation of health promotion initiatives and programmes due to sharing several underlying principles with successful evaluation methods. Rootman (2001), in a comprehensive publication detailing the principles of evaluating health promotion initiatives, identified four key elements to be included in a successful evaluation process. The first feature identified was participation. The evaluation process needs to include key stakeholders at each stage including policy makers, community members, organisations etc. Including the individuals who are being evaluated is noted as being of particular importance. This focus on participation by stakeholders is similarly important in action research. In fact, Reason and Bradbury (2008) have identified participation and democracy as a key identifying factor of action research. Baum et al. (2006) describes how action research is at its most effective when it involves all stakeholders.

The second feature identified by Rootman (2001), is a multidisciplinary approach to evaluation. It should involve a broad range of techniques to gather as much information as possible, both quantitative and qualitative. By utilising different methods of information gathering a more comprehensive evaluation is possible. Again, when one compares this factor with the principles of action research the similarities are clear. Action research is, by definition, multidisciplinary in nature including both traditional forms of inquiry and more action based practical methods. Burns (2009) supports this statement highlighting how action research employs different disciplines of inquiry effectively utilising both the traditional theoretical style of research involving examination of literature and hypothesis development, along with practical action-based research in which the researcher involves themselves within the research.

The next element of a successful evaluation outlined by Rootman (2001) is that the evaluation should serve to build the capacity of the key stakeholders to address key concerns related to health promotion. This aspect is more easily achieved when an evaluation is participatory in nature as proposed in the first feature identified by

Rootman (2001). Stakeholders are empowered through having a say in the evaluation process and are given opportunities to benefit the programme in a more collaborative manner. Empowerment of stakeholders is yet another parallel which these principles share with action research. Kemmis (2006) describes how by utilising an action research approach, stakeholder may easily express their views and democratically develop solutions to any issues as well as to plan for the future. Furthermore, Meyer (2000) has identified how action research is often utilised by practitioners of disciplines such as healthcare and education to improve their own practice.

Finally, Rootman (2001) identifies that an evaluation must be appropriately designed to adequately measure the initiative, considering the often-complex nature of health promotion initiatives and their long-term impact. Traditionally, health promotion initiatives have several factors to be aware of when evaluating such as design, sustainability, participant experience, outcomes etc. Taking these factors into account, it is necessary to devote an ample amount of time to the planning of the evaluation in order to prepare for these factors and also to have contingency plans ready in the event of an unexpected occurrence. Similar to the previous three aspects, action research is again ideally equipped to meet this requirement. Through its blend of traditional theoretical research and practical action, action research is uniquely positioned to examine the complex elements of a health promotion initiative by giving the researcher freedom to approach the evaluation in a variety of ways. Whitehead, Taket and Smith (2003) describe how action research interventions are highly specific to the subject being studied and are uniquely tailored to deal with the specific context at hand. While this may be seen as a limitation in some circumstances due to the highly specific nature reducing the opportunity for generalizability of any findings, this also allows for a bespoke investigation which can appropriately evaluate the complex elements of the initiative. This multidisciplinary approach which is tailored for the unique social setting allows the researcher to plan meticulously for the evaluation whilst also offering freedom to adapt the research to coincide with the complexity of the health promotion initiative being evaluated.

When one considers how closely action research coincides with these four tenets of effective evaluations, it is apparent that action research methodologies may be effective when evaluating a health promotion initiative. Through its collaborative nature it enables a participatory approach to the evaluation which empowers

stakeholders and provides opportunity for growth. Its multidisciplinary approach along with its highly specific examination lends to the generation of a wealth of data relating to the initiative being studied. These four elements of effective evaluation have led the researcher to the decision to utilise action research as the methodological approach for the study. However, action research is a complex methodology and its definition as well as its history and uses warrant further discussion which will be addressed in Chapter 3.

2.16 Conclusion

It is clear from the literature that there is an increasing population of older adults both in Ireland and worldwide. Several studies have demonstrated how physical capacity is compromised by ageing. It is also recognised across all the studies which were reviewed that increasing physical activity, in particular, for those who were previously inactive, can have a profound positive impact on an individual's health as they grow older. Despite the almost universal recognition of the positive effects of physical activity, it is also widely reported that physical inactivity is extremely prevalent and that physical activity levels decrease with age. It is suggested that physical activity programmes for older adults offer a solution to this issue of physical inactivity, however, research has also indicated that these programmes tend to have a greater short-term impact and over longer periods of time become far less effective. Considering the numerous benefits of physical activity programmes for older adults, and the increasing number of older adults in the population, the importance of promoting sustainable physical activity programmes for older adults is of the upmost importance.

Having discussed the pertinent literature pertaining to older adult health, fitness testing and evaluation, the researcher has provided context and justification for the direction of the research carried out within this project. The following Chapter will address the methodology utilised in carrying out the present study.

Chapter 3:
Methodology

Chapter 3 Methodology

3.0 Introduction

The research methodology is the specific procedures or techniques used to identify, select, process, and analyse information about a topic (Goddard, and Melville, 2004). One of the key components of successful research is a well-defined methodology. Thus, the purpose of this chapter is to describe the methodology utilised in the conduct of this research study and as such will describe the systematic steps of procedural planning and strategies that was employed during the study.

At the outset of any research undertaken, it is of critical importance that the researcher has a clearly defined research question to then enable the development of a research methodology which is tailored specifically towards addressing this research question (Hogan, Dolan and Donnelly, 2009). In essence, the research question guides the choice of methodology at a fundamental level. Consequentially, it is appropriate to restate the aim and objectives of the study prior to exploring the methodology used to facilitate their exploration.

As stated in Chapter 1, the aim and objectives of the study are as follows:

Aim: To explore the impact of a well-elderly exercise programme on the health and exercise habits of older adults.

Objectives:

1. To develop an Evaluation Protocol for a public health 'well-elderly' exercise intervention programme.
2. To assess the experiences of programme participants.
3. To analyse the perceived physical outcomes of the programme.
4. To explore the perceived psychological outcomes of the programme.
5. To investigate barriers/facilitators to programme maintenance.

The chapter is divided into a number of key sections in order to address each element of the research methodology utilised within the present study. The chapter begins with a description of the research paradigm in order to provide context for decisions made regarding the method as well as to contextualise interpretation of the findings presented in future chapters. Following this description of the research paradigm, the

researcher will clearly define the action research process undertaken within both cycles of the research. Finally, data collection methods and data analysis methods will be discussed as well as the ethical considerations made for the study.

3.1 Research Paradigm

Each individual, whether consciously or unconsciously, subscribes to a philosophical viewpoint which interprets and contextualises the world around them in various ways (Khaldi, 2017). The same, of course, is true of the researcher, who's 'research paradigm' may be seen as a lens through which they view or interpret their research. American philosopher Thomas Kuhn (1962) first used the term 'paradigm' to refer to a researcher's philosophical outlook and inherent way of thinking. The term is typically used to indicate a pattern or model or typical example including cultural themes, worldviews, ideologies and mindsets. Paradigms have been described as a general framework or viewpoints. They provide ways of looking at life and are grounded in sets of assumptions about the nature of reality (Babbie, 2020). This paradigm is developed through the abstract beliefs and thoughts of the researcher and has a profound impact on how the researcher views and acts in the world around them. As the paradigm is the conceptual lens through which the researcher views the world, this has several implications for the research study in relation to methods utilised and how results are interpreted. For the present study, the researcher's philosophical outlook will be clearly defined in order to contextualise decisions made as well as interpretation of findings.

Lincoln and Guba (1985) state that there are four main components that form the research paradigm: ontology, epistemology, axiology, and methodology. It is crucial for the researcher to have a strong understanding of these elements as they form the foundation for the basic assumptions, beliefs, norms, and values apparent within each paradigm. As such, there is an understanding that the research undertaken within the context of a particular paradigm will uphold, and be guided by the assumptions, beliefs, norms, and values of the chosen paradigm. Figure 3 below gives a visual representation of each element of the paradigm.

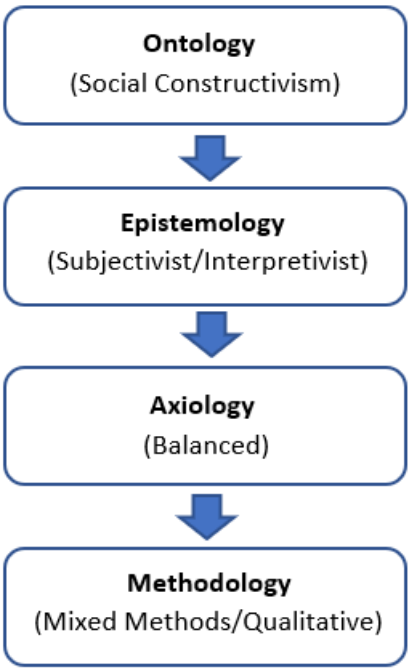

Figure 3: Research paradigm used in the study.

The following sections will explore each of the elements depicted in Figure 3 above as well as how each of these has informed the present study.

3.1.1 Ontology

The word ontology combines the Greek words *onto*, meaning being or that which is, and *logia*, meaning logical discourse. Ontology is theory associated with the nature of being. It refers to assumptions about the nature of reality, what exists and how these interact with one another (Blaikie, 1993). Ontology discusses how things exist in the world and whether this existence is subjective or independent of the individual observing them (Koshy, 2009).

The two most predominant ontological perspectives, positivism, and constructivism are in opposition due to their differing ontological positions (Bailey, 2011). Positivism provides an exploration of the world through a lens of objective truths (Antwi and Hamza, 2015). This ontological perspective is based within a realist ideology that subscribes to the notion that reality conforms to rubrics of cause and effect (Flowers, 2009). Positivism also asserts that reality exists in a state independent of the observer,

meaning the subject and the object are two distinct entities which directly opposes the idea of social construction (Scotland, 2012). Holden and Lynch (2004) have argued that a positivist ontological approach be excluded when examining social contexts involving human subjects. Conversely, the constructivist ontological theory posits that the nature of reality is fundamentally intertwined with the individual and therefore discards the notion of an objective reality independent of the individual (Mills, Bonner, and Francis, 2006). Within the constructivist ontology it is understood that reality is indirectly constructed based on individual interpretation and that people interpret and make their own meaning of events.

Considering the arguments for these two ontological perspectives, the researcher rejects the positivist outlook and instead subscribes to a constructivist interpretation. The researcher is an agreement with the constructivist depiction of multiple realities which are socially constructed, hence removing the possibility of a single objective reality (Killam, 2013). Thus, within the context of the present study, the researcher aims to utilise this constructivist ontological position to explore BBBB participant's perspectives of their unique experiences within the programme and perceptions of the programme. As the present research project is person centred in nature, focusing on the lived experience of participants, as well as their perception of outcomes associated with the programme, it is therefore appropriate to assume a constructivist ontological stance in the undertaking of this exploration. This constructivist approach will enable the researcher to highlight the subjective experiences and unique outcomes of each participant of the Well-Elderly Physical Activity Programme.

3.1.2 Epistemology

The etymology of the word 'epistemology' stems from the Greek words *episteme,* meaning knowledge, and *logos* which means theory. Epistemology is a philosophical theory of knowledge: of how we know what we know, a means of establishing what counts as knowledge (King and Horrocks, 2010), it examines the ways in which human beings come to understand the world around them (Roos and Von Krogh, 2016). Roos and Von Krogh (2016) go on to say that the qualities of anything are dependent on their relationship with the individual who is perceiving them. The American writer Philip K. Dick (cited in Rickles, 2010 p.10) eloquently captured this notion when he

said: “Maybe each human being lives in a unique world, a private world different from those inhabited and experienced by all other humans”.

Some refer to epistemology as the study of knowledge as it has the goal of revealing knowledge about knowledge itself. Epistemology typically discusses factors such as the different kinds of knowledge, and the role of reasoning in the development of that knowledge. It also places great importance on the difference between knowing and believing and the degree of certainty in knowledge (Wenning, 2009).

Social constructionism and social constructivism are sociological theories of knowledge that consider how social phenomena or objects of consciousness develop in social contexts. A social construction (social construct) is a concept or practice that is the construct of a particular group. When we say that something is socially constructed, we are focusing on its dependence on contingent variables of our social selves rather than any inherent quality that it possesses in itself. The assumption of the social constructivist/subjectivist epistemology is that the researcher will glean understanding of their research through inferences made from their own thoughts on the data as well as processing information gained through interaction with the research participants. Understanding is gained further through the personal experiences of the researcher within the setting which is being investigated. Furthermore, participants will develop unique meaning and understanding of their experiences from their own subjective thoughts. As such, there is a presupposition that a greater understanding can be gained through an interactive process between the researcher and the participants (Punch, 2013).

Constructivist approaches to research have the intention of understanding “the world of human experience” (Cohen and Manion, 1994, p.36), suggesting that “reality is socially constructed” (Mertens, 2005, p.12). The constructivist/interpretivist researcher tends to rely upon “participants’ views of the situation being studied” (Cresswell, 2003, p.8). Cresswell (2003) goes on to describe how the constructed meanings of each individual are highly subjective based on their interpretation of the situation. Regarding ontological perspective, the researcher adopts a constructivist epistemological stance with the belief that the reality for each individual participant of the Well-Elderly Physical Activity Programme entailed subjective experiences and outcomes to be explored. Thus, the researcher undertakes this study from the

constructivist/interpretivist epistemological perspective to facilitate an exploration into the subjective meanings of BBBB participants.

Guba and Lincoln (1989) identify that the central tenet of research undertaken within the constructivist/interpretivist paradigm is to understand subjective human experiences. The interpretivist approach attempts to understand the thoughts of the research participants in order to gain a greater understanding of the data and a more accurate interpretation of results. Due to the understanding within the paradigm that reality is socially constructed and that human experiences are the primary focus of this style of research, theory does not precede research but follows it so that it is grounded on the data generated by the act of research (Strauss and Corbin, 1990). This notion of theory stemming from action is consistent with the aims of action research making this methodology well suited to take place within the interpretivist paradigm. According to Morgan, (2007), research which is conducted under the interpretivist research paradigm generally display the following qualities:

- The admission that the social world cannot be understood from the standpoint of an individual.
- The belief that realities are multiple and socially constructed.
- The acceptance that there is inevitable interaction between the researcher and his or her research participants.
- The acceptance that context is vital for knowledge and knowing.
- The belief that knowledge is created by the findings, can be value laden and the values need to be made explicit.
- The need to understand the individual rather than universal laws.
- The belief that causes and effects are mutually interdependent.
- The belief that contextual factors need to be taken into consideration in any systematic pursuit of understanding.

(Morgan, 2007)

3.1.3 Axiology

Axiology refers to the ethical considerations which must be addressed when developing a research proposal. Hart (1971) describes axiology as a theory of values which addresses the truth and validity of value judgements. It is the process of defining and evaluating what the researcher considers to be correct behaviour within their research and it addresses what value is placed on the different aspects of the research such as the data and the participants themselves. In essence, axiology refers to the researcher's opinion on the nature of ethics and what they consider ethical within research (Bahm, 1993). Killam (2013) suggests that within the interpretivist paradigm, a balanced axiology is present. A balanced axiology refers to the researcher presenting a balanced report of the outcomes of the research by reflecting their values and the values of the participants in a fair and honest way. In order to conform to this balanced axiology, the researcher will focus on transparency in the research process with the aim of presenting results in a fair and unbiased way by clearly defining how data was gathered and analysed. Additionally, due to the expansion of the research methodology due to the Covid-19 pandemic, this transparent approach is of particular relevance and as such, the researcher clearly defines changes and additions to the methodology which are as a result of the pandemic.

The researcher's ontological, epistemological and axiological viewpoints inform the research paradigm which in turn impacts the choice of methodological approach. The previous sections have clearly defined the researcher's stance as that of constructivism/interpretivism, with a key focus on discerning individual meaning, unique to each participant. Considering the importance of determining meaning from each participant, a qualitative approach to research has been undertaken.

3.2 Qualitative Research

Within both the constructivist/interpretivist research paradigm and action research, the central goal of the research project is to gain an understanding of the subjective experiences of the participants. Typically, this will be accomplished using a qualitative research methodology. Qualitative research aims to facilitate a deeper understanding of the experiences which shape human lives and social worlds (Fossey et al., 2002).

Qualitative research methods have roots which can be traced to several diverse disciplines such as sociology, anthropology, and psychology, however, regardless of the discipline, many researchers believe qualitative research should be predominantly concerned with describing social contexts and the interpretation of subjective meaning (Silverman, 2020). Naturally, interpreting subjective meaning, being the key focus of the interpretivist/constructivist paradigm, is of particular relevance to the present study which is underpinned by this philosophical perspective.

The term 'qualitative research' itself does not adequately define any single methodology and is used as a broad umbrella term for any research methodologies that aim to describe or explain the participants behaviour, experience, interactions, and social contexts without the use of statistical methods more common to quantitative methodologies (Patton, 2005). Within the present study, the researcher predominantly used semi-structured interviews as the primary data collection tool. The use of qualitative interviews enabled the researcher to explore the unique perspectives of each individual interviewed as determined by their interpretation of experiences, as guided by the constructivist /interpretivist research paradigm.

3.3 Action Research Methodology

Action Research (AR) was chosen as the methodological approach for this study as it centres on generating evidence gained through research as a means of finding innovative solutions to practical problems and issues of concern with an emphasis on empowering practitioners to improve their quality of practice (Craig, 2009; Reason & Bradbury, 2006). Action research is not easily defined. It is a style of research rather than a specific method. First used in 1946 by Kurt Lewin, a social scientist concerned with intergroup relations and minority problems in the United States, the term is now identified with research in which the researchers work explicitly with and for people rather than undertake research on them. Reason and Bradbury (2008) reiterated that AR is difficult to define however they go on to provide a working definition, defining AR as:

> "a participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview which we believe is emerging at this historical moment" (Reason and Bradbury, 2008 p.1).

They go on to outline how AR:

> "Seeks to bring together action and reflection, theory and practice, in participation with others, in pursuit of practical solutions to issues of pressing concern to people, and more generally the flourishing of individual persons and their communities".

Due to its focus on producing practical solutions in social settings whilst also providing a strong academic foundation, action research is an ideal methodological approach to use when examining the community-based 'Well-Elderly' Physical Activity Programme which is the focus of this research project.

The present study utilised an action research approach, with a focus on collaboration and participation with programme leaders, throughout each phase of the research. As well as the collaborative nature of the study, the real-world situational context, concerned with a practical and worthwhile pursuit, in the form of evaluating the 'Well-Elderly' Physical Activity Programme also highlights the fundamental characteristics of action research as described by Reason and Bradbury (2008). In the context of using an action research approach, the researcher's understanding of action research is akin to that of Reason and Bradbury (2008) who define action research as:

> 'a participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview which we believe is emerging at this historical moment' (Reason and Bradbury, 2008 p.1).

By contextualising the goals of the research project within the scope of action research, the researcher was able to utilise the continuous cycles of planning, acting, observing, and reflecting, which generally characterise action research approaches, to strive for this aim of evaluating the physical activity programme. Jean McNiff, author of seminal work in the area of action research, elaborates on these cycles to describe her spontaneous, self-recreating system of enquiry as: 'a systematic process of observe, describe, plan, act, reflect, evaluate, modify' (McNiff 2002, p. 56).

McNiff goes on to say that the action research process is not linear, but rather, transformational which allows the researcher a greater degree of freedom and fluidity when implementing the methodology. This fluidity in the methodology is an idea held by many within the action research fraternity. Marshall (2001) describes how the researcher's intents often 'unfold, shift, clarify or become more complex'. Although this methodological fluidity is a major strength of action research, a guiding approach in the form of a model is also useful. There are several models of action research which have been developed over the years which will be discussed in the following section.

3.4 Models of Action Research

Although action research is sometimes described as being difficult to define, several models exist describing the process which the researcher undertakes when conducting action research (Craig, 2009). Beginning with Kurt Lewin and his seminal description of the action research cycle, several other models of action research throughout history will be discussed.

Kurt Lewin is often called the father of Action research having developed some of the key theories in the area as well as coining the term itself. His model is an action-reflection cycle of planning, acting observing and reflecting. After the period of reflection an amended plan can be made to act in a more efficient way and the cycles continue in the hopes of improving the plan and action over each iteration of the cycle.

Lewin's model of action research served as a precursor for the development of several other models of action research. Dave Ebbutt in his 1985 model of action research, felt that the stages were too linear and restrictive. Ebbutt instead theorised that a series of successive cycles which allowed the possibility of evaluation within each cycle instead of only just after would be more effective. Similarly, Kemmis and McTaggart in their 1988 model, propose a cyclical view of action research, however, the difference comes in this model through the way that reflection leads on to the next planning stage and how the planning stage is not separate from the previous cycle but is instead intertwined with the previous stages. The short and numerous cycles in this model are designed to ensure rigour and to produce effective AR which leads to an end result of change.

Elliott (1991) further expands on Lewin's AR model pointing out that in using Lewin's model, one might assume that the 'general idea' can be fixed in advance, that 'reconnaissance' is merely fact-finding, and that 'implementation' is a straightforward process. Elliot argues that the general idea should be allowed to change, that reconnaissance should include analysis as well as fact finding and should occur throughout the action research process and not only at the beginning. Elliott stated that implementation is not a simple task, and one should monitor the effects of action before evaluation takes place (Elliott, 1991, p. 70). Elliott's more detailed version of AR is visible below in Figure 4.

Within the context of this research study, John Elliott's (1991) detailed model of action research was used as a guide within this research project (below in Figure 4) due to its comprehensive planning steps and its ongoing reconnaissance and fact finding throughout the process. Although the research follows Elliott's model, it has been suggested that, for action research, it crucial for the researcher to remain fluid and utilise the freedom which action research allows (Koshy, 2009).

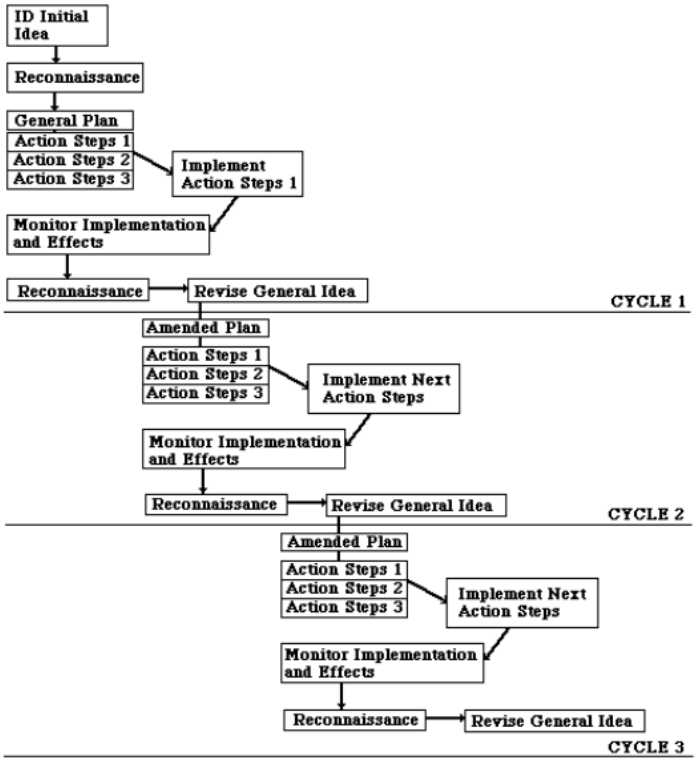

Figure 4: John Elliott's Model of Action Research (1991)

An action research approach underpinned the methodology of the present research study, using Elliott's (1991) model as a guide. The collaborative nature of action research enabled the researcher to utilise the knowledge and experience of the collaborative team, including programme leaders and research supervisors. Furthermore, the focus on practicality facilitated an action orientated experience for the researcher through visitation with the programme and engaging with BBBB programme participants.

3.5 Characteristics of Action Research

Although the field of AR is hugely varied, Reason and Bradbury (2008) have identified characteristics of AR which are broadly shared and help to characterise it, these are shown below in Figure 5.

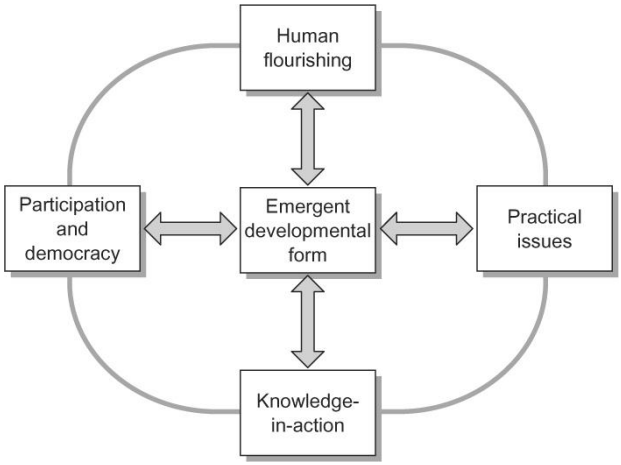

Figure 5: Characteristics of Action Research (Reason and Bradbury, 2008)

3.5.1 Knowledge in action

One of the primary purposes of AR is to develop practical knowledge that is useful to people in their everyday lives. It is also focused on the practical use of this knowledge to contribute to increased well-being for all involved. This concept of practical knowledge being superior to abstract theory has been supported by philosophers for some time. John Macmurray in his Gifford Lectures aptly stated:

> "Most of our knowledge, and all our primary knowledge, arises as an aspect of activities that have practical, not theoretical objectives; and it is this knowledge, itself an aspect of action, to which all reflective theory must refer." (Macmurray, 1957:12).

Greenwood & Levin (2006) concur with the idea of practical knowledge gained through action being a key component of AR. They highlight how the credibility and validity of action research knowledge is measured according to whether actions that arise from it ultimately solve the initial problem.

3.5.2 Participation and Democracy

Reason and Bradbury (2008) highlight how participation and democracy are characterising factors of AR. Action research is participatory by nature and it is best utilised by the people in the communities being targeted by the research. Meyer (2000) detailed how AR, with its focus on generating collaborative solutions to practical problems, empowers practitioners to engage themselves within the research process. Reason and Bradbury (2008) posit that AR can be employed most effectively by involving all stakeholders both in the questioning and sense making that informs the research, and in the action, which is its focus. As Reason and Bradbury (2008) stated: "… Participation affirms peoples' right and ability to have a say in decisions which affect them, and which claim to generate knowledge about them."

Kemmis (2006) states that one of the first steps in AR is the opening of communicative spaces which allows participants to democratically express their views. These communicative spaces allow people to achieve mutual understanding and consensus about what to do, in the knowledge that the legitimacy of any conclusions and decisions reached by participants will be proportional to the degree of authentic engagement of those concerned.

3.5.3 Practical Issues

Action Research is first and foremost aimed at making a positive change and developing useful knowledge and techniques. It is not merely research for the sake of research, and it attempts to make a difference in the lives of those involved. Reason and Bradbury (2008 p.5) said of Action Research:

> "Action research is not about knowledge for its own sake but knowing in the pursuit of worthwhile purposes - which we may describe as the flourishing of human persons, communities, and the ecologies of which they are part. Just what is worthy of our attention is, of course, a form of inquiry in its own right… A primary purpose of action research is to produce practical knowledge that is useful to people in the everyday conduct of their lives."

3.5.4 Emergent Developmental Form

Action Research and the means by which knowledge is gained from it cannot be pre-determined or planned linearly as the form which the research takes changes and develops over time. According to Reason and Bradbury (2008) good AR develops over time in a process which evolves as the researcher develops new skills and knowledge. Knowledge also expands within the communicative spaces as skills and standard of practice elevates to a new standard. As such, not only is practical knowledge in the area generated but also new abilities are gained which improve the researcher's ability to gather knowledge and research techniques become more efficient and beneficial over time (Reason and Bradbury, 2008).

Marshall (2001) describes how with AR it is important to inquire with intent and this intent may change and evolve over time as:

> "Inquiry involves intent, a sense of purpose. This may be held tacitly. There may be multiple intents, in accord or discord. Often intents unfold, shift, clarify or become more complex. Working with this aspect of inquiry is vital to self-reflective practice". (Marshall, 2002, 435)

Reason and Marshall (2003) elucidate the ever-developing form of AR. They go on to detail how focus of the inquiry can only emerge over time through the process of iterative inquiry cycles. This means establishing an iterative process, nurturing a deep experiential engagement with the issues to be explored and allowing the pattern of inquiry activity to emerge over time. Due to this developmental form AR is often depicted as a cyclical model as described by O'Leary (2004). This cyclical model of Action Research is displayed below in Figure 6.

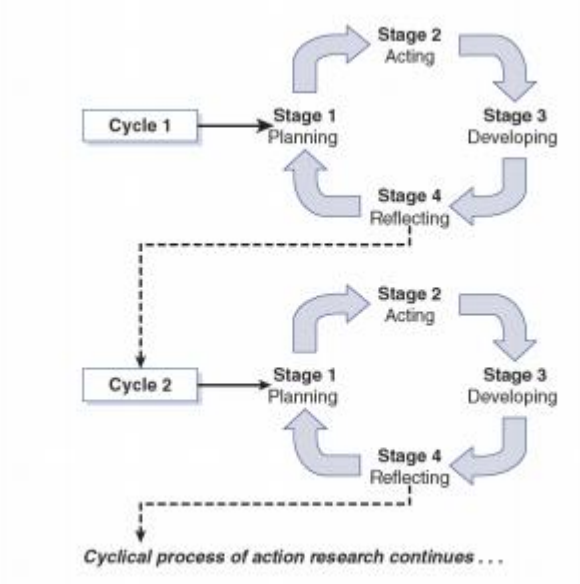

Figure 6: Cyclical Portrayal of Action Research (O'Leary, 2004)

3.6 Differences between Action Research and Classical Methodologies

Dionne (2007) has highlighted that Action Research (AR) differs from classical research methodologies in a number of ways. In regard to the objective of the study the two differ as classical methodologies often seek to gain generalizable wisdom through knowledge whereas with AR the researcher hopes to gain specific wisdom through action in the programme.

As a result of this another difference arises in that with AR the researcher is actively involved in the action and is themselves an 'actor' whilst other methodologies involve external actors with the researcher separated from the action. Dionne (2007) has also highlighted the difference between AR and classical methodologies regarding the choice behind the research subject. For most classical methodologies, the reasoning behind the undertaking of the study is the interest in the field from the researcher or the scientific relevance of the research undertaken. AR differs greatly from this as one of the key components of action research is its goal of contributing to social science by seeking to find solutions for pressing social concerns (Elliott, 1991).

The research planning also differs between the two as with classical research there is a linear process whereas AR is an interactive and ever-changing process. Reason and Bradbury (2008) defined the process of AR as a living, emergent process that cannot be pre-determined but changes and develops as those engaged deepen their understanding of the issues to be addressed and develop their capacity as co-inquirers both individually and collectively. The final difference identified by Dionne (2007) is with the conclusions of the research. Often in classical research these conclusions have only a theoretical reinsertion whilst for AR there is a direct reinsertion into practice.

3.7 A Brief History of Action Research

Kemmis and McTaggert (1988) and Zuber-Skerrit (1992) have stated that action research originated with Kurt Lewin, an American psychologist. Although there is evidence to suggest that he was not the first to utilise an action research approach, it is Lewin's description of action research in the 1940s which is often cited as the precursor for all other forms of action research today. Lewin's model of action research process involved a spiral of steps, each of which is composed of planning, action and the evaluation of the result of action (McTaggert, 1994).

This cyclical style of action research can be traced back to Lewin's work in the mid-1940s where he conducted socio-technical experiments in the area of Group Dynamics at the Tavistock Institute. Of particular importance, was the application of these experiments to practices of social democracy and organisational change (Greenwood and Levin, 1998). McKernan (1991) has demonstrated that although Lewin is seen as the founding father of action research, there is clear and convincing evidence that action research is a root derivative of the 'scientific method' reaching back to the Science in Education movement of the late nineteenth century and has provided evidence of several other social reformists utilising this method such as Boone (1904) and Buckingham (1926).

After the Science in Education, movement we can see evidence of the philosophical background of action research in the 1920s, 30s and 40s in what is seen as a period of experimentalist and progressive educational thought. In particular the work of John Dewey (1929; 1938) is of importance as he utilised the inductive scientific method in

order to develop logical solutions to projects in the fields of education, psychology, philosophy and aesthetics. As well as this, Dewey utilised a process which he called the 'stages of reflective thinking' which contains several features which are utilised in action research in more recent times. Dewey's (1938) model involved identifying a problem that is perplexing and observing and refining the identified problem to create a fuller understanding. From here a hypothesis or an understanding about the problem can be developed including possible solutions. The hypothesis is then put through scrutiny via logic and reasoning and finally tested in a practical setting.

During the mid-1940s the Group Dynamics movement began in the field of social psychology. This movement was concerned with the system of behaviours and psychological processes occurring within a social group (intragroup dynamics), or between social groups (intergroup dynamics). The interest in this area stemmed from social problems such as prejudice, intergroup relations and reconstruction of social groups which arose from the war. In order to understand and solve these pressing concerns practitioner inquiry was utilised and action research as it is known today was born. Kurt Lewin developed action research to be utilised as a tool for experimental inquiry. This development was based on work which Lewin was doing with social groups experiencing difficulties (Lewin, 1946). Lewin believed that social science should be used in order to develop solutions to social problems, and he eloquently portrayed his belief when he stated: "Research that produces nothing but books will not suffice (Lewin, 1948:203)".

As a result of the work done by Lewin and the theories which he developed action research became a much more credible form of social inquiry for researchers and in Lewin's time was praised as a great innovation in the social sciences. After Lewin, action research became an integral part of social inquiry and has been utilised in several fields such as organisation development, education, commercial organisations, healthcare and nursing as well as many others (Coghlan and Brannick, 2013).

3.8 What is the Value in Using Action Research?

From the history of action research, which has been outlined above, it is evident that action research as a methodology has increased in terms of popularity and respect over the years and it has become a more commonly used methodology particularly in the areas of health and education. There are numerous benefits to utilising action research as a methodology which the researcher believes has led to its widespread use. The most prominent of these benefits are detailed below. As mentioned above, action research is predominately utilised in the fields of healthcare and education and as a result, there is very little research in the area of health and fitness testing or older adult physical activity which could be used as a direct parallel to the present study. However, the benefits which will be detailed below, have a clear application to the present project although the sectors in which the research conducted may not be the same.

3.8.1 Practical

One of the main advantages in using an action research methodology is in its aim to identify and resolve problems rather than merely undertaking a theoretical investigation (Whitehead, Taket and Smith, 2003). Action research begins, in many different iterations and models, with the identification and description of a practical problem rather than a formal research question or hypothesis (Lewin, 1946, Elliott, 1991). For example, Casey et al. (2019) identified that, in nursing and midwifery, analysis tools can aid both policy evaluation and policy development. However, there was no existing framework for analysing the content of professional regulation and guidance documents among health care professionals. The identification of this problem and the recognition of its practical importance serve as the beginning of the action research process. This illustrates how the underlying aim of action research is practically improving practice as opposed to simply theory generation as with many other research methodologies.

Action research aims to improve practice by engaging and collaborating with individuals and implementing suitable interventions in real-time. These interventions are highly specific and practical as they take place in the individual or organisation's

unique social context (Whitehead, Taket and Smith, 2003). The researcher is implementing changes and is able to observe any outcomes and analyse data while the research is being undertaken as opposed to simply generating theory which may be implemented at a later date. For instance, Barrett (2006) demonstrates this strength of action research well in her study on how midwives can impact the lives of young mothers. After identifying the problem of some young mothers being unprepared for children, a 'Midwives' Action Research Group' was developed to generate practical solutions. The group came up with several ideas such as providing more support for new fathers and setting up a midwives' peer support group. These ideas were able to be implemented immediately and their effects could be analysed in real-time. This effectively demonstrates the practicality of Action research as the solutions which it generates are being implemented and evaluated continually in the specific context they were developed for.

Action research is a highly practical methodology which encourages the researcher to involve themselves in a highly specific problem which can often not be generalised. For the BBBB programme, this will facilitate a greater understanding of the programme through practical involvement as well as promote solutions gained through action as opposed to simply theory.

3.8.2 Flexible

Action Research is a valuable tool for the researcher due to its methodological flexibility. The researcher is not restricted to one particular methodological approach and in fact pluralism and multifaceted approaches are actively encouraged for triangulation (James and Augustin, 2018). Action research encourages utilising both quantitative and qualitative approaches and advocates for the use of diverse research techniques. A prime example of this can be viewed in Waterson's (2000) study in the area of social services. She collected and analysed data over three phases, which included documentary data collection, focus group interviews, unstructured individual interviews, reflective account analysis and a post-test structured questionnaire. This leads to a diverse and holistic set of data being gathered which can be utilised extremely effectively to identify potential solutions to problems. As exemplified in the above study, the emancipatory and participatory nature of action research has

traditionally leaned towards qualitative research. However, flexible modes of incorporating both quantitative and qualitative research methods are now being recognised as an increasingly appropriate way forward for health promotion (Ivankova and Wingo, 2018). Christ (2018) has demonstrated the benefits of utilising mixed methods action research in his study on the special education system in the United States which ultimately secured a grant of 1.4 million dollars. Qualitative data included semi-structured interviews, conversations at team meetings, classroom reflections, and interviews of professional development participants. Quantitative data included student records, yearly writing proficiency tests, and analysis of student writing samples. This mix of methods allowed for triangulation of data and produced more compelling information than had a specific qualitative or quantitative approach had been utilised.

As discussed above action research takes place in practical settings in real-time. As such, it may involve opportunistic interventions which could not be predicted at the outset of the study. These interventions emerge and develop over time and are analysed and studied which leads to new interventions being developed and so on. The opportunistic nature of action research is effectively demonstrated in Lax and Galvin's (2002) study on community action. A chance meeting which was initiated by a local housing estate's families group wishing to improve childcare arrangements, led to the auditing of existing childcare provision and the gathering of users' opinions. This in turn led to the development of a sub-group which was directed to train local residents to support a holiday play scheme. Outcomes such as the example above cannot be predicted at the outset of the research however, action research provides the researcher with the flexibility required to take advantage of these opportunities for the benefit of those involved.

As action research allows for flexibility in its methodological approach, it give the researcher the opportunity to evaluate the problem in various ways. For the BBBB programme, the flexibility of action research allows for a comprehensive evaluation through various methods which may be changed over time. Any new opportunities for analysis that arise over time may also be investigated due to this flexibility.

3.8.3 Collaborative

Action Research is highly collaborative in nature. It places a great deal of importance on engaging the subject in the design and conduct of the research through a democratic and social process of inquiry (Wakefield, 2018). The subject of the study may be either the researcher themselves or the research participant or both meaning the participants may be full collaborators in the study or they may simply be the research subject. In either instance it is of paramount importance that a collaborative approach is utilised by those involved. Collaboration between practitioners is illustrated well in Baldwin's (2006) study on teams of social workers. He found that by working together with cooperative inquiry, practitioners were able to take ownership of their learning, reduce anxieties and increase reflectiveness all of which are positive outcomes. The above example shows how collaboration between practitioners can lead to positive outcomes. However, as stated above, collaboration between the researcher and the subject of the study may also take place. This form of action research is usually identified as 'participatory action research'. Koch and Kralik (2009 p.5) have said of participatory action research:

> "Participatory action research principles enable a potentially democratic process that is equitable and liberating as participants construct meaning during facilitated, group discussions."

Participatory action research has been utilised in studies in order to empower the research subjects and give them agency to develop solutions to their own problems. In the medical field, Schneider et al. (2004) has used participatory action research as a tool to improve communication between patients with schizophrenia and their medical professionals. In the study, a group of people with schizophrenia conducted interviews with each other in order to examine the experiences of people with schizophrenia as well as their interactions with medical professionals. This participation by the research subjects is extremely liberating for the research subjects and gives them an opportunity to assist themselves as opposed to being prescribed a solution.

The collaborative nature of action research is a key benefit and it gives the researcher important insights into the setting directly from those who are involved. For the BBBB programme collaboration with those running the programme will give the researcher a greater understanding of the programme itself and allow for a greater analysis.

3.9 The Limitations of Action Research

Action research is often undertaken as a methodology with the benefits outlined above in mind. Although these benefits lead to action research being an extremely useful method for inquiry, there are also a number of limitations which the researcher believes should be considered.

Koch and Krallick (2009) have identified that, due to the fact that action research is collaborative in its nature as well as taking place over an extended period of time through many cycles and iterations, it can be difficult for the researcher to set-up and sustain. It requires the collaborators to place a great amount of trust within each other as well as being dependant on a large level of prolonged effort, participation and engagement. Parkin (2009) has also identified that it may be a difficult task for the researcher to bring about actual change within the group being studied potentially due to past experiences, different levels of engagement in the programme, differing perceptions on the need to change and varying willingness to change.

As identified in the benefits section above, the methodological flexibility of action research is one of its key advantages. However, this may also lead to one of the greatest difficulties in utilising action research. Due to the fluid nature of action research the outcomes of the study as well as the processes which will be utilised to achieve these outcomes are difficult to define, particularly at the outset of the research. As a result of this, researchers who use this methodology may face situations where they are unsure of what to investigate, when certain outcomes should be expected or even when the research is likely to be complete (Whitehead and Day, 2012). Whitehead and Day (2012) go on to state that due to this difficulty in defining the research journey, it may be difficult to organise the research plan early on. This may lead to other difficulties for the researcher such as trouble gaining funding or ethical approval as the researcher can't articulate the outcomes or processes at the outset of the research.

Another potentially limiting factor which Koch and Krallick (2009) have identified is how action research may be perceived as a somewhat blunt or insensitive tool by the organisation or community which it is being employed in. As shown in Elliott's (1991) model of action research the first phase is 'identifying the problem'. As such there is an implication that before the research begins there is a problem with the group being investigated which requires changing or fixing. Although this analysis of the

‘problem’ is undertaken with the mind-set of developing a solution for the benefit of the organisation in question, criticism may be perceived negatively and occasionally, imposed political or managerial agendas may work to oppose this type of scrutiny and hinder rather than help the research efforts (Koch and Krallick, 2009). Additionally, action research is often applied to groups or communities which are perceived to be in a vulnerable or powerless position. The research may, therefore appear to be threatening to these groups as it highlights the disparity of authority and the potentially oppressive nature of the community or organisation in which they reside.

As with some other qualitative methodologies, generalizability of the data being gathered is a limitation of action research. By its very nature, action research is extremely context-specific as the researcher/practitioner is placed at the heart of their own social setting with the goal of finding practical solutions and improving practice in this specific area. Although this is highly beneficial for improving conditions within this particular setting, it is difficult to compare one setting to another or to apply any findings which are found in another context meaning the research is largely only of benefit to the group which is the focus of the research (Whitehead and Day, 2012). However, Crozier et al. (2012) identified that it may be beneficial to study and compare settings against one another as there may be common themes which apply across different organisations and groups.

Within the action research paradigm much of the focus and, indeed effort, of the researcher is directed towards organisation and co-ordination of various tasks and activities. As well as this, the researcher is responsible for the facilitation of dialogue, dissemination of information and ultimately the progress of the programme. Mackenzie et al. (2012) argues that these processes may become all-encompassing as the ‘action’ component of action research tends to dominate and the ‘research’ section is pushed to the background. They go on to say that in these situations the researcher becomes more of a facilitator of learning than a researcher particularly if the nature of the learning is about eliciting and documenting values and knowledge held by participants. Although this is not inherently negative, the amount of focus placed on the ‘action’ may diminish the amount of traditional research activity which would usually be associated with academic research.

The focus on the 'action' element of the research lends itself to another potential limitation of action research which is methodological rigour. As the researcher places emphasis on finding practical solutions to the problem they may become more focused on 'action' than on 'research' to the detriment of a systematic and rigorous protocol. This issue is also visible in other aspects of the research. Although certain elements are considered to be positives, they also lend to the methodological rigour being placed under scrutiny. One such aspect is the fluid and dynamic nature of the research. On one hand, this fluidity creates possibilities for the action researcher which would be traditionally unavailable however this ever-changing protocol is in direct contrast to what would usually be considered rigorous in academic settings. Another positive aspect of action research which lends to this criticism is the collaborative nature of the research. By involving stakeholders, who are potentially inexperienced or novice researchers, there may be difficulties in maintaining research rigour and validity (Badger, 2000).

Although it is important to understand the limitations of action research, the benefits of utilising it far outweighs the negatives. Action research enables the researcher to examine an issue in a practical setting while utilising several methods of investigation for a comprehensive evaluation. Action research is situated ideally in the middle ground of practical action and theoretical knowledge making it the perfect methodology for the evaluation of the 'Well-Elderly' Physical Activity Programme.

3.10 Situational Context: Background to the Research

The present study aims to explore the impact of a 'Well-Elderly' Physical activity programme, namely the Better Balance, Better Bones (BBBB) programme, on the health and wellbeing of older adults. The BBBB programme is an 8-week physical activity programme aiming to facilitate the maintenance of positive health for participants. Prior to the present research study, the programme did not utilise a formal Evaluation Protocol. Programme leaders approached the Institute of Technology Tralee (now Munster Technological University) to assist with the development of the aforementioned Evaluation Protocol. Through engagement with the Master's research programme within the college, the present study was implemented to enable the development of the Evaluation Protocol for the BBBB programme.

3.10.1 The Better Balance Better Bones (BBBB) Programme

The BBBB programme was initially developed by the Cork Community Physiotherapy Department with the primary aim of providing an exercise class for community dwelling people who were at low risk of falls. The original programme development was informed by the Otago Exercise programme, which has been shown to be efficacious, with ample evidence supporting its use (Campbell, 2003). The ethos of the programme is to be community based and easily accessible for participants, with the aim of promoting positive ageing, building bone health, and reducing the risk of falling. The programme is designed with guidance from the scientific literature to have standardised components in each class which target key areas of fitness for the participants: aerobic, strength, static and dynamic flexibility, and range of motion exercises. Furthermore, the National Guidelines on Physical Activity for Ireland (Department of Health and Children, 2009) and the WHO (2018) guidelines were also utilised in the development of the programme.

The programme involves 8 weeks of exercise classes consisting of 45-minute sessions once per week. The warm-up section of the classes involves aerobic activities such as walking with the goal of improving cardiovascular function for the participants as well as the typical function of a warm-up; pulse raising and mobility. Following the warmup is a circuit style component which involves a range of exercises including additional aerobic exercises, strength work with dumbbells or resistance bands and mobility and flexibility exercises. The next section involves exercises dedicated to balance exercises. Static balance exercises such as standing on one leg and dynamic balance exercises such as heel-to-toe walking are incorporated to provide a wholistic approach to balance training. Finally, an aerobic cool-down is performed including some light stretches in order to return the participants to homeostasis. Another major focus of the programme is education in the area of home-based exercise. A home exercise programme (HEP) is provided with an exercise of the week and education is provided as to the efficacy of each exercise to increase adherence to the HEP. Each class also includes a brief educational talk regarding exercise advise.

A pilot programme was carried out in Cork in 2016 with positive outcomes and feedback from participants which led to the Kerry Physiotherapy Department and Baile Mhuire day centre looking to adopt the programme for use in Kerry in May

2019. The programme was initially funded through the National office for Services for Older People and is currently being funded through local community services in Kerry. The programme is carried out in line with Slainte care policy which advocates for the care of people within their own communities. This programme aims to keep people well and strong for longer, hence reducing falls and thus the need for acute care. It is very much community based and demonstrates value for money with the engagement of exercise facilitators who run the programme and by reducing the cost associated with falls. The National Falls and Bone Health strategy (HSE.ie, 2021) which coordinates the development of a comprehensive falls and fracture prevention system recommends that community-based programmes aimed at the well elderly are an important component of the aims of their strategy.

3.10.2 Inclusion/Exclusion Criteria

The inclusion/exclusion criteria for participation in the study came from a pre-existing screening method utilised by the activity leader of the BBBB programme. The programme leaders were in control of the screening process for the purposes of data protection, in order to keep the researcher separate from access to participant health data. The screening involved an assessment of the candidate's health in which they were asked several questions such as: Have you noticed any changes in your balance? Have you noticed any changes in your walking? Have you slipped tripped or fallen, in the past year? If the answer to these questions were yes, a further timed up-and-go test was performed where the individual must get up off a chair walk around a cone 3 metres away and return the chair as quickly as possible. During this further test, their gait and balance was assessed and if they were unsteady or appeared as though they may have been at risk of falling, they were deemed ineligible for the programme. Appendix A attached contains full inclusion/exclusion criteria.

Following the balance related screening, a health-related questionnaire is administered, which examines participants medical history, of particular interest were, current medical conditions, current medication, any pains experienced during exercise etc. If a person had a serious medical condition which would mean participation in the programme would be a risk, they were unable to participate and were deemed

ineligible for participation in the programme and engagement in the research project Evaluation Protocol.

If participants were deemed eligible to participate in the physical activity programme they were then asked if they wished to participate in the pre- and post-assessment. If participants did not consent to engage in the assessment, they were still allowed to participate in the physical activity programme and informed that this would in no way impact their engagement with the programme. Prior to the running of the protocol a comprehensive information letter was given to each participant and voluntary, informed consent was given by each participant. A copy of the information letter and consent form used for Cycle 1 of the research is attached in Appendix B and C respectively.

3.10.3 Covid-19

Whilst in the process of completing the first action research cycle of the project in March 2020, the Covid-19 pandemic escalated to the level where a countrywide lockdown was implemented. This lockdown had a profound impact on the research project due to restrictions placed on movement, social distance requirements, facilities closing, and exercise classes being cancelled. The pandemic was especially impactful on the present study due to the participants of the study being considered to at high risk. When the lockdown occurred, the researcher had just implemented the evaluation protocol which had been developed as per the aim of the study. Interviews were conducted with programme participants as well as the exercise facilitator to get feedback as to their perceptions on the evaluation protocol and how it could be improved going forward. A revised evaluation protocol was developed, informed by these observations and interviews, however, it was not possible to implement this revised protocol due to the restrictions imposed by the Covid-19 pandemic.

Unfortunately, due to the lockdown it would have been impossible to continue the research in a manner which would carry out the original aim as restrictions made access to the study participants impossible. Initially, the direction of the project was uncertain as at the outset of the lockdown it was not clear as to how long it would continue. Once it became clear that the lockdown would persist for a substantial

period, it was decided that the direction of the project would require an expansion. The aim and objectives of the study were revised in line with this and as such the project was expanded to incorporate a qualitative exploration of the programme in addition to exploring the development of an Evaluation Protocol.

As the lockdown occurred many months into the research project, substantial work had already been completed towards achieving the original aim of the study. As such, the researcher has determined that there is a necessity to detail the methods carried out in this time as well as since the revision of the aims of the study. Consequentially, the following sections have been split into two cycles. Cycle 1 denotes the original methods carried out during the development and implementation of the evaluation protocol. Cycle 2 refers to the expanded qualitative evaluation undertaken to explore the impact of the physical activity programme. The progression of the research through each phase of Elliott's model is summarised in Figure 7 below.

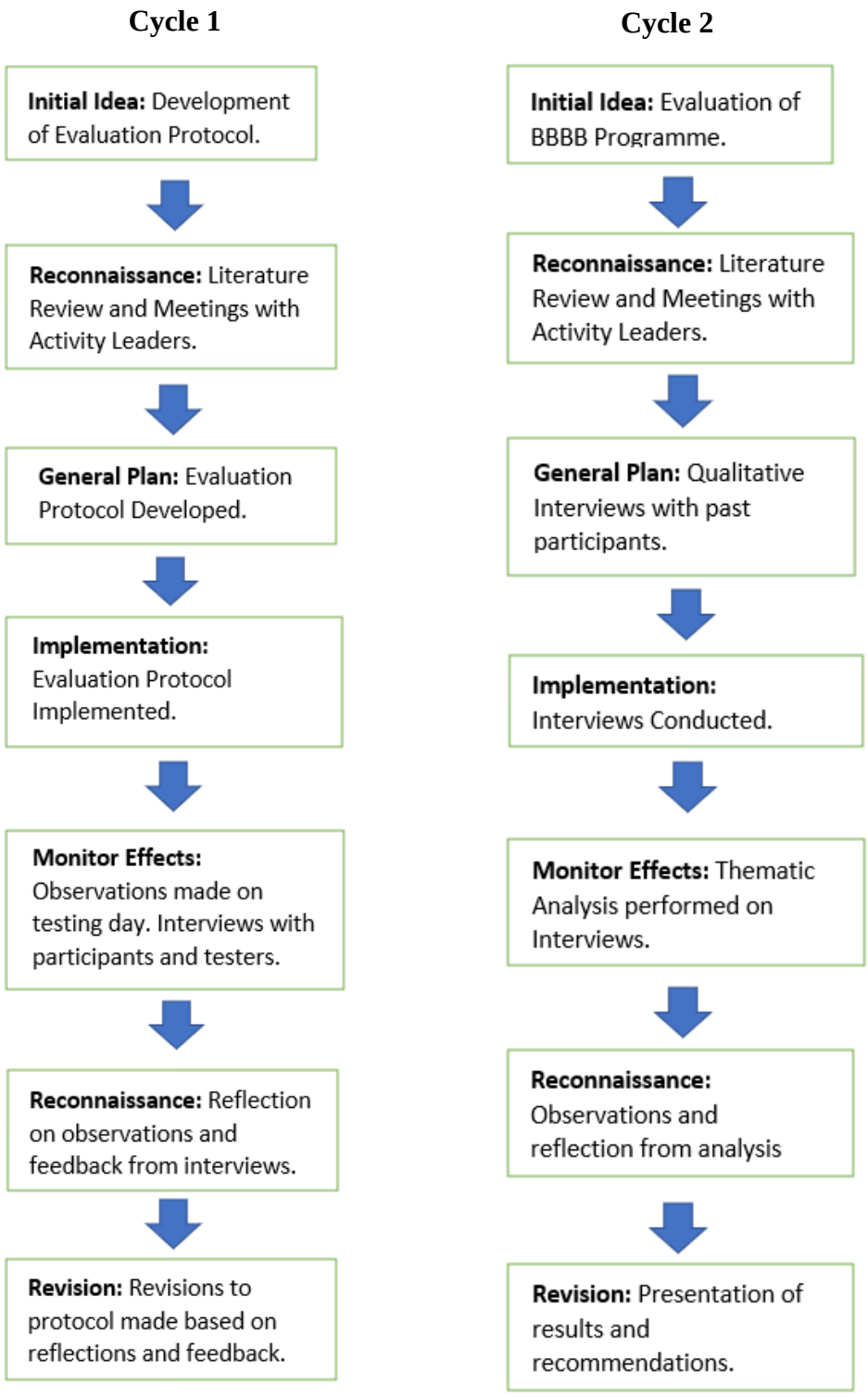

Figure 7: Action Research Cycles Conducted During Cycle 1 and Cycle 2

3.11 Participants

3.11.1 Participants (Cycle 1)

The participants who were involved during the initial stage, Cycle 1 of the research, developing an evaluation protocol for an older adult exercise programme, were selected due to convenience as this group were set to begin the programme at the outset of the research project. The subjects in the study were participants of the BBBB programme which took place in January 2020. The programme operates on a voluntary basis and the participants signed up to take part in the programme through Baile Mhuire Day Centre, Tralee who have overall responsibility for recruitment and running of the programme. The subjects in this group consisted of 15 female and 3 male participants (N=18).

From this initial group of 18, 4 participants were selected to participate in interviews relating to their experience of the evaluation protocol. These 4 participants were randomly selected from the larger group, however, due to the predominantly female participant base of the group, the researcher ensured that one male participant be included in order to gain greater variation within the sample. This sample of 4 consisted of 3 female and 1 male participant.

Table 2 : Cycle 1 Participants

Stage of Research	**Evaluation Protocol**	**Post-Evaluation Interview**
Number of Participants	18 Participants	4 Participants

3.11.2 Participants (Cycle 2)

Cycle 2 consisted of a qualitative evaluation of the programme using remote interview conducted via telephone. A total of 14 interviews were conducted with 10 participants (3 participants were re-interviewed). It was initially planned that 16 interviews would be conducted with 12 participants; however, 2 interviews did not take place due to being unable to contact the participants.

The 14 interviews consisted of participants from 3 separate programmes which were ran at different times in order to assess if there were differences in participants groups depending on how long it had been since programme completion.

Four participants who had just completed the programme were interviewed, 3 of which were re-interviewed 3 months later. The 4th could not be contacted for the re-interview.

Three participants were interviewed who were 6 months post programme completion. Again, a 4th interview was planned, however, one of the participants could not be contacted.

Finally, 4 participants were interviewed who were 12 months post programme completion. The participants were randomly selected from each programme by the activity leader and, with consent from the participants, contact details were passed on to the researcher. For data protection purposes the researcher did not have access to demographic data such as age of the interview participants.

Table 3: Cycle 2 Participants by Group.

0 Months Post Programme	**3 Months Post Programme**	**6 Months Post Programme**	**12 Months Post Programme**
4 participants	3 Participants (re-interview from 0-month group)	3 participants	4 participants

3.12 Research Methods: Data Collection Tools

3.12.1 Semi-Structured Interviews

Semi-structured interviews were utilised as the primary method of data collection within both cycles of the research. A semi-structured interview is a verbal exchange where one individual, the interviewer attempts to gather information form another, the interviewee (Schmidt, 2004). Semi-structured interviewees are differentiated from a fully structured interview by enabling greater freedom of discussion. Although the interviewer utilises a list of predetermined questions, the semi-structured interview is more conversational in manner, allowing both interviewees and interviewer the freedom to change the direction of discussion and explore topics as they present themselves (Longhurst, 2003). Within the constructivist paradigm, the focus of research is on understanding subjective human experiences, and the freedom to explore topics as they arise within semi-structured interviews provides a useful method of eliciting deep and meaningful data.

As stated above in section 3.10.3, Cycle 1 of the present study involved the development of an Evaluation Protocol for the BBBB programme. During this development process semi-structured interviews were conducted with 2 testers who had administered the protocol as well as 4 participants who had completed the Evaluation Protocol on the testing day. The goal of these interviews was to elicit information pertaining to the efficacy of the Evaluation Protocol regarding, difficulty, enjoyment, ease of understanding, length, and efficiency. Information obtained within these interviews was used to inform refinements made to the Evaluation Protocol as evidenced in Chapter 4.

Cycle 2 of the present study involved an expansion to the project aims to include a qualitative analysis of the BBBB programme. This qualitative analysis involved semi-structured interviews conducted with programme participants and the interview guide was designed to facilitate discussion on each of the outcomes associated with the study aims and objectives (section 3.0). The findings and discussion pertaining these interviews is presented in Chapter 5.

3.12.2 Collaborative Meetings

Reason and Bradbury (2008) describe collaboration, in the form of participation and democracy, as one of the defining features of action research. Indeed, action research is highly collaborative in nature placing a great deal of importance on the democratic and social process of inquiry (Wakefield, 2018). The collaborative nature of action research was highlighted throughout collaborative meetings conducted throughout both cycles of the research study.

Within the first cycle of research, the development of an Evaluation Protocol, collaborative meetings, between the researcher, programme leaders and research supervisors, were utilised primarily during the planning phase. These collaborative meetings enabled reconnaissance and fact-finding, providing key information relating to the programme regarding, programme aims, timeline and participant information. Furthermore, these collaborative meetings heavily informed the development of the protocol itself, with the researcher discussing possible tests to be included in the protocol with programme leaders. Again, the outcomes of these collaborative meetings are presented in Chapter 4.

As mentioned in section 3.10.3, with the onset of restrictions imposed by the Covid-19 pandemic, an expansion to the research aim was required. Collaborative meetings were held between the researcher, research supervisors and BBBB programme leaders in order to determine the direction the research project would take when it was made clear it would not be possible to continue the project in line with the original aim. These meetings enabled the collaborative team to develop an expanded project aim which included a qualitative evaluation of the BBBB programme, which would be possible to complete remotely via telephone interviews. These meetings also facilitated the development of the interview guide utilised with programme participants during the qualitative interviews. Appendix D includes a copy of the interview guide used.

3.12.3 Fieldnotes

Fieldnotes refer to qualitative notes recorded by the researcher in the course of field research, documenting their observations (Mulhall, 2003). Fieldnotes are widely recommended in qualitative research as a means of documenting needed contextual information (Phillippi and Lauderdale,2018). Within the context of the present study, fieldnotes were taken throughout the research process for the purposes of observation as well as reflection.

Cycle 1 of the research was concerned with the development, and refinement, of an Evaluation Protocol. As mentioned above, in section 3.12.2, the development process involved collaborative meetings with programme leaders as well as research supervisors. Following each meeting, fieldnotes were taken in order to familiarise the researcher with the key discussion undertaken during the meetings. Additionally, these fieldnotes clearly define the development process of the Evaluation Protocol, thus ensuring transparency as outlined within the balanced axiology of the study.

The fieldnotes taken also served as a research diary, enabling the researcher to explore key moments throughout the research journey and reflect on them. Reason and Bradbury (2008, p.1) describe how action research 'seeks to bring together action and reflection, theory and practice'. The use of these fieldnotes enabled the researcher to directly link the process of action and reflection, with the meticulous note taking following each action serving as reflective practice.

3.13 Evaluation Protocol Testers

Due to the comprehensive nature of the evaluation protocol as well as the large size of the group participating in the programme, it was decided that a number of testers be utilised in order to make the testing process more efficient. The testing team consisted of the researcher, the activity leader in charge of the programme, the physiotherapist associated with the programme and two fourth year undergraduate students from the Health and Leisure Programme at the Institute of Technology Tralee (now Munster Technological University). Each of the testers had prior experience working with older adult clients either in an academic setting via the college or in a professional context.

Each tester also had previous experience with fitness testing for older adults, however, further education in this area was provided during a pilot study session, full details of which can be seen in Chapter 4, section 4.2.1.

3.14 Ethical Considerations

As the research project focused on working with older adults, who are classified as being a higher risk group, a large focus was placed on conducting the research in a safe and ethical manner. The initial iteration of the research project involved not only developing and Evaluation Protocol but administering the protocol thus necessitating the administration of physical tests and recording the results of said tests. It was therefore necessary to seek full ethical approval for the research project from the Institute Research and Ethics Committee (IREC). Full ethical approval was granted in January 2020. Due to the expansion in methodology imposed by the Covid-19 pandemic, the IREC was notified of the change to methodology and approved of the new methodology as interviews had always been intended to be a part of the study and participants had previously consented.

In planning and submitting for ethical approval, risks associated with the evaluation were identified and considered. In engaging participants in the completion of physical tests, it was determined that there was minimal level of risk which is inherently associated with physical activity. There was a minor risk of injury during the physical testing battery, as is the case with any physical activity. This risk was seen as very low as physical injury was unlikely to occur during the testing due to the low intensity level of the tests being performed and also that the tests utilised were specifically tailored for use with older adults. The tests were also carried on a one-to-one basis meaning each tester was able to closely monitor the participants and observe for any signs of distress/discomfort etc. In addition, those administering the tests were REPs qualified fitness instructors and a qualified physiotherapist. It was also ensured that an AED was present at the location of testing and a charged mobile phone available in the event that emergency services were required to be contacted.

It was also identified that there was a limited risk of mild psychological distress arising from the completion of some of the questionnaires. The WHO-5 questionnaire (Appendix E) is related to psychological wellbeing and as such has a minimal risk of psychological distress. The Activities-Specific Balance Confidence (ABC) Scale (Appendix F) is related to balance and potentially becoming unsteady which may also have a minimal risk of psychological distress. These questionnaires were deemed unlikely to cause distress, however, in the event that they did, precautions were put in place. There was a tester available who only focused on assisting with the questionnaires. In the event of distress, the tester would have been available to support the individual as necessary.

For the qualitative interviews conducted in the Summer 2020, there was no significant risk identified. Questions were asked in relation to programme experience, perceived benefits, physical activity levels etc and were unlikely to elicit any form of psychological distress. Prior to each interview, the researcher had a brief phone call with each participant outlining the purpose of the interview, expected duration, and ensuring that they had no obligation to participate and could withdraw at any time. This phone call further reduced any risk of distress.

In order to comply with the most recent GDPR guidelines for health-related research, it was required that informed consent was voluntarily given by each participant. Informed consent refers to providing the participant with all information related to the research being undertaken so that they may make an educated choice as to whether they wish to take part (GDPR, 2021). To accomplish this a comprehensive information letter was given to each participant prior to the evaluation as well as prior to the interview process. This letter included information relating to the goals of the research, what was required of participants, any risks associated with the research, how data would be handled and used etc. The letter also ensured anonymity for anyone wishing to participate in the study as well as highlighting that there would be no negative effects associated with not wishing to participate. A full copy of the information letter and consent form is available in Appendix H and I.

During the evaluation procedure data was gathered in relation to lower-body strength, upper-body-strength, dynamic balance, static balance, flexibility aerobic endurance, balance confidence, self-efficacy for exercise and general wellbeing. During the

interview process data was gathered in relation to programme experience, perceived outcomes of the programme and barriers/motivators to physical activity. The researcher did not have access to any personal information or medical history information as the programme activity leader was in control of all personal data obtained in screening forms. All information which was gathered is being used only for the purpose outlined to the participants and with their explicit consent. The information gathered for this research was done so with guidance from the ethical committee chair of Institute of Technology Tralee. The information that was collected is kept private and stored securely and safely on the researcher's computer which is protected with a password. Any hard copies of material with the information are stored within a locked drawer in a locked office. All participants in the study are pseudonymised and are given a fictitious name in any written reports. The information that is gathered in the study will be kept for five years after which it will be destroyed. An assessment of the data protection implications of this project has been undertaken in accordance with the law, a copy of which is attached in Appendix J.

3.15 Reflexivity

Reflexivity is a term which refers an individual's personal beliefs and how these may have affected practices carried out during the research or otherwise affected or biased the study in any way. Reflexivity involves examining one's assumptions in order to create transparency within the research and ensure rigour within the method. This examination of biases is especially important within qualitative research due to the effect which they may have on interpretation of data (Finlay 1998). Within the constructivist paradigm in which this research project takes place, reflexivity is of particular interest. The researcher has previously recognized, when discussing the research paradigm earlier in this chapter, that each individual has a subjective view of the world which leads to differing interpretations of events. This recognition of subjectivity comes with an implication that the researcher's subjective view will have a distinct impact on how the study is carried out and also how results are interpreted. By explicitly stating personal opinions which may affect the research, the researcher creates a more valid position from which to present the research. Central to the notion

of reflexivity is a focus on my own subjectivity as a researcher at each stage of the research process (Finlay and Gough, 2008).

As an individual with a lifelong interest and involvement in sport and physical activity it is critical to disclose these experiences in order to make discussion as objective as possible. Personally, interest in physical activity was founded at a young age stemming from my father who enjoys a competitive athletics career. From an early age I was always active and enjoyed running and playing outside with my siblings. As such I have a longstanding belief that physical activity is a fundamental part of existence and that it is a source of much happiness both for me and those within my social group. This love of sport and physical activity inspired me to attend the Institute of Technology Tralee in order to study on their excellent Health and Leisure programme which was foundational in developing my current stance on physical activity. Through 4 years of study my beliefs were further reinforced, and the importance of physical activity was cemented in my mind.

Regarding older adults and physical activity, the researcher also has considerable life experience which is relevant to disclose for objectivity's sake. In my personal life, I would have had very little exposure to older adult exercise for the first 20 years of my life. Two of my 4 grandparents were chronic smokers with very little interest in physical activity, 1 had a stroke which rendered them incapable of walking and the remaining one, I recall, would go for walks in the evening, which at the time I would not have classed as physical activity. This notion changed however, when I began my education at IT Tralee as there were several modules which focused on exercise for older adults. Prior to this experience, exercise for older adults would have been something which I had not even considered, however, through this education it was brought to the forefront of my mind. Once it was highlighted to me the benefit which physical activity could provide for older adults, this area of older adult exercise became one which I was very passionate about which formed the motivation behind this very project. Through direct work with older adult groups during my undergraduate study, it was highlighted to me that older adults were much more capable than I would have previously thought from my personal life which has greatly impacted my view on older adult physical activity.

Within a professional setting, the researcher also has experience in working with older adults for physical activity. Due to my love of physical activity, after graduating from college, I pursued a career in swim teaching and exercise instruction. Within this work I led an aqua aerobics class targeting older adults for almost 2 years prior to the Covid-19 pandemic. Before taking on this class I would have had some experience working with older adults from college, however, the experience I received within this professional context was crucial in developing how I approach older adult participants. Prior to the class, I would have been relatively shy when working with older adult clients, not being sure of how to talk to them casually due to the misconception that our interests would be miles apart and fearing that the age gap would make conversing difficult. The group I had for the aqua aerobics class were, however, extremely social and constantly had me chatting for long periods of time and laughing at jokes and stories etc. Through this interaction with the participants in the class, I became much more confident in working with older adults and my misconception that it would be difficult to converse was thoroughly quashed. This experience has made me much more comfortable in dealing with older adult clients, something which no doubt made rapport building much easier in this project.

My experience in building rapport no doubt was crucial in enabling honest discussion with participants during the interview process. When first meeting the participant group, I made an extra effort to engage with each participant, learning names and being friendly as I was worried that, being a young sporty male, participants may be intimidated or feel alienated by me. I was aware that in order to facilitate honest discussion during the interview process, I would need to ensure the participants were comfortable with me. Through this engagement with the group, a rapport was built which would enable more openness in the interview process to be conducted later.

It is impossible to ensure absolute honesty within the interview process, with another point of concern being my association with the programme. I was aware that participants may perceive me to be associated with the BBBB programme and as a result may simply tell me what I wish to hear in order to not appear critical of the programme. In order to mitigate this, I always introduced myself as being associated with the college as opposed to the BBBB programme. Additionally, I regularly reminded participants that any criticism which they had would be welcome and would in no way negatively affect them. Furthermore, through the use of the information

letter, and verbal reminders, participants were ensured of their anonymity, meaning anything they said could not be linked to them.

3.16 Data Analysis

Consistent with the constructivist/interpretivist paradigm, the researcher aimed to determine meaning from each of the participants in the exploration of their interviews. A thematic analysis was chosen as the method of data analysis in order to enable the themes prevalent throughout the interviews to be defined and contextualised to understand their meaning. Braun and Clarke's (2006) method of thematic analysis was utilised to analyse the qualitative data obtained from the semi-structured interviews which were conducted with BBBB participants.

3.16.1 Thematic Analysis

Thematic Analysis is a systematic approach to organising and identifying patterns, or themes, within a set of data. By searching for patterns and identifying meaning across an entire set of data, thematic analysis enables the researcher to gain a greater understanding of the data and to comprehend shared meanings between participants (Gavin, 2008). Through this process thematic analysis can be used to identify commonalities between the participants in a dataset and make sense of these patterns. The justification behind the use of thematic analysis within this project is twofold. Firstly, due to its accessibility and simple yet effective application it provided a good entry point to the daunting world of qualitative research in which the researcher is a novice. Secondly, the six-step model developed by Braun and Clarke (2006) provided a framework and a structure to the analysis of data whilst also allowing flexibility in the interpretation of the results (Clarke, Braun and Hayfield, 2015). This method of analysis gave the researcher enough guidance to successfully identify themes within the dataset, whilst also allowing enough freedom to create personal meaning guided by the researcher's interpretivist/constructivist paradigm.

1. Familiarisation with the data

   The first step in Braun and Clarke's method involves the researcher familiarising themselves with the data set. The purpose of this phase is to become intimately familiar with the data which is being analysed and to begin noticing and understanding patterns which may become relevant in the next phase. In this phase the researcher became familiar with this dataset in several ways which are identified as useful by Braun and Clarke (2006). Firstly, the data was gathered by the researcher when conducting the interviews and even at this stage, certain patterns became apparent. Secondly, during the transcription process the researcher spent a considerable amount of time listening to, and transcribing verbatim, the content of the recordings. In addition to transcribing, the researcher also re-read the transcripts after they had been written. During this re-read notes were made in relation to initial areas of interest within the transcripts.

2. Developing Initial Codes

   The second step of the thematic analysis process is where the systematic analysis of the data begins through the coding or the interview transcripts. Codes are used to identify and define features of the dataset which may be relevant to the researcher (Joffe, 2012). These codes are used to describe the features and provide a summary of the data. The coding process is quite flexible in that it is to the researcher's discretion how codes are developed and how data is represented within the codes. Codes can be either semantic, meaning they describe the data to the interviewee's meaning, or interpretive, where they are used to derive meaning which is interpreted by the researcher (Guest et. al, 2011). Within this analysis the researcher used predominantly semantic coding to describe the dataset but also utilised some interpretive coding to search for hidden meanings and add depth to the data set. For example, the codes: motivation, desire to stay healthy, desire to maintain independence were generated from the following quote: *"I'm motivated to be physically active to stay as active and healthy as I can. I don't ever want to be a burden to people now that I'm getting older. I still feel young." Participant 4(2nd).* Appendix K contains a sample of a coded transcript.

3. Searching for Themes

   The third phase of thematic analysis is the development of themes across the entire data set, and it is at this phase that the shape of the patterns within the data really starts to take form. Braun and Clarke (2006 p.82) describe how a theme *'captures something important about the data in relation to the research question and represents some level of patterned response or meaning within the data set'.*

   Themes are developed in this way by forming the raw codes and data into themes associated with the patterns that the researcher identifies. For this research project, the process of identifying themes involved identifying areas where several codes overlapped and were repeated. Themes were generated by grouping codes together which shared some unifying factor. By identifying the commonality between the codes, a theme is developed. For example, the codes: Family Encouragement, Group Support and Programme Participation were developed into the theme: Motivation.

4. Reviewing Initial Themes

   The fourth step involves analysing the themes which were found in the third step in the context of the original codes which were generated and the dataset as a whole. This step is essential to ensure rigour within the analysis as when working with large datasets it is often not possible to be always aware of the entire dataset during the analysis process. For this reason, it is necessary to revise themes against the entire set to maintain quality. In order to review the themes which had been generated for this research project, the researcher asked a set of questions suggested by Braun and Clarke (2006) to assess the quality of each theme:

   - Is this a theme or just a code?
   - What does this tell me about the data?
   - What does this theme include/exclude?
   - Is there enough data to support this theme?
   - Does the theme lack coherence?

After ensuring the that the themes were of quality by utilising these guiding questions, the researcher performed a final re-read of the transcripts to ensure that the themes correctly represent the dataset as a whole.

5. Defining and Naming of Themes

   In the fifth phase the themes which make it through the review process in step four are named and defined. To define a theme, it is necessary for the researcher to identify the unique features of the theme which separate it and make it unique. For this project, the researcher defined each theme individually by ensuring that they had a singular definable focus which was not overlapping any other themes and that they were related to the research questions. In this phase the researcher also began selecting extracts which would be used to set the narrative for each theme which will be demonstrated in the report. This phase also included selecting names for the themes which involved the researcher identifying a short title for each which makes the theme easily identifiable and understandable for example, Motivation or Programme outcomes.

6. Producing the Report

   The sixth and final step in Braun and Clarke's method is to utilise the themes identified in the previous steps to produce a report which disseminates the research findings. Regarding the current research project, the research presents the findings of the thematic analysis in chapter 5 along with relevant discussion pertaining to current literature in the area of older adult health and physical activity. Additionally, these findings are further utilised in order to make recommendations in Chapter 6.

3.17 Conclusion

The present chapter explored the methodological approaches employed within the research study. The researcher defined their philosophical outlook, in the form of the research paradigm, as that of constructivism/interpretivism. Constructivist approaches to research have the intention of understanding "the world of human experience" (Cohen and Manion, 1994, p.36), therefore a qualitative methodology was utilised in order to unearth the subjective meaning of the experiences of each individual interviewed. The first cycle of research utilised semi-structured interviews, collaborative meetings and fieldnotes to inform development and revision of the Evaluation Protocol. The following Chapter, Chapter 4, presents the results and discussion pertaining to this development cycle.

Due to restrictions imposed by the Covid-19 pandemic, the methodology was expanded at the end of the first cycle of research. Semi-structured interviews were predominantly utilised as a data-collection tool in order to facilitate meaningful discussion. Braun and Clarke's (2006) 6-step thematic analysis process informed the analysis of the interviews conducted and led to the development of themes. The findings and discussion pertaining to this second cycle of research are presented in Chapter 5.

Chapter 4:

Results and Discussion

Cycle 1: The Development of an Evaluation Protocol

Chapter 4 Cycle 1-Results and Discussion

4.0 Introduction

As outlined in the previous chapter, this research project incorporates two action research cycles. The first cycle of the present study aimed to develop a comprehensive and efficient Evaluation Protocol for use in the 'Well-Elderly' Physical Activity Programme, while the second phase entailed expanding the aim and conducting a qualitative evaluation of the programme. An overview of both cycles can be seen below in Figure 8.

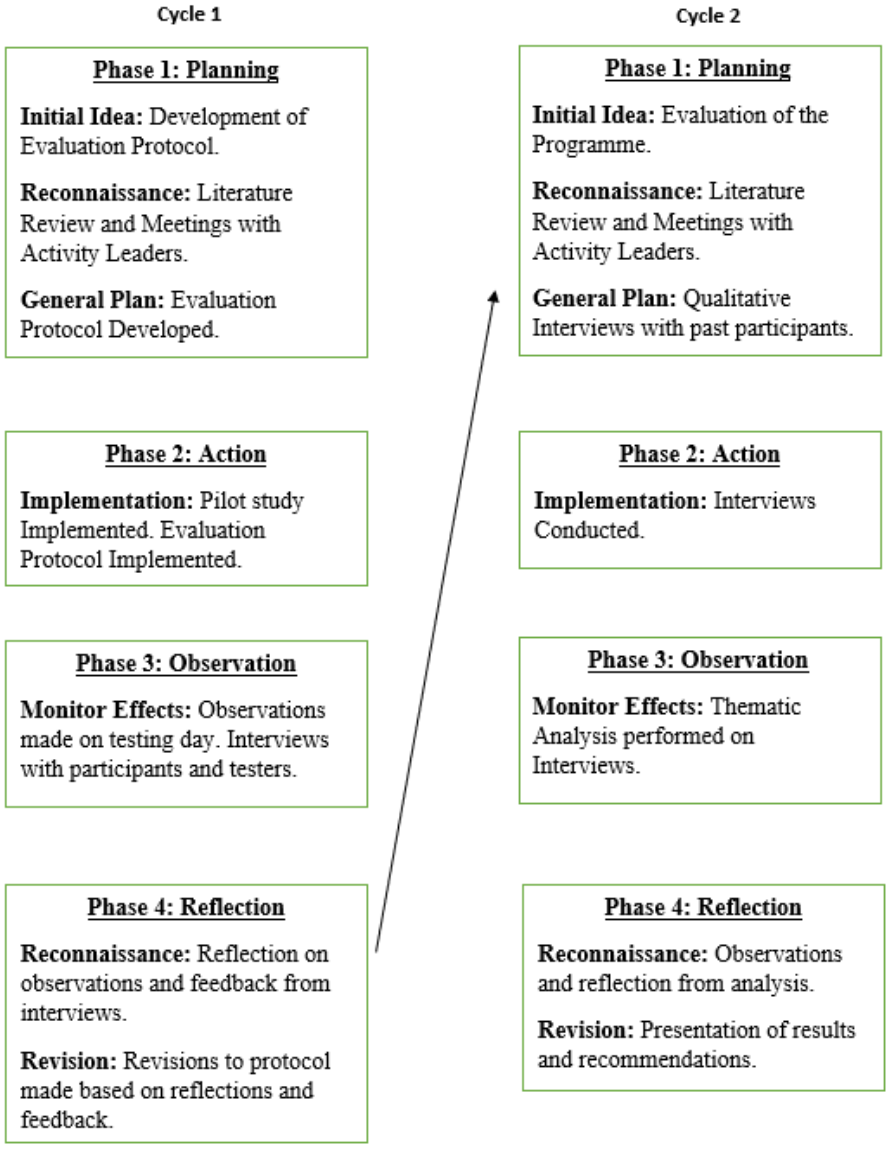

Figure 8: Overview of Action Research Cycles and Relevant Phases

The following chapter focuses on the first cycle of the action research process conducted, with the second cycle being discussed in the next chapter, chapter 5. As stated, the first cycle of the present study aimed to develop a comprehensive and efficient Evaluation Protocol for use in 'Well-Elderly' Physical Activity Programme thus addressing the first research objective. The researcher utilised an action research methodology to collaboratively develop this Evaluation Protocol with the programme leaders. The protocol was developed through a review of literature pertaining to older adult health and fitness testing as well as through collaborative meetings and interviews conducted with the programme leaders, tester and programme participants. This chapter presents an exploration of the outcomes and outputs obtained through the phases of developing the Evaluation Protocol, while also guiding selection of inputs for the logic model that will be presented in chapter 6.

The chapter is divided into a number of key sections reflective of the various phases of the action research Cycle 1; Development of an Evaluation Protocol for a 'Well-Elderly' Physical Activity Programme (see Figure 8 above). Firstly, section 4.1 details the planning phase of the action research cycle. This phase involved reconnaissance and fact finding regarding the programme, the completion of an extensive literature review pertaining to older adult health and fitness, and methods of exercise testing for older adults. This section outlines how the examination of the literature, in conjunction with collaborative meetings, led to the development of the pilot Evaluation Protocol. Section 4.2 explores the action phase of the action research cycle. Within this section the researcher will discuss the implementation of the pilot Evaluation Protocol developed. Section 4.3 examines the observation phase of the action research cycle. Within this section the researcher presents observations made during the initial testing of the protocol as well as feedback obtained from those administering the protocol. Finally, section 4.4 discusses the reflection phase of the action research cycle and how the feedback and information gained from the observation phases informed the refinement of the Evaluation Protocol.

4.1 Phase 1: Planning

The first phase of any research study involves identifying what to study and developing knowledge in the area. The first phase of action research involves the planning phase wherein the researcher develops the initial idea for the project, gathers all pertinent information for the study and utilises this information to develop an initial plan of action (Reason and Bradbury, 2008). For the present study, this phase predominantly involved a comprehensive review of the literature as well as collaborative meetings with programme leaders. The processes and findings associated with this planning phase are presented in detail in the following section.

4.1.1 Development of the Initial Idea

As outlined in Chapter 3; Methodology, the BBBB programme is an 8-week, community based physical activity programme which aims to incrementally improve strength, balance, and general aerobic fitness in older adults. Prior to the current research project, there was no formal evaluation methodology associated with the programme. The programme leaders approached the Institute of Technology Tralee (now Munster Technological University) to assist in the development of a formal Evaluation Protocol. It was agreed that the college would assist in the development of an Evaluation Protocol through engagement with the Master's research programme which culminated in the development of the current project. As such, the initial project aim was set to develop and test a programme Evaluation Protocol for the use of the physical activity leaders who would be delivering the programme.

4.1.2 Programme Reconnaissance and Developing the Initial Idea

McNiff et al., (2003) describes reconnaissance as the starting point of action research where the researcher determines where they are at, the outcomes expected and how they will achieve these goals. The reconnaissance phase of the current action research cycle involved finding information which could be utilised in developing the initial plan. To effectively plan for the action step, it is imperative to have a comprehensive understanding of the area which is being investigated. In particular, reconnaissance

and fact finding related to the programme was crucial for this study as at the outset the researcher had relatively little information about the programme itself.

In September 2019 the researcher attended and observed 2 Better Balance, Better Bones (BBBB) programmes being delivered. From these initial visits, it was possible to observe the format of the programme; in essence each class consisting of an aerobic warmup, a circuit involving muscular strength and endurance exercises, a balance training section and finally a cooldown and stretch routine. Moser and Korstjens (2018) describe the importance of immersing oneself in the research setting in order to perform effective observation and the early in-person visits performed by the researcher reinforce this notion, facilitating a greater understanding of programme delivery and participants. The knowledge gained from these visits enabled the researcher to gain a profile of participants engaged in the programme, in terms of approximate age and functional capacity as well as identifying the various components of fitness targeted through programmed implementations, this in turn informed the key foci associated with the evaluation protocol.

From these early visits, the researcher determined that the programme was targeting each of the components of fitness (cardiovascular endurance, muscular strength, muscular endurance, flexibility, and body composition) in keeping with many other physical activity programmes (Cress et al., 2005), while also including the skill related component of balance. The understanding of the types of exercise utilised, the profile of the typical participant as well as the expected outcomes of the programme naturally served as an important foundation when determining what should be included in an Evaluation Protocol for the programme. As it was targeting each of the components of fitness, tests for each of these areas would be required to evaluate the effectiveness of the programme in each area. Additionally, as the programme participants were older adults, the researcher determined that the tests would need to be appropriate for this demographic. Furthermore, this initial encounter served as an opportunity for the researcher to establish an early rapport with the programme leaders as well as to establish a shared goal, the development of the protocol. Research has indicated that a shared purpose is an essential aspect of collaboration (Utley and Rapport, 2002) and the early establishment of rapport as well as a common aim was a crucial early step in the research process enabling the researcher and programme leaders to effectively collaborate in the development of the Evaluation Protocol.

4.1.3 Literature Review

Reconnaissance and fact finding is the second key element of the planning phase following the development of the initial idea. One of the primary methods of fact finding utilised by the researcher in the development of the protocol was a literature review. A literature review is an examination and synthesis of pertinent research in the chosen area of study (Hart, 2018). Traditionally, literature reviews are conducted at the outset of a research project in order to distil current information so that the project may be informed by existing knowledge in the area (Rowley and Slack, 2004). The literature review conducted for the present study played a key role in furthering the researcher's knowledge base in the areas of older adult health and age-related changes as well as programme evaluation modalities. This review was essential in informing the key elements to be included within the Evaluation Protocol.

Upon initial investigation of literature pertaining to health evaluation, the five components of fitness were frequently alluded to. The five components of fitness (cardiovascular endurance, muscular strength, muscular endurance, flexibility and body composition) are often used as a blueprint for guiding physical activity with a comprehensive activity programme targeting improvements in all areas (King et al., 2019). Considering the reconnaissance of the programme highlighting how the exercises performed targeted each of these components, further emphasis was placed on the necessity to include a test to enable the evaluation of each component of fitness. Upon searching the literature for tests of each component which would be suitable for older adults, the Senior Fitness Test (SFT) developed by Rikli and Jones (2001) was frequently highlighted. The SFT battery quickly became of interest to the researcher as a practical and suitable set of tests which had been utilised in several clinical trials (Purath et al., 2009; Wilkin and Haddock, 2010). Furthermore, research has proven the SFT to be a valid and reliable method of testing each area of fitness for older adults (Rikli and Jones, 2013). The researcher used the SFT battery (see Table 4 below) as the initial blueprint of the Evaluation Protocol due to its validity, reliability, ease of use and comprehensive nature evaluating each component of fitness (apart from body composition which is typically measured using the Body Mass Index formula (Prentice and Jebb, 2001)). It was decided by the researcher not to include an analysis of BMI as programme leaders had reported that BMI was not a specific goal of the

programme. Additionally, the SFT battery includes a test of agility and balance in the form of the timed up-and-go test which is relevant to the BBBB programme with one of the primary foci of the programme being the maintenance of balance for participants. From this initial blueprint, revisions were made to the protocol informed by collaborative meetings with programme leaders. The collaborative meetings, and the outcomes of these meetings are discussed in the following section.

Table 4: Senior Fitness Fitness Test Battery (Rikli and Jones, 2001)

Component of Fitness	Test
Lower Body Muscular Strength/Endurance	30-Second Chair Stand Test
Agility/Balance	Timed Up-and-Go Test
Upper Body Muscular Strength/Endurance	Arm Curl Test
Cardiovascular Endurance	6-Minute Walk Test/2-Minute Step Test
Upper Body Flexibility	Back Scratch Test
Lower Body Flexibility	Chair Sit-and-Reach Test

4.1.4 Collaborative Meetings (Reconnaissance and Information Gathering)

Collaborative Meetings were a crucial element of the planning phase, enabling the researcher to gather valuable information relating to the programme. As outlined in the previous chapter, the action research process is highly collaborative in nature. It places a great deal of importance on engaging collaborators, be they the subject or colleagues, in the design and conduct of the research through a democratic and social process of inquiry (Wakefield, 2018). As such collaboration was a key component of the present study. During the process of developing the Evaluation Protocol for the programme in the first cycle of the research journey, the researcher linked closely with the programme leaders which included the exercise facilitator and the physiotherapist leading the programme. Collaborative meetings were conducted with the programme leaders in order to acquire information relating to the programme which would be utilised to inform the development of the Evaluation Protocol. Furthermore, these meetings served as an opportunity to inform the development of the protocol through direct feedback from the programme leaders.

As stated, these initial meetings, and the development of associated fieldnotes (a sample of which is include in Appendix L) with the programme leaders served as an important foundation for the development of the Evaluation Protocol with key programme information being provided to the researcher. The primary learning outcomes from these meetings included the following:

- The programme aims were identified by the researcher. The programme is not exclusively a falls prevention programme as the researcher had initially assumed, but instead employs a holistic approach to health maintenance and improvement.
- The target group of the programme was highlighted with the programme being not targeted solely at older adults but any individual aiming to maintain their health as they age.
- Logistical information about the programme was provided. The researcher learned that it was an 8-week programme conducted once a week. The pre- and post-programme evaluation would be implemented one week prior to the 8-week programme and one week post the 8-week programme.
- There is a comprehensive screening process conducted prior to participant engagement in the programme which ensures programme participants are considered not to be a fall risk (see section 3.4.2 for full screening details).
- The exercise facilitator delivering the programme had undertaken an informal pre- and post-programme evaluation of their most recent group of participants. This evaluation entailed the timed up and go test, the 6-minute walk test and the tandem stand balance test.

By clearly defining the programme aims, it was possible to gain a better understanding of what needed to be included in the programme. The programme aims target several of the five components of fitness reinforcing that an assessment of each component would be necessary to determine if the programme was meeting its desired outcomes. Prior to the research, an assumption was made that the programme was specifically a "fall-prevention" programme. The early meetings with the team helped the researcher to define the aims of the programme more clearly. The BBBB programme aims to enable participants to maintain positive health as they age. In particular, the

programme places emphasis on maintaining and improving cardiovascular fitness, muscular strength, balance, flexibility, and fall prevention, evidencing a multi-faceted approach to health. This multi-faceted approach employed by the programme has been demonstrated to be effective for older adult health outcomes within the literature with improvements to cardiovascular health, muscular strength and balance being associated with health-related quality of life, increased ease of ADLs and reduced fall risk (Knowles et al., 2015; ACSM, 2009; Li et al., 2016). Research has also demonstrated that a programme which utilises a diverse approach to fall prevention, including strength training as well as balance training, may be more beneficial than a programme which relies solely on balance training (Clemson et al., 2012). This would imply that although the programme is not focused specifically on fall-prevention, it is ultimately demonstrating best practice in that regard.

The programme also promotes education regarding home-based exercise through in class education, an exercise to perform at home each week and an information booklet. The education provided to participants is a cornerstone of the programme and aims to increase both participant knowledge of health and physical activity as well as engagement in home-based exercise.

> It was clear that Mary and Anne were focused on the educational aspect of the programme. Throughout the meeting they were quick to remind me that education was a key part of each class with information being given during water breaks, and of course, the exercise of the week being used to promote home-based exercise. (Fieldnotes, Meeting 2, October 2019).

Physical activity programmes which provide education built-in have been shown to be effective within the literature. Research has highlighted that interventions based on an approach of education regarding physical activity have a positive effect on physical activity for the elderly (Moradi, 2017). Studies have emphasised that physical activity programmes which utilise an approach combining both a physical training programme and an educational element are significantly more beneficial for older adult health outcomes than programmes which primarily focus on physical training (Perrot et al., 2019). This educative approach may also be beneficial for meeting the programme aim of increasing home-based exercise engagement with research demonstrating that education regarding exercise and, in particular, fall prevention strategies, may be an effective motivator for older adults' engagement in physical activity (Dikinson et al., 2011).

The programme leaders were adamant that the programme was not labelled solely as an older-adult programme as it had been intended to target all adults.

> Anne raised a concern about the title of the research project itself …Anne stated that she didn't like the word "elderly" being included in the title as she has stated the programme doesn't only advertise to elderly people. She also raised a concern that the participants in the programme may be upset to see the word "elderly" if they did not consider themselves as such. (Fieldnotes, Meeting 4, November 2019)

However, from the observations made at the programme implementation, as well as these early meetings it was clear that, although technically the programme could accommodate younger adults, programme participants consisted exclusively of older adults. This is not uncommon within the literature, with Farrance et al. (2016) describing that programme participants typically prefer demographic homogeneity, meaning that they wish to participate with individuals of the same age group and gender. As early renditions of the programme were trialled with day centre users, who are primarily older adults, it is unsurprising that the demographic homogeneity continued throughout future groups. Furthermore, considering that the programme aims and even the title of the programme 'Better Balance, Better Bones' are suited more towards older adults, the older adult participant profile is to be expected. As such, it was therefore necessary to develop the Evaluation Protocol with this in mind, making sure it was appropriate for older adults which further supported the use of the SFT battery (Rikli and Jones, 2001).

The logistical information, in relation to the proposed length of the programme and start and end dates, was of key importance as it provided a timeline for the development of the Evaluation Protocol. Furthermore, it was determined by the researcher that a pilot study would be necessary to complete a trial run of the protocol prior to the scheduled pre-programme evaluation, however, at this early stage a date was not set. Instead, the focus of these early meetings centred around information gathering regarding the programme.

The programme leaders described the use of a screening process prior to participant engagement with the programme in order to determine their suitability for participation. The elements within the screening process included a telephone interview, a health and medical history questionnaire and a gait analysis. This screening process would act as the inclusion/exclusion criteria for the present study (see Appendix A). Pre-participation screening is quite common as although the value

of physical activity is commonly reported, it has long since been recognised that some individuals may be ill-advised to participate in certain kinds of activity (ACSM, 1995). The use of this screening measure within the programme enables the activity leaders to ascertain who would be a suitable participant prior to programme implementation, thereby reducing risk of participant injury (Cardinal and Cardinal, 2000).

The programme leader had attempted an informal evaluation with the most recent group of participants prior to the study. This evaluation involved the 6- minute walk test, the timed up-and-go test and the tandem stand balance test. Both the timed-up and go test and the 6-minute walk test are from the SFT battery (Rikli and Jones, 2001) further supporting its use as a blueprint for the initial protocol. Although the leaders had utilised these tests to perform an evaluation, the current research project was necessary in order to develop a more comprehensive Evaluation Protocol which would be validated through its repeated implementation.

The information gained in these early meetings provided important logistical information about the programme which gave the researcher a timeline of when the Evaluation Protocol needed to be completed. Additionally, information regarding the running of the programme as well as its defined outcomes provided a strong foundation of knowledge from which to develop the Evaluation Protocol. Furthermore, the programme leaders experience in administering some of the tests which were being considered would prove vital in the development of the initial battery of tests.

4.1.5 Collaborative Meetings (Protocol Development)

In addition to reconnaissance and information gathering, the collaborative meetings facilitated the development of the Evaluation Protocol directly through the identification of key outcomes to be measured as well as possible tests to be included. Whilst planning for a programme, there are positives associated with internal planners, such as the programme leaders, and external planners such as the researcher. The internal planners are more likely to have insider organisational knowledge, however the external planner is less susceptible to bias (Issel, 2004). Thus, a number of collaborative meetings were conducted which focused on an exploration of the key

outcomes to be measured was conducted. As stated in the previous section, the key components of fitness targeted within the programme were identified which enabled the researcher to develop an initial battery of tests based on an investigation of the literature and observation of the programme implementation. The initial draft of the Evaluation Protocol used the SFT as a blueprint.

As programme leaders had previously completed an evaluation which included two of the tests from the SFT battery, the programme leaders were able to give a unique insight into how they work in practice. The exercise facilitator raised concerns regarding the 6-minute walk test stating that it was extremely time consuming to administer as each individual had to be evaluated one at a time which meant 6 minutes for each participant.

> Mary and Anne both raised concerns about this test as they stated that it took an extremely long amount of time to administer as each individual had to be evaluated one at a time which meant 6 minutes for each participant. (Fieldnotes, Meeting 3, November 2019)

As the number of participants was often approximately 20 per programme this would lead to hours of testing for this one test alone. Naturally, this was a concern for both the researcher and programme leaders, as one of the research goals was to develop not only a comprehensive Evaluation Protocol, but also a practical and efficient Evaluation Protocol which could be administered by a single tester (the exercise facilitator). This is a prime example of the insider knowledge referred to earlier by Issel (2004).

Ultimately, it was deemed impossible to develop an Evaluation protocol which is both highly detailed as well efficient enough to be utilised by a single tester. As such, it was proposed by the researcher that two distinct Evaluation Protocols be developed; a comprehensive protocol to enable a thorough evaluation of the protocol as well as a short-form protocol which may be implemented by a single tester. Although this idea was well received by the programme leaders, it was ultimately decided that for the initial pilot Evaluation Protocol, the comprehensive protocol would be the focus in order to facilitate a detailed evaluation.

In recognition of the 6-minute walk test being extremely time consuming, the 2-minute step test was selected instead as an alternative to assess cardiovascular endurance. The 2-minute step test is presented as an alternative within the SFT battery when time or space cannot accommodate the 6-minute walk. Although the 6-minute walk is seen as

the gold-standard test of cardiovascular endurance for older adults, the 2-minute step test has been demonstrated to be a reliable and valid alternative (Rikli and Jones, 2013).

The other test which had previously been conducted, the timed up-and-go test, is utilised to measure agility and dynamic balance. Again, this test is from the SFT battery and has been demonstrated to be reliable and valid (Rikli and Jones, 2013). The exercise facilitator had a positive experience with this test as it was simple to administer as well as very time efficient taking only seconds for each participant.

> Mary had also utilised the timed up-and-go test with the participants and found it had none of the same problems. She described how it was quick and easy to use and stated that she thought it was a good test. (Fieldnotes, Meeting 3, November 2019)

Furthermore, the inclusion of the test is strongly supported in the literature, with the test being included in several clinical trials with older adults, in particular relating to falls (Beauchet et al., 2011). The test involves getting up from a seated position, walking a short distance around a cone and returning to a seated position, movements which are applicable to ADLs and independent living. Considering the efficiency and practicality of the test, it was included within the testing battery.

Due to the programme's emphasis on balance training, it was decided to add another test of balance to the Evaluation Protocol. As the timed up-and-go test focuses on dynamic balance, i.e. balance in movement, it was determined that a static balance test would also be appropriate. The one-legged stance test was chosen due to its applicability to ADLs which mirrors the programme's goal of maintaining health and independence (Anemaet and Moffa-Trotter, 1999). Furthermore, studies have also suggested that impaired performance in this test is a marker of frailty in elderly persons making it a valuable test to include within the battery (Drusini et al., 2002).

In order to measure the other components of fitness targeted by the programme, the relevant SFT tests were chosen. The 30-second chair stand test for muscular endurance, the arm curl test for muscular strength and the chair sit-and-reach test for flexibility were included in the Evaluation Protocol in order to facilitate an evaluation of each component of fitness. It was crucial to include tests of muscular strength and endurance within the Evaluation Protocol with research reporting that muscle weakness is consistently cited as an independent risk factor for high mortality in older adults (Goodpaster et al., 2006). In addition, it is necessary to evaluate flexibility with

research indicating that there is an association between decreased flexibility and fall-risk for older adults (Guimaraes and Farinatti, 2005)

Each of these tests from the SFT battery have been repeatedly demonstrated in the research as being both valid and reliable tests for their respective components of fitness (Rikli and Jones 2013). Additionally, studies have indicated that there is a correlation between the tests of the SFT battery and objective laboratory assessments of each respective component (Hesseberg at al., 2015).

It has often been acknowledged in the literature that as well as the apparent physical benefits to physical activity there are several psychological benefits which may also be achieved (Brymer and Davids, 2016). As such, the researcher presented the idea that a holistic Evaluation Protocol must include measures related to psychological health. The WHO-5 is a short self-reported measure of current mental wellbeing and is among the most widely used questionnaires assessing subjective psychological wellbeing (Topp et al., 2015). This questionnaire was discussed within a collaborative meeting with one of the programme leaders having experience with the questionnaire.

> Anne described how she had experience using the WHO-5 questionnaire in her work as a physiotherapist. She thought that it was a good questionnaire being aware of its wide use. She also described it as being quick and easy to use. (Fieldnotes, Meeting 5, December 2019)

The programme leader advocated for the use of this questionnaire as it was easy to administer and commonly used for evaluating psychological wellbeing. The questionnaire was included in the battery in order to give an overall indication of any changes to psychological wellbeing resulting from programme participation.

From the information gathering phase of the research, it was acknowledged that the programme targeted an approach of promoting at-home exercise utilising an information booklet and an "exercise of the week" for participants to perform in between classes. This booklet and exercise of the week aimed to increase participants knowledge and skill regarding home-based exercise techniques. As stated earlier, this two-pronged approach of physical training in conjunction with education has been demonstrated to be effective at promoting positive health outcomes for older adults (Perrot et al., 2019). With this element being a key component of the programme, the researcher determined that it would be useful to evaluate how this home-based exercise education impacted participants likelihood to be physically active. The self-efficacy for exercise scale (SEE) is a 9-item scale assessing an individual's confidence

that they would exercise in certain trying conditions (see Appendix G). The collaborative team of the researcher and programme leaders decided to include the SEE as it would be effective in determining if the programme impacted the participant's likelihood to engage in physical activity post programme participation.

> I suggested we use the SEE scale to see if the programme had an effect on participants likelihood to exercise after the programme. Mary and Anne concurred that it may be useful in determining whether the programme was affecting participants self-efficacy to exercise. (Fieldnotes, Meeting 5, December 2019)

Finally, due to the focus placed on improvement of balance during the programme, it was acknowledged that there may be a psychological impact associated with this style of training. The researcher and the activity leaders hypothesised that participants would be more confident in their balance due to participation in the programme. Research has suggested that deterioration in balance may result from activity restriction mediated by the fear of falling (Powell and Myers, 1995). As such it was suggested by the researcher that the activities-specific balance scale (ABC) could be utilised in order to ascertain participant confidence post programme participation.

> In the meeting, we also discussed confidence. I had seen the ABC scale in my lit review, and I discussed its inclusion with Anne and Mary. They thought it would be very useful to include the test and were interested to see if the programme influenced participants balance confidence. (Fieldnotes, Meeting 5, December 2019)

The ABC is designed to measure an individual's confidence in his/her ability to perform daily activities without falling. Considering how the programme places emphasis on maintaining balance in order to promote independent ageing, the ABC was determined to be suitable for the Evaluation Protocol to determine if the programme impacted balance confidence in any way.

The collaborative meetings played a key role in the development of the Evaluation Protocol. Programme leaders, having worked closely with previous participant groups were able to provide key information obtained through their experience. Using the SFT battery as a guide, the researcher and the programme leaders collaborated to identify the suitability of each test as well as what other evaluation metrics should be included. By combining the information gathered between the review of the literature, and the collaborative meetings a pilot Evaluation Protocol was developed which will be described in the following section.

4.1.6 Protocol Development

With insights gained through information gathering meetings, a thorough examination of the literature as well as collaborative development meetings an initial Evaluation Protocol was developed, as described above. In total 6 physical tests and 3 questionnaires were included in the battery enabling a holistic view of the impact of the programme by assessing all components of fitness, psychological wellbeing, self-efficacy for exercise and balance confidence. The tests and questionnaires chosen would enable a thorough evaluation of how the programme met each of the goals which it had ascribed (See section 3.4.1). Table 5 below lists all tests and questionnaires chosen for the Evaluation Protocol.

Table 5: Evaluation Protocol Battery

Physical Tests	**Questionnaires**
The Timed Up and Go Test (TUG) The Two-Minute Step Test (TMST) 30-second Chair Stand Test Chair Sit and Reach Test Arm Curl Test One-Legged Stance Test	Self-Efficacy for Exercise Scale (SEE) Activities-Specific Balance Confidence Scale (ABC) The WHO-5 Well-Being Index (WHO-5)

Having completed the development of the initial draft of the Evaluation Protocol, it was necessary to put the protocol into action in the form of implementing a pilot study. This pilot study would enable a trial of the protocol to establish its ease of use as well as provide an opportunity for testers to become familiar with the tests. Lessons from the pilot study would also inform changes to be made to the protocol for the pre-programme evaluation.

4.2 Phase 2: Action

The second phase of the action research process involves the action phase in which the researcher implements the initial plan developed during the previous planning phase (Reason and Bradbury, 2008). Within the present study this phase entailed the researcher implementing the pilot Evaluation Protocol in the form of a pilot study. Feedback from the pilot study was used to make changes to the Evaluation Protocol which was then implemented with programme participants. The following section explores the steps undertaken during the action phase of this study.

4.2.1 Implementation of the Evaluation Protocol in a Pilot Study

A pilot study is typically conducted within research in order to enable the researcher to trial the methods which they will use within the study (Leon et al., 2011). Additionally, pilot studies provide a learning opportunity for the research team and can be used to train individuals in the methods which will be utilised within the study and in the context of the present study, the pilot was utilised to train the researcher and other testers in the methods of the Evaluation Protocol. The pilot study conducted for the present study was a crucial learning experience as it allowed testers to become familiar with how to correctly administer and score each test included within the Evaluation Protocol. It also provided an opportunity for errors or inconsistencies to be noted and rectified prior to the pre-programme evaluation on the participants group. The pilot study took place on December 12th, 2019, at a local day centre with four participants.

4.2.2 Protocol Refinement from Pilot Study

The main aim of the pilot study was to educate the four testers, including the two programme leaders and the two undergraduate students, on how to effectively administer each test and questionnaire included within the Evaluation Protocol. Although the testers had previous experience with exercise testing and working with older adult clients, they did not have experience in administering the tests proposed in the Evaluation Protocol. During the session each of the testers became familiar with

all tests being administered which would facilitate a smoother testing day as testers were proficient at administering and scoring each test.

From the pilot study it was determined that the tests and questionnaires selected were effective and easy to administer so no changes were made to test selection, however, several refinements were made to the protocol in order to improve reliability of scoring as well as ease of understanding by programme participants as determined by observations made by the researcher and recommendations from testers. The refinements made to the protocol were as follows:

- It was highlighted that for the TUG the participant must be seated with their back pressed fully against the back of the chair before the timer is stopped.
- For the one-legged stance test, a common foot height was ascertained as well as determining that the participant would raise their foot in front of them as opposed to behind them.
- For the chair sit-and-reach it was decided that participants would remove their shoe in order to avoid discrepancies caused from different shoe styles.
- A clearer introduction to and explanation of the ABC scale was required by pilot participants which led to the inclusion of a clearer and more concise introductory paragraph explaining what was expected within the questionnaire.
- Revision of some terminology used within in the ABC questionnaire, for example the term kerb was changed to footpath and mall was changed to shopping centre to facilitate greater understanding.

The pilot study enabled the researcher as well as the other testers to become proficient in administering the tests which were to be utilised within the Evaluation Protocol. From this pilot evaluation, refinements, as detailed above, were made to the protocol prior to its implementation with the programme group. Following these revisions made after completion of the pilot test, it was possible to implement the Evaluation Protocol with the next group of participants set to engage in the programme.

4.2.3 Protocol Implementation

BBBB participants were informed of the research project through a comprehensive information letter (Appendix B) and provided informed consent to participate in the programme evaluation. As previously stated, the Evaluation Protocol was administered to programme participants in a session one week prior to the commencement of the 8-week programme. The testers included the physical activity programme leaders as well as two undergraduate students who have knowledge of older adult health as well as exercise testing through their college studies. Each tester administered two tests, with one tester monitoring the questionnaire station with results from each test being recorded for later analysis. The researcher observed the session, noting the logistical flow within their fieldnotes.

Following the completion of the testing day, fieldnotes were reviewed and interviews with the two programme leaders involved in the testing day were conducted in order to inform any changes which may be utilised to improve the Evaluation Protocol. The following section explores the next phase in the action research cycle, Phase 3: Observation and presents the outcomes of the evaluation and interviews undertaken.

4.3 Phase 3: Observation

The observation phase of the action research cycle involves the researcher observing the effects of the action phase (Reason and Bradbury, 2008). Within the current study, the researcher made observations on the testing day relating to the logistics and organisational features of the session. In addition, interviews were conducted with two of the four testers, the programme leaders, relating to their observations from the testing day. The following section presents the observations made by both the researcher and the testers interviewed.

4.3.1 Observations from Testing Day

While administering the Evaluation Protocol to the group of participants, the researcher made a number of observations which proved to be useful in refining the Evaluation Protocol. Overall, the evaluation of participants went well with predominantly positive observations being noted. Firstly, testers were proficient at administering each test and instructions were clearly given in line with the training provided during the pilot session. These precise and standardised instructions gave participants a clear indication of how to perform each test so there was no confusion in this regard. In addition, it mitigated any bias which may arise from varied explanations of how to perform or score each test. It is clear that the information given for each test was clear and concise and as a result remained unchanged. Providing clear instruction to participants may also play a role in the participants' perception of the programme leaders knowledge with research suggesting that knowledge is a key component of proficiency for older adult physical activity leaders (Lan et al., 2016).

Another positive observation from the evaluation day was participant enjoyment and eagerness to perform. The 18 participants involved in the evaluation were excited to participate in each test and learn how they scored for each test. The majority were interested in learning about the purpose of the test and inquired about what the scores meant and how they would improve each one.

> One of the big positives I found was participants seemed to be enjoying themselves and were so enthusiastic about the tests. Most of the participants wanted to stop moving through the protocol and chat about how they got on and if their score was good or not. (Fieldnotes, Test Day, January 2020)

Naturally, participant enjoyment is an important factor when it comes to physical activity programmes as people will be less likely to return to a class which they perceive as boring or unenjoyable. Furthermore, studies have noted that programmes which provide an opportunity for fun, and enjoyment have a positive impact on participants particularly in relation to their mood (Abrantes et al., 2017). Indeed, participants were so excited about the testing day that many showed up early for their evaluation which resulted in some showing up prior to their allocated evaluation slot.

On the testing day the room which had been booked for the evaluation was occupied by a class which had gone over time. Initially it was planned that testers would be able to set up the stations for each test prior to participants arriving in order to ensure a

smooth transition from test to test however this delay caused a slight setback in time. Participants in the evaluation were given staggered time slots, 15 minutes apart, in groups of 4 so as to facilitate a smooth experience for participants with no waiting times. However, as already stated, many participants arrived early due to eagerness to begin the evaluation. The early arrival of participants in conjunction with the delay in setting up the room caused a backlog of participants who were required to wait for their evaluation which had not been the intention prior to the testing day. Although the early arrival of participants as well as the delay in the room were out of the control of the researcher, it highlighted the importance of time management and having a contingency plan. For future evaluations, ensuring participants knew to arrive at the correct time would be important. Additionally, allowing more time between participant groups would alleviate any backlogs. Furthermore, it may be pertinent to provide a waiting area for participants to socialise in prior to their assessment.

Another issue which arose was in regard to the questionnaires. Some of the participants struggled to understand what was being asked of them in some of the questionnaires particularly the Self-Efficacy for Exercise (SEE) scale. People can interpret questions differently, particularly in this instance where participants were aske hypothetical questions, for example “how confident would you be that you could exercise if it was raining?”.

> Some of the participants struggled to understand what was being asked of them in some of the questionnaires particularly the Self-Efficacy for Exercise (SEE) scale. It was the hypothetical nature of the scale which was confusing for some of the participants. Barry and I, when assisting with the questionnaires, did our best to rephrase the statements to improve understanding however for some participants, I feel they still could not grasp the concept. (Fieldnotes, Test Day, January 2020)

The questionnaires had been piloted during the pilot study where the 3 subjects had no problem in answering the questionnaire, so the possibility of confusion went unnoticed by the researcher. This has demonstrated the importance of being careful with wording and instructions in the future in order to make things extremely clear for participants who may be unfamiliar with certain concepts. In particular, it demonstrated that the instructions given for the SEE needed to be revised for future participants in order to facilitate greater understanding.

4.3.2 Interview with Testers

At the outset of the research, prior to any changes made necessary by the Covid-19 pandemic, it was planned that this Evaluation Protocol would be refined over time through several phases. Following on from this initial testing day, feedback from observations would be utilised to make the Evaluation Protocol more efficient and effective overall. In order to gather as much feedback as possible for this process, interviews were conducted with the two programme leaders who had been testers administering the Evaluation Protocol in order to gain an insight into how they perceived the initial testing day went, as well as how the Evaluation Protocol could be improved going forward. An attempt was made to conduct interviews with the two undergraduate students, however, they were unavailable for interview. Quotations from the interviews conducted are used to support statements made and pseudonyms have been used to protect the identity of the testers.

Within the interviews conducted, many of the same observations made by the researcher on the testing day were reiterated by those administering the protocol. The testers interviewed thought that the implementation of the Evaluation Protocol was a success. The testers praised the use of the standardised instructions given to each participant. It was apparent that these instructions made administering each test easy for both the tester in terms of explanation and scoring and also the participants in regards to understanding what they were required to do. Anne, one of the testers, describes the practically of the tests within the protocol:

> *"I thought the tests were brilliant. It was very easy to explain to the lads what you wanted, and they just got it right away. It made things a lot easier for me".* (Anne, Tester)

The range of tests was also a point of praise within the interview with testers. The testing protocol included tests for each of the components of fitness apart from body composition as well as an additional balance assessment and psychological questionnaires. Naturally, one of the fundamental components of evaluation is the necessity to explore each of the desired outcomes of the programme (Clarke, 1999). Considering how the programme takes a multi-faceted approach to physical activity, incorporating diverse training modalities, it is necessary to perform a wide range of tests in order to ascertain the effectiveness of each type of activity performed. Testers described how they felt that there was a great variety of tests which enabled them to

gather a large amount of data for each participant which was evaluated during the testing day. This data would also enable the testers to perform a detailed comparison post-programme in order to analyse the effects of the programme for participants. Mary, the other tester interviewed, describes the comprehensive nature of the protocol as follows:

> *"It was great really, we were getting all those different tests done and getting scores for each of them. At the end there was so many different pieces of info to go through for each test. It was fantastic really*". (Mary, Tester)

The comprehensive nature of the evaluation also led to the protocol taking a long time to administer. The tester acknowledged within the interview that the goal would be to streamline the evaluation so that it could be completed by a single tester. The testers felt that it would be impossible for the current iteration of the protocol to be utilised by a single person, however, it was also acknowledged that it was important to gather a comprehensive dataset to enable a more thorough evaluation. Mary commented regarding the issue of timing:

> "*I suppose I would be just concerned about the time. We possibly didn't really factor in how long it was going to take for each person."* (Mary, Tester)

Again, these comments regarding the length of the protocol reinforces the rationale for the development of both a long-form Evaluation Protocol that could be performed occasionally to perform a detailed evaluation, as well as a short-form Evaluation Protocol which may be utilised more regularly due to its efficiency.

Prior to the assessment there had not been a full run through of the protocol from the starting point of reading the information sheet, to the end point of completing the three questionnaires. From this perspective the testers were unable to know how long it would take for the full evaluation. This issue would be rectified for any future rendition of the protocol by performing a complete trial run of the protocol in order to measure how long it would take to complete for each participant. Mary suggested:

> "*If we had actually had the volunteer who actually had to come in fill out the paperwork, do the next one, do it exactly as you would on the day. What we trialled there was actually doing the tests how we're doing them, but we didn't trial the time factor".* (Mary, Tester)

Participant enjoyment was also an element of the evaluation day commented on by testers. The testers reported that many of the participants were extremely eager to participate in each of the tests, even showing up much earlier than their scheduled appointments. The testers noted that participants having fun and there was a social

element evidenced as many of the participants discussed the different tests with the testers and amongst themselves in the group. Participants were curious about the purpose of the tests and what the results meant, inquiring into the workings of each test with the tester conducting it. Mary describes how the evaluation participants enjoyed the testing day:

> *"Yeah, they seemed to like it. They wanted to get stuck into the test and afterwards they would be asking all about it and how they got on".* (Mary, Tester)

This eagerness to participate led to participants arriving early for their evaluation which in turn led to a backlog of participants as mentioned earlier. Mary had also made this observation and was a concern for her during the evaluation day:

> "*I'd be really conscious of people giving their time, and that some people ended up waiting periods of time*." (Mary, Tester)

Although there was no way to control participants arriving early on testing day, another element which caused a slight lag in the flow was the allocation of tests with one tester conducting two of the longer tests, the 2-minute step test and the one-legged stance test. Mary acknowledged this point and proposed a solution stating: "*Anne had the two longest tests, the step test and the single leg stance test. You would definitely need a person doing each of those"* (Mary, Tester). Prior to the testing day it had been assumed that the one-legged stance test would be a quick test to administer, however, some participants took several minutes to complete which highlighted that perhaps this test was inappropriate for the active participant group engaging in the Evaluation Protocol and a more challenging test may need to be considered. This feedback highlighted that for future evaluations that there should be a tester on each of the longer tests.

The evaluation conducted was quite comprehensive involving testes for each component of fitness as well as psychological elements of health. The Evaluation Protocol was developed with this intention and aimed to gather comprehensive health data in order to perform a thorough evaluation. The protocol was also developed with the understanding that there would be multiple testers on the day to conduct each test. Anne felt, however, that more testers would be beneficial when conducting such a comprehensive evaluation stating:

> "*If I was doing it in the morning, I would have more people for testing."* (Anne, Tester)

It was proposed that more testers would likely improve the flow of the testing as people would be able to move through the tests more efficiently without having to wait for a tester to become available. Additionally, the idea of a 'floater' was introduced. This floater would be tasked with of greeting participants as they came in and directing them to the testers when free. Mary proposed that it would be beneficial to have several testers as well as this 'floater':

> "*You would definitely need a person doing each of those, but I even think nearly one or two people floating. Somebody controlling it*." (Mary, Tester)

It was agreed that having a 'floater' to oversee the testing would be very beneficial from an organisational and logistical perspective. In particular, this 'floater' would be useful for managing participants who may show up to their appointments too early. On the testing day this organisational duty fell on testers who would welcome and direct participants to the waiting area and instruct them on what the evaluation would entail. This in turn often delayed the tester in conducting the various tests assigned to them. By having a dedicated 'floater' this would allow the testers to focus solely on the tests, whilst also providing more information and guidance to each participant as they were engaged in the tests. The researcher concurs that in a situation where a comprehensive evaluation is being conducted on a larger group, more testers and a 'floater' or overseer would be beneficial. It may be possible to utilise more testers on a less regular basis in the form of the long-form evaluation protocol as mentioned earlier. Again, for the sake of practicality, a short-form evaluation would also be useful in order to enable a single tester to perform an evaluation.

The testing day was perceived as a success by both the researcher and the other testers. The variety and ease of delivery of each test was praised and the comprehensive nature of the data gathered was commended. Based on observations made by the researcher as well as the testers interviewed, it was clear that participants enjoyed the evaluation finding the tests entertaining and interesting. The observations made by the researcher and the outcomes of the interview conducted with the testers provided a wealth of information, feedback and insights gained which will be utilised to further refine the testing process in the following reflection phase.

4.3.3 Interview with Participants

Following the implementation of the Evaluation Protocol a brief interview was conducted with four participants who had completed the evaluation. The aim of the interview was to obtain feedback which could inform revisions to the protocol. It should be noted that, from observations made within the researcher's fieldnotes, that participants seemed nervous during the interview, and it was difficult to elicit detailed information from them.

> I could tell that the participants were quite nervous. Each time I asked a question, I would only get one-word answers back. I also felt as though they would not wish to be critical of the Evaluation Protocol, even though I ensured them that criticism was welcome. (Fieldnotes, Interview with Participants, January 2020)

Participants reported to enjoying the Evaluation Protocol with one participant, Todd stating "I wouldn't change anything about it" (Todd, Programme Participant). This was the consensus among the other three interviewed with each stating that they had no suggestions to improve the Evaluation Protocol. In addition, participants were questioned regarding the difficulty of the evaluation. Each interviewee stated that they found the difficulty to be appropriately difficult being not too hard but also not too easy. Unfortunately, as participants seemed quite nervous, it was not possible to obtain any more detailed feedback during the interview.

Overall, the use of the Evaluation Protocol was a success both in terms of the evaluation performed as well as the observations made which may improve the protocol. The administering of tests and the instructions of the testers was seen as a positive and the ease of scoring and reporting results was also excellent. Participants enjoyed the evaluation day exhibiting eagerness and inquisitiveness towards each test. For future evaluations, it was shown to be necessary to emphasis to participants the time of their evaluation appointment in order to avoid crossover. Additionally, it was also deemed necessary to revise instructions for the questionnaires, in particular, the SEE in order to facilitate greater understanding for participants.

4.4 Phase 4: Reflection

Reflection is one of the most crucial elements of the action research cycle. Reflection is a key stage of the research journey and is often necessary to determine the learning outcomes associated with the study (Van Beveren et al., 2018). Within the reflection phase of action research, the researcher reflects on the observations made during the previous phases and utilises these observations to refine their plan further (Reason and Bradbury, 2008). This plan may then be implemented in future cycles of the project. In the present study, this phase involved reviewing the feedback produced from the observations made by the researcher and the interviews with programme testers. This feedback is then utilised to refine the Evaluation Protocol further. The following section details the reflection phase of this action research project.

4.4.1 Protocol Review and Reflection

The researcher has reflected upon the development and implementation of the programme as well as feedback obtained from observations made by the researcher on the testing day and interviews conducted with the testers. Firstly, regarding the initial development of the protocol; a thorough examination of the literature was performed, as previously described, which ensured a strong foundation of knowledge was the basis for the development of the Evaluation Protocol. The SFT battery was used as a blueprint for the initial development and the researcher feels that it was an appropriate and highly effective guide. The SFT contains tests which measure each of the health-related components of fitness and its reliability and validity have been proven time and again (Rikli and Jones, 2013). Additionally, the SFT was developed for use with older adults making it an appropriate evaluation tool for the group from the 'Well-Elderly' Physical Activity Programme consisted exclusively of older adults.

The collaboration process was instrumental in the development of the Evaluation Protocol and led to the selection of the 2-minute step test over the 6-minute walk as well as the inclusion of the additional one-legged stance test. The collaborative process also led to the inclusion of the psychological questionnaires (WHO-5, ABC, SEE), to enable an evaluation of psychological wellbeing which was crucial in evaluating the programme from a holistic perspective. These collaborative meetings were especially

effective as the programme leaders naturally had a wealth of experience in the area which aided the researcher in the development process (Issel, 2004). Rodriguez-Campos (2012) identified collaboration as an important aspect of evaluation highlighting that a collaborative evaluation enables evaluators to access greater amounts of information and creatively solve problems. This collaborative process ultimately led to the development of a pilot protocol, as discussed above, which was implemented in a pilot study in order to train testers on each test as well as assure validity of test scores before its implementation with programme participants. The researcher will perform a reflection on the collaborative processes of the research in Chapter 6, section 6.4.

As outlined above in section 4.2.3, the protocol was implemented with a group of programme participants and a number of key observations were made by the researcher on the testing day. An interview with 2 of the protocol testers was also conducted (as undergraduate student testers where unavailable) regarding their perceptions of the Evaluation Protocol. Key feedback was evident within both the observations made and the interview conducted which was useful in identifying strong and weak areas of the protocol. In reflecting on both the implementation of the pilot Evaluation Protocol and key feedback obtained through observation and the interviews conducted the following are the key pieces of feedback identified:

- The tests included were reported to be easy to administer and easy to score.
- The variety and range of tests enable a comprehensive evaluation of all components of fitness as well as psychological outcomes associated with programme participation.
- Participant enjoyment was a highlight with participants seeming eager to complete tests and inquisitive regarding the outcomes.
- Many participants arrived early for their evaluation causing a backlog. More emphasis on appointment times is suggested as being useful. Additionally, to utilise this time as a social opportunity, a seating area will be arranged for participants.

- Some participants found the questionnaires difficult to understand, particularly the SEE. Revisions will be made to the introductory paragraph and questionnaire instructions in future versions.
- It was suggested that increasing the number of testers may promote greater efficiency during the testing day.
- Having a floater would be useful in order to carry out organisational and logistical tasks.
- It may be necessary to implement two distinct Evaluation Protocols, a long-form to facilitate a comprehensive evaluation and a short-form utilised more regularly to enable a single tester to perform the evaluation.

4.4.2 Protocol Revision

In revising the protocol, only small changes would be necessary as feedback was predominantly positive. The tests utilised were seemingly effective, easy to administer and comprehensive in gathering data meaning for the next iteration of the protocol no tests would be changed. The procedure for how the participant completes the evaluation will be as follows: The participant is provided with an appointed time for their evaluation. They are introduced to the testers and get ready for the first test. They proceed through each test as depicted below in Figure 9 and are assessed in each area with results being recorded. The participant may have a brief rest for water in between each test. After the physical testing, the participant will move on to the questionnaires. Although questionnaires are self-administered, an additional tester will supervise to provide support with the completion of questionnaires as necessary. When the participant moves on to the questionnaire section the next participant will come in to begin their physical testing and so on. A full copy of the Evaluation Protocol is attached in Appendix M.

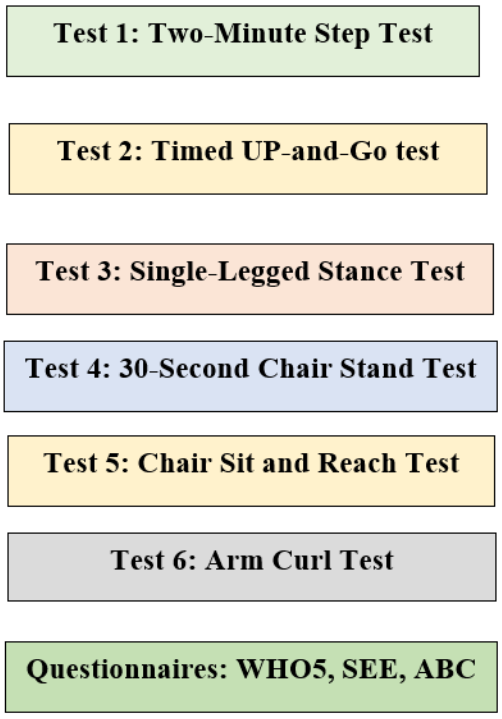

Figure 9: Evaluation Protocol Layout

In terms of other revisions to the protocol, participant enjoyment was a key feature of the evaluation as evidenced from both the researcher observations as well at the interview conducted with testers. For future evaluations, this enjoyable atmosphere should be emphasised in order to promote a positive experience for the participants. Testers will be made aware to maintain a cheerful demeanour throughout the evaluation session and promote social interaction, competitiveness, and fun for the participants. By continuing to make enjoyment a focal point of the evaluation experience, programme leaders will enable participants to create a positive initial impression of the programme.

Regarding early arrivals, more emphasis will be placed on appointment times for participants and a waiting area will be set up as a contingency. This waiting area will also serve as a means to increase enjoyment through socialisation with peers. Socialisation is a key benefit associated with older adult physical activity programmes with a lack of social contact being associated with decreased health outcomes (Cornwell and Waite, 2009).

If possible, a ‘floater’ will also be utilised in order to greet participants as well as to oversee the evaluation and ensure fluidity. The floater will be able to entertain participants in the event that they were required to wait for their evaluation. Furthermore, this floater could provide information to participants and address any questions which they had regarding the evaluation.

Finally, the issue regarding lack of understanding of the questionnaires will be addressed. Instructions for each of the questionnaires will be reviewed in order to ensure they are clear. The instructions for the SEE will be re-worded to facilitate a greater understanding for programme participants. A tester will be made available to oversee the questionnaires and provide participants with guidance in the event that they are unclear of what to do.

This first cycle of development and revision was important as a foundation in developing the protocol and while revisions to the Evaluation Protocol have been made, it was initially planned that there would be several cycles of implementing and refining the protocol. Unfortunately, due to the Covid-19 pandemic it was not possible to progress to the next cycle of the research which would have entailed implementing the revised Evaluation Protocol due to social distancing guidelines imposed as well as the cessation of physical activity programmes. The researcher hopes that after the pandemic is over, more work can be completed regarding the refinement of the Evaluation Protocol. In chapter 6, Conclusions and Recommendations, the researcher provides several further recommendations for the refinement of the Evaluation Protocol.

4.5 Conclusion

The present chapter addresses the outcomes of the first action research cycle implemented- The development of an Evaluation Protocol for a ‘Well-Elderly’ Physical Activity Programme. Phase 1 of the action research process involved the planning phase which entailed comprehensive information gathering which enabled the researcher to utilise both pertinent literature and the experience of collaborators as a foundation for developing the initial protocol. Through collaborative meetings, refinements were made to the protocol resulting in a pilot protocol. The second phase

of the action research cycle involved the action phase. Within this phase, the researcher utilised the pilot Evaluation Protocol developed during the planning phase to conduct a pilot study which effectively enabled testers to learn and become proficient in administering each test which enabled confident and competent evaluation on testing day. Additionally, observations from this pilot study enabled changes to be made to the Evaluation Protocol which was then implemented with programme participants. The third phase of the action research cycle involved the observation phase consisting of fieldnotes taken throughout the research cycle. In addition, interviews were performed with testers in order to gain feedback regarding the implementation of the protocol. The ease of administering tests, the range of tests utilised, and participants enjoyment were the primary outcomes reported from observations on the testing day and interviews conducted. The need to give more specific appointment times as well as the potential need for more testers and the possibility to implement both a short-form and long-form protocol were suggested as potential refinements for the Evaluation Protocol. From these observations the researcher was able to complete phase 4, the reflection phase in which the observations made in the fieldnotes as well as the interview with testers were analysed, and feedback was utilised to develop a refined Evaluation Protocol.

Feedback from this testing day enabled the researcher to produce recommendations for a refined protocol, however, due to the implications of the Covid-19 pandemic, it was not possible to implement these refinements at the present time.

Due to the restrictions imposed as a result of the Covid-19 pandemic the provision of physical activity programmes for all, including older adults who are more vulnerable to the virus, ceased. As a result, the implementation of the refinements to the Evaluation Protocol and the transition through the associated AR cycles ceased. This in turn resulted in a necessary change to the research methodology and an expansion of the project aim. While the focus on this project was initially to develop an Evaluation Protocol for the physical activity programme, the revised aim encompasses a qualitative evaluation of the programme itself. It was envisaged that this qualitative evaluation may enable a further refinement of the Evaluation Protocol, identifying aspects or outcomes not previously considered, but may also enable the refinement of programme provision. The next chapter, Chapter 5, presents the findings and discussion produced from this qualitative exploration.

Chapter 5:

Results and Discussion

Cycle 2: Qualitative Evaluation of a 'Well-Elderly' Physical Activity Programme

Chapter 5 Cycle 2-Results and Discussion

5.0 Introduction

As stated in the previous chapter, a refined Evaluation Protocol was developed through the use of an action research approach, however, due to restrictions imposed by the Covid-19 pandemic, it was not possible to implement these refinements in a practical setting. As such it was necessary to expand the project aim to include a qualitative evaluation of the physical activity programme which in itself may enable further refinement of the Evaluation Protocol and enable an evaluation of programme outcomes from the perspective of the lived experiences of programme participants engaged with the Better Balance, Better Bones (BBBB) programme. This second cycle of research again utilised an action research approach consisting of a planning phase, an action phase, an observation phase and a reflection phase an overview of which can be seen below in Figure 10.

Figure 10: Overview of Second Action Research Cycle

The following chapter briefly discusses the first three phases of this action research cycle relating to the development of the interview guide as well as the conducting and recording of interviews, all of which are presented in their entirety in chapter 3. The bulk of the chapter will focus on the reflection phase consisting of a presentation of the results and discussion which emerged from this qualitative evaluation. The reflection phase is the final phase of an action research cycle and involves the analysis of results in order to determine outcomes as well as the direction of future actions and research (Reason and Bradbury, 2008). The qualitative evaluation was conducted utilising telephone interviews with past programme participants to explore their perceptions of the programme with the aim of utilising this information to evaluate the impact of the programme. The data analysis and subsequent reflection on results was undertaken informed by Braun and Clarke's (2006) six step process.

5.1 Phase 1: Planning

Whilst in the process of completing the first action research cycle of the project in March 2020, the Covid-19 pandemic escalated to the level where a countrywide lockdown was implemented. This lockdown had a profound impact on the research project due to restrictions placed on movement, social distance requirements, facilities closing, and exercise classes being cancelled. The pandemic was especially impactful on the present study due to the participants of the study being considered to be at high risk. As a result, a virtual emergency meeting was held between the researcher, research supervisors and the restrictions placed on the researcher due to the lockdown, it was decided to expand the aim of the project to incorporate a qualitative exploration of programme outcomes, which could be conducted remotely by engaging programme participants via telephone administered interviews. As such, this planning phase required the development of an interview guide as well as planning the logistics of the interviews.

The researcher conducted a brief literature review in order to determine how to structure the interview guide as well as the number of interviews to conduct. It was determined that 16 interviews would be conducted as research has suggested that saturation of the data typically occurs around 12-16 interviews (Francis et al., 2010).

Although it had been planned to conduct 16 interviews, 14 was the final number conducted due to not receiving a response regarding 2 of the interviews. Additionally, meetings with supervisors and programme leaders informed the content of the interview guide. In particular, the programme leaders aided in the selection of questions as they had knowledge which stemmed from first-hand experience of delivering the programme, evidencing insider knowledge which again highlights the benefits of collaboration (Issel, 2004) and the merits of utilising an action research approach with its focus on collaboration (Kemmis, 2006).

A draft interview guide was developed focusing on the aims of the programme regarding physical and psychological changes perceived by participants, programme experience and maintenance of activity post-programme. The researcher also decided to include questions relating to barriers and motivators to physical activity in order to gain an understanding of what motivated or stopped participants from being active post-programme., as informed by prominent research publications such as the Eurostat survey (2018) as well as the research carried out by the Irish Sports Monitor.

Following the development of the interview guide, interviews were organised by randomly selecting participants and contacting them via telephone to organise a date and time. Each participant was sent a comprehensive information letter and informed consent was given prior to conducting interviews. Copies of the information letter as well as consent form can be seen in Appendix H and I. Interviews were conducted exploring participants lived experience with the programme in order to facilitate a greater understanding of the programmes outcomes, strengths, weaknesses etc.

5.2 Phase 2: Action

Interviews were conducted with the programme past participants in the Summer of 2020. Upon receiving consent, the participants were contacted to set a date and time for the interview and also to begin building a sense of rapport which is essential for a successful interview (Abbe and Brandon, 2014). The researcher conducted a semi-structured interview following the interview guide with each participant involved. The questions asked were open ended to facilitate deeper replies to the questions and to stimulate discussion on the topics (Weller et al., 2018). Interviews were recorded with

informed consent to obtained prior to the interview process. These recordings were then transcribed verbatim.

In line with the adapted research methodology, qualitative interviews were conducted with past participants of the BBBB programme. A total of 14 interviews were conducted with 10 participants. The 14 interviews consisted of participants from 3 separate BBBB programmes which were ran at different times. Four participants who had just completed the programme were interviewed, of which 3 were re-interviewed 3 months later. Three participants were interviewed 6 months post-programme completion, and 4 participants were interviewed 12 months post-programme completion. It was initially planned to compare results between each of the groups, however, the data analysis resulted in no differences being reported between the groups.

5.3 Phase 3: Observation

The observation phase within action research involves making observing the implementation of the previous action phase and noting findings (Reason and Bradbury, 2008). This phase involved the analysis of the data which consisted of a thematic analysis following Braun and Clarke's (2006) 6 step model as outlined in the Methodology chapter. In order to observe the effects of the programme the researcher first became familiar with the data through listening to the recordings, transcribing and reading the interview transcripts. From these transcripts the researcher then developed codes to describe the data which were then grouped into themes based on patterns within the interviews. A full description of the thematic analysis process can be seen in the Methodology chapter, section 3.12.2.

5.4 Phase 4: Reflection

Within the reflection phase of action research, the researcher reflects on the findings observed from the previous observation phase and utilised these findings to refine the original plan (Reason and Bradbury, 2008). The reflection phase within the present study occurred in the form of thematic analysis. The final phase of Braun and Clarke's

(2006) 6 step model involves the development of a report on the findings produced by the thematic analysis. The thematic analysis performed led to the development of four overarching themes throughout the interviews. The reflection phase of this cycle of action research involved the development of these themes as well as reflection and discussion on each theme. The themes which emerged as well as the discussion pertaining to each theme is discussed in detail within the following sections.

5.5 Qualitative Evaluation of the Physical Activity Programme

Following the qualitative interviews, data was analysed utilising thematic analysis informed by Braun and Clarke's (2006) six phase process involving a thorough investigation of each interview transcript which resulted in the development of initial codes which encapsulate the meaning of the data. These codes were then grouped into themes which were reviewed and revised resulting in the final themes as depicted in Figure 11 below.

In analysis of the interview transcripts four overarching themes emerged; these included Programme Outcomes, Programme Delivery, Barriers and Motivation as depicted in Figure 11 below. The first main theme which emerged was Programme Outcomes. Participants identified programme outcomes associated with physical, psychosocial, educational, and behavioural outcomes of the programme. The next theme reported was programme delivery which encapsulates how participants perceived their experience in the programme in relation to programme organisation and delivery, perceptions of the instructor and their social experience. Next, motivators for physical activity were identified and a distinction was made between intrinsic and extrinsic motivators. Finally, barriers to physical activity were recognized and again divided into intrinsic and extrinsic barriers. Participant quotes taken from the interview transcripts are used to support the outcomes reported, with pseudonyms used to protect the anonymity of study participants. Pertinent literature from the subject area is discussed in conjunction with each theme and sub-theme in order to augment the exploration provided.

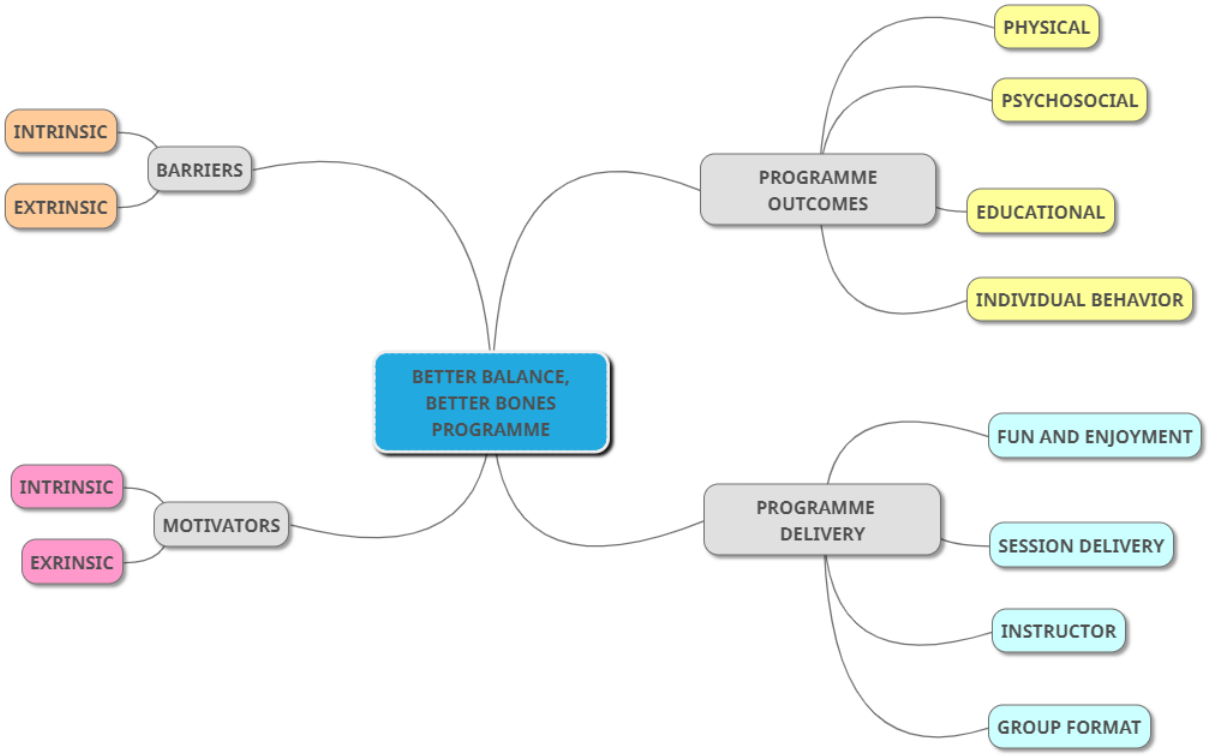

Figure 11: Overview of Themes Identified Within the Thematic Analysis.

5.6 Programme Outcomes

Physical activity is widely acknowledged as being crucial for the maintenance of positive health (Ekelund et al., 2019) and the BBBB programme aims to facilitate this process by engaging participants in physical activity. The BBBB programme aims to enable older adults to maintain independence through improving cardiovascular health, muscle strength, flexibility, and balance. The programme also encompasses fall prevention exercises as well as educational segments which serve the purpose of enabling participants to engage in home-based exercises. The theme of programme outcomes arose in the interviews with participants as they discussed how they perceived the programme impacted them. This theme was broken down into four sub-themes based on the type of outcome reported by participants. The four sub-themes identified were: physical outcomes, psychosocial outcomes, educational outcomes and individual behavioural outcomes, each of which will be explored below.

5.6.1 Physical Outcomes

One of the primary objectives of the BBBB programme is concerned with maintaining and improving the physical health of participants in order to maintain independence. This objective was clearly reflected within the participant interviews with most subjects interviewed mentioning physical changes in some way. Participants reported to experiencing a general benefit to overall health as well as more specific outcomes such as, ease of engagement in activities of daily living (ADLs) as well as improved muscular strength.

Activities of daily living (ADLs) are essential for independent living and are predictors of morbidity and mortality in older populations (Millán-Calenti et al., 2010). Older adults who are dependent in ADLs are also more likely to have poor physical health such as low muscle mass, muscle strength, and physical performance, which further limit their ability to perform activities (Wang et al., 2020). An essential component of the BBBB programme is the development of these areas of fitness in order to facilitate independence through easing of ADLs. Toni highlighted how balance improvements gained from participation in the programme have positively impacted their ADLs:

> "*I would say the balance was definitely stronger. I also find that if I was getting up during the night to the bathroom, I can move easier….*" (Toni, Programme Participant)

Similarly, Barbara reported how the programme improved their quality of life through making their daily routine easier to perform, both in tasks at home and in her engagement in leisure activities:

> "*Certainly, coming down the steps would have been the one I was interested in and that improved a bit and coming down the mountain that improved a bit also."* (Barbara, Programme Participant)

Additionally, Prue gave an example of how the programme enabled her to improve her ADLs when going to the shop where she used to have a difficulty in clipping her toe on the footpath:

> "*I would sometimes clip my toe on the higher kerbs of the footpaths you know, when I go to the shop. I'd just be dragging my feet too low and sometimes you'd even stumble a bit. I lift my legs a bit higher now going up onto the path after the programme."* (Prue participants).

The maintenance of physical function in order to successfully perform ADLs as one ages is of critical importance (Rikli and Jones, 2013). Inactivity is typically associated with a decrease in overall physical function and consequentially, ability to successfully

perform ADLs (Venturelli et al., 2011). An individual's ability to perform ADLs is assumed to be related to lifestyle factors such as activity level (Kostic et al., 2011). The reported improvement in ADLs by BBBB participants has been seen elsewhere in the literature. Campbell et al. (2021), in a systematic review on the effect of exercise on quality of life and ADLs for frail older adults demonstrated the efficacy of activity programmes with 10 of the 15 studies reviewed reporting an improvement in ADLs. Likewise, Dobek et al. (2006) has reported similar ADL improvements in a study conducted on older adults completing a 10-week, once per week physical activity programme similar to the BBBB programme.

Many programme participants reported that they found the programme beneficial for their physical health. The improvement in physical health outcomes such as muscular strength and endurance of participants was expected and is evidenced in participants exploration of their engagement with the programme, as research has often shown a relationship between increasing physical activity and improving physical health. Warburton and Bredin (2017) demonstrated in a recent systematic review that there is a curvilinear relationship between physical activity and health outcomes, meaning even a small increase in physical activity levels may have a large impact on health. This relationship could explain the benefits reported by participants as, although the programme only took place once per week, many participants reported a perceived physical benefit. Similarly, Sherrington et al. (2018) in a Cochrane systematic review, demonstrated that multiple-component group exercise, similar to that which is performed in the BBBB programme, may lead to improved health outcomes for participants such as improved muscular strength and endurance.

Mary reported how she felt the programme improved her muscle strength and how this would be important in fall prevention:

> "*I feel that the programme was beneficial for improving the muscle tone of your legs and your arms and to consider the safety aspect as you get older and you don't want to worry about falls.*" (Mary, Programme Participant)

Prue had a similar experience with the programme reporting that as the programme progressed, she saw a physical improvement through improving in her engagement with the various exercises which they performed in each class:

> "*I found that each week you would be able to go a bit longer and do a few more so I was definitely getting fitter."* (Prue, Programme Participant)

The results presented above are reflective of participants' perceptions of changes to physical health as no objective measures of physical health were utilised post-programme making it difficult to objectively show an improvement. However, self-rated health has been consistently shown in the research to be a strong predictor of objective health (Pitas et al., 2017; Benyamini, 2011) although some research has indicated that the correlation between subjective and objective health measures decreases with age (Latham and Peek, 2013). Notwithstanding an improvement in physical health has been reported by a number of the participants.

Although there was a consensus within the interviews that the programme was beneficial, with most interviewees reporting that they found they benefitted from the programme, some participants reported not being aware of any specific change in physical health credited to the programme. Molly describes how she did not notice any physical change, and explains how this may be due to always being very active:

> *"I don't (see any physical changes) but you see I was always very active anyway I mean id go out and cut lawns for you for 3 hours no problem, like, and I was well able to lift the weights and everything that day (the testing day) I'd have lifted way heavier."* (Molly, Programme Participant)

There are a number of factors to which the researcher attributes this lack of perceived change. Firstly, is the activity level of participants. Many of the participants interviewed for this study reported to being regularly physically active prior to engaging in the programme. Naturally, for an individual who already engages in routine physical activity, a pronounced improvement in physical health would be unexpected as they would already be experiencing the benefits from their participation in physical activity. Secondly is the voluntary nature of the programme with participants voluntarily signing up to participate as opposed to a referral or prescriptive based recruitment. Research has indicated that exercise programmes may be more likely to recruit participants who are already active and familiar with exercise (Russel et al., 2009) which may account for a more minute change in physical health. Lastly is the frequency of sessions and duration of the programme which may be potentially too short with sessions taking place once per week for 8 weeks. Research has demonstrated that exercise programmes which incorporate 2 or more sessions per week may be more beneficial for participants (Huang et al., 2010). Additionally, it is suggested that programmes which last for 15 or more weeks tend to be more efficacious than shorter ones (Fitzharris et al., 2010). As the programme examined in

the present study falls short on these two markers, this could also be an explanation for the lack of perceived physical changes for some programme participants and it may be recommended to increase the duration and frequency of classes with the aim of enhancing physiological changes for participants.

5.6.2 Psychosocial Outcomes

Exercise and physical activity have been recognized as being crucial for the maintenance of positive mental health for several years (Harris, 2018). The term psychosocial health is used to describe a multifaceted view of mental health encapsulating several elements such as psychological health and social health (discussed in this section) as well as behaviour and environment (discussed in the sections relating to individual behaviour and barriers). Participants alluded to several psychosocial health outcomes within the interviews such as; overall psychological wellbeing, improved mood and improved confidence. Additionally, the programme was commonly cited as being a valuable social opportunity enabling participants to improve their social health through increasing social connections and improving social support.

Positive psychological wellbeing as a result of exercise was one of the most commonly reported outcomes in the present study. Participants found that physical activity had a profound influence over their mood. Jim highlights how exercising improves their mood:

> *"Oh yeah, I'd always feel good after exercising. I wouldn't feel right in myself if I didn't do some bit every day."* (Jim, Programme Participant)

In addition, Prue also described how the programme made her feel:

> *"You'd just feel happy after you'd finished like. I'd find myself happy for the day and even before I'd be looking forward to it."* (Prue, Programme Participant)

It is routinely acknowledged within the literature that physical activity leads to a profound improvement in psychological health outcomes (Brymer and Davids, 2016). In particular, physical activity has been demonstrated to be an effective tool for improving mood for older adults by reducing levels of anxiety and depression (Schuch et al., 2016). Studies have also highlighted the importance of decreasing leisure-time sedentary behaviour in improving mental health outcomes (Halgren et al., 2020).

Through the weekly classes and the promotion of home-based exercise, the BBBB programme encourages both an increase in overall activity and also a reduction of sedentary behaviour of participants through the exercise of the week which they are encouraged to practice each day. Other similar studies into the effects of exercise programmes on psychological health have further reinforced the evidence presented in the current study ,that increased levels of physical activity improves mood outcomes (Piadehkouhsar et al., 2019). Of particular relevance to the current time, research has also indicated that higher levels of physical activity may help alleviate some of the negative mental health symptoms experienced by older adults while social distancing guidelines are followed during the COVID-19 pandemic (Callow et al., 2020).

In addition to mood, self-confidence is another major element of positive psychological wellbeing. Research has indicated that self-confidence is directly related to other elements of psychological health with low levels of self-confidence being directly related to increased levels of anxiety and depression (Schönfeld et al., 2016). Participants in this study reported that participation within the programme had an improvement on their levels of self-confidence. Patricia reports how the programme Improved her confidence:

> "*I felt good about myself that I was up and out there you know. I liked that I was doing something for myself that was good for me."* (Patricia, Programme Participant)

Similarly, other participants spoke of improved confidence in relation to their balance both at home and in other scenarios. Molly highlights how the programme led to an improvement in their balance confidence:

> "*I'm well able to get off the chair without using my hands now. You'd just be more steady in yourself I'd have no bother now and I'm more aware to pick up the feet when I'm walking*." (Molly, Programme Participant)

As with the physical outcomes of the programme, some participants reported not experiencing any change in their psychological wellbeing from having participated in the programme although there was agreement that physical activity has an impact on mental health. Toni explains why the programme may not have influenced their psychological health:

> *"I wouldn't have noticed a difference no. But you see I'd have very good mood anyway I'm not the type to worry about anything. So, I'd always have had very good mental health*." (Toni, Programme Participant)

As already discussed in the section relating to physical outcomes, the researcher proposes that the same factors outlined there, being the voluntary nature of classes attracting already active individuals as well as the lower frequency of classes and duration of the programme are a potential cause for the lack of perceived change to psychological health experienced by some programme participants. Although some participants did not perceive a change, the majority perceived a benefit to psychological health which the researcher attributes to the social nature of the programme as highlighted by participants, with research indicating that the psychological benefits gained from physical activity for older adults are a result of increased social contact (Stathi et al., 2010).

This key theme of socialisation emerged within the interviews with participants highlighting how the programme provided a great social opportunity. Each participant interviewed mentioned the social interactions in the programme in some way further highlighting its importance. Terry shares how the social group impacted their experience in the programme:

> "*Like there was a great comradery there and I looked forward to my Tuesday mornings going in there."* (Terry, Programme Participant)

As we age it can become more difficult to be social due to changes in life such as retirement etc. (Nicholson, 2012). The programme was seen by participants as a fantastic opportunity meet people and engage in a social activity. When Patricia was asked what they most enjoyed about the programme, she described how due to recent retirement the programme has allowed her to become social again:

> "*I suppose the social part. Definitely the social part. I've just finished work, I'm 67 retired so it worked for me, I was able to meet people and I enjoyed it*." (Patricia, Programme Participant)

Similarly, Prue also explains how post retirement the programme has provided an opportunity for social experiences:

> *"I suppose just for someone like us who's retired it's a very constructive thing to do and meet up with somebody and do something other than just drinking coffee."* (Prue, Programme Participant)

While for Molly, living alone made it difficult for her to be active socially, however, the programme enabled her to meet other people:

> *"I wouldn't do much I'd just put the telly on and that's why I enjoyed the course so much just to get that social interaction."* (Molly, Programme Participant)

The need to be socially connected has long since been acknowledged in the academic community with the need to feel loved and a sense of belonging coming only after physiological and safety needs in Maslow's famous hierarchy (Maslow and Lewis, 1987). In particular, social connectedness is an issue which is of crucial importance when discussing older adults due to the prevalence of social isolation apparent in the elderly community (Nicholson, 2012). Social disconnectedness and perceived isolation have been shown to be related to lower levels of self-reported physical and mental health (Cornwell and Waite, 2009). As seen from the quotes presented above, circumstances such as retirement may lead to situations where it is difficult for older adults to be socially active. The amount of emphasis which BBBB participants placed on the importance of the social experience of the programme is telling and further reinforces the need for enabling and promoting a sense of connectedness among programme participants.

Research has demonstrated that older adults who are considered to have a larger social network, meaning the amount of people they are in contact with day to day have a higher likelihood of positive health outcomes (Rodríguez-Artalejo et al., 2006). It has also been suggested that higher levels of social support from peers correlates with lower levels of mortality for older adults (Zhao et al., 2017) Social groups have been highlighted as being extremely beneficial for older adults due to the reciprocity of social support present with older adults not only receiving but also giving support to friends (de Brito et al.,2017). The Better, Balance Better Bones programme offers participants an opportunity to be more socially active through participation in classes, as well as the opportunity to create social groups which they can be part of outside of class time. Mary describes how they have developed social contacts from their participation in the programme:

> *"I enjoyed the social interaction with women from the local area and I've met a couple of them since, before Covid, for coffee and that."* (Mary, Programme Participant)

The participants interviewed highlighted the social aspect of the programme as one of its major strengths. As well as an opportunity to be physical active, the programme provided participants with an opportunity to be active socially, which research has demonstrated as being difficult for older adults with the issue of social isolation being highly prevalent for this demographic (Nicholson, 2012). The group-exercise nature of the BBBB programme enabled participants to foster social connections, make friends and expand their social network as evidenced by participant responses and the literature has indicated that social support such as this is crucial for the maintenance of older adult health (Zhao et al., 2017).

5.6.3 Educational Outcomes

One of the fundamental elements of the BBBB programme is the educational aspect which is incorporated into each session. Programme participants were educated through explanation of exercises during class, educational talks during breaks between exercises and an information booklet given to each participant containing an exercise to be completed each week. One outcome evident in the interview process was the education which the participants reported to have received during their time in the programme. Each participant interviewed reported that the programme provided them with an educational benefit in some way with some reporting that the programme highlighted the importance of physical activity to them. Patricia explains how the programme educated her on the need to incorporate different types of activity:

> *"I would have always been active, but it would have been mainly walking which isn't enough. You have to do your exercises with the weights and the bands as well."* (Patricia, Programme Participant)

Participants also reported to having improved awareness of their movements and posture due to education received during the programme. Jim noted how education from the programme has made him aware of how they perform movements around the house:

> *"That would be something as well now that I would be very conscious of that I wouldn't have taken any notice of before. Like that you have to stand up right or sit up right and keep your back straight. Like I would have heard that, but I wouldn't have taken any notice, but I'd be conscious of it now."* (Jim, Programme Participant)

In addition to education regarding the importance of exercise, participants commonly reported to learning home-based exercise techniques through in class education from the instructor as well as the information booklet provided at the beginning of the course. Participants stated that the exercise which were performed during the course of the programme were often new to them and were exercises which they would never have done had it not been for the programme. Paul tells of his educational experience in the programme:

> *"I learned a lot. I learned that there was an awful lot of new things that I wouldn't even have thought of."* (Paul, Programme Participant)

One of the goals of the BBBB programme is for participants to learn home-based exercise techniques which can be incorporated into their daily lives. Through education during class time, as well as the information booklet provided, several easy to do exercises which could be performed at home were taught to the participants. The participants reported to having gained a greater understanding of how to exercise at home following their participation in the programme. Barbara details how the programme taught her about home-based exercise:

> *"The instructor was very good to just show how you could incorporate all those things into daily life really and that there was no massive equipment needed like."* (Barbara, Programme Participant)

The information booklet provided was also seen to be an aid to learning the exercises which were taught during the programme. Participants noted how the booklet helped them to practice the exercises at home with an easy reference point to each of the exercises taught during the programme. Mary describes how, in conjunction with learning during the sessions, the instruction booklet provided an effective learning tool:

> *"Well with the exercises you repeated them so they were taught so that you could learn them and even with the booklet it was really easy to follow".* (Mary, Programme Participant)

The educational outcomes reported by the participants of the programme is of upmost importance as education regarding health and physical activity is a key factor to be considered when discussing the efficacy of a programme. Research has highlighted that interventions based on an approach of education regarding physical activity have a positive effect on physical activity for older adults (Moradi, 2017). Studies have demonstrated that interventions which combine both a physical training programme and an educational element are significantly more beneficial for older adult health

outcomes than ones which simply utilize physical training, at least in the case of fall risk (Perrot et al., 2019). Considering the approach of the BBBB programme, which incorporates a combination of both physical and educational training, programme leaders are following best practice in this regard (Moradi, 2017) with participants highlighting both a physical and educational benefit.

5.6.4 Individual Behaviour

The effect which a programme has on the behaviour of the participants and how it influences their physical activity habits is necessary to discuss when exploring the impact of a physical activity programme. As programmes are often implemented over a relatively short time period. i.e. 6-8 weeks, this is an important point to consider as participants will need to adhere to principles learned during their engagement with the programme to continue to receive benefits post programme completion. In the case of the BBBB programme, education relating to home-based exercise techniques is utilised in order to enable participants to begin incorporating the learned exercises into their routine. A key feature of the programme is the exercise of the week which is taught to participants each week in class. Participants are then encouraged to perform this exercise at home in the interim between classes. During the 8-week programme this was highly effective with all participants reporting to perform the exercise of the week. These findings coincide with the majority of literature in the area of older adult physical activity programmes results produced from a comprehensive systematic review of 57 older adult physical activity interventions reporting that 90% of respondents adhered to interventions based in the home and 84% adhered to group-based interventions (Vand der Bij et al., 2002). Prue explains how she has integrated the programme exercise into her daily routine:

> *"We're doing them exercises now 20 minutes in the morning and 20 minutes in the evening that we learned above at the programme."* (Prue, Programme Participant)

Molly describes how she incorporated exercises which she learned from her participation in the programme into her daily walk:

> "*I'd be doing my exercise slot everyday between the physio and the programme…I'd go back to XXX (Location) and use the steps and the bars behind for the step-ups and everything I had kind of it all built into my walk."* (Molly, Programme Participant)

Although adherence to the exercise of the week was extremely high for the duration of the programme, according to the participants interviewed, post-programme adherence was problematic. With the exception of 2 interviewees, all participants (n=10) reported that they stopped performing the BBBB programme associated exercises after the programme was over. For some, there was a gradual decline in adherence following the programme. Jim highlights this when asked about adherence to the programme exercises 3 months post programme completion:

> *"Maybe at the start, but not that much. I would have been more conscious of them at the start, but it definitively stopped as time went on.*" (Jim, Programme Participant)

For others like Paul, there was an immediate cessation of the exercises post-programme:

> *"I just stopped. It was a slippery slope after the programme I fell into a bad routine. I needed the programme for the motivation to keep me going."* (Paul, Programme Participant)

This is consistent with much of the research in the area which suggests that adherence to physical activity typically declines over time for older adults (Findorff et al., 2009). Taylor et al. (2004) concurred that although exercise interventions are typically effective in the short term that they were ultimately ineffective regarding a long-term increase in physical activity levels. Kendrick et al. (2018) concluded that older adults, and in particular females, are less likely to maintain exercise following a physical activity programme than other groups. As the majority of participants interviewed were female, this compounds the likelihood of finding a drop-off in participation rates post programme.

Although many participants reported to not continuing the exercises after completing the programme, there were some who did. Participants who reported that they still performed the exercises had continued to occasionally perform exercises as part of their walking routine. Although these participants maintained adherence post-programme, they also stated that there was a decline in adherence to the exercises, with frequency of practice decreasing over time. Patricia, who reported to still perform the exercises as part of their routine, acknowledges this decline:

> "*I think probably the further away from the class you get the more difficult it is to keep the focus on it."* (Patricia, Programme Participant)

There was a number of barriers and motivators to physical activity reported by participants which impacted participants adherence as reported above. These motivators and barriers are discussed in detail as their own themes in section 5.8 and 5.9 below.

Although participants reported to being active with class-related activities for the duration of the programme, the majority of participants stated that they ceased this activity soon after programme completion. This is consistent with the literature in the area, with older adult groups typically having low levels of maintenance in the long-term post cessation of a physical activity programme (Kendrick et al., 2018). Naturally, this is an issue which must be addressed, with one of the goals of the BBBB programme being an uptake in home-based exercise post programme. In the following chapter, chapter 6, the researcher will provide recommendations in order to mitigate this issue of low levels of post-programme maintenance.

5.7 Programme Delivery

Programme Delivery refers to how participants of the BBBB programme perceived the delivery of the programme. This theme was further sub-divided into three subthemes reflective of elements that impacted on participants experience of the programme delivery, these sub themes include: Fun and enjoyment, which relates to how participants perceived their programme experience; Session delivery, which describes participants reports of how each session was structured and how this impacted their experience; Instructor, which details the participants reports of how the instructor of the programme affected their experience; and Group-exercise format, which describes how the group nature of the programme affected their experience. Similar research has shown that these elements of a physical activity programme are crucial to its effectiveness and may ultimately lead to higher adherence rates for participants (Killingback et al., 2017).

5.7.1 Fun and Enjoyment

The organisation of the programme was seen as one of the highlights of the programme which led to the hugely positive experience which participants reported. The programme was seen, first and foremost, as a fun and enjoyable experience. Although participants acknowledge that it was a workout, and challenging at times, the programme was organised and delivered in such a way that a sense of fun and enjoyment was pervasive throughout. All participants interviewed echoed this sentiment highlighting how important this element was to the overall programme experience. Toni shares their opinion on their experience of the programme:

> *"I really enjoyed it because it was something to look forward to. Meeting people and doing things together. It was excellent."* (Toni, Programme Participant)

Studies have noted that programmes which provide an opportunity for fun, and enjoyment have a positive impact on participants particularly in relation to their mood (Abrantes et al., 2017). Likewise, one study has suggested that physical activity programmes conducted with an approach ensuring fun have been able to improve motivation as well as self-reported quality of life (Carlier et al., 2016). The fun which participants had at the BBBB programme is evident with some participants reporting to enjoying the programme to the extent that they were excited to participate each week. For example, Jim said in relation to the programme:

> *"Fantastic! For me it was fabulous. I was looking forward to going back each week."* (Jim, Programme Participant)

5.7.2 Session Delivery

The variety of exercises utilised in the programme was also highlighted as being a positive organisational feature which for many enhanced their enjoyment in their engagement in the programme. Participants remarked that each session felt varied and fresh which made it exciting to come back each week. The variety of exercises also meant that participants would not get bored during classes which facilitated a more enjoyable experience for the participants. Variety of exercises has been shown to be beneficial in the research. One study demonstrated that a higher variety of exercises in a session led to heightened performance and enjoyment (Barkley et. al., 2011) although the participant group in this study were not older adults making a direct

comparison difficult. Many of the exercises performed in the classes were described as new to the participants and interviewees stated that they found learning these new exercises to be extremely enjoyable as well as interesting. Molly describes how the exercises taught during the programme were a highlight:

> *"I enjoyed the exercises and that there was great variety. They weren't too demanding, and they weren't boring you know. The class was very well structured as I said. It flowed very quickly; you never felt the hour there."* (Molly, Programme Participant)

Additionally, Prue highlighted how the class was enjoyable due to how different it is from their normal physical activity routine, which involved mainly walking:

> *"I really enjoyed all the different exercises like the standing on one leg. It's different from the walking like because you're not using those muscles."* (Prue, Programme Participant)

This variety also led to the programme providing a comprehensive workout incorporating several different elements of fitness. Participants noted that each workout would target several different areas and felt that they were getting a complete and comprehensive workout, which benefitted the whole body, within each session. Research has indicated that programmes which incorporate a variety of exercises which target several different components of fitness are effective in improving several health outcomes for older adults (Kawasaki et al., 2011). Paul outlines the comprehensive nature of the sessions:

> *"I found that it was a cardiac workout, it was a mental workout a physical workout. It was all the things it should have been. It was like going to a mini gym without all the weights and heavy stuff. There was nothing heavy in it, but it was working. It was tough without being over the top."* (Paul, Programme Participant)

The level of challenge associated with the programme was seen to be appropriate by the participants. It was highlighted that although the classes were challenging at times, they were never too difficult. Interviewees enjoyed the difficulty level as they felt they were accomplishing something through their effort whilst not being overworked through overly intense workouts. There was no literature available to the researcher which discussed how difficulty level affected participant experience in physical activity programmes so discussion of this result in comparison to academic sources is not possible, however, naturally a programme which participants perceive as having appropriate difficulty will be much more enjoyable than one which is seen as being too difficult or even too easy. Jennifer describes how they perceived the difficulty level of the programme:

> *"We did a bit of everything. Each time we would warm up and do as much of different exercises that you could manage. They were very good because you weren't pushed to do more than you could do*." (Jennifer, Programme Participant)

5.7.3 Instructor

Research has indicated that the role of engaging participants in a programme and ensuring their maintenance often falls on the instructor leading the programme's delivery (Hawkley et al., 2010) The exercise facilitator in charge of delivering the BBBB programme was cited by each participant as being influential in facilitating an enjoyable experience within the programme. The instructor was reported to be both friendly and knowledgeable by participants enabling a rapport to be developed.

Furthermore, the instructor was seen to be accommodating to each participant often adapting exercises to provide an appropriate level of challenge. Finally, the instructor was reporting as being a source of support and motivation for participants.

A rapport was built between the instructor and programme participants which ensured an enjoyable class and a friendly atmosphere. Participants noted that the instructor was very friendly and welcoming which made it easy to feel as though they were part of the group. A study examining the indicators of professional competence for older adult exercise instructors found that teaching attitude including friendliness and respect for participants ranked highly according to expert opinion (Lan et al., 2016). Interviewees stated that the friendly nature of the instructor made the classes extremely enjoyable. For example, Patricia shares their opinion of the instructor:

> "*The instructor made it very enjoyable, and they made it very easy to integrate with the group*" (Patricia, Programme Participant)

As well as being friendly, the instructor was seen as being very knowledgeable by programme participants. As education is a key aspect of the BBBB programme, having an instructor who is knowledgeable regarding physical activity is a necessity. The instructor was reported as having a great understanding of exercises and giving concise and easy to follow directions. This knowledge of exercise training led to the instructor being able to deliver an effective exercise class for participants. Research has indicated that a high level of professional knowledge relating to exercise knowledge, older adult physiology and programme design are key indicators of proficiency for older adult exercise instructors (Lan et al., 2016). Participants acknowledged that the instructor's

knowledge made them feel comfortable participating in the programme. Laura expressed how the instructor's knowledge gave her a sense of security:

> *"I feel reassured that the people running the course know exactly what they are talking about and have been trained properly."* (Laura, Programme Participant)

The International Curriculum Guidelines for Preparing Physical Activity Instructors of Older Adults as developed by Ecclestone and Jones (2004) recommend that an effective older adult physical activity instructor has a thorough understanding of how to manipulate exercise variables such as mode, frequency, duration, intensity as well as an understanding of key principles such as over-load, functional relevance, challenge, and accommodation. It is clear from respondents' answers that the instructor for the BBBB programme exhibited knowledge of these areas through their delivery of the programme. In particular, the instructor's ability to adapt exercises to be more accommodating for the individual was noted as being especially effective. Jennifer described how the instructor adapted exercise to enable her to go at her own pace:

> *"They were very good because you weren't pushed to do more that you could do. It was so you could go at your own pace."* (Jennifer, Programme Participant)

As reported throughout the interviews with participants expressing that they felt the programme was tailored to each individual due to the adaptive nature of instruction. Interviewees reported that the instructor always prescribed the ideal level of difficulty to be challenging but also never pushed participants too hard. These accommodations fostered a sense of confidence amongst the participants as they were confident that they would not be forced to do something which they may have been perceived to be overly challenging. Additionally, the instructor would provide enough challenge for participants to feel that they were receiving a benefit from participation, striking a balance between the two. Paul gives his insights into the instructor and how they delivered an effective programme:

> "*The instructor was very nice to us and very good with us, but she was going to keep the pressure on us as well. There were enough exercises in it that it was just right like it wasn't overdoing it, but it was still challenging*." (Paul, Programme Participant)

Programme participants reported that the instructor was a key source of motivation and support during sessions. The support offered during the sessions enabled participants to push themselves and feel as though they were progressing each session. This sense of support provided a key foundation for the positive programme

experience reported by interviewed participants. A similar study conducted by Killingback et al. (2017) examining the factors which affected older adults' adherence to group exercise programmes, reported similar results with participants highlighting the instructor as a source of support and motivation. These similar findings highlight how the instructor is often a key source of support and motivation for older adult physical activity programme participants. Terry describes how the sense of support which he felt from the instructor enabled him to lead an active life outside the boundaries of the programme:

> *"I found the facilitators so helpful and encouraging, it pushed me to be more active outside the class such as going for walks."* (Terry, Programme Participant)

As outlined above the instructor delivering the programme was perceived extremely positively by programme participants. Their kind temperament was praised with participants highlighting how they felt welcome in the class as a result leading to a friendly atmosphere for all. Participants praised the instructor's knowledge saying that they were competent in regard to programme delivery and, in particular, had a strong ability to adapt activities in order to accommodate all ability levels. The instructor was seen as a source of motivation and support for participants, facilitating a highly positive experience which participants were eager to continue.

5.7.4 Group-Exercise Format

The BBBB programme was reported by participants to be as much a social experience as it was a physical activity programme. The group exercise format of the programme allowed for participants to socialise with one another and enabled the promotion of a sense of social connectedness. Participants reported that meeting fellow participants was one of the highlights of the programme experience. This theme of social connectedness experienced by older adults who participate in group physical activity programmes is commonly referenced in the literature. A systematic review which explored adherence of older adults participating in group exercise programmes found that social connectedness, an umbrella team which the authors used to describe the subthemes of belongingness, demographic homogeneity, socialising and support, was reported by programme participants in each study analysed (Farrance et al., 2016). The BBBB programme increased participants social network by giving them

an opportunity to meet both friends and new people each week allowing for a greater level of social support. This socialisation was seen as an important feature of the programme by participants. Toni highlights how effective the programme was for making friends and creating a social network:

> "*There were some people I knew but others I didn't, so I had the opportunity of meeting and talking with new people. I made new friends from the course and have gone out for tea with some of them since the course finished*." (Toni, Programme Participant)

The group exercise format was also seen as a feature which led to a positive programme experience. By exercising as part of a group, participants reported to finding the exercises much more fun as they were able to support one another. The group aspect also allowed for socialisation during the classes which added to the enjoyment of participants by making the sessions feel fun and interactive. Again, these results highlight the importance which socialisation plays in the enjoyment and engagement of older adults in group physical activity programmes. The current research echoes this sentiment of social aspects being of upmost importance for older adult participants with studies often identifying social reasons for participant engagement (Hartley and Yeowell, 2015). This is certainly true for BBBB participants interviewed as Mary describes how although they typically dislike exercise, the classes were enjoyable due to the group dynamic:

> *"I wouldn't like exercising too much, but you enjoy it when it's a social activity even if you're out of breath but you're all together."* (Mary, Programme Participant)

Interviewees reported that the group dynamic led to a positive and social atmosphere within the classes. Participants described how the group made them feel welcome and how there was a sense of comradery within the group so that each individual felt comfortable participating. The positive group atmosphere reported is interesting in one respect as there was a somewhat varied age range for participants (20 years from youngest to oldest) and some research has indicated that older adults are less comfortable participating in physical activity with others who are considerably older or younger (Beauchamp et al., 2018). It could be argued that although there was a difference in ages between some participants the majority of the group were of a similar age and all were 60+ making variance less consequential as participants would be unlikely to be considered "too young" by peers. This positive relationship between participants ultimately supported a positive experience, with each participant acknowledging the comradery between peers as an important aspect of what made the

programme successful. Prue commented on how the group atmosphere allowed her to enjoy the programme:

> *"Like there was a great comradery there and I looked forward to my Tuesday mornings going in there."* (Prue, Programme Participant)

The delivery of the programme was highlighted by participants as being instrumental in their positive programme experience. The programme was described as being fun and enjoyable, with a wide variety of exercises and appropriate difficulty. The instructor was reported as being both friendly and knowledgeable, fostering a positive atmosphere and providing a sense of support and motivation for each individual. The group exercise format of the programme enabled participants to engage in social activity with other participants and facilitated improved social support from peers.

5.8 Motivation

Physical activity is crucial for the maintenance of positive health for people of all ages, however, it is particularly beneficial for older adults due to its efficacy in reducing the decrease in health outcomes associated with normal ageing (Knowles et al., 2015). As such, the motivation behind an individual's participation in physical activity is equally important to ascertain so that a greater understanding of why an individual is more or less active. Additionally, this understanding may help determine if certain methods are more beneficial at motivating physical activity than others. Programme participants were questioned regarding what motivators within their lives promoted physical activity for them. By determining the factors which motivate participants to be physically active, programme leaders will be able to utilise this information to facilitate greater motivation for programme participants. Motivation is often broken down into two subcategories; intrinsic motivation, meaning internal factors which govern motivation, and extrinsic motivation relating to the external factors (Sansone and Harackiewicz, 2000). As such the motivations reported by programme participants have been subdivided into intrinsic and extrinsic factors which will be discussed in the following section.

5.8.1 Intrinsic Motivation

BBBB participants were asked what factors motivated them to be physically active with the most typical responses received involving participants describing intrinsic factors as opposed to extrinsic. There were considerably more intrinsic factors reported by participants which suggests that motivation to exercise is typically derived from an internal source, at least for the participants interviewed in the present study. The desire to maintain independence was the most commonly cited motivator for participants with more specific motivators, including balance maintenance and fall prevention being highlighted.

This finding supports current literature in the area of motivation to exercise for older adults. A study examining motivating factors of Iranian community-dwelling older adults reported that study participants who engaged in physical activity were much more likely to do so as a result of intrinsic motivators (Derakhshanrad et al., 2020). In the same study, it was found that extrinsic factors (described as interpersonal or community factors) proved to be less influential in motivating participants to be physically active. The similarities are clear between the literature and the current study with vastly more intrinsic motivators being cited as reasons to be physically active.

For the participants of the BBBB programme the most common intrinsic factor reported was a desire to maintain positive health as participants grew older and there was an understanding amongst the participants that physical activity was beneficial for maintaining health. Patricia describes what motivates her to be physically active:

> "*I will turn 67 shortly and am adamant to make my last few years as best as I can. I want to be as fit and do as much as I can while I can. I have a very positive attitude which helps keep me active."* (Patricia, Programme Participant)

The desire to maintain health was often mentioned in conjunction with the desire to maintain independence in later life. Participants expressed how they used physical activity as a method to remain independent and self-reliant in later life. Again, this desire to remain independent as one ages is reflected clearly in the literature. The intrinsic desire to maintain independence was similarly reported as a key motivator for physical activity in a study into older adult adherence rates conducted by Killingback et al. (2017) with interviewees stating that motivation was based on a desire to remain well enough to continue to live independently in their own home. Another similar study conducted by Gothe and Kendall (2016) demonstrated that the desire to maintain

health and independence was the primary motivation for physical activity with one participant from the Gothe and Kendall study effectively summarizing their motivation as "being able to stay by myself, take care of myself, and stay out of the nursing home." Likewise BBBB participants described how they enjoyed being able to rely upon themselves and how being independent gave them freedom to live how they wished. Some participants also highlighted how they wished to remain independent so as to not place a burden on family members in the event that they would need assistance. This goal of remaining healthy and independent was the primary motivation evident among programme participants interviewed. Jim eloquently describes how the desire to maintain independence motivates him to be active:

> "*To keep my independence, to always be able to walk and drive, to be strong enough to do what I want to do physically and then I suppose the significance of physical wellbeing to mental wellbeing and that the two are more closely associated than you would realise."* (Jim, Programme Participant)

Participants also reported to being physically active in order to maintain their balance as they age. In particular, this motivation to maintain their balance was a factor which influenced participation in the BBBB programme for several participants. Again, this motivation ties in with the wish to remain independent, with participants linking the maintenance of balance with the freedom to remain independent. Patricia describes how the desire to improve balance impacted her decision to participate in the programme:

> *"I just knew my balance wasn't as good as it once was, so it was just a good thing to participate in the programme."* (Patricia, Programme Participant*)*

As the maintenance of balance is one of the key outcomes of the programme, as referenced in the title, it is not surprising that participants who voluntarily signed up for the classes have a desire to maintain or improve balance. The literature supports this result with studies identifying a desire to maintain positive health as a key motivator for physical activity although studies typically report this as a general desire to maintain health as opposed to any specific component of health such as balance (Bethancourt et al., 2014). There is direct support for this result in the research also with participants in the study conducted by Killingback et al. (2017) highlighting the desire to maintain balance as a motivator. For BBBB participants, wanting to maintain balance was seen as a crucial feature of health needed to maintain their independence

and as a result many participants described this as a motivating factor, for example, Barbara describes how she wishes to maintain their balance to remain independent:

> "*If you live on your own, you have to do most things yourself and can't be expecting people to come do things for you, so you try to keep as balanced or active as you can*." (Barbara, Programme Participant)

Additionally, some participants reported to being physically active in order to prevent falls or accidents. Physically activity was seen as an effective method of maintaining strength and balance which would support participants in their efforts to avoid becoming unsteady or experiencing a fall. This motivation is clearly linked to the previous motivator explored, wanting to maintain balance, and could be seen as the inverse or possibly a negative way of describing the desire to maintain balance with fear being more of a factor. Typically, participants expressed more general desires such as wanting to maintain health or independence and those that were more specific mentioned balance with the fear of falling being much less commonly reported. Paul reported that he was motivated by fall prevention having previously experienced falls stating, *"I had 2 accidents before, and I said never again."* (Paul, Programme Participant). It is likely that this prior history had an influence on their motivation.

Ultimately the intrinsic factors reported by participants relate to one thing, the desire to maintain health and independence. Most participants recognised that physical activity, both within and outside the programme, was a crucial aspect of maintaining one's health. Some participants reported more specific intrinsic motivators, the desire to maintain balance and the desire to prevent falls, however, these two motivators are in essence derivatives of the desire to maintain independence.

5.8.2 Extrinsic Motivation

Although intrinsic motivators were more commonly reported by participants, there was also a key extrinsic factor mentioned, that being social support, which was regularly cited by participants as a motivator in one form or another. The importance of social support for older adults being physically active is a recurring theme both in the literature and in the present study. Hughes et al. (2009) demonstrated that physical activity programmes can utilise motivators, such as social support and have been shown to be one means of increasing physical activity levels for older adults. Group

exercise programmes have also been shown to have higher adherence rates than individual physical activity which further supports the importance of the social aspect (Van der Bij et al., 2002). While social support has already been discussed in the context of the BBBB programme, the following section relates to social support more generally regarding participation in physical activity. Participants interviewed highlighted several different forms of support from different social sources which influence their participation in physical activity. Some participants were encouraged by family members to be active and even to take part in the BBBB programme. Molly describes how her family impacted her participation in the programme:

> "*I've a daughter who's a physio…she used to always say God if I'd time I'd do a class because it would be very beneficial, ye should all be doing one*." (Molly, Programme Participant)

Similarly, some participants reported to being physically active due to being part of an active social group. They expressed how the group motivated them to be physically active as they would often go walking together when they met up as opposed to simply sitting down and chatting. Other research has likewise demonstrated that support such as this from outside sources motivates older adults to be physically active (Belza et al., 2008). Patricia describes how she motivated several of her friends to participate in the programme which is a practical example of how social support may encourage physical activity for older adults:

> *"I heard about it and I actually said it to 4 or 5 other girls that this is on and even a few other girls that would be on the other course I said that this would be good for us and they said yes."* (Patricia, Programme Participant)

The other major form of social support highlighted by the interviewees was BBBB programme itself. Through participation within the programme, participants were motivated to be physically active by being part of the group. Again, this links in with the previous point relating to the impact of social support on motivation with the programme being a form of social support in itself. Participants noted how the programme impacted motivation in several ways. Firstly, the weekly classes themselves motivated participants to be active through their attendance each week. Secondly, participants were encouraged to practice the exercise of the week which was taught to them during each class. Lastly, it was reported that simply being part of the programme was a source of motivation for some participants and they were likely to be active due to their participation in the BBBB programme. Mary describes how the group aspect of the programme helped them with motivation:

> "*Well for me I find personal motivation hard, so I feel going to course like that is really important I almost feel like I need that support for the motivation to exercise and I feel that the other ladies in the course all felt the same and everybody really enjoyed it and we all motivate each other."* (Mary, Programme Participant)

By defining the factors which motivate programme participants to be physically active, programme leaders will have a greater understanding of how to leverage this motivation to produce greater long-term engagement in lifelong physical activity. Participants reported to being predominantly intrinsically motivated, with the majority of participant stating that they were physically active out of a desire to maintain independence. It would be difficult to influence intrinsic motivation, as it is derived from an internal source, however, it may be possible to influence the extrinsic factors which motivate participants. Participants cited social supports, in the form of friend groups and the programme group as a form of motivation. By focusing on facilitating this group atmosphere, the programme leaders may be able to increase participants motivation. In the following chapter, chapter 6, the researcher will present recommendations as to how programme leaders may utilise this extrinsic motivator to engage participants in physical activity post-programme completion.

5.9 Barriers

While the previous section dealt with the topic of motivation to be physically active; both in regard to engagement in the BBBB programme itself as well as outside of the programme; the next section will instead discuss barriers which may decrease the likelihood with which an individual will be physically active post their engagement with the programme. It is equally important to address barriers to physical activity as these limitations will have as severe an impact on activity levels as motivators and gaining an understanding into what may hamper an individual's ability to be physically active may be extremely useful. For the BBBB programme, understanding the barriers which participants face will enable programme leaders to utilise strategies to mitigate these obstacles to engagement in physical activity. As with the previous section, the barriers to physical activity are broken down into intrinsic and extrinsic factors, intrinsic barriers being internal factors (such as disliking exercise) and

extrinsic barriers being external factors (such as the weather) as identified by participants.

5.9.1 Intrinsic Barriers

Unlike the factors affecting motivation, in which there was a considerable disparity between the amount of intrinsic versus extrinsic factors, the barriers reported by the participants were more evenly spread between the two. Additionally, participants were able to identify considerably more motivating factors than barriers. Some participants reported that they lacked motivation to perform certain forms of physical activity. Although many participants reported to enjoying physical activity in general and in particular, walking, there was a consensus that motivation to perform the exercises learned on the programme was low. This barrier was reported to be more acutely noticeable after the participants had completed the programme. Jennifer expressed how she didn't enjoy exercising alone but the group made it easier:

> "*I don't particularly enjoy exercising but there was no part that I disliked but exercising on your own is not a pleasurable as in a group."* (Jennifer, Programme Participant)

The predominant intrinsic barrier reported was that participants disliked exercising on their own, particularly regarding the exercises learned on the programme. Each interviewee cited this as a common barrier for exercise stating that they only found those types of activities enjoyable when part of a group. Again, this dislike of exercising on their own can be viewed as the inverse of enjoying the social support of the group. The importance of social support for older adults in maintaining levels of physical activity has been highlighted in the previous sections related to motivators for physical activity. As such by removing that social support experienced in the programme, participants were less motivated to be physically active. Similar research has coincided with this finding with older adults commenting that they did not wish to engage in physical activity alone and individual exercise was viewed as boring whereas group exercise was viewed positively (Killinback et al, 2017). After the Better, Balance Better Bones programme was over, naturally each individual participant would not have access to a group to exercise with, which in turn meant that

this played a huge role in the level of maintenance reported. Jim describes how the group aspect of the programme affected physical activity for them:

> *"I do think that the group element is great you know because the motivation of a group will be much better than just the motivation of yourself like I do the exercises out in the garden at different times, and I'd do them on my own but I just do miss the group and I think that the value of group participation is immense."* (Jim, Programme Participant)

Participants reported to being active frequently through less formal methods such as walking, housework, gardening etc. It was stated that this form of activity was much more enjoyable for participants than more structured exercise routines. Research conducted into older adult adherence to exercise coincides with the results presented here. A study conducted by Rahman et al. (2019) indicated that older adults who engage in recreational and cultural activities, such as walking and housework, have a higher motivation for physical activity as compared with those whose primary form of physical activity is sports and exercise. The same study goes on to state that individuals whose primary source of physical activity is recreational and cultural activities tend to be motivated by intrinsic factors as opposed to their counterparts who predominantly engage in sports and structured exercise being extrinsically motivated. As many of the participants in this current study reported to being intrinsically motivated to exercise for reasons such as health, this could explain why there was an aversion to perform the learned exercises, with intrinsically motivated individuals being less likely to engage in sport and structured exercise.

Participants cited two main intrinsic barriers to physical activity. Firstly, it was reported that, for many, they disliked structured exercise unless they were in a group. As a result of this, participants preferred to do other activities as opposed to programme related activities. The other primary intrinsic barrier which arose was the aversion to individual exercise. As stated above, participants were willing to participate in programme specific exercises as long as they were in a group, however, found that these exercises were not enjoyable or boring when they had to do the alone. Considering this, the lack of maintenance post-programme is to be expected as with the loss of the social group, participants were unlikely to continue to engage in programme-specific exercises. This finding highlights the need for maintaining social support post programme completion. In chapter 6, the researcher will offer recommendations as to how social support can be maintained post-programme which will mitigate this intrinsic barrier.

5.9.2 Extrinsic Barriers

Similar to the intrinsic barriers, participants reported considerably less extrinsic barriers than motivators. The first extrinsic barrier which interviewees commonly reported was the weather. Participants stated that if the weather was poor, they were unlikely to be physically active. Although the literature more frequently deals with motivators as opposed to barriers, there are studies which support these results with weather being commonly reported by older adults as a barrier to physical activity (Gothe and Kendall, 2016). For programme participants this barrier was quite common with the majority of participants listing this factor when asked what would make it difficult for them to be physically active. Due to the participants primary source of physical activity being outdoor walking, the weather is naturally a prevalent factor. It is possible that for older adults who partake in indoor activities, this factor would not deter them from activity. Molly described how the weather inhibited her when asked what deterred them from being physically active:

> "*February was so bleak. We weren't getting outside the door a lot of us because it was just too wet and too windy. I suppose when you're that bit older, you're a bit cagey about going for walks in the rain."* (Molly, Programme Participant)

The next major extrinsic barrier reported was that participants felt as though they had too many other priorities which left them with a lack of time to be physically active. It was highlighted that for many of the interviewees physical activity was not a top priority and that if other tasks required doing, they would take precedence over physical activity. Again, the literature concurs with this finding with lack of time being commonly reported by older adults as a major barrier to being physically active (Grossman and Stewart, 2003). Other studies into barriers to engagement in physical activity for older adults have demonstrated how physical activity is often seen as a lower priority with other tasks taking precedence over it (Gothe and Kendall, 2016). Paul describes below how other priorities made it difficult to be physically active:

> "*I'm looking forward to when I've a bit of time when I don't have as many commitments that I can get back to it. I've committed myself to too many things now if I hadn't, I would have done a bit more probably*." (Paul, Programme Participant)

Likewise, Jennifer highlights how not having enough time impacted their physical activity levels:

> "*Time would be the main barrier. For example, if I was helping out with my grandkids, I might not have time to be physically active each day."* (Jennifer, Programme Participant)

Similar to the extrinsic motivation factors, the BBBB programme also served as a barrier in the sense that some participants derived motivation from the programme, meaning that the programme ending had a negative impact on engagement in physical activity for some. Participants noted that when the programme ended, they struggled with motivation to be physically active, particularly in relation to the exercises learned on the programme. Again, this ties in with the loss of social support experienced upon programme cessation. The social dynamic of the programme created a support system for participants with meetings each week, contacts made through the programme and the ability to exercise as part of a group. When the classes ended, this social support was removed, and many participants found it difficult to maintain the levels of activity which they had sustained for the duration of the programme. Mary describes the role of the programme in her motivation to be physically active:

> "*Well for me I find personal motivation hard, so I feel going to course like that is really important I almost feel like I need that support for the motivation to exercise and I feel that the other ladies in the course all felt the same and everybody really enjoyed it and we all motivate each other."* (Mary, Programme Participant)

Extrinsic factors also featured as barriers to physical activity for programme participants. The weather was seen as a barrier to physical activity with many participants describing how poor weather deterred them from physical activity. In a way, this presents an opportunity for programme activities, based indoors, to be utilised as an alternative to outdoor activity. It may be possible to highlight these activities to participants as possible alternatives to outdoor activities when the weather is poor. Another extrinsic factor which participants reported was a lack of time. It was stated that participants often found themselves too busy to be physically active and that physical activity was often quite a low priority. By educating participants regarding the importance of physical activity, as the programme currently does, it may be possible to make physical activity a greater priority. Finally, programme cessation was reported as an extrinsic barrier with participants stating that they ceased programme activities after the programme had concluded. As stated earlier, by facilitating a social group for participants post-programme completion it may be possible to reduce the effect of this barrier and increase maintenance of long-term physical activity.

5.10 Conclusion

As outlined above at the outset of the second action research cycle, due to restrictions imposed by the Covid-19 pandemic, it was necessary to conduct an emergency meeting in order to determine a new direction for the research study. Within this planning phase, an expansion of the aim of the study was proposed enabling a qualitative evaluation of the BBBB programme in the form of telephone interviews. This planning phase also entailed the development of an interview guide through collaboration with programme leaders as well as planning interviews logistically. The action phase of this cycle consisted of conducting the interviews with past participants while the observation phase entailed the transcription of interviews as well as the initial stages of thematic analysis. The reflection phase for this second cycle required the researcher to complete the thematic analysis of the interviews and reflect on the findings, concluding with the discussion of the findings presented in this chapter. The findings discussed in the present chapter will serve to inform programme refinement in the form of recommendations presented in the following chapter, chapter 6. The thematic analysis process, informed by Braun and Clarke's (2006) 6-step process, led to the emergence of four main themes: programme outcomes, programme delivery, barriers, and motivators.

Participants reported to experiencing both physical and psychological improvements attributed to programme participation as well as educational benefits related to the development of home-based exercise skills. Furthermore, the social benefit of the programme was highlighted as a key feature, with all participants noting the social support which was received throughout the programme as being instrumental to their enjoyment of the programme. From these outcomes it is clear that the programme was effective for many participants at eliciting the intended effect of improving physical and psychosocial health for participants as well as increasing participant knowledge of physical activity. Some participants, however, were unable to notice any change in physical or psychological health, which may be attributed to the voluntary nature of the programme, the frequency of sessions as well as their previous high levels of physical activity. Recommendations will be made in the following chapter for potentially improving the recruitment aspect of the programme.

Programme experience was reported as being extremely positive with organisational aspects of the programme leading to participants enjoyment. In particular, the instructor was seen as a huge strength of the programme from which participants derived enjoyment, support, and motivation. As well as the instructor, fellow participants were reported as being crucial and the social aspect of the programme was cited as being the driving force behind participant enjoyment and motivation. As such, social support was stated as one of the primary motivators for physical activity by participants with the other most prevalent motivator being identified as a desire to remain independent. The interviews also revealed barriers to physical activity which included extrinsic factors such as the weather and lack of time. Additionally, intrinsic factors such as a dislike of certain kinds of exercise were reported.

By identifying the key outcomes of the programme as perceived by participants it is possible to evaluate how effective the BBBB programme was regarding its aims of improving participant health and promoting home-based exercise. The results revealed that the programme successfully increased participant perceived physical and psychological health as well as knowledge of home-based exercise for most participants. These findings suggest that the delivery of the programme is effective, and few recommendations will be required in this capacity. Some participants, however, did not experience these changes, additionally many participants failed to continue with programme related activities post-programme completion. These factors highlight the potential for improvement in the area recruitment and in the area of post-programme maintenance of physical activity. The next chapter will present recommendations for the programme regarding programme delivery based on the insights gained from the results and discussion presented in the current chapter while the previous chapter, chapter 4 will inform recommendations for a revised evaluation protocol.

Chapter 6:
Conclusions and Recommendations

Chapter 6 Conclusions and Recommendations

6.0 Introduction

In this final chapter, the researcher will summarize and present the key findings which emerged from both cycles of the research journey; Cycle 1: the development of an evaluation protocol for a 'Well-Elderly' Physical Activity Programme, and Cycle 2: the qualitative evaluation of a 'Well-Elderly' Physical Activity Programme. Recommendations will be made informed by the findings presented in the previous two chapters. Additionally, from these recommendations a proposed Logic model will be synthesised in order to depict the cause-and effect relationship between actions and their expected outcome. Finally, the researcher will reflect on the action research process undertaken in the current study.

6.1 Research Insights

This study addressed the research aim of exploring the impact of a well-elderly exercise programme on the health and wellbeing of older adults. This aim was initially addressed through the development of an evaluation protocol for a 'Well-Elderly' Physical Activity Programme. Following the restrictions imposed by the Covid-19 pandemic, an expansion to the research aim was needed. This expansion resulted in the second cycle of the research and included a qualitative evaluation of the programme. The following sections address the insights gained throughout both cycles of the research and how these insights will serve to inform recommendations for the Evaluation Protocol as well as the 'Well-Elderly' Physical Activity Programme.

6.1.1 Cycle 1: Development of and Evaluation Protocol

Cycle 1 of the research focused on the development and implementation of an evaluation protocol for the 'Well-Elderly' Physical Activity Programme, the Better Balance Better Bones (BBBB) Programme being implemented in Co. Kerry. The development process involved an extensive review of literature pertaining to older adult health and wellbeing as well as evaluation and assessment modalities utilised in assessing functional fitness, health, and wellbeing for older adults. In addition, and in

reflecting on the action research methodology, collaborative meetings were also utilised throughout the development process. The collaborative meetings enabled refinement of the protocol utilising the experience of programme leaders. Through this process, a pilot Evaluation Protocol was developed and implemented in a pilot study. Feedback from this pilot study enabled further refinements to the protocol which was then implemented with a selected BBBB programme cohort.

During the implementation of the Evaluation Protocol, the researcher made observations in the form of fieldnotes in order to explore the implementation of the protocol and record key points of feedback. In addition, following the implementation of the Evaluation Protocol, interviews were conducted with those who had administered the protocol, as well as participants who had completed the evaluation in order to determine their perception of the Evaluation Protocol. The resulting feedback obtained was used to investigate the efficacy of the protocol and inform further refinements.

As discussed in Chapter 4, following the analysis of the fieldnotes taken by the researcher during the testing day, as well as the interviews conducted, observations which would enable refinements to the protocol were identified. In reflecting on both the implementation of the pilot Evaluation Protocol and recommendations obtained through observation and the interviews conducted the following are the key areas identified in relation to refinements to the Evaluation Protocol:

- The tests included were reported to be easy to administer and easy to score.
- The variety and range of tests enable a comprehensive evaluation of all components of fitness as well as psychological outcomes associated with programme participation.
- Participant enjoyment was a highlight with participants eager to complete tests and inquisitive regarding the outcomes.
- Many participants arrived early for their evaluation causing a backlog. More emphasis on appointment times is suggested as being useful. Additionally, to utilise this time as a social opportunity, a seating area will be arranged for participants.

- Some participants found the questionnaires difficult to understand, particularly the Self-Efficacy for Exercise (SEE) Scale. Revisions will be made to the introductory paragraph and questionnaire instructions in future revisions to the protocol.
- It was suggested that increasing the number of testers may promote greater efficiency during the testing day.
- Having an extra floating tester would be useful in order to carry out organisational and logistical tasks.
- It may be necessary to implement two distinct Evaluation Protocols, a long-form to facilitate a comprehensive evaluation and a short-form utilised more regularly to enable a single tester to perform the evaluation.

Unfortunately, due to restrictions imposed by Covid-19, observations were only possible from the initial pre-test of the Evaluation Protocol. While refinements to the Evaluation Protocol have been made based on the feedback obtained, a second action research cycle focusing specifically on enabling further development, testing and refinement of the Evaluation Protocol developed was not possible. In progressing with an evaluation of the 'Well-Elderly' Physical Activity Programme, a second action research cycle was initiated to enable a qualitative exploration of participant perceptions of the 'Well-Elderly' Physical Activity Programme. It was hoped that this second action research cycle may provide further insights that may inform both the development of the Evaluation Protocol and the design and implementations of the programme.

6.1.2 Cycle 2: Qualitative Evaluation of a 'Well-Elderly' Physical Activity Programme

As stated above, Cycle 2 of the research involved a qualitative exploration of participants perceptions of the BBBB programme. Due to restrictions imposed arising from the Covid-19 pandemic, telephone interviews with past programme participants were conducted. The interviews conducted enabled an exploration of programme participants, their perceptions of the programme, as well as the perceived health outcomes associated with their engagement in the programme. Interviews were

recorded, transcribed, and analysed using Braun and Clarke's (2006) method of thematic analysis. The data analysis process resulted in the development of themes representative of the participants' perceptions of the programme.

Participants reported to finding the programme beneficial with most describing a noticeable impact on physical health which they attributed to their participation in the programme. Several interviewees reported improvements in specific components of fitness; strength, balance and an ease in ADL's which would suggest that the programme was effective regarding the improvement of physical health, at least as perceived by participants.

Although many participants reported a perceived improvement in physical health, some participants noted that they did not perceive any physical changes as a result of their participation. In Chapter 5, the researcher has posited that it is likely due to the active nature of the participant group, they were less likely to experience a change in physical health with research indicating that individuals who volunteer for physical activity programme tend to be more active (Russel et al., 2009). This lack of perceived change may also be due to the frequency and duration of the programme being slightly less than optimal with research indicating programmes which occur twice per week and last roughly 15 weeks may be more beneficial (Huang et al., 2010; Fitzharris et al., 2010).

The findings regarding psychological health were similar to those found for physical health, with the majority of participants recognizing some benefit to psychological health, such as improved mood and self-confidence, and some reporting no change. Those reporting no change stated that they already perceived their "mental health" to be positive, so it is possible that the active nature of the participant group is again the cause of this lack of perceived change. Again, Russel et al. (2009) has highlighted that there is an inherent selection bias within physical activity programmes, with active individuals being more likely to volunteer.

Apart from physical and psychological health outcomes reported, the programme was also reported to be a valuable social outlet for participants. All participants interviewed reported to enjoying the social aspect of the programme and found that it increased their enjoyment of the programme and motivation to be active as well as it being an opportunity to make new connections. The results pertaining to the social nature of the

programme further emphasize the importance of social connectedness for older adults and supports a growing body of evidence which suggests that social support is a crucial determinant of health for older adults (Killingback et al., 2017).

From an educational standpoint the programme proved to be effective with participants reporting to learning about the importance of exercise as well as several exercises and routines to practice at home. Unfortunately, maintenance of programme related activities post cessation of the programme was extremely low, with the majority of participants reporting to ceasing activities post-programme due to lack of enjoyment when performing exercises on their own, which again highlights the importance of social support, a theme which is prevalent within the literature (Kendrick et al., 2018). Additionally, Keogh et al., 2014, when analysing the never2old programme found that a holistic delivery including education as well as physical training was ultimately more beneficial, in terms of activity adherence, than exclusively utilising physical training. As such, the educational aspect of the programme must be considered as an integral element to retain.

Programme delivery was perceived as extremely positive with all participants praising the organisation of the programme. In particular, participants reported to sessions being fun and enjoyable with a wide variety of exercises being utilised throughout the programme. The instructor was praised by all participants interviewed with interviewees placing emphasis on their knowledge and accommodating nature. Naturally, the social nature of the programme, in the form of its group-exercise format, facilitated a positive experience with each participant noting that the social element of the programme was what made the experience truly enjoyable as they were able to participate and enjoy the programme with their peers.

The interviews addressed participants main motivators and barriers to engagement in physical activity. Regarding motivation, intrinsic factors were more commonly reported by participants, with the main motivation for physical activity being the desire to maintain health and independence. Social support proved to be the predominant extrinsic motivator with participants reporting encouragement from family and friends as well as the support received from the BBBB programme.

Barriers to physical activity proved to be more evenly divided between intrinsic and extrinsic factors. Participants cited one primary intrinsic barrier to physical activity. It

was reported that, for many, they disliked structured exercise unless they were in a group. As a result of this, participants preferred to do other activities as opposed to programme related activities. Regarding extrinsic barriers to physical activity, the predominant factors reported by participants were a lack of time, poor weather, and the cessation of the BBBB programme.

Considering the points highlighted above relating to both cycles of the research, the research will present a number of informed recommendations.

6.2 Recommendations

Insights gained through the researcher's lived experience within the context of engaging with the BBBB programme, as well as from direct feedback from programme leaders and participants have informed several recommendations pertaining to both the Evaluation Protocol and the implementation of the BBBB programme. These recommendations are outlined below.

6.2.1 Evaluation Protocol

In the final development of an Evaluation Protocol for the BBBB programme, recommendations were informed by insights gained throughout the first cycle of research. The researcher recommends that a pre-and post-programme evaluation be conducted for each programme participant in order to evaluate individual outcomes. The Evaluation Protocol needs to be comprehensive, including an array of tests for components of fitness and psychological outcomes, in order to ensure a thorough evaluation is possible, however, it should also be efficient enough to enable a single tester to administer the protocol on multiple participants for sustainability of use.

Due to the restrictions imposed by Covid-19, feedback could only be obtained from the initial pre-test as it was not possible to implement the protocol again in a post-test. As such, it is difficult to determine what an optimal evaluation framework would include, however, a revised evaluation protocol was developed at the end of the first cycle of research. The tests and questionnaires included within the Evaluation Protocol can be seen in Table 6 below.

Table 6: Evaluation Protocol Battery of Tests

Physical Tests	**Questionnaires**
The Timed Up and Go Test (TUG) The Two-Minute Step Test (TMST) 30-second Chair Stand Test Chair Sit and Reach Test Arm Curl Test One-Legged Stance Test	Self-Efficacy for Exercise Scale (SEE) Activities-Specific Balance Confidence Scale (ABC) The WHO-5 Well-Being Index (WHO-5)

From the observations made by the researcher as well as the testers interviewed, the above iteration of the evaluation protocol proved to be easy to administer and score as well as being easily understood by the participants. The protocol was highly comprehensive in nature, examining each of the components of fitness in addition to an extra balance test and 3 psychological questionnaires. Although the aim was to develop a comprehensive protocol which would facilitate a thorough evaluation of programme outcomes, in order to enable a single tester to be able to administer the protocol, the battery of tests would require revision in order to make it practicable of use by a single tester. In order to facilitate both a comprehensive evaluation as well as an efficient protocol for use by a single tester, the researcher recommends the presence of 2 distinct Evaluation Protocols, a comprehensive Evaluation Protocol and a short-form Evaluation Protocol.

The comprehensive evaluation would involve the Evaluation Protocol developed during Cycle 1 of the research, depicted in Table 6. It is suggested that this protocol may be used less frequently, possibly with one or two groups per year as it would not be possible for a single tester to utilise this protocol with every participant group. By implementing this evaluation, although less regularly, it will provide a comprehensive evaluation of the programme which can be augmented by the additional shorter evaluations completed. As work on the development of the evaluation protocol was halted prematurely due to Covid-19, future research is required with a focus on exploring a refined battery of tests.

It is recommended that for the comprehensive evaluation, an educational assessment would be beneficial in order to evaluate the educational outcomes of the programme. As the programme places a large focus on educating participants regarding the importance of physical activity and home-based exercise, it is important to determine whether this knowledge is being retained by participants. The educational assessment could work in the form of a short interview with participants conducted post engagement with the programme in which they describe what they have learned during their time within the programme. The findings of these interviews could then be compared to the targeted learning outcomes set out by programme leaders. The results of these short interviews will enable programme leaders to determine the aspects of the in-programme education which are being retained by participants, as well as what elements require more attention in the future.

It is recommended that a short-form Evaluation Protocol be utilised as the primary evaluation method for the BBBB programme. The primary aim of this short-form protocol would be maintaining efficiency whilst also gathering data relating to the primary health outcomes associated with participation in the programme. Considering the content of the programme, a large focus is placed on training for balance, cardiovascular fitness and lower body strength. As such, the researcher suggests that the tests for these components of fitness utilised within the long-form Evaluation Protocol, the timed up-and-go test (balance), the two-minute step test (cardiovascular fitness) and the 30-second chair stand test (lower body strength), be implemented as the physical tests in the short form battery. The inclusion of a standard evaluation for each programme will also serve as a method of educating the participants and should be viewed as part of the intervention.

Regarding the psychological component of the evaluation, the researcher recommends the WHO-5 Wellbeing index as it is concise and provides an overall view of the participant's general wellbeing. Again, due to being unable to conduct further research regarding the Evaluation Protocol as a result of Covid-19, the researcher recommends further research is required to determine an optimal short-form evaluation protocol. The proposed short-form Evaluation Protocol battery of tests can be seen in Table 7 below.

Table 7: Short-Form Evaluation Protocol Battery

Physical Tests	**Questionnaires**
The Timed Up and Go Test (TUG) The Two-Minute Step Test (TMST) 30-second Chair Stand Test	The WHO-5 Well-Being Index (WHO-5)

6.2.2 Programming Recommendations

With regard to the delivery of the programme, there will be minimal changes recommended, with evidence from the qualitative evaluation of the programme via participant interviews suggesting that programme delivery was seen as a highlight of the BBBB programme. In particular, participants praised the structure of the class, the variety of exercises and the instructor's overall delivery. Considering these positive findings, it is recommended that no changes be made to session delivery. In addition, a majority of participants perceived a physical and psychological benefit which they attributed to their participation in the programme. This suggests that exercise choice was not only enjoyable for participants but was also perceived as being beneficial.

Throughout the interview process, the theme of social connectedness arose frequently with participants praising the BBBB programme as a valuable social opportunity. Again, through the results obtained during the qualitative evaluation of the programme, it is suggested that no changes are required in this capacity with participants already perceiving it as a predominantly social experience. Thus, the researcher recommends that the social nature of the programme remain a focal point of the delivery.

It is recommended that class frequency and overall duration be increased in order to facilitate greater improvements to health outcomes. As evidenced by the literature, programmes which occur twice weekly and last roughly 15 weeks tend to have greater outcomes for participants (Huang et al., 2010; Fitzharris et al., 2010). With some of the participants reporting that they perceived no change in physical and psychological health, it is possible that the once-a-week class may not have been enough to stimulate progression. By increasing the classes to twice per week and extending the duration

of the programme to 15 weeks in length, the opportunity for participants to experience health benefits will increase dramatically. The desire for more classes was not mentioned in the interviews by any participant, so it is difficult to determine how a change like this would impact participants perceptions of the programme which may warrant discussion prior to any change being made. Again, it may be useful to utilise a continued action research approach in order to involve participants in any developments to the programme.

6.2.3 Recruitment and Adherence Recommendations

The cohort of participants interviewed for the evaluation reported to having been physically active prior to their engagement with the BBBB programme. Russel et al. (2009) suggests that individuals who volunteer for physical activity programmes are typically more active, which is consistent with the findings of the present study. With this in mind, there is an implication that less active individuals, who would arguably experience greater benefit from participation, are less likely to volunteer. As the individuals who need the programme the most are less likely to volunteer, a referral system may be useful in order to promote 'hard to reach' individuals to engage in physical activity. Research has shown that engaging these 'hard to reach' individuals, defined as older adults living in deprived areas, from minority ethnic groups or aged over 85 years, in physical activity is of particular importance when seeking to target those who may benefit the most and to reduce health inequalities (Liljas et al., 2019). The process of reducing health inequalities also coincides with one of the primary aims of the Healthy Ireland Strategic Action Plan 2021-2025 (Healthy Ireland, 2021).

It is recommended that the programme could collaborate with primary health care services in the form of local GPs, physiotherapists, day centres etc. in order to develop a pathway whereby participants are recommended for the programme. Research has indicated that recruitment via primary care health professionals who are known and trusted by participants may be successful in engaging them in physical activity (Liljas et al., 2017). This referral system could be highly beneficial in increasing the programme's reach to include these 'hard to reach' individuals.

Post-programme exercise adherence was reportedly very low with the majority of participants reporting a full cessation of programme exercises after the BBBB programme had ended. As such, it is recommended that more emphasis be placed on post-programme maintenance for participants. The researcher suggests that pathways be put in place for participants to advance to a follow-on programme if they wish to do so. Alternatively, leaders could make suggestions for other physical activity programmes which may be suitable for participants. In the event that the participants do not wish to continue participation, a follow-up phone call/message inquiring as to physical activity habits and health status may be effective in promoting engagement in physical activity.

Understandably, resources may become an issue in this scenario involving engaging with each past programme participant, however, it may be possible to set up peer-led activity groups to encourage post-programme maintenance. Research has indicated that peer-led physical activity groups are a cost-efficient and effective method of promoting physical activity for older adults (Werner et al., 2014). These peer-led groups would mitigate any issues regarding resources as they are self-sustainable and would be an effective method of increasing post-programme exercise adherence. Additionally, the groups would provide a social outlet for participants which is a crucial factor considering the importance of social support for the maintenance of physical activity in the older adult population. Furthermore, links could be established with already existing active retirement groups/classes in order to continue participants engagement in physical activity post-programme.

In order to explore the expected impact and outcomes of the recommendations outlined above, a proposed Logic model has been developed to demonstrate the cause-and-effect relationship of these recommendations. Epstein and Klerman (2012) describe how Logic models serve the purpose of describing how the planned actions of an intervention are expected to impact the participants. In Figure 12 below the researcher depicts the recommendations presented above within the context of the proposed Logic model for the BBBB programme in order to give an easy-to-follow visual representation of the expected outcomes of the recommendations.

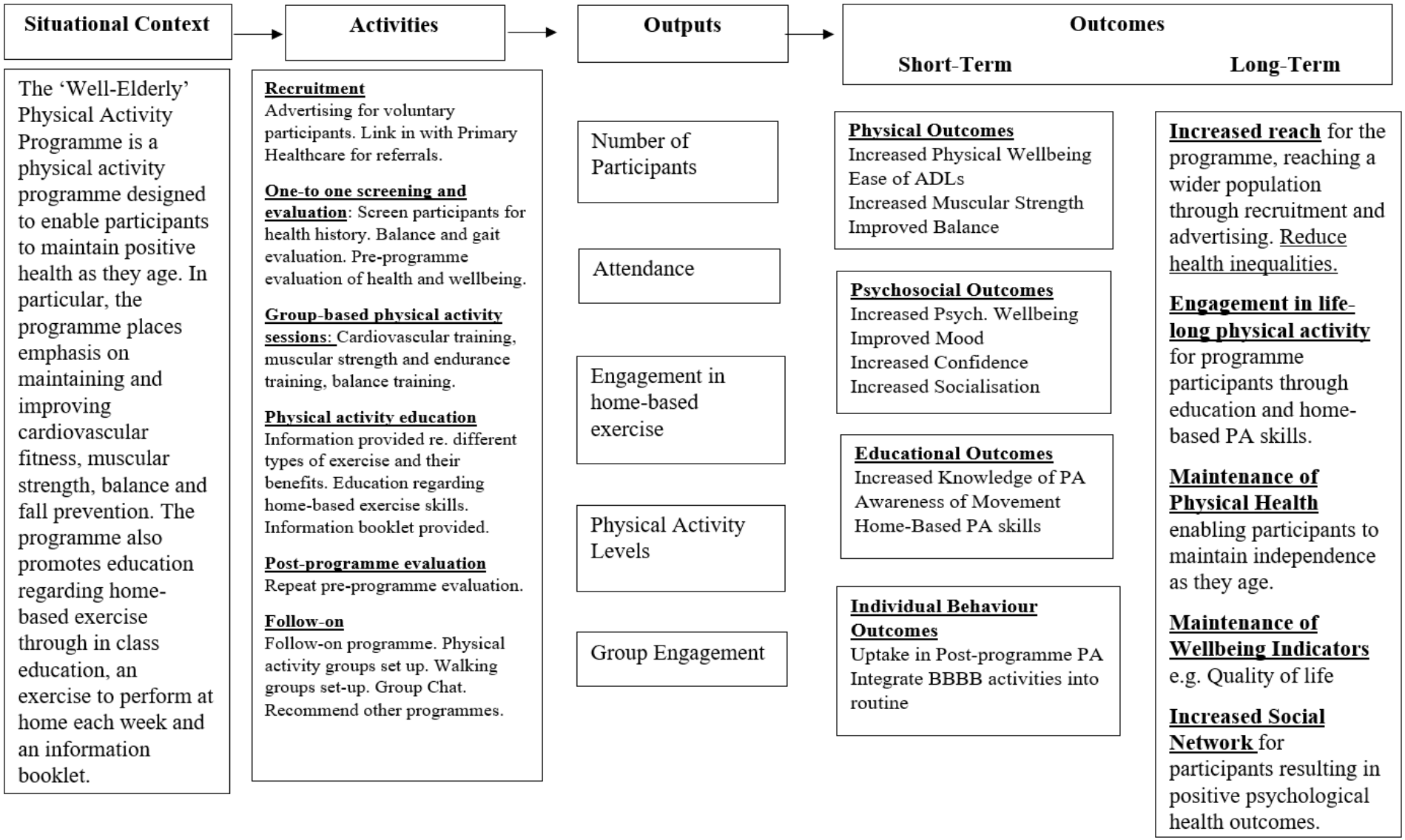

Figure 12: Proposed LOGIC Model for the programme

6.3 Future Research

In order to cultivate further understanding as well as to reinforce the findings presented in the current study, the researcher recommends the following research direction for future studies:

As Cycle 1 of the research was cut short, the researcher recommends that another study continue the exploration of the long and short-form Evaluation Protocol for the 'Well-Elderly' Physical Activity Programme.

The current evaluation should be repeated with other participants groups in order to determine the consistency of the results.

A similar evaluation could be replicated on another older adult physical activity programme in order to determine if findings are consistant outside of the BBBB programme. Alterrnatively a control group could be used to compare with participants groups to acertain if percieved changes to health can be attributed to participation in the programme.

As long-term adherence is such a key aspect for any physical activity programme, a study which focuses on developing a number of pathways for older adults to maintain physical activity post-programme completion would be extremly beneficial in order to facilitate engagement in lifelong physical activity for programme participants.

Research which evaluates the recruitment strategies of physical activity programmes for older adults and develops a framework for inclusive recruitment may be effective at increasing the reach of physical activity programmes in communities, thus, resulting in a reduction in health inequalities and an increse in partcipation rates for 'hard to reach' individuals.

6.4 Reflections on the Research Journey

In the completion of this research project, I have engaged in reflection on significant areas of the research journey. Reflection has been long-since recognised as a cornerstone of research, eliciting deep exploration of the learning outcomes associated with the conducting of research (Van Beveren et al., 2018) Indeed, Elliott (1991)

highlights reflection as a crucial element of action research, describing it as essential in determining the lessons learned in the process. This reflective piece will focus on an exploration of, what I consider the key learning gained from the completion of the project.

In the investigation of philosophical perspectives, for the development of the research paradigm utilised within the present study, I have gained an appreciation for the differing philosophical viewpoints of positivism and constructivism. Whilst I can certainly understand the viewpoint of the positivist researcher in their belief of objective reality, having had prior experience conducting quantitative research, the completion of this study has highlighted to me the significance of subjective experiences and the unique reality of each individual.

Within the constructivist paradigm, it is understood that reality is indirectly constructed based on individual interpretation and that people interpret and make their own meaning of events (Killam, 2013). Initially this concept was difficult for me to grasp, having little prior experience in the area of philosophy, however, through interacting with the programme participants during the qualitative interview process, the subjectivity of experiences has become clear to me. Qualitative research aims to facilitate a deeper understanding of the experiences which shape human lives and social worlds (Fossey et al., 2002) and through the qualitative process I was given an insight into the unique experiences of each participant. By seeing how each participant could interpret events in varying ways, the significance of subjective experience as well as the importance of the constructivist paradigm has been clearly demonstrated to me. From this understanding, I have developed a more philosophical outlook which will enable me to continue to consider the value of individual experience in my future work.

Action Research was chosen as the methodological approach to the present study, with its focus on participation, collaboration, and practical issues (Reason and Bradbury, 2008) and in using action research, the value of collaboration has been clearly demonstrated to me. Collaboration occurred primarily between programme leaders, research supervisors and I in the form of meetings held to inform the development of the Evaluation Protocol in Cycle 1 as well as to inform creation of the interview guide in Cycle 2. Prior to this research project, I had little experience working as part of a

team, however, the present study has clearly demonstrated the benefits to me, leaving me with an appreciation for the importance of teamwork and collaboration. Firstly, is the value of multiple, diverse skill sets and knowledge. From my undergraduate study, I was aware of the ability of collaboration and teamwork to enable a greater knowledge pool (Khawam et al., 2017), however, it is only after engaging in collaboration myself that I understand the significance of it.

Initially, I was quite sceptical of the benefits, and even somewhat anxious to relinquish any aspect of ownership of the project but over the course of the project, I was given a demonstration of teamwork in action. Issel (2004) has stated that internal actors within an organisation or programme, often have unique knowledge and experience which can be utilised in programme development and evaluation. This was evident through my meetings with programme leaders, and I was able to utilise this insider knowledge to plan for and implement the evaluation more effectively. In retrospect, my anxieties regarding ownership were needless, as the collaborative aspect only served to improve the experience for enabling me to utilise the knowledge and experience of my collaborators, whilst also retaining autonomy of the project. Indeed, by working as part of a team, I have an admiration for collaboration and its benefits.

The Covid-19 pandemic and the resulting lockdown had ramifications for many people in the population in general, and also for researchers. As a researcher with relatively little experience, the process of completing a masters research dissertation is inevitably challenging as new skills are required and unfamiliar processes are learned. For the researcher beginning their project during the pandemic, a whole host of other challenges presented themselves which made the process even more difficult. As this project focused on an older adult group, one of the high-risk groups, access to participants was naturally restricted. These restrictions made it necessary to expand the project's direction to include a qualitative evaluation.

This was an extremely difficult period for me due to the fear and uncertainty which I experienced. When I first heard of the lockdown, I was afraid that I would be unable to even continue my research, as the older-adult group was considered high risk and interaction with them would be impossible. In these difficult circumstances, the value of action research was clearly highlighted. Action research has often been described as a flexible methodology and in fact pluralism and multifaceted approaches are

actively encouraged within action research (James and Augustin, 2018). With the flexibility enabled by action research, an expansion was made to the methodology which allowed for the completion of the research project. This experience has given me an appreciation for the methodological fluidity of action research, without which I may have been unable to complete this project.

This research journey has been a profound learning experience leading to the development of skills, knowledge, and confidence. Through the conducting and analysing of interviews, I have significantly developed my qualitative research skills. In particular, I recall having difficulty in finding the deeper meaning within participants responses, however, through this experience the exploration process is much more familiar to me, and I am much more confident in qualitative analysis. My knowledge base has been greatly enhanced, particularly in the area of older adult health, in the undertaking of my literature review. This knowledge highlights to me the ephemeral nature of youth, the certainty of old age and the power of physical activity to maintain health.

I have developed a great deal of self-confidence throughout the research process, especially in its completion. A large-scale project such as this is a daunting prospect and by completing it, I have proven myself to be a capable researcher, a feat which I am exceedingly proud of. I will also derive a great deal of confidence from the leadership role I was in regarding the direction and autonomy of the project. I feel that this confidence in leadership will be of great benefit to me going forward, and that I will be more comfortable talking command of situations. Finally, I have gained an appreciation for the use of action research with its focus of combining theoretical knowledge and practical action. Having worked with the programme group in a practical setting I understand the value of utilising research for the benefit of people, in particular, older adults and I wholeheartedly believe that research should focus on developing solutions for the benefit of practical problems.

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Appendices

Appendix A: Inclusion/Exclusion Criteria

SFFF Better Balance Better Bones INCLUSION CRITERIA

Inclusion Criteria

- Seniors who are independently mobile both indoors and outdoors (NO WALKING AID/STICK)
- Need to be physically able to take part in a group exercise class of (30 -40 mins class)
- People living independently at home
- Able to follow clear instructions and also to give verbal feedback on how they feel in class
- All medical conditions controlled
- Does not require specialist exercise programme
- Seniors who did not have more than one fall in the previous year

Participants not suitable for SFFF Better Balance Better Bones

- Two or more self reported falls in the previous year
- Uncontrolled medical conditions which the GP considered would exclude patients from partaking in exercise
- Conditions requiring a specialist exercise programme e.g recent neurological event , recent fracture
- Not living independently (e.g. living in residential or nursing home)
- Significant cognitive impairment(resulting in the individual being unable to follow simple instructions)
- Already receiving long term physiotherapy or already in an exercise programme
- Carrying out greater than 150 mins mod to vigorous exercise.
- Not able to walk into and out of venue independently before and after(30-45 mins exercise)
- Uses a walking aid
- Must be able to pass Level 1 Falls screening

Level 1 Screening ; Ideally pre class on phone

1. Have you noticed any changes in your walking **Yes No**

2. Have you noticed any changes in your balance **Yes No**
3. Have you tripped slipped or fallen in the past year? **Yes No**
4. Are you worried about slips trips or falls ? **Yes No**

If Yes to any of the above ; Up and Go test **Pass or Fail**

Advised to discuss with GP /PHN/PT

***If difficulty for participant on Level 1 Falls Screen, class not suitable and onward signposting for appropriate assessment with Health Professional

INCLUSION CRITERIA NOTES PAGE ;

CORCAIGH CIARRAÍ
CORK KERRY

Falls Prevention

Cork
Sports Partnership

Appendix B: Information Sheet - Cycle 1

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Information Sheet

This project is being undertaken as a Masters by Research Programme with the Institute of Technology Tralee. The aim of this study is to develop an evaluation protocol which will effectively assess functional fitness outcomes as well as psychosocial outcomes of the programme.

Participants are asked to perform several fitness tests in an assessment both before and after the programme. These tests are: the two-minute step test, the 30-second chair stand test, the timed up and go test, the arm curl test, the chair sit and reach test and the one-legged stance test. Participants are also asked to fill out questionnaires relating to psychological outcomes. These are: The self-efficacy for exercise scale (SEE), the activity-specific balance confidence scale (ABC) and the World Health Organisation 5 point wellbeing scale (WHO-5).

Participating in this study is completely voluntary. Participants are at liberty to withdraw from the study at any time without prejudice or negative consequences.

By taking part in this study, participants will be assisting greatly in an area of great importance. Data is only accessible to named researcher and supervisors of researcher. Data is kept on a laptop, password secure and filling cabinet that only the researcher has access to.

Appendix C: Written Consent Form- Cycle 1

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Written Consent Form

Project Title: Development and Validation of an Evaluation Protocol for a Public Health "Well-Elderly" Exercise Intervention Programme.

I agree to take part in the above Health & Leisure, Institute of Technology, Tralee research project. I have had the project explained to me, and I have read the information sheet provided, which I am entitled to keep. I understand that agreeing to take part means I am willing to:

Participate in the assessment before and after the exercise programme as well as potentially be available for an interview in relation to my experience in the programme.

Data Protection:

This information will be held and processed in order to assess the effectiveness of the exercise programme as well as the effectiveness of the assessment procedure.

I understand that any information that I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the projects, or to another party. No identifiable personal data will be published. This identifiable data will not be shared with any other organisation.

Withdrawal:

I understand that my participation is voluntary, that I can choose not to participate in a part or all of the project, and that I can withdraw at any stage of the project without being penalised or disadvantaged in anyway.

Participant *Researcher*

Name: _____

Signature: _____ Signature: _____

Date: _____

Appendix D: Interview Guide

Interview Guide

Introduction

- When did you participate in the BBBB Programme?
- Why did you decide to participate in the Better Balance, Better Bones Programme?

Section 1- Programme Experience

- Tell me a little about your experience of the programme.
- Were there any aspects of the programme that you enjoyed in particular? (Exercising in a group etc…)
- Were there any aspects you were unsure of or found challenging?
- What elements of the programme would you change/add if you could?

Section 2- Perceived Physical Changes

- Do you feel you benefited from your participation in the programme regarding your physical health?
- Could you tell me about any changes in the ease of your daily activities?

Section 3- Perceived Psychological Changes

- Do you feel you benefited from your participation in the programme regarding your mental health?
- Could you tell me about any changes in your mood? (Social environment)

Section 4-Barriers/Facilitators to Physical Activity

- What encouraged you to remain engaged in the programme? (Fun, Social, Benefits etc.)
- Was there anything which made it difficult to continue participating in the programme?
- Could you tell me about anything in your life which encourages/supports your physical activity? (Family, Friends, Enjoyment etc.)
- Could you tell me about anything which makes it difficult for you to participate in physical activity?

Section 5- Impact on Physical Activity Habits

- If you think back to just before the BBBB started (X months ago), how physically active would you say you were before then?
- Since the programme, has there been any differences in your physical activity habits?
- Would you say you are as active now as when you had just completed the programme?
- Are you still practicing the exercises you learned in the programme?
- What impact has Covid-19 had on your physical activity?
- Has there been any skills from the programme that you are using now during the Covid-19 isolation?
- Is there anything else you would like to add in relation to the BBBB programme?

Appendix E: WHO-5 Wellbeing Index

The WHO-5 questionnaire

Instructions:
Please indicate for each of the 5 statements which is closest to how you have been feeling over the past 2 weeks.

Over the past 2 weeks...		All of the time	Most of the time	More than half the time	Less than half the time	Some of the time	At no time
1	... I have felt cheerful and in good spirits	5	4	3	2	1	0
2	... I have felt calm and relaxed	5	4	3	2	1	0
3	... I have felt active and vigorous	5	4	3	2	1	0
4	... I woke up feeling fresh and rested	5	4	3	2	1	0
5	... my daily life has been filled with things that interest me	5	4	3	2	1	0

Scoring principle: The raw score ranging from 0 to 25 is multiplied by 4 to give the final score from 0 representing the worst imaginable well-being to 100 representing the best imaginable well-being.

Appendix F: Activities Specific Balance Confidence (ABC) Scale

The Activities-specific Balance Confidence (ABC) Scale*

Instructions to Participants: For each of the following activities, please indicate your level of confidence in doing the activity without losing your balance or becoming unsteady from choosing one of the percentage points on the scale from 0% to 100% If you do not currently do the activity in question, try and imagine how confident you would be if you had to do the activity. If you normally use a walking aid to do the activity or hold onto someone, rate your confidence as if you were using these supports.

0%	10	20	30	40	50	60	70	80	90	100%
No Confidence										Completely Confident

How confident are you that you will not lose your balance or become unsteady when you...

1. ...walk around the house? _____%
2. ...walk up or down stairs? _____%
3. ...bend over and pick up a slipper from the front of a closet floor? _____%
4. ...reach for a small can off a shelf at eye level? _____%
5. ...stand on your tip toes and reach for something above your head? _____%
6. ...stand on a chair and reach for something? _____%
7. ...sweep the floor? _____%
8. ...walk outside the house to a car parked in the driveway? _____%
9. ...get into or out of a car? _____%
10. ...walk across a parking lot to the mall? _____%
11. ...walk up or down a ramp? _____%
12. ...walk in a crowded mall where people rapidly walk past you? _____%
13. ...are bumped into by people as you walk through the mall? _____%
14. ...step onto or off of an escalator while you are holding onto a railing? _____%
15. ...step onto or off an escalator while holding onto parcels such that you cannot hold onto the railing? _____%
16. ...walk outside on icy sidewalks? _____%

Appendix G: Self-Efficacy for Exercise (SEE Scale)

Self-efficacy For Exercise (SEE) Scale

How confident are you right now that you could exercise three times per week for 20 minutes if:

	Not Confident										Very Confident
1. The weather was bothering you	0	1	2	3	4	5	6	7	8	9	10
2. You were bored by the program or activity	0	1	2	3	4	5	6	7	8	9	10
3. You felt pain when exercising	0	1	2	3	4	5	6	7	8	9	10
4. You had to exercise alone	0	1	2	3	4	5	6	7	8	9	10
5. You did not enjoy it	0	1	2	3	4	5	6	7	8	9	10
6. You were too busy with other activities	0	1	2	3	4	5	6	7	8	9	10
7. You felt tired	0	1	2	3	4	5	6	7	8	9	10
8. You felt stressed	0	1	2	3	4	5	6	7	8	9	10
9. You felt depressed	0	1	2	3	4	5	6	7	8	9	10

Appendix H: Information Letter-Cycle 2

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VOLUNTEER INFORMATION SHEET

Exploring the Impact of a Public Health "Well-Elderly" Exercise Intervention Programme.

Dear Volunteer,

As part of my Master Research project, I am carrying out a study related to the impact of the Better Balance, Better Bones physical activity programme. This evaluation involves an interview, which should take approximately 30 minutes, relating to your experience with the programme, any physical or mental changes experienced having completed the programme and your current exercise habits. The information below goes into further detail regarding the interview as well as how the information will be handled. Thank you.

What is the study about?
The project aims to explore the impact of the Better Balance, Better Bones Programme in relation to physical health, psychological health, exercise habits, barriers/ facilitators to exercise and long-term maintenance of physical activity.

What will I have to do?
Your involvement in the study will be during a scheduled interview time which will be organised in advance. The interview will take approximately 30 minutes to complete. During the interview you will be asked questions relating to your programme experience as well as any physical/psychological changes experienced since the programme began etc. There is no correct answer, and you may answer in as much detail as you wish.

What are the benefits?
The findings of the study will help to produce information which may be utilised to inform the Better Balance, Better Bones programme going forward.

What if I do not want to take part?
Participation in this study is voluntary, consent must be freely given, and you can choose not to take part or to stop your involvement in this study at any time. If you choose not to participate in this study, this will, in no way affect your participation in the Better Balance, Better Bones Programme.

What if I have a complaint about the research?
If you have a complaint relating to the research you can contact the principal investigator or the Institute Research Ethics Committee, contact details below.

What if I choose to withdraw consent?
Consent may be withdrawn at any time during the study and this will in no way affect your participation in the Better Balance, Better Bones Programme. In order to withdraw consent, you can contact the physical activity leader, researcher or supervisor. Contact details can be found below.

What type of information is being gathered?
This study is collecting data in relation to your experience with the programme, any changes experienced since the programme, exercise habits etc. The researcher will not have access to any personal information or medical history information. The HSE is in control of all personal data obtained in screening forms. Any information gathered will strictly be used for the purposes outlined in this information sheet and may only be used with your explicit consent.

What happens to the information?
The researcher is bound by the college's Research Ethics Policy not to disclose or share any personal information which is gathered that has not been anonymised. The information is being gathered with guidance from the ethical committee chair of Institute of Technology Tralee. The information will only be used for the purpose stated in this information leaflet. The information that is collected will be kept private and stored securely and safely on the researchers' computer. The computers are protected with a password. Any hard copies of material with the information will be kept within a locked drawer in a locked office. Your name will not appear on any information. The information gathered will not leave the state. You will be assigned a fictitious name when the information is being written in a report by the researcher. The information that is gathered in the study will be kept for five years. After this time, it will be destroyed. An assessment of the data protection implications of this project has been undertaken in accordance with the law.

Who else is taking part?
Other participants in the physical activity programme will also be invited to take part in the study. The physical activity leader as well as the testers involved in the testing procedure will also be interviewed in relation to the study.

What happens at the end of the study?
At the end of the study the information will be used to present results. The information will be completely anonymous. No individual's name appears in any of the results. All data gathered from the research will be stored securely and safely by the researcher (Robert Purcell) in their office or their research supervisor's office for 5 years. Information that is stored on computer will be stored on a computer that is password-protected.

What if I have more questions or do not understand something?
If you have any questions about the study, you may contact the researcher or the physical activity leader. You may also ask questions at any time during the programme. It is important that you feel that all your questions have been answered.

What happens if I change my mind during the study?
At any stage should you feel that you want to stop taking part in the study, you are free to stop and take no further part. There are no consequences for changing your mind about being in the study.

Ethical approval and lawful basis for this research project

In accordance with Article 6 and Article 9 of the GDPR the lawful basis for use of this data is your explicit consent. The researcher, research supervisors, the HSE and the Institute of Technology Tralee act as joint data processors and data controllers for this study. The research has been assessed by the Institute Research Ethics Committee and ethical approval has been granted.

Contact name and number of Project Investigator and research committee.

Researcher
Robert Purcell, Research Student, Institute of Technology, Tralee.
Tel. [redacted]
Email: [redacted]

Supervisors

Jackie Gallagher, Institute of Technology, Tralee
Tel. No. [redacted]
Email: [redacted]

Eimear Foley, Institute of Technology, Tralee
Tel. No. [redacted]
Email: [redacted]

Physical Activity Leader
Sinead McElligott
Tel No. [redacted]0
Email: [redacted]

Chair, Institute Research Ethics Committee
Dr. Anna-Marie Greaney, Institute of Technology, Tralee
Email: [redacted]

Thank you for taking the time to read this. I would be grateful if you would consider participating in this study.

Yours sincerely,

Robert Purcell

Appendix I: Consent Form-Cycle 2

TITLE OF RESEARCH STUDY:

_____

	YES (Please Initial)	**NO** (Please Initial)
I have read and understood the Information Leaflet about this research study.		
I have been given the opportunity to ask questions about the study and my participation. I am satisfied that I understand the information.		
I voluntarily agree to take part in the above study.		
I understand that I don't have to take part in this study and that I can opt out at any time. I understand that I don't have to give a reason for opting out.		
I am aware of the risks, benefits (*and alternatives if applicable in health related research*) of this research study.		
I give informed explicit consent to have my data processed as part of this research study in accordance with the Information Leaflet.		
I have been given a copy of the Information leaflet and this completed consent form for my records.		
I am aware of who to contact if I have queries/concerns about my involvement.		
I agree to being contacted by email / phone as part of this study.	Email Phone	Email Phone

Signature of Research Participant: _____
Date:_____

Signature of Legal Guardian/Representative: _____
Date:_____
(As applicable)♦

To be completed by the Researcher/Person taking consent.
I, the undersigned, have taken the time to fully explain to the above participant the nature and purpose of this study in a way that they could understand. I have explained the risks involved as well as the possible benefits. I have invited them to ask questions on any aspect of the study that concerned them. I have given them a copy of the information leaflet and consent form with contacts of the study team and consent form.

Signature of Researcher/Person taking consent: _____ Date: __
_____

Appendix J: DPIA Risk Management Template

Risk Management Template

Aid to identifying whether a DPIA is required	Yes	No	Comment
Is the information likely to raise high risk privacy concerns?		x	
Will the study involve you using new technology that might be perceived as being privacy intrusive? E.g. the use of biometrics or facial recognition.		x	
Will the study result in you making decisions or taking action against individuals in ways that can have a significant impact on them?		x	
Is the information about individuals of a kind likely to raise privacy concerns or expectations? E.g. health records, criminal records or other information that people would consider to be private.		x	No access to overall health records. HSE staff only will have access to personnel data at point of screening.
Will the study require you to contact individuals in ways that they may find intrusive?		x	Any future contact with participants will be with explicit permission only
Will the study require the systematic monitoring, tracking or observing individuals' location or behaviour?		x	Observation at 2 points in time only as specified in research protocol with explicit consent
Is a Data protection Impact Assessment required? (If you answer Yes to any of the above performing a DPIA is advisable)		x	

Appendix K: Sample of Coded Transcript from Participant Interview

R-Why did you decide to participate in the BBBB programme?

J-I felt as though it was written just for me. The right thing at the right time really. I just thought it was great because we haven't had anything like that on offer that I'd seen. I felt like it was what I needed for m health and just to do some organised activity. I had been running a BNB for years and it closed down, so I just thought I don't do any organised exercise. I'm an active person and id worked physically hard in the BNB but you know I just knew my balance wasn't as good as it once was, so it was just a good thing. Also, I knew I would learn things on the course.

Robert C. Purcell Motivation to Start Program

R-Could you tell me about your experience of the programme?

J-It was just extremely well organised and well thought out. It was structured so that learning was very easy and there was no big jumps from easy to difficult it was always stepped learning and lots of repetition so each week would be a repetition of what you'd done but a bit more challenging so I found the progress of the classes to be really good.

Robert C. Purcell Programme Organisation

Robert C. Purcell Learning

Robert C. Purcell Programme Difficulty

R-Were there any aspects of the programme that you enjoyed in particular?

J-I enjoyed the social interaction with women from the local area and I've met a couple of them since, before covid, for coffee and that. I really looked forward to it and felt full of energy after it. I found it good for motivation. Like I struggle to keep things going but it helped me to keep going and I even bought equipment that we used on the course and up until recently I had continued to do all the exercises but I have a personal situation recently were I'm selling my house and everything has been put on hold and I don't feel very motivated because I'm in limbo and at any moment I may have to pack everything up. My whole concentration is on this and I'm on my own so my whole motivation to exercise has dipped. Anyway, I just enjoyed learning new things to try like the resistance exercises were excellent, like you can't set up something as large as that yourself or coming up with routines. Like, there are loads of balance exercises, sure, which are difficult to perfect but simple to do. I think the awareness that your balance deteriorates as you age is extremely important.

Robert C. Purcell Meeting new people

Robert C. Purcell Social Group

Robert C. Purcell Programme Enjoyment

Robert C. Purcell Motivation

Robert C. Purcell Low Motivation

Robert C. Purcell Learning new Exercises

Robert C. Purcell Awareness

R-Were there any aspects of the programme that you found challenging or that you disliked?

J-Not at all, there were a couple of ladies that found it challenging and didn't continue to come. I did find some aspects of it challenging but the course was accommodating in every way. No one was forced to do anything at all for instance some of the balance exercises like going over cones with your hands over your head that was probably the hardest thing and I could do it a lot better at home but as soon as I got into that hall I just could not do it you know so I never improved my time on that when she did a little test at the end. Just simple things like how quick you could stand up and sit down for a minute and I improved my time on that a lot so I was very pleased with that.

Robert C. Purcell Accommodating

Robert C. Purcell No Balance Improvement

Robert C. Purcell Physical Improvement

R-Is there anything you would add in or change if you could?

J-No because it was so well structured. I would have loved for it to continue on with more challenges and more exercises so really I think if there was something available in the future I need to seek out

Robert C. Purcell Programme Organisation

Robert C. Purcell Desire for Follow-up

Appendix L: Sample of Fieldnotes

Meeting: #3

Location: Day Centre **Date:** 22/11/19 **Time:** 3.30pm

Participants: Rob, Anne, Mary

Purpose: To explore tests for use in the Evaluation Protocol

I met up with Anne and Mary in the day centre in order to discuss the different physical tests which I would be using in my evaluation protocol. Again, the meeting began with small talk between myself, Anne and Mary. Once again, I feel that this was a very useful tool in order to ease my mind and build rapport between the three of us. As we felt more comfortable with each other, it would be easier for us to discuss the tests which we would use and also it would make it easier for us to voice our opinions to one another. This meeting further reinforced the idea that rapport building is crucial in meetings and gave me a very important lesson which I will utilise throughout the remainder of the research and indeed the rest of my professional dealings as well.

The first item which we discussed at the meeting after the small talk was the tests that they had been using for their own pre and post evaluation which they had been trying for the previous few programs. The tests which they had been using were the timed up and go test, the 6-minute walk test, as well as several balance tests. I found these tests to be an interesting mix as they were some of the tests which I had already identified as possibly being utilised in the evaluation protocol. The fact that they had already been attempting to use these tests in pre and post-test evaluation settings put my mind at ease as initially one of my concerns coming into the program would be that there would be little understanding of testing protocol and rigour. However, this was not the case as I now realised that both Anne and Mary had experience in administering tests which would be similar to the tests used in my evaluation protocol. It also put my mind at ease as it showed it was possible to perform a successful pre and post-test evaluation on the participants of the programme.

The first test which we discussed was the 6-minute walk test which was the aerobic test that they had been utilising for their own version of a pre and post-test evaluation. Mary and Anne both raised concerns about this test as they stated that it took an extremely long amount of time to administer as each individual had to be evaluated one at a time which meant 6 minutes for each participant. As the number of participants was often roughly 20 per programme this would lead to hours of testing for this one test alone. Naturally, this was a concern that I recognised as one of the goals of my research was to develop not only a comprehensive evaluation protocol, but also an efficient one which could be administered by a single tester and not take all day to complete. This issue needed to be dealt with in my version of the evaluation protocol. Although the 6-minute walk test takes a long time, it is often seen as the gold standard test for aerobic fitness in older adults. But as a result of its cumbersome nature an alternative aerobic test would have to be utilised in order to make the protocol efficient. Mary had also utilised the timed up-and-go test with the participants and found it had none of the same problems. She described how it was quick and easy to use and stated that she thought it was a good test.

Appendix M: Copy of Evaluation Protocol Physical Test Booklet

‘Well-Elderly’ Physical Activity Programme Evaluation Protocol- Physical Tests

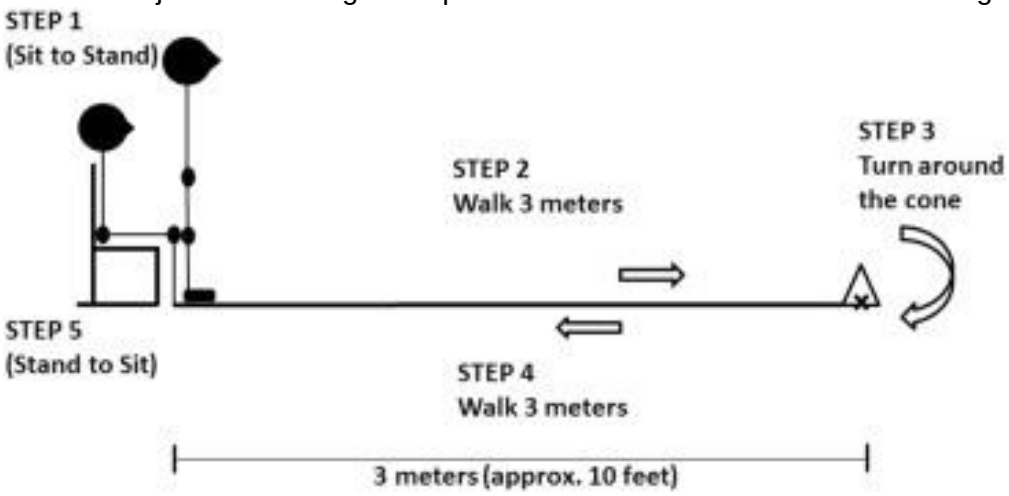
The Timed Up and Go Test

Purpose: To assess Dynamic Balance.

Equipment: A sturdy armchair, a tape measure, a cone or piece of tape to mark the distance from the chair and a stopwatch.

Procedure:

1. Begin the test with the subject sitting correctly (hips all the way to the back of the seat) in a chair with arm rests. The chair should be stable and positioned such that it will not move when the subject moves from sit to stand.
2. The subject can use the arm rests during the sit – stand and stand – sit movements.
3. A cone or piece of tape is placed 3 meters from the chair and is clearly visible to the subject.
4. The following instructions are issued to each subject involved before the test: “On the word GO you will stand up, walk to the line on the floor, turn around and walk back to the chair and sit down. Walk at your regular pace”.
5. The timing begins when the word Go and stops when the subject returns to a correct seated position with their back against the arm rest.
6. The subject should be given a practice trial that is not timed before testing.



The Two-Minute Step Test

Purpose: To assess Aerobic Endurance.

Equipment: A stopwatch and a piece of tape to mark the wall.

Procedure:

1. The subject stands up straight next to the wall while a mark is placed on the wall at the level corresponding to midway between the patella (kneecap) and iliac crest (top of the hip bone).
2. The subject then marches in place for two minutes, lifting the knees to the height of the mark on the wall.
3. Resting is allowed and holding onto the wall, or a stable chair is allowed. Stop after two minutes of stepping.
4. Record the total number of times the right knee reaches the tape level in two minutes (Rikli and Jones 2002).

30-second Chair Stand Test

Purpose: To assess Lower-Body Strength.

Equipment: A folding chair without arms, with seat height of 17 inches (43.2 cm).

Procedure:

1. The chair is placed against a wall to prevent it from moving. The participant is seated in the middle of the chair, back straight; feet approximately a shoulder width apart. Arms are crossed at the wrists and held against the chest.
2. The individual may practice a repetition or two before completing the test.
3. If an individual must use their arms to complete the test, they are scored 0.
4. The participant is encouraged to complete as many full stands as possible within 30 seconds.
5. The participant is instructed to fully sit between each stand.
6. While monitoring the participant's performance to ensure proper form, the tester silently counts the completion of each correct stand.
7. The score is the total number of stands within 30 seconds (more than halfway up at the end of 30 seconds counts as a full stand).
8. Incorrectly executed stands are not counted.

Chair Sit and Reach Test

Purpose: To assess Lower-Body Flexibility (Primarily Hamstrings and Back).

Equipment: A chair (approx. 17in high) and a ruler or measuring tape.

Procedure:

1. The subject sits on the edge a chair (placed against a wall for safety).
2. One foot must remain flat on the floor. The other leg is extended forward with the knee straight, heel on the floor, and ankle bent at 90°.
3. Place one hand on top of the other. Instruct the subject to Inhale, and then as they exhale, reach forward toward the toes by bending at the hip.
4. Keep the back straight and head up. Avoid bouncing or quick movements, and never stretch to the point of pain.
5. Keep the knee straight and hold the reach for 2 seconds.
6. The distance is measured between the tip of the fingertips and the toes.

Arm Curl Test

Purpose: To assess Upper-Body Strength.

Equipment: A 5-pound weight for women and an 8-pound weight for men, a chair without armrests and a stopwatch.

Procedure:

1. The test is conducted on the dominant arm side (or stronger side).
2. The subject sits on the chair, holding the weight in the hand using a suitcase grip (palm facing towards the body) with the arm in a vertically down position beside the chair.
3. Brace the upper arm against the body so that only the lower arm is moving (tester may assist to hold the upper arm steady).
4. Curl the arm up through a full range of motion, gradually turning the palm up (flexion with supination). As the arm is lowered through the full range of motion, gradually return to the starting position.
5. The arm must be fully bent and then fully straightened at the elbow.
6. Repeat this action as many times as possible within 30 seconds.

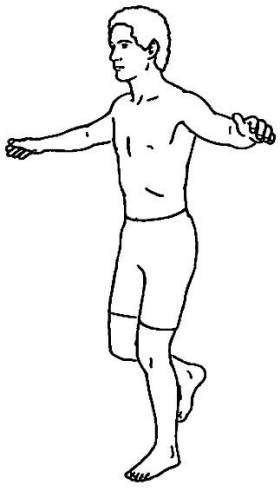
One-Legged/Single-Leg Stance Test

Purpose: To assess Balance.

Equipment: A stopwatch.

Procedure:

1. To perform the test, the individual is instructed to stand on one leg without support of the upper extremities or bracing of the unweighted leg against the stance leg.
2. The individual begins the test with the eyes open, practicing once or twice on each side with his gaze fixed straight ahead.
3. The test can be done with both eyes open and eyes closed.
4. The amount of time which an individual can maintain this position is recorded.



Scorecard	
Date:	
Name:	**Age:**

1. Timed Up and Go Test	**Time in Seconds:**	
2. Two-Minute Step Test	**# of Steps (2 min):**	
3. Thirty-Second Chair Stand Test	**# of Stands (30 sec):**	
4. Chair Sit and Reach Test	**Distance in cm R:**	**L:**
5. Arm-Curl Test	**# of Curls (30 sec):**	
6. One-Legged Stance Test	**Time in Seconds:**	