

## DOCTOR OF PHILOSOPHY

### Exploring the delivery and wellbeing benefits of outdoor and nature-based activities for people living with dementia in the community and in an extra care setting

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**Exploring the delivery and  
wellbeing benefits of outdoor and  
nature-based activities for people  
living with dementia in the  
community and in an extra care  
setting**



By

**Molly Browne**

(PhD)

**August 2021**

# **Exploring the delivery and wellbeing benefits of outdoor and nature-based activities for people living with dementia in the community and in an extra care setting**

*A thesis submitted in partial fulfilment of the University's requirements for the Degree of Doctor of Philosophy*

By  
**Molly Browne**  
August 2021





## **Certificate of Ethical Approval**

Applicant:

Molly Browne

Project Title:

Getting Up and Out: Investigating the experiences, opinions and perspectives of a variety of 'experts' involved in activity provision and care support for older adults with dementia.

This is to certify that the above named applicant has completed the Coventry University Ethical Approval process and their project has been confirmed and approved as Medium Risk

Date of approval:

26 January 2018

Project Reference Number:

P63662





## **Certificate of Ethical Approval**

Applicant:

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Project Title:

A pilot study to investigate the impact of a horticultural-based activity programme for people living with dementia in the community in Birmingham.

This is to certify that the above named applicant has completed the Coventry University Ethical Approval process and their project has been confirmed and approved as High Risk

Date of approval:

10 January 2019

Project Reference Number:

P70804



## **Certificate of Ethical Approval**

Applicant:

Molly Browne

Project Title:

A pilot study exploring the impact of a programme of outdoor and nature-based activities on the physical and mental well-being of people living with dementia and poor mental health in an Extra Care retirement village.

This is to certify that the above named applicant has completed the Coventry University Ethical Approval process and their project has been confirmed and approved as High Risk

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04 March 2019

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- MICRA PhD and Early Career Conference, Virtual Conference, May 2020
  - "Exploring the impact of outdoor, horticultural and nature-based activity for people living with dementia and cognitive impairment" (recorded presentation due to COVID-19)
- Postgraduate Researcher of the Year, Coventry University, January 2020
  - The role of outdoor and nature-based activity in dementia care (oral presentation and academic discussion)
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  - Exploring a horticultural activity programme for people living with dementia: A pilot study (oral presentation)
- Doctoral Capability and Development Conference, Coventry University, May 2019
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- Coventry University Research in Progress, Faculty of Arts and Humanities, January 2019
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- Coventry University, Dementia Action Week, May 2018
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*All photographs have been included with participant consent, thank you to all the participants who took part in this research.*



## Glossary

**Animal-assisted activities** - Activities involving animals for motivational, educational, recreational and/or therapeutic benefits to enhance quality of life.

**Green dementia care** - Indoor and outdoor experiences and activities that aim to promote health and wellbeing through interaction with nature for people living with dementia.

**Green exercise** - Activities that simultaneously involve exercise and exposure to nature.

**Horticultural therapy** - The use of plants by a trained professional to achieve clinically defined goals.

**Meaningful activity** - Activities that have a personal significance to those taking part and offer the person taking part a sense of meaning through meeting interests and needs, and offering pleasure, social connection and autonomy.

**Outdoor and nature-based activities** - Any activities relating to the outdoor environment and nature, these can include outdoor and indoor activities (e.g. bird watching, walking, watching a nature documentary, and gardening).

**Outdoor environment** – Any outdoor environment, including public and private green spaces, and built and natural environments, such as parks, allotments, community-gardens, private gardens, woodland, waterways and beaches.

**Person-centred dementia care** – an approach within dementia care within which the person living with dementia is at the centre of their care, which is tailored to their individual needs, capabilities, history and personality.

**Social and therapeutic horticulture** - The process of using plants and gardens to improve physical and mental health, as well as communication and thinking skills.

**Therapeutic gardening** - Horticultural and gardening activities delivered to achieve therapeutic benefits but not facilitated by trained therapists and specialists.

**Therapeutic horticulture** - The process by which individuals may develop well-being using plants and horticulture. This is achieved by active or passive involvement.

## **Abstract**

There is growing prevalence of dementia in the UK, with up to 1 million people predicted to be living with dementia by 2025 (Prince et al. 2014). Green dementia care is a person-centred approach involving activities which enable connection to nature and promote health and wellbeing. Several benefits associated with outdoor and nature-based activities have been shown, however the UK-based and community-based research evidence is limited. Therefore, the aim of this research was to identify and evaluate the benefits associated with outdoor and nature-based activities for people living with dementia and cognitive impairment in the community in the UK, to inform green dementia care practice.

This research utilised a mixed methods approach to provide a holistic perspective on the benefits of outdoor and nature-based activities on wellbeing. Study 1 involved qualitative interviews to explore the perceptions of individuals delivering outdoor and nature-based activities for people living with dementia in the UK (n=21). The findings led to the development of a model to guide the delivery of effective outdoor and nature-based activities. This was used to inform a 6-week horticultural activity intervention delivered at a community garden, and a 12-week outdoor and nature-based activity intervention delivered at an ExtraCare village. The interventions were evaluated using quantitative measures, and a range of qualitative measures including direct participant observations, reflections, and participant interviews.

The results indicated the interventions provided benefits for people living with dementia in the community and in an extra care setting including positive behaviour, reminiscence and increased social interaction was shown specifically for people living with dementia. A decrease in depressive symptoms and increase in overall quality of life was reported by the participants living at the ExtraCare village. The findings highlight that such activities can be effective by providing multi-sensory stimulation, and opportunities for meaningful activity and being outdoors. Recommendations for the development and implementation of effective outdoor and nature-based activities are presented to enhance green dementia care in practice.

# **Chapter 1:**

## **Introduction**

Green dementia care involves the delivery of outdoor and indoor activities, for people living with dementia, with the aim of promoting health and wellbeing (Barrett, Evans and Mapes 2019). Since the government prioritised supporting people living with dementia in the UK to live, there has been growing awareness of the non-pharmacological interventions which could enhance the health and wellbeing of people living with dementia through providing stimulating activities (Department of Health 2012).

### **1.1. The prevalence of dementia in the UK**

Dementia is an umbrella term for a number of incurable neurodegenerative diseases of the brain (Alzheimer's Research UK) and is not due to normal age-related changes. The prevalence of dementia in the UK is growing, with a predicted increase from 885,000 people currently living with dementia (Alzheimer's Society 2019) to 1 million people by 2025 and 2 million people by 2050 (Prince et al. 2014). Since 2015, dementia and Alzheimer's disease are the leading cause of death in the England and Wales (up to October 2020, Office for National Statistics 2020), and results in an annual cost estimated at £24.4 billion, of which £10.2 billion was attributed to social care costs, £3.8 billion to health care costs and £10.1 billion to unpaid care (based on data from 2015, Wittenberg et al. 2019). The growing prevalence of dementia is going to place greater strain on the health and social care system in the UK.

Two-thirds of people living with dementia in the UK live in their own homes, supported by family and informal caregivers (Alzheimer's Research UK n.d.). In the absence of a cure for dementia, a key priority in the UK is to support people living with dementia and those caring for them to live well and enable people to continue living in their own homes. This was the core focus of the UK government paper 'Living Well with Dementia: a national dementia strategy' (Department of Health and Social Care 2009). In addition, the first Prime Minister's

Challenge on Dementia (Department of Health 2012) prioritised enhancing wellbeing and quality of life for people living with dementia. Furthermore, it highlighted the central role that people living with dementia and those caring for them should have in decision making about the management of their disease, which supports a person-centred approach to dementia care.

## **1.2. A person-centred approach to dementia care**

In recent years, dementia care has shifted from a biomedical approach, focusing on biological and medical components of dementia, to a biopsychosocial approach which recognises the physiological and social components (Cohen-Mansfield 2000; Engel 1977; Spector and Orrell 2010). Kitwood (1997) presented the concept of person-centred care, suggesting that dementia care should promote a sense of personhood and wellbeing by meeting four psychological needs: comfort, attachment, inclusion and identity. Kitwood (1997) defined personhood as “standing or status that is bestowed upon one human being by others in the context of relationships and social being. It implies recognition, respect and trust”. Later, Dewing (2008) related this concept of personhood to the attributes that contribute to being a person. Furthermore, Kitwood (1997) proposed that people living with dementia were more likely to experience a loss of personhood, and identified behaviours within dementia care that did not support personhood and therefore, led to a decline in wellbeing. The provision of dementia care that focused on meeting the psychological needs identified by Kitwood (1997), could improve personhood and wellbeing, and formed the basis of person-centred dementia care (Mitchell and Agnelli 2015).

One person-centred dementia care approach is the Eden Alternative (Thomas 1994). The objectives of the Eden Alternative are to reduce feelings of loneliness, helplessness and boredom amongst older adults by putting the meaning back into life through purposeful and meaningful activities (Thomas 1994). One of the Eden Alternative principles refers to supporting contact with nature and animals, as a core component of good quality care, which

has been applied in the context of dementia care (Burgess 2015). More recently, building on the person-centred care model introduced by Kitwood (1997), Brooker (2003) highlighted the importance of social connections and interactions as part of good person-centred dementia care. As a result, greater attention has been given to the lived-experience of people living with dementia and meeting both their psychological and social needs through activities.

The most recent Prime Minister's Challenge on Dementia (Department of Health 2015) suggested the use of non-pharmacological methods to manage behavioural and psychological symptoms associated with dementia. This was supported by the National Institute of Health and Care Excellence (NICE) guidelines, 'Dementia: assessment, management and support for people living with dementia and their carers' (NICE 2018) which suggest that people living with dementia should have a range of activities that relate to their own interests and preferences, and are known to promote wellbeing. The guidelines recommend cognitive stimulation therapy and reminiscence therapy, but provide no further information about how to deliver this effectively. Research has shown the positive impact of cognitive stimulation therapy (Spector et al. 2003) on improved cognitive function, wellbeing and quality of life, and communication and social interaction (rated by care staff) (Aguirre et al. 2013). The evidence for the effectiveness of reminiscence therapy has indicated positive impacts on quality of life, cognition, communication and mood (Cotelli, Manenti and Zanetti 2012; Subramaniam and Woods 2012; Woods et al. 2018). However, the effects for both interventions are inconsistent and the research is lacking in detail about the treatment protocols making replication and practical application challenging. It is with growing awareness of non-pharmacological treatments that the concept of green dementia care has emerged.

### **1.3. Green dementia care**

Green care encompasses several outdoor and nature-based activities that are delivered with therapeutic intent, and includes green exercise (e.g. walking outdoors) (Pretty et al. 2007; Peacock, Hine and Pretty 2007), therapeutic horticulture (Sempik, Aldridge and Becker 2003),

and animal-related activities such as care farming (de Bruin et al. 2010; Hine, Peacock and Pretty 2008). It is the connection to nature within green care that is believed to offer unique benefits compared to other social and community-based approaches to support health and wellbeing (Sempik 2008). Green care farming, a concept that originated in the Netherlands, utilises a range of outdoor and nature-based activities delivered within a farm setting that have been shown to enhance health and wellbeing (de Bruin et al. 2010; de Bruin et al. 2015). Only recently has the concept of green care been applied within dementia care specifically (Barrett, Evans and Mapes 2019).

Green dementia care recognises that connecting to nature and spending time outdoors can lead to improved behaviour and mood, triggering memories, increased self-identity, greater opportunity for social interaction and enhanced overall wellbeing (de Boer et al. 2017; Blake and Mitchell 2016; Duggan et al. 2008; Gonzalez and Kirkevold 2013; Olsson et al. 2013; Mapes et al. 2016; Whear et al. 2014). Green dementia care may help overcome the barriers to connecting with nature faced by people living with dementia that include a lack of support and limited access to outdoor environments due to poor design and risk-aversion, and a lack of structured activity (Clark et al. 2013; Duggan et al. 2008).

#### **1.4. Outdoor and nature-based activities**

A key component of green dementia care is the provision of outdoor and nature-based activities. Within the literature, these have been predominantly explored with people living with dementia within residential care settings, such as care homes and nursing homes, whilst research within extra care settings and the community is limited (Barrett, Evans and Mapes 2019). Whilst the benefits of green dementia care are apparent, there is no clear guidance or nation-wide strategy in the UK for implementing effective outdoor and nature-based activities.

One particular area of nature-based activity that has shown to benefit health and wellbeing of people living with dementia is gardening and horticulture. Positive impacts on physical, mental and social health have been noted as a result of gardening and horticultural activities amongst

the general population (Soga, Gaston and Yamaura 2017). 'Horticultural therapy' and 'therapeutic horticulture', and more recently 'social and therapeutic horticulture', are specific activities delivered for therapeutic purposes with people living with a range of mental health issues, disabilities and chronic conditions, including dementia (Sempik, Aldridge and Becker 2003; Thrive n.d.). There is growing evidence to suggest that such activities can increase positive behaviour and mood, increased engagement in activities, increased social interaction, increased self-esteem and self-identity, reduced depression, improved cognitive function and improved overall wellbeing for people living with dementia (Barrett, Evans and Mapes 2019; Blake and Mitchell 2016; Gonzalez and Kirkevold 2013; Lu et al. 2020; Watts and Hsieh 2015; Whear et al. 2014; Zhao, Liu and Wang 2020).

As well as gardening and horticultural activities, research suggests that walking can enable people living with dementia to connect to nature and experience wellbeing, and increase opportunities for social interaction and reminiscence (Hughes et al. 2011; Mapes 2011a; Mapes 2011b; Mapes et al. 2016; McDuff and Phinney 2015; Robertson et al. 2020). de Bruin et al. (2010) suggested that walking was beneficial for people attending dementia day centres at green care farms, as it was integrated into other activities such as feeding animals and harvesting vegetables. There are links between animal-related activities and increased social interaction and physical activity, and overall quality of life (Friedmann et al. 2015; Nordgren and Engström 2014; Olsen et al. 2016; Travers et al. 2013; Yakimicki et al. 2019). In a recent study, Evans et al. (2019) suggested that animal visits, for example therapy dog visits, could contribute to effective green dementia care in a care home setting. The use of animal-related activities in green dementia care warrants further research (Barrett, Evans and Mapes 2019).

Although there is evidence to support gardening and horticulture, walking (and other forms of green exercise) and animal-related activity, there is no clear guidance on combining these activities within green dementia care. The evaluation and assessment tools used within the existing research to explore the benefits are inconsistent, which makes it difficult to compare the findings. Furthermore, there is little information about the design and development of

interventions and activities which limits the ability to replicate the research in different settings or implement effective activities in practice. Much of the research has been undertaken within a residential care setting, and in the USA and Canada, with a lack of research within a community and extra care setting in the UK. It is argued that community-based activities may provide the much needed support for the two-thirds of people living with dementia in the community and those caring for them.

### **1.5. Community-based activities and green dementia care**

Community-based activities have been shown to offer people living with dementia and those caring for them opportunities to socialise with others (Sheard 2004) and combat the loss of connection with the wider community that people can experience (Duggan et al. 2008). Community-based activities have been recommended; Robertson et al. (2020) highlighted that people living with dementia could maintain connection with their community and build social relationships through access to local outdoor environments. Clark et al. (2013) identified that research exploring the barriers and benefits of connecting to nature and spending time outdoors amongst people living with dementia in the community should be prioritised.

In the UK, opportunities for people living with dementia to engage in community-based outdoor and nature-based activities do exist, albeit inconsistently. Dementia Adventure are a UK charity promoting the importance of, and supporting people living with dementia to connect to nature. They offer holidays for people living with dementia and their caregivers which involve outdoor activities (Dementia Adventure n.d.). Another UK charity, Thrive, promote community gardening and horticulture to improve health and wellbeing; one of their three community gardens, in Reading, was specially designed for people living with dementia (Thrive 2018).

The research presented in this thesis will explore the benefits and effectiveness of a community-based horticultural activity intervention delivered at a community garden for people living with dementia in the local community. It will also involve the development and testing of a broader outdoor and nature-based activity intervention delivered in an extra care setting.



The development of extra care retirement villages was to allow older people, especially those living with dementia, to maintain independence in their own home within a supported environment (Darton et al. 2012; Evans et al. 2017; Evans et al. 2020). Despite careful consideration about the design of extra care retirement villages, people living with dementia in an extra care setting are still likely to face barriers to connecting with nature and spending time outdoors (Clark et al. 2013; Duggan et al. 2008) and fewer opportunities for structured outdoor and nature-based activities (Evans et al. 2019). Whilst green dementia care may benefit residents living with dementia, many extra care settings allow people living in the local community to access the facilities on-site. There is potential for green dementia care delivered within an extra care setting to include people living with dementia in the local community, thus providing community-based outdoor and nature-based activities. Research has shown that involving members of the community in activities taking place within care settings can help reduce social isolation for residents (Brewin 2018). Therefore, this research sought to explore the benefits of outdoor and nature-based activities within a community and extra care setting, for people living with dementia, to contribute to the evidence for green dementia care in the UK. Furthermore, the present research addresses the lack of recommendations on the development and implementation of effective outdoor and nature-based activities in these settings.

## **1.6. Aim and objectives**

The aim of this research is to explore, identify and evaluate the benefits associated with outdoor and nature-based activities for people living with dementia and cognitive impairment in the community in the UK.

The specific objectives are:

1. To identify the benefits of outdoor and nature-based activity for people living with dementia in the community and in an extra care setting.
2. To develop, implement and test a person-centred horticultural activity intervention, delivered at a community garden, for people living with dementia in the community.
3. To develop, implement and test an outdoor and nature-based activity intervention for people living with dementia and cognitive impairment at an extra care retirement village.
4. To formulate practical recommendations for the delivery of a person-centred outdoor and nature-based activity for people living with dementia and cognitive impairment in the community and in an extra care setting.
5. To determine how collaborative working may support the successful delivery of outdoor and nature-based activity for people living with dementia in the community, and overall green dementia care.

## **1.7. Research approach**

These objectives are addressed through three studies, firstly through an exploratory qualitative study involving semi-structured interviews with individuals delivering outdoor and nature-based activities for people living with dementia in the UK. Secondly, through the development, implementation and testing of an evidence-based horticultural activity intervention delivered at a community garden for people living with dementia in the community to explore the benefits on participant's wellbeing and the effectiveness of the intervention.

Finally, through the development, implementation and testing of an evidence-based broader outdoor and nature-based activity intervention, which will combine the three main types of activities, delivered for people living with dementia and/or cognitive impairment within ExtraCare village. This study will also explore the benefits associated with a more varied activity intervention and evaluate the effectiveness of the intervention. An outline of the methods that are employed to address each of these objectives are presented in table 1.1, with mapping to the chapters in this thesis.

Table 1.1. Thesis objectives with mapping to chapters and an outline of the methods

<b>Thesis objective</b>	<b>Chapter</b>	<b>Method</b>
To identify the benefits of outdoor and nature-based activity for people living with dementia.	2	<ul style="list-style-type: none"> <li>Literature review</li> </ul>
	4	<ul style="list-style-type: none"> <li>Qualitative semi-structured interviews with individuals delivering outdoor and nature-based activities</li> </ul>
To develop, implement and test a person-centred horticultural activity intervention, delivered at a community garden, for people living with dementia in the community.	5	<ul style="list-style-type: none"> <li>Development of an evidence-based horticultural activity intervention guided by the literature and findings from study 1.</li> <li>Evaluation of the benefits and effectiveness using a mixed methods approach.</li> </ul>
To develop, implement and test an outdoor and nature-based activity intervention for people living with dementia and cognitive impairment at an extra care retirement village.	6	<ul style="list-style-type: none"> <li>Development of an evidence-based outdoor and nature-based activity intervention guided by the literature and findings from study 1.</li> <li>Evaluation of the benefits and effectiveness using a mixed methods approach.</li> </ul>
To formulate practical recommendations for the delivery of a person-centred outdoor and nature-based activity for people living with dementia and cognitive impairment in the community and in an extra care setting.	2	<ul style="list-style-type: none"> <li>Literature review and review of guidance</li> <li>Practical considerations</li> <li>Evaluation of the intervention</li> <li>Evaluation of the intervention</li> </ul>
	4	
	5	
	6	
To determine how collaborative working may support the successfully delivery of outdoor and nature-based activity for people living with dementia in the community, and overall green dementia care.	5	<ul style="list-style-type: none"> <li>Evaluation of the intervention</li> <li>Evaluation of the intervention</li> </ul>
	6	

## 1.8. Thesis structure and overview

This thesis seeks to contribute to the evidence-base by identifying the benefits associated with outdoor and nature-based activities for people living with dementia and cognitive impairment in the community. Furthermore, addressing a lack of practical guidance, this thesis will consider the practical implications of developing and implementing outdoor and nature-based activities for people living with dementia, and make practical recommendations. The thesis is structured into seven chapters see figure 1.1 below.

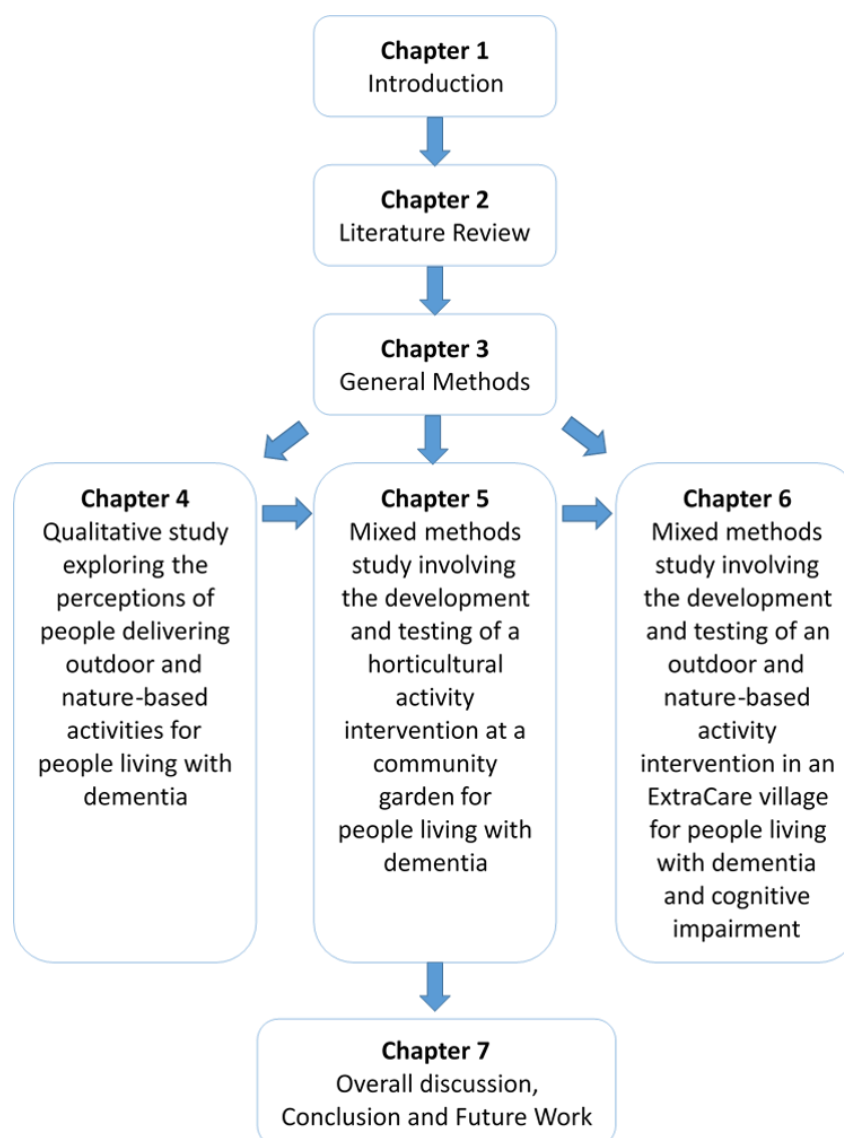


Figure 1.1. Thesis structure

**Chapter 2** presents a review of the literature to explore the evidence for the benefits associated with outdoor and nature-based activities, and green dementia care. This chapter also includes a review of the effectiveness of outdoor and nature-based activities and information presented about the development and delivery of the interventions within the literature. The review highlights several gaps in the existing evidence-base and our knowledge, which the research seeks to address.

**Chapter 3** outlines the philosophical stance that underpins the research methodology and presents the theoretical models and frameworks that guided the research. The application of a mixed methods approach from a pragmatic perspective is justified. An overview of each study design is provided, detailing the data collection methods; the development of the interventions and study protocols are outlined in the subsequent chapters. Chapter 3 also presents the data analysis that was conducted and ethical considerations for the research.

Chapters 4-6 outline the empirical studies. **Chapter 4** presents the first of the three studies that were carried out. This study involved qualitative research using semi-structured interviews to explore the experiences and perspectives of individuals delivering outdoor and nature-based activities for people living with dementia in the UK. The findings highlight the benefits associated with outdoor and nature-based activities for people living with dementia, as well as identifying some of the challenges faced when delivering such activities in a practical setting. This study led to practical recommendations and a model to guide the development and implementation of outdoor and nature-based activities, which were used in the subsequent studies.

**Chapter 5** presents an evidence-based horticultural activity intervention delivered at a community garden for people living with dementia in the community. This study utilised a mixed methods approach to explore the benefits and evaluate the effectiveness of a 6-week horticultural activity intervention that was delivered at Martineau Gardens, a community garden in Birmingham, UK. Four key themes highlighted the benefits to wellbeing for participants living with dementia and their caregivers, which were enjoyment, reminiscence,

active participation and caregiver support. The recommendations and model presented in the previous chapter contributed to the delivery of effective horticultural activities within a community garden setting. The findings from this study, as well as the recommendations and model from study 1, informed the development and implementation of the intervention presented in the Chapter 6.

**Chapter 6** presents an evidence-based outdoor and nature-based activity intervention that included different types of activities, designed for and tested with people living with dementia and/or cognitive impairment at Bournville Gardens, an ExtraCare retirement village in Birmingham, UK. This study used mixed methods to explore the benefits and evaluate the effectiveness of a 12-week outdoor and nature-based activity intervention. The findings show the benefits to the wellbeing and overall quality of life of the participants living with dementia and/or cognitive impairment, which included connection to others and increased social interaction, high levels of enjoyment, a sense of purpose and opportunities to spend time outdoors. This study highlighted the benefits of collaborative working to offer off-site activities for people living in an extra care setting and meet the interests of the participants. The findings from this study provide further support for the recommendations and model from study 1, to guide the delivery of a multi-activity intervention in an extra care setting.

**Chapter 7** presents the overall discussion, the strengths and limitations of the research and outlines the implications for practice and policy. Recommendations for future research are presented and final conclusions drawn. A personal reflection is also included.

## **1.9. Thesis contributions**

This research seeks to advance knowledge and understanding of the benefits associated with outdoor and nature-based activity for people living with dementia in the community and in an extra care setting in the UK. It provides practical recommendations and a model to guide the development and implementation of outdoor and nature-based activities and interventions to

contribute to effective green dementia care. This research makes the following contributions to knowledge:

- An evidence-based assessment of the benefits of outdoor and nature-based activity for people living with dementia informed by the literature, experiences of experts, people living with dementia and their caregivers.
- The development and evaluation of a novel horticultural activity intervention for people living with dementia and their caregivers.
- The development and evaluation of a novel, person-centred multi-activity outdoor and nature-based activity intervention that not only highlighted a variety of benefits for people living with dementia and cognitive impairment but suggested benefits associated with a broad range of outdoor and nature-based activities. The findings from this study also identified the added value that off-site and outdoor activities had for people living with dementia and cognitive impairment within an extra care retirement village.
- A set of practical recommendations and a model to guide practitioners in the development and implementation of a person-centred and meaningful outdoor and nature-based activities for people living with dementia and cognitive impairment in the community and extra care in the UK.

## Chapter 2:

### Literature Review

This chapter explores the existing evidence of the delivery of effective outdoor and nature-based activity, and associated benefits, for people living with dementia and seeks to:

- Identify the benefits associated with three common types of outdoor and nature-based activities: gardening and horticulture, green exercise and animal-related activities.
- Highlight the current understanding of, and best practice in, green dementia care.
- Identify the gaps in the existing literature and knowledge of implementing successful green dementia care.

This chapter is structured in four sections. The first section presents the importance of connecting to nature and being outdoors for people living with dementia. It also considers the barriers faced by people living with dementia when trying to connect to nature and spend time outdoors. The second section identifies the evaluated benefits of outdoor and nature-based activities. The third section explores the role of community-based outdoor and nature-based activities in supporting people living with dementia, particularly those living in the community. The fourth section discusses the information and guidance on the design and delivery of effective outdoor and nature-based activities. In order to review the existing literature a search was conducted across a number of databases (including: AMED, CINAHL, Cochrane Reviews, Cochrane Trials, GreenFILE, Medline and Nursing & Allied Health Database) and in key journals (including: dementia, Activities, Adaptation and Aging and the Journal of Housing for the Elderly). Search terms such as, “outdoor activities”, “nature-based activities”, “nature”, “outdoor environments”, “outside”, “gardening”, “therapeutic gardening”, “horticulture”, “horticultural therapy”, “therapeutic horticulture”, “social and therapeutic horticulture”, “green exercise”, “outdoor exercise”, “outdoor physical activity”, “walking”, “animal-related activity”, “animal therapy”, “pet therapy”, “animal-assisted activity”, “green care farming”, “care farming” and “green dementia care” were used alongside “dementia”, “Alzheimer’s disease”,



“Alzheimer’s”, “cognitive impairment”. Further web-based searches have been used to identify other published work (through google scholar), books, non-academic research, guidance from dementia charities and outdoor activity organisations, policy and governance documents, information sheets, and clinical and practical guidelines. A search of the literature was conducted several times, most recently in January 2020 and follow-up searches have been done to identify literature published and released up to November 2020.

## **2.1. The importance of connecting to nature and being outdoors**

People living with dementia value connecting to nature and being outdoors (Duggan et al. 2008; Mapes et al. 2016). There is growing evidence to suggest that connecting to nature and spending time outdoors can have specific benefits to their physical, mental and social health and wellbeing (Clark et al. 2013; Mapes 2011a; Mapes 2011b; Mapes et al. 2016). These are in addition to the well-established benefits for the general population which include reduced stress, improved mood and increased social interaction, which are discussed further below (Barton and Pretty 2010; Department for Environment, Food and Rural Affairs 2011; Marmot 2010; Pretty et al. 2005).

To understand some of the benefits associated with being outdoors and connecting to nature it is important to recognise that human beings have a long-standing evolutionary connection to nature (Kaplan and Kaplan 1989; Ulrich 1983; Wilson 1984). Two key theories describe how nature benefits human wellbeing through the reduction of stress, via an emotional and physiological response (stress reduction theory) (Ulrich 1983), and through attention restoration in which mental fatigue is reduced and feelings of relaxation are promoted by the visual properties of a natural environment (attention restoration theory) (Kaplan and Kaplan 1989). Building on these theories, further research has highlighted the positive impact of nature on physical, mental and social health and wellbeing (Barton and Pretty 2010; Department for Environment, Food and Rural Affairs 2011; Marmot 2010; Pretty et al. 2005). Physical benefits include increased Vitamin D absorption (vital for bone health) and regulation of sleep-wake cycle (circadian rhythm) through exposure to sunlight (Holick 2007), reduced

physiological symptoms of stress including reduced heart rate (Park et al. 2010; Ulrich et al. 1991) and blood pressure (Park et al. 2010; Ulrich et al. 1991, 5. Park et al. 2007; Park et al. 2010) and improved cardiovascular function and physical function as a result of increased exercise (Bowler et al. 2010; D'Andrea, Batavia and Sasson 2007; Hartig et al. 2003; Pretty et al. 2003; Pretty et al. 2005; Wang and MacMillan 2013). The mental health benefits include improved attention (Hartig et al. 2003; Kaplan and Kaplan 1989; Ottosson and Grahn 2005), decreased stress and anxiety (Hartig et al. 2003; Maas et al. 2009; Ulrich et al. 1991) and improved mood (Barton and Pretty 2010; Hartig et al. 2003). Positive changes to cognitive functioning (attention, memory, and impulse inhibition) have also been noted amongst the general population (Bratman, Hamilton and Daily 2012; Keniger et al. 2013).

Moreover, access to high-quality green space has been associated with greater mental wellbeing (White et al. 2013) and reduced depression, anxiety and stress (Beyer et al. 2014). Participation in exercise undertaken outdoors is associated with higher self-esteem, positive mood and increased enjoyment, when compared to indoor exercise (Barton and Pretty 2010; Pretty et al. 2005; Focht 2009; Plante et al. 2006). Specifically, the mental health benefits of gardening have been widely reported, and include the reduction of symptoms associated with poor mental health such as depression, anxiety and psychological stress (Gonzalez et al. 2011; Sempik, Aldridge and Becker 2003) as well as an increased sense of meaning and purpose (Parkinson, Lowe and Vecsey 2011) and an increase in overall psychological wellbeing (Clatworthy, Hinds and Camic 2013; Sempik, Aldridge and Becker 2003; Soga, Gaston and Yamaura 2017; Wang and MacMillan 2013).

Connecting with nature has shown to benefit social health and wellbeing by promoting social inclusion and social interaction. This is through creating opportunities for shared work and engagement in meaningful and purposeful occupation including activities such as gardening and outdoor exercise (Gladwell et al. 2013; Heliker et al. 2014; Peacock, Hine and Pretty 2007). Gardening has been linked with increased social interaction which can reduce feelings of loneliness (Brown et al. 2004; Fieldhouse 2003; Gurski 2004) and can lead to people to

feeling better connected to their family, the past and nature (Heliker, Chadwick and O'Connell 2000; Infantino 2004). Sempik, Aldridge and Becker (2005) highlighted that horticultural activities delivered with social and therapeutic horticulture focus on social inclusion.

It is believed that these benefits are also experienced by people living with dementia (Clark et al. 2013). However, additional benefits have been proposed which are covered in the following section. Moreover, consideration will be given to the barriers and challenges faced by people living with dementia when connecting to nature, and accessing outdoor environments.

## **2.2. The benefits of connecting to nature and being outdoors for people living with dementia**

People living with dementia in the UK have expressed that connecting to nature and spending time outdoors is a key contributor to their wellbeing and quality of life (Bossen 2010; Brooker 2001; Chalfont 2006; Clark et al. 2013; Duggan et al. 2008; Mapes 2011b; Mapes et al. 2016). In addition, spending time outdoors allowed people to maintain their engagement with the wider community (Mapes 2011b). The benefits include improved general wellbeing (Brooker 2001; Duggan et al. 2008; Rappe 2005), physical health benefits associated with opportunities to exercise (Mapes 2011a; Mitchell and Burton 2010), psychological and emotional benefits (Mapes 2011b; Vuolo 2003) and social benefits (Clark et al. 2013; Duggan 2008; Mapes 2011b). People have reported valuing the fresh air and nature, and wanted to visit a range of outdoor environments, such as parks and inland waterways (Mapes et al. 2016).

Mapes et al. (2016) reported that regular visits to outdoor and natural environments were beneficial for people living with dementia (reported by 80% of the 172 caregivers surveyed in their study). Mapes et al. (2016) also highlighted that the outdoor environments that participants (n=54) reported visiting, and wanted to visit, closely related to their perception of nature. For example, participants living with dementia reported a preference for outdoor environments with water as it was more natural and appealing. However, the most regularly visited outdoor and natural environments were public parks and gardens, allotments, and inland waterways, rather than more natural environments such as woodlands and beaches

(Mapes et al. 2016). The two reasons for this were that people living with dementia reported feeling safe and comfortable in these more familiar environments, and environments such as public parks and gardens were closer to where participants lived (Mapes et al. 2016). This highlighted issues around accessibility and how the design of outdoor environments that can impact on the experiences of people living with dementia and their ability to engage with outdoor activities (Chalfont 2006; Clark et al. 2013; Mapes et al. 2016).

One particular type of outdoor environment that has received great attention in dementia research and practice, and is a core focus in the research presented in this thesis, is the garden environment. Garden design has been widely discussed in relation to dementia, and a number of authors have presented guidance and recommendations for designing garden environments that offer therapeutic benefits for people living with dementia (Brawley 2006; Brawley 2007; Calkins 2005; Chalfont 2006, Chalfont 2007; Chalfont and Rodiek 2005; Cohen and Day 1993; Gonzalez and Kirkevold 2013; Liao et al. 2018; Rodiek and Schwarz 2007; Whear et al. 2014). Spending time in a garden environment has shown to improve behaviour (Detweiler et al. 2008; Hernandez 2007), reduce symptoms associated with dementia including sleep disturbance and wandering (Mather, Nemecek and Oliver 1997) and increase social interaction (Blake and Mitchell 2016; Gonzalez and Kirkevold 2013; Whear et al. 2014).

Research has highlighted types of gardens and key features that contribute to these benefits. Sensory gardens have a strong focus on the multisensory experience offered by nature and plants, which can stimulate all of the senses (Hernandez 2007). Pollock (2001) suggested that sensory plants which are edible, colourful and tactile can encourage people living with dementia to interact and engage with the garden. Multisensory stimulation through spending time in the garden has been associated with increased engagement in the garden, such as greater interest in plants and activities and higher levels of motivation, as well as the promotion of positive behaviours and facial affect (Cox, Burns and Savage 2004). Gardens can also offer a calming environment that avoids overstimulation, offering quiet places to relax which can lead to stress reduction (Gonzalez and Kirkevold 2013).

Edwards, McDonnell and Merl (2013) noted how people living with dementia in a care home preferred viewing nature, which led to a change in behaviour following the completion of a new therapeutic garden and sunroom. People went from spending their leisure time sitting in front of the television to sitting in the sunroom and looking at the garden (Edwards, McDonnell and Merl 2013). Moreover, the presence of the garden was associated with an increase in resident's self-reported quality of life and a decrease in depression (Edwards, McDonnell and Merl 2013). Further benefits have been associated with gardens and their use for various outdoor and nature-based activities, such as gardening and walking (Detweiler et al. 2008; Hernandez 2007). Grant and Wineman (2007) suggested that the provision of activities within the garden might entice people living with dementia to spend time outdoors, particularly within residential care settings. Mapes et al. (2016) reported that the opportunity to engage activities was a key motivator for spending time outdoors.

As the key aim of the research presented in this thesis was to explore the benefits associated with a variety of outdoor and nature-based activities for people living with dementia, consideration is given below to the current evidence for three most common types of activities: gardening and horticulture, green exercise (outdoor exercise) and animal-related activity. Before the benefits associated with each of these is explored in more detail, attention is given to the barriers and challenges faced by people living with dementia to connecting to nature and spending time outdoors.

### **2.3. Barriers to connecting to nature and spending time outdoors for people living with dementia**

Those living with dementia are less likely to spend time outdoors than the general population; including people living with dementia in their own homes within the community (Duggan et al. 2008) and in residential care settings (care homes and nursing homes) (Care Commission and Mental Welfare Commission for Scotland 2009; Gilliard and Marshall 2012; Mather, Nemecek and Oliver 1997). Research shows that people living with dementia face additional barriers to connecting with nature and spending time outdoors, beyond those experienced by

the general population, which include a lack of time, negative perceptions e.g. safety concerns, a lack of motivation and physical fitness, and inadequate access to local green outdoor space (Weldon and Bailey 2007). Given the potential benefits, it is important to understand the barriers people face in order to design and deliver effective interventions and activities that address these.

Duggan et al. (2008: 198) used the term “shrinking world” to describe the impact dementia has on a person’s interactions and activities within outdoor environments when living in their own homes within the community. Caregivers acknowledged that symptoms associated with the disease, such as confusion and memory loss, reduced access to outdoor environments (Duggan et al. 2008). Kane and Cook (2013) surveyed over 500 people living with dementia, in both their own homes and residential care settings in the UK, to investigate how well they were living with dementia. Fifty percent of participants reported that they only left their house once a week or less, and over 70% stated they had given up their hobbies and interests as a result of their dementia (Kane and Cook 2013). Furthermore, research suggests up to 50% of people living with dementia in residential care settings never go outside whilst a further 25% rarely go outside (Care Commission and Mental Welfare Commission for Scotland 2009; Gilliard and Marshall 2012). These figures are high considering many residential care settings having purpose built gardens and outdoor environments (Rendell and Carroll 2015; Clark et al. 2013).

In a report commissioned by Natural England, Clark et al. (2013) identified six key themes reflecting the specific barriers to engaging with nature for this group: environmental issues, education and awareness, resources, access - physical barriers, attitudes and perspectives, and risk aversion. These findings are supported by other research and represent the barriers experienced by people living with dementia in their own homes and within residential care settings (Chalfont 2006; Mitchell and Burton 2010). Environmental and access issues were reported by Clark et al. (2013) who highlighted common features within outdoor and natural environments that can exacerbate impairments of people living with dementia (Clark et al.

2013; Local Government Association 2012; Mapes and Vale 2012). Research suggests that features which aim to increase accessibility for the general population may hinder people living with dementia for example, lots of signage can make it more difficult for people to navigate outdoor environments (Mapes 2010; Innovations in Dementia 2009; Brorsson et al. 2011; Mitchell and Burton 2006). Uneven paving and a lack of seating were reported by Mitchell and Burton (2006) who explored the barriers faced when engaging with their local neighbourhood. Similar factors were noted by Chalfont (2006) that prevent people living with dementia in care homes using gardens and outdoor spaces. Another key environmental and access issue that has been reported is a lack of transport to many outdoor environments (Mitchell and Burton 2010) and inadequate facilities (Mapes et al. 2016).

Research suggests that poor awareness and understanding about dementia, from organisations that design and manage outdoor and natural environments, may negatively impact on a person's experience (Clark et al. 2013; Local Government Association 2012). Furthermore, it can lead to a lack of support and appropriate resources within the environment to support individual needs (Clark et al. 2013; Local Government Association 2012). Mapes et al. (2016) highlighted the importance of support in enabling people to connect with nature and spend time in outdoor and natural environments. Insufficient support from staff was noted by Evans et al. (2019) and Mapes et al. (2016) as a key barrier to going outdoors for people living with dementia in residential care settings. The study by Evans et al. (2019) included people living with dementia in extra care schemes highlighting that barriers are experienced in different settings (own homes in the community, extra care housing and residential care). Another key barrier within a residential care setting is organisational risk aversion (Chalfont 2006; Evans et al. 2019; Mapes et al. 2016; Whear et al. 2014). Staff are often concerned about potential risk and harm to residents, and staff availability and lack of time can result a lack of support to go outdoors (Evans et al. 2019). People living with dementia also reported that a lack of activities were a barrier to them spending time outdoors (Mapes et al. 2016). This lack of outdoor and nature-based activities is supported by Chalfont et al. (2006) and

Clark et al. (2013) in both a community and residential care setting. In contrast, Evans et al. (2019) suggest that extra care and care home residents do engage with outdoor and nature-based activities despite the aforementioned barriers, although they do acknowledge that structured and supported activities are less likely to be available to people living with dementia in extra care.

A priority in both research and practice is how these barriers and challenges can be addressed to enable people living with dementia to connect to nature and spend time outdoors, thus experiencing the benefits to their health and wellbeing (Clark et al. 2013). Whilst Clark et al. (2013) do not outline specific ways to overcome the barriers identified, they do suggest that more research is needed to explore the benefits. Clark et al. (2013) also noted that given two-thirds of people living with dementia in the UK live in their own homes in the community, the benefits of connecting to nature and spending time outdoors should be investigated further in this population.

Mapes et al. (2016) recommend that outdoor organisations and those caring for people living with dementia (individual caregivers and care organisations) address the support needed for people living with dementia to spend more time outdoors and engage in a variety of outdoor and nature-based activities. Social activities were highlighted, as well as walking, watching wildlife and community gardening, as activities that may benefit people living with dementia if delivered with the necessary support (Mapes et al. 2016). Based on the research presented by Mapes et al. (2016) they later outlined a positive approach to risk-taking e.g. also considering the benefits of spending time outdoors and engaging in activities as well as the potential risk for people living with dementia. Consideration was given to this positive approach to risk-taking during the research presented in this thesis.

The findings from Evans et al. (2019) summarise key recommendations to supporting the provision of good green dementia care through supporting access to outdoor environments and outdoor and nature-based activities, in residential care settings, including extra care. The key factors include getting management support, appropriate staff training, recruiting



volunteers to support the delivery of activities, considering the design of the outdoor environment to make sure it is safe and accessible, and echo the positive approach to risk-taking recommended by Mapes (2017). One final point, both Evans et al. (2019) and Mapes et al. (2016) suggest that a collaborative approach, involving outdoor organisations, care organisations and other community organisations, could enhance the provision of outdoor and nature-based activities for people living with dementia.

## **2.4. Green dementia care**

As highlighted in the introduction, green dementia care offers people living with dementia opportunities to engage in outdoor and nature-based activities with the aim of enhancing their health and wellbeing (Barrett, Evans and Mapes 2019). Yet, the term has only been recently used and green dementia care practice is not well established.

Green care farming has gained attention in recent years, particularly in Holland (since the early 2000s) and refers to community-based day care that offers people opportunities to engage in a variety of outdoor and nature-based activities within a farm setting (Hassink and van Dijk 2006; Schols and Van der Schriek-van Meel 2006). Green care farming has been successfully explored with people living with dementia, which could be considered within green dementia care practice (de Bruin, et al. 2010; de Bruin et al. 2015; de Boer et al. 2017). Research shows that not only does being outdoors in a farm environment benefit people's health and wellbeing, but it also enables them to take part in meaningful outdoor activities, engage in social interaction and allows people to feel a sense of purpose (de Bruin et al. 2009; de Bruin et al. 2010; de Bruin et al. 2015). In addition, community-based green care farms have been associated with reducing caregiver burden and providing respite (de Bruin et al. 2015). Although there is evidence to support green care farming in dementia care, the provision of such activities in the UK is limited and untested.

de Bruin et al. (2020) suggests that green care farming contributes to person-centred dementia care by enabling people to engage in activities which align to their interests and offer a sense

of purpose. de Bruin et al. (2020) highlights the importance of establishing and addressing the interests and capabilities of people living with dementia, and ensuring that the environment is one that enables rather than disables. Furthermore, they suggest collaborative working between dementia care organisations and green care farms to provide greater opportunities for people living with dementia to connect to nature and spend time outdoors.

Whilst there is little research on green dementia care practice, three types of activities that are beneficial have been identified: gardening and horticultural activities (Blake and Mitchell 2016; Gonzalez and Kirkevold 2013; Lu et al. 2020; Watts and Hsieh 2015; Whear et al. 2014; Zhao, Liu and Wang 2020), green exercise (Mapes et al. 2016) most commonly walking (Mapes 2011a; Mapes 2011b; McDuff and Phinney 2015; Robertson et al. 2020) and animal-related activities (Evans et al. 2019; Friedmann et al. 2015; Kilmova, Toman and Kuca 2019; Nordgren and Engström 2014; Olsen et al. 2016; Travers et al. 2013; Yakimicki et al. 2019). The specific benefits of each type of activity are discussed in the following sections.

## **2.5. Benefits associated with gardening and horticultural activities for people living with dementia**

Arguably, gardening and horticultural activities are the most widely researched outdoor and nature-based activity for people living with dementia. The benefits include: enhanced wellbeing, increased positive behaviour and facial affect (emotions), increased engagement in activities, increased opportunity and occurrence of social interaction, greater self-esteem, increased self-identity, reduced depression and symptoms of dementia, and improved cognitive function (Blake and Mitchell 2016; Gonzalez and Kirkevold 2013; Lu et al. 2020; Watts and Hsieh 2015; Whear et al. 2014; Zhao, Liu and Wang 2020). These benefits are explored in more detail below.

### **2.5.1. Wellbeing and positive behaviour, facial affect (emotions) and engagement**

A small number of studies have measured the impact of gardening and horticultural activities on general wellbeing for people living with dementia. Hall et al. (2016) reported that participants living with dementia (n=14) showed increased levels of wellbeing (observed and recorded using Dementia Care Mapping™) during a 10-week horticultural activity programme delivered at a day care centre. Participants appeared to be in a state of wellbeing 77.42% of the time, with 60.42% of that time in a state of extremely high wellbeing (score of 5/5 in the DCM), whilst only appearing in a state of visible ill-being 5.53% of the time (Hall et al. 2016). These high levels of wellbeing were associated with participants having autonomy to engage in activities they were interested in. Noone and Jenkins (2018) also attributed the high levels of wellbeing amongst participants living with dementia (n=6) engaged in community-gardening activities to feelings of autonomy. These findings support those of Hewitt et al. (2013) who found that their participants living with young onset dementia (n=12), who attended a gardening group, improved their wellbeing during the first 8 weeks of their study (46 weeks total). Participants maintained the high levels of wellbeing throughout the intervention (Hewitt et al. 2013). However, only Noone and Jenkins (2018) included the perspectives of the participants living with dementia; subjective components of wellbeing were not addressed by Hall et al. (2016) and Hewitt et al. (2013).

Research by Yasukawa (2009) and Smith-Carrier et al. (2019) did involve interviews with people living with dementia to explore the impact of gardening and horticulture on their wellbeing. Yasukawa (2009) (unknown number of participants) reported that the high levels of wellbeing occurred through participants being engaged in horticultural activities and having greater opportunity for social interaction, although the full details of the research could not be accessed. The findings from Smith-Carrier et al. (2019) also suggest that the social interactions that occurred during gardening activities, and within the garden environment, enhanced participant's wellbeing.

Although other studies have not explicitly measured wellbeing, several of the benefits identified have been attributed to enhancing wellbeing. Increased positive behaviours, facial affect (emotions) and levels of engagement during gardening and horticultural activities have been reported (Gigliotti and Jarrott 2005; Gigliotti, Jarrott and Yorgason 2004; Hall et al. 2016; Hewitt et al. 2013; Park, Shoemaker and Haub 2008; Yasukawa 2009; Watts and Hsieh 2015). An increase in positive behaviour and facial affect, including smiling, nodding, interactions and eye contact maintained, has been noted more widely amongst participants living with dementia during gardening and horticultural activities (Gigliotti and Jarrott 2005; Gigliotti, Jarrott and Yorgason 2004; Park, Shoemaker and Haub 2008; Yasukawa 2009; Watts and Hsieh 2015).

Gigliotti, Jarrott and Yorgason (2004) reported increased positive emotions and mood (greater overall affect score  $p < 0.01$ ) amongst participants engaging with horticultural activities ( $n=14$ ) when compared to those engaging in ordinary activities including cognitive stimulation games and exercise. Of note, the increase in positive emotions and mood was shown consistently when comparing three different types of horticultural activities which included cooking, crafts and planting (Gigliotti, Jarrott and Yorgason 2004). These findings were supported by Gigliotti and Jarrott (2005) who also saw greater positive emotions and mood during horticultural activities amongst participants living with dementia ( $n=48$ ). Increased positive behaviour and emotions were also reported by Calkins, Szmerekovsky and Biddle (2007), Jarrott, Kwack and Relf (2002), and Jarrott and Gigliotti (2010) however, the results did not reach statistical significance. In addition, studies by Park, Shoemaker and Haub (2008) and Yasukawa (2009) reported positive emotions as a result of horticultural activities but the studies could not be fully accessed to understand the extent of this finding and the contributing factors. Interestingly, all studies used participant observations and staff ratings to record behaviour and facial affect, and did not ask participants living with dementia to confirm how the activities made them feel. This may have strengthened the findings and enabled a greater understanding about the potential benefits of gardening and horticultural activities on participant's wellbeing.

As well as greater levels of positive behaviours and facial affect, gardening and horticultural activities have been shown to increase levels of engagement (interest and participation) amongst people living with dementia when compared to other types of activities such as exercise and crafts (Blake and Mitchell. 2016; Gigliotti and Jarrott 2005; Gigliotti, Jarrott and Yorgason 2004; Jarrott and Gigliotti 2010; Jarrott, Kwack and Relf 2002, Lu et al. 2020; Watts and Hsieh 2015; Zhao, Liu and Wang 2020). Furthermore, lower levels of non-engagement, classed as a lack of interest, attention and participation, were recorded during structured horticultural activities that were facilitated and supported by horticultural therapists, horticultural therapy students and care staff (Jarrott, Kwack and Relf 2002; Gigliotti and Jarrott 2005; Gigliotti, Jarrott and Yorgason 2004). This is in comparison to other structured activities such as exercise (Jarrott, Kwack and Relf 2002; Gigliotti and Jarrott 2005; Gigliotti, Jarrott and Yorgason 2004). In the study conducted by Jarrott and Gigliotti (2010), when different types of engagement (active engagement, passive engagement, self-engagement, non-engagement and other) were explored, participants living with dementia (n=129) taking part in horticultural activities (compared to other activities) spent a statistically significant greater time in both active engagement (e.g. active participation and motor or verbal response to an activity) and passive engagement (e.g. listening to or observing an activity). Jarrott and Gigliotti (2010) suggested that their person-centred approach to delivering the activities contributed to the positive findings, however they do not identify explicitly how a person-centred approach was achieved. The existing evidence suggests that gardening and horticultural activities can promote positive behaviours and emotions, and lead to higher levels of engagement than other types of activity for people living with dementia.

### **2.5.2. Increased self-esteem and sense of identity**

Increased self-esteem for people living with dementia through gardening and horticultural activities appeared to offer a sense of achievement and accomplishment (Blake and Mitchell 2016; Hewitt et al. 2013; Lui and Chu 2018; Smith-Carrier et al. 2019). Blake and Mitchell (2016) highlighted that participants were able to make a contribution through their involvement

in the garden, leading to a sense of satisfaction, which in turn improved their self-esteem. Smith-Carrier et al. (2019) also suggested that the contribution to work within the garden led to these positive feelings. Hewitt et al. (2013) reported that caregivers also felt that gardening activities were purposeful which enabled people to feel valued and useful, which provided a sense of achievement. Similar findings were noted by Hall et al. (2016), who reported that participants living with dementia viewed their contribution to the garden as a personal accomplishment. A sense of purpose and achievement could help people living with dementia feel greater self-worth, which can contribute to good wellbeing (Smith et al. 2005; Steeman et al. 2007).

Research has highlighted a link between gardening and horticultural activities and promotion of self-identity through enabling people living with dementia to continue their interests and hobbies (Edwards, McDonnell and Merl 2013; Hewitt et al. 2013; Noone and Jenkins 2018; Smith-Carrier et al. 2019). This supports person-centred dementia care (Brooker 2003; Kitwood 1997; Phinney, Chaudhury and O'Connor 2007). Noone and Jenkins (2018) reported that gardening allowed people living with dementia to express their interest in gardening and self-identity by sharing their knowledge and skills with others. Day centre staff suggested that the participants were able to express themselves and utilise their existing abilities to take part in gardening activities, with appropriate levels of staff support (Noone and Jenkins 2018). The caregivers interviewed by Hewitt et al. (2013) also reported that gardening activities promoted self-identity for the participants by providing opportunities for independence during the activities.

The findings from Smith-Carrier et al. (2019) concur that gardening activities can contribute to self-identity, as reported by participants living with dementia. They also highlight that being in the garden enabled some participants living with dementia to experience a sense of meaning through curiosity, wonder and learning as they watched plants grow and observed the life cycle of plants and nature (Smith-Carrier et al. 2019). Participants described the activities as

“meaningful” and “spiritual” as it enabled them to “focus on the present” which gave them hope for the future (Smith-Carrier et al. 2019: 9-10).

### **2.5.3. Greater opportunities for social interaction**

Opportunities for people living with dementia to engage in social interaction and experience social connections is fundamental to person-centred care (Brooker 2003; Kitwood 1997) and has been shown through green dementia care (Barrett, Evans and Mapes 2019; Evans et al. 2019). Social interaction is a fundamental human need (Baumeister and Leary 1995) and particularly important for people living with dementia who are more likely to experience social isolation and loneliness (Kane and Cook 2013). A number of studies have demonstrated the benefits of gardening and horticultural activities on social wellbeing through increased social interaction, especially where activities have taken place in a group setting (Blake and Mitchell 2016; Hall et al. 2016; Hewitt et al. 2013; Gigliotti and Jarrott 2005; Gigliotti, Jarrott and Yorgason 2004; Jarrott and Gigliotti 2010; Noone and Jenkins 2018; Noone et al. 2017; Smith-Carrier 2019).

Blake and Mitchell (2016) concluded in their literature review, that gardening and horticultural activities led to increased social interactions amongst people living with dementia as plants and activities provided prompts for conversation between them. This was also recognised by Rappe and Topo (2007) when indoor plants were introduced into a care home. Studies by Gigliotti and Jarrott (2005), Gigliotti, Jarrott and Yorgason (2004) and Jarrott and Gigliotti (2010) all reported increased verbal engagement (talking, asking questions) between participants living with dementia during horticultural activities when compared to other activities (e.g. cognitive stimulation activities, exercise and crafts). They suggested this was due to increased engagement in the activities but did not expand on this any further.

Reminiscence was also noted in relation to gardening and horticultural activities, which led to increased social interaction as people shared their memories and stories with each (Blake and Mitchell 2016). Reminiscence draws on long-term memories which are less effected by

dementia and has been thought to contribute to overall wellbeing (Hall et al. 2016; Smith-Carrier et al. 2019). Smith-Carrier et al. (2019) suggested that the sensory stimulation provided by plants and nature encouraged reminiscence and social interaction, which appeared to distract participants from their present frustrations. Gigliotti, Jarrott and Yorgason (2004) and Jarrott and Gigliotti (2010) note how the facilitators of the horticultural activities encouraged social interaction through specifically asking participants about their memories of gardening, which stimulated reminiscence and social interaction.

Group-based activities were associated with increased social interaction and a sense of belonging and inclusion for people living with dementia (Smith-Carrier et al. 2019). One participant shared: "I feel productive and part of something. It is not my garden; it is our garden" (Smith-Carrier et al. 2019: 8). Participants reported that they enjoyed working together and helping each other, they commented on a sense of comradeship amongst the group (Smith-Carrier et al. 2019). Similarly, Noone and Jenkins (2018) identified 'Gardening and community' as a key theme which reflected the social benefits of attending a community gardening group. Interestingly, the participants included in the study by Noone and Jenkins (2018) knew each other prior to taking part in the gardening activities (attending the same dementia day care centre), and therefore the authors had not anticipated changes to the social interaction between participants. However, interviews with the day centre staff reported a shift in the social dynamic between the participants as a result of a greater sense of belonging to the gardening group as participants shared an interest in gardening (Noone and Jenkins 2018). This was reflected by participants who described themselves as 'the gardeners' (Noone and Jenkins 2018).

These findings suggest that gardening and horticultural activities can benefit social health and wellbeing by increasing social interaction through discussions, conversation and reminiscence for people living with dementia, as well foster a sense of belonging and inclusion through shared interests and group working (Blake and Mitchell 2016; Hall et al. 2016; Hewitt et al.



2013; Gigliotti and Jarrott 2005; Gigliotti, Jarrott and Yorgason 2004; Jarrott and Gigliotti 2010; Noone and Jenkins 2018; Smith-Carrier 2019).

#### **2.5.4. Positive impact on symptoms associated with dementia.**

The common symptoms of dementia are shown in table 2.1 (page 35). Gardening and horticultural activities have been shown to improve symptoms of dementia including depression, agitation, anxiety, sleep disturbance and cognitive impairment (Connell, Sanford and Lewis 2007; Hewitt et al. 2013; Kang et al. 2010; Lee and Kim 2008; Lui and Chu 2018; Luk et al. 2011; Smith-Carrier et al. 2019; Vuolo 2003; Zhao, Liu and Wang 2020). An important finding relates to the impact on depression. Prevalence of depression is high amongst people living with dementia, with up to 40% of people living with dementia experiencing depression and depressive symptoms which can have a negative impact on their wellbeing and quality of life (Alzheimer's Society n.d.; Enache, Winblad and Aarsland 2011; Kitching 2015). Furthermore, there is some evidence to suggest that depression is not only a risk factor for dementia but when experienced by someone living with dementia it can accelerate their cognitive decline (Wiels, Baeken and Engelborghs 2020).

Smith-Carrier et al. (2019) reported reduced depressive feelings experienced by participants as a result of engaging with gardening activities. One participant share:

“Gardening makes me happy... It's always good in the garden, there is more energy there and it increases my energy. It's exercise and exercise helps a lot, makes me feel less depressed ... It [gardening] reduces depressive feelings and helps you feel happier and more joy in life in spite of dementia” (Smith-Carrier 2019: 10).

Participants interviewed by Smith-Carrier et al. (2019) also reported how gardening enabled them to focus on the present, and feel relaxed and mindful. Lui and Chu (2018) reported that horticultural activities were beneficial as they allowed the mind to relax, which supports the attention restoration theory of Kaplan and Kaplan (1989). Kang et al. (2010) also reported a significant decrease ( $p < 0.001$ ) in depression amongst participants living with dementia who

engaged in horticultural activities however, other activities (music and art) were included in the intervention and therefore the benefits may not be a result of the horticultural activities. Although there is a wealth of evidence to suggest that gardening and horticultural activities can reduce depression in the general population, including people with severe depression and disabilities, (Clatworthy, Hinds and Camic 2013; Gonzalez et al. 2010; Soga, Gaston and Yamaura 2017; Wang and MacMillan 2013) there is a lack of research specifically amongst people living with dementia.

Gardening and horticultural activities have been shown to reduce other common symptoms associated with dementia including agitation, anxiety and sleep disruption (Connell, Sanford and Lewis 2007; Lee and Kim 2008; Luk et al. 2011; Vuolo 2003; Whear et al. 2014; Zhao, Liu and Wang 2020). Participants living with dementia who engaged in gardening and horticultural activities including weeding, planting and flower arranging showed a reduction in levels of agitation (Lee and Kim 2008; Lu et al. 2020; Luk et al. 2011; Vuolo 2003; Zhao, Liu and Wang 2020) when assessed through observations and caregiver ratings. Hewitt et al. (2013) observed a reduction in levels of anxiety however, they suggested that the small group environment may have had a greater effect than the gardening and horticultural activities specifically. There is a small amount of research to suggest that gardening and horticultural activities can have a beneficial effect on sleep disruption, which is commonly experienced by people living with dementia (Connell, Sanford and Lewis 2007; Lee and Kim 2008). Participants who engaged in horticultural activities taking place indoors and outdoors experienced greater total sleep time (Connell, Sanford and Lewis 2007; Lee and Kim 2008).

Gardening activities have shown to improve physical function for older adults (Wang and MacMillan 2013) and specifically those living with dementia by promoting physical activity (Gonzalez and Kirkevold 2013). There appears to be an association between declining cognitive function and declining physical function (Auyeung et al. 2008; Fitzpatrick et al. 2007; Kuo et al. 2007). Thelander et al. (2008) reported that physical function determined the types of outdoor activities that people living with dementia were able to participate in. The existing

literature has not specifically explored the impact of gardening and horticultural activities on levels of physical function. Therefore, it is not clear whether the findings amongst the general population are similar for those living with dementia.

Despite cognitive impairment being the main symptom associated with dementia, only a small number of studies explored the impact of gardening and horticultural activities on cognitive function (D'Andrea, Batavia and Sasson 2007; Kang et al. 2010; Lee and Kim 2008; Yasukawa 2009). Lee and Kim (2008) reported a statistically significant increase in cognitive function amongst nursing home residents (n=23) following an indoor horticultural activity intervention. In a study of residents living with dementia in long-term residential care (n=21) Yasukawa (2009) also reported a significant improvement in cognitive function following a horticultural activity intervention (no detail on whether this was conducted indoors or outdoors). Horticultural activities were also associated with improvements to cognitive function in a study of nursing home residents living with dementia (n=40) conducted by D'Andrea, Batavia and Sasson. (2007). Interestingly, D'Andrea, Batavia and Sasson (2007) also measured cognitive function in participants living with dementia in a control group who engaged with other activities (e.g. music and social activities) and noted a reduction in cognitive function following the intervention. Table 2.1 summarises the common symptoms associated with dementia.

Table 2.1. Common behavioural and psychological symptoms associated with dementia (from Alzheimer's Research UK)

<b>Behavioural and psychological symptoms associated with dementia</b>	<b>Description</b>
Memory loss	<ul style="list-style-type: none"> <li>• Usually one of the first symptoms, especially in Alzheimer's disease</li> <li>• Short-term memory affected initially</li> <li>• Long-term memories can become confused</li> </ul>
Behavioural changes	<ul style="list-style-type: none"> <li>• Often as a result of feeling confused, frustrated or distressed</li> <li>• Behaviour that is challenging or suddenly changes</li> <li>• Including agitation, restlessness, repetitive behaviours, shouting, screaming, hiding/hording, accusing, losing inhibitions, trailing and following</li> </ul>
Communication and language disturbance	<ul style="list-style-type: none"> <li>• Vary depending on individual and type of dementia</li> <li>• Not able to find the right words, using substitute words or describing rather than naming things</li> <li>• Not able to express oneself</li> <li>• Loss of meaning of speech but fluency maintained</li> <li>• Inability to make an appropriate response</li> <li>• Unable to understand what others are saying</li> <li>• Loss of verbal communication</li> </ul>
Aggression	<ul style="list-style-type: none"> <li>• Physical aggression: hitting, pinching, scratching, biting</li> <li>• Verbal aggression: shouting, screaming, swearing</li> <li>• Can be related to a person's personality or their dementia</li> </ul>
Sight and perceptual disturbance	<ul style="list-style-type: none"> <li>• Hallucinations can be experienced</li> <li>• Visuo-perceptual difficulties: misperceptions, misidentifications</li> </ul>
Walking/wandering	<ul style="list-style-type: none"> <li>• Related to memory loss and confusion</li> <li>• Relieving pain or restlessness</li> <li>• Boredom and a lack of activity</li> <li>• Maintaining independence and activity</li> <li>• Feeling lost or looking for someone</li> </ul>
Sleep disturbances	<ul style="list-style-type: none"> <li>• Disruption to the body's circadian rhythm (internal body clock) affecting sleep-wake cycle</li> <li>• Waking in the night with confusion and disorientation</li> <li>• Not able to go to sleep or sleep for long periods of time</li> <li>• Linked with sun downing where people can become agitated, aggressive or confused late in the day due to disruption to their circadian rhythm</li> </ul>
Depression and anxiety	<ul style="list-style-type: none"> <li>• Related to diagnosis and living with dementia</li> <li>• Related to other symptoms</li> <li>• A lack of social interaction and stimulation</li> <li>• Lack of meaningful activities to keep a person occupied</li> <li>• Apathy and lack of motivation</li> </ul>

## **2.6. Benefits associated with green exercise for people living with dementia**

Research suggests that green exercise is likely to benefit people living with dementia in the same way as the general population, through improving cardiovascular function, reducing stress, improving mood and self-esteem, and contributing positively to mental wellbeing (Barton and Pretty 2010; Bowler et al. 2010; Gladwell et al. 2013; Pretty et al. 2003). Furthermore, exercise in general has been associated with improving wellbeing and mobility for people living with dementia by slowing the rate of functional decline (Littbrand, Stenvall and Rosendahl 2011; Pitkälä et al. 2013) and enabling them to continue with activities of daily living (Forbes et al. 2015). Although there is growing research about green exercise and the benefits to health and wellbeing for the general population, Mapes (2011a) sought to understand awareness of green exercise. They identified a lack of understanding and awareness about green exercise amongst 'experts' within the area of dementia (academics, policy makers, practitioners) with only 50% of participants being aware of what green exercise was (out of 28). However, 32% of those interviewed felt that green exercise would be more beneficial for people living with dementia than the general population, whilst 62% felt that it would be of equal benefit (Mapes 2011a).

Green exercise has been identified as providing opportunities to encourage people to spend time outdoors (McDuff and Phinney 2015). Walking is a popular form of green exercise that has been widely reported by people living with dementia and caregivers (Mapes 2011a; Mapes et al. 2016). Other types of green exercise include cycling and running but have not been widely researched in relation to dementia (Clark et al. 2013). Mapes (2011a) highlighted the benefits of green exercise for people living with dementia through a review of the literature which found increased verbal expression (Chalfont 2006), improved sleep (Brooker, Woolley and Lee 2007; Connell, Sanford and Lewis 2007), improved mobility and continence (Brooker, Woolley and Lee 2007) and improved eating patterns (de Bruin et al. 2010). Furthermore, green exercise was associated with offering joy and pleasure, through providing sensory

stimulation (Chalfont 2006; Mapes 2010; Mapes 2011a). Mapes (2011a) included anecdotal evidence consisting of quotes, stories and poetry from people living with dementia in which green exercise was identified as a key reason for people living with dementia connecting to nature. Other benefits of walking that have been reported include “dampening down” symptoms of dementia (Mapes 2010) and perceptions of maintaining health and fitness (McDuff and Phinney 2015).

Increased social interaction has also been found through walking activities (Mapes 2010; McDuff and Phinney 2015; Robertson et al. 2020). Mapes (2010) observed that people living with dementia were more verbally fluent during a nature walk, when compared to being indoors. Group-based walking encouraged people living with dementia to join in with discussions and speak to different people during the walk (Robertson et al. 2020). Hughes et al. (2011) suggested that walking also prompted reminiscence which led to increased social interaction as people living with dementia shared their memories of walking and being outdoors. Increased social interaction was not just observed in participants living with dementia by Mapes (2010), caregivers were also seen to engage in greater levels of social interaction as being outdoors provided a more informal setting for conversation and gained social support through sharing the challenges of caring for someone living with dementia (Robertson et al. 2020). Furthermore, Robertson et al. (2020) suggested that the walking groups enabled participants living with dementia to engage with a more diverse group than they would usually, which fostered the development of new and different relationships.

## **2.7. Benefits associated with animal-related activities**

de Bruin et al. (2015) acknowledged the benefits of green care farming for people living with dementia which included animal-related activities, most commonly feeding farm animals. A limited amount of research has found that animal-related activities are beneficial for people living with dementia by increasing social interaction (Yakimicki et al. 2019), increasing physical activity, thus eliciting a range of associated physical and mental health benefits, (Friedmann

et al. 2015) and improving overall quality of life (Nordgren and Engström 2014; Olsen et al. 2016). Whilst animal-related activities have been considered a therapy in their own right, they have been included within outdoor and nature-based activities (Bossen 2010; Edwards, McDonnell and Merl 2012; Evans et al. 2019). Evans et al. (2019) highlighted that animal visits, which were common in care homes, can positively contribute to effective green dementia care.

In a recent review, Yakimicki et al. (2019) suggested that animal-related activities can improve social functioning for people living with dementia, regardless of the type of animal involved (e.g. dogs, horses, cats, fish). However, the impact of animal-related activities on behavioural and psychological symptoms of dementia (aggression, agitation and depression) were less conclusive, with only 9 (of 15) studies reporting significant reductions in symptoms (Yakimicki et al. 2019). Similar inconclusive findings were noted by Lai et al. (2019) who conducted a review of only controlled trials. Conversely, Kilmova, Toman and Kuca (2019) suggested that dog-related activities specifically could improve behavioural and psychological symptoms (shown in table 2.1) for people living with dementia, when activities had been tailored to meet the interests of the individuals. Evans et al. (2019) also reported that dog visits within residential care settings were common due to the perceived benefits for people living with dementia.

## **2.8. Extent of the evidence**

Whilst there is evidence to support a wide range of benefits for people living with dementia as a result of engaging in gardening and horticultural activities, walking, and animal-related activities there are some under-explored areas within the growing body of literature. The majority of the research involves small-scale and often single-site studies, therefore the findings may not be generalisable or transferable to other settings or other people living with dementia. A large portion of the existing research has been conducted in residential care settings (care homes and nursing homes) and dementia day care centres, especially in

relation to gardening and horticultural activities, and animal related activities. Only two studies exploring the impact of gardening and horticultural activities were conducted within a community setting (accessible to the public) (Hewitt et al. 2013; Noone and Jenkins 2018). There is also a paucity of research that has been conducted in the UK. Whilst the walking studies are UK-based, only two of the studies relating to gardening and horticultural activities were conducted in the UK (Hewitt et al. 2013; Noone and Jenkins 2018). Again, the findings from the existing literature may not be generalisable to a UK setting due to differences in the structures and systems of dementia care.

Another significant limitation is the lack of information about how the activities and interventions have been designed and developed, and then implemented with people living with dementia. Very few studies have identified how the activities were tailored to meet individual needs or adapted for people living with dementia, despite highlighting these features as contributing factors to the benefits found. Furthermore, few studies have drawn conclusions about the components of the activities or specific activities which elicited the positive effects that are reported. The inconsistent outcome measures and lack of clear evaluation about the effectiveness of the activities limits the comparison of the findings. Finally, the lack of detail about the activities and interventions makes it difficult to replicate the research and test similar interventions to compare the benefits, or to implement potentially beneficial activities in practice.

The research presented in this thesis seeks to address some of the existing gaps in knowledge about the benefits of outdoor and nature-based activities for people living with dementia, particularly focusing on those living within the community and extra care settings where research is lacking. Moreover, this research will develop and evaluate two evidence-based activity interventions, one delivered in a community-garden and one in an extra care retirement village, to consider the components needed to deliver effective outdoor and nature-based activities in these settings. Given this focus, the following section considers the benefits and



existing evidence of community-based outdoor and nature-based activities before discussing the development and implementation of effective activity interventions.

## **2.9. Community-based outdoor and nature-based activities**

As two-thirds of people living with dementia in the UK are living in their own home, Clark et al. (2013) recommended that research exploring the benefits of connecting to nature for people living with dementia should focus on people living within the community. Community-based services have been shown to help people living with dementia and their caregivers live well (Black et al. 2013; Innes, Kelly and McCabe 2012) which is also recommended in national dementia strategies in the UK (Department of Health 2012; Department of Health 2015; Department of Health and Social Care 2009). Despite this, provision of community-based support and services for people living with dementia and their caregivers in the UK is inconsistent (Morton et al. 2019). There is potential for community-based activities to offer opportunities for people living with dementia and their caregivers to experience social interaction (Sheard 2004) and take part in meaningful activities (Nyman and Szymczynsk 2016). There is growing awareness about making 'dementia-friendly communities' that promote community-based support for people living with dementia (Department of Health 2015; Robertson et al. 2020).

Evidence suggests that outdoor environments can offer opportunities for meaningful activity, which can enable people living with dementia within the community to stay both socially and physically engaged (Ward et al. 2018). Meaningful activities are an important part of person-centred dementia care (Bradshaw, Playford and Riazi 2012; Perrin and May 2000). Noone et al. (2017) suggested that gardening and horticultural activities could support people living with dementia in the community to overcome loneliness and isolation which is highly prevalent (Kane and Cook 2013) and therefore should be explored further. Organisations such as Thrive and Dementia Adventure, are promoting community-based outdoor and nature-based activities for people living with dementia and beginning to share best-practice through training

programmes and contributing to the growing research (Mapes 2011a; Mapes 2011b). This is lacking in the literature though, so there is a need for evidence approaches to ensure effective implementation, and the sharing of lessons learnt.

## **2.10. The design and delivery of effective outdoor and nature-based activity interventions**

Although the wellbeing benefits of spending time outdoors and engaging in nature-based activities has been shown, there remains a lack of information and guidance to inform the development and implementation of effective activity interventions in practice.

### **2.10.1. User-centred design**

In recent years, user-centred design has been increasingly applied within healthcare (Clarkson et al., 2004; Cottam and Leadbeater 2004). It has been utilised within the field of dementia research and practice, particularly regarding environmental design and the development of assistive technologies (Jakob, Manchester and Treadaway 2017; Ludden et al. 2019; Morrissey, McCarthy and Pantidi 2017; Suijkerbuijk et al. 2019; Thorpe et al. 2016). User-centred design places the person(s) living with dementia and their caregivers at the heart of the design and development process, and strives to create environments and technologies that meet the specific needs. Furthermore, Jakob, Manchester and Treadaway (2017: 2) suggest that such approaches to design research and practice, can support people living with dementia to “re-connect with people and places, maintain their dignity, and re-gain a sense of belonging, purpose and accomplishment”.

User-centred methods such as co-design and co-creation have been utilised to engage people living with dementia and their caregivers directly in the research and design process (Jakob, Manchester and Treadaway 2017; Morrissey, McCarthy and Pantidi 2017 Slegers, Duysburgh and Hendriks 2015; Suijkerbuijk et al. 2019; Thorpe et al. 2016; Wang et al. 2019). Druin (2002) presents four levels of user involvement in the design and prototype-process: 1) User: tests the final concept to see how it works; 2) Tester: once initial design work is completed

they test the prototype; 3) Informant: is involved in the design process at various points (decided by the designer); 4) Design partner: is involved throughout the whole design process. Following a scoping review of design research involving people living with dementia as users, testers and informants (based on the definition by Druin 2002), Wang et al. (2019) argued that it is beneficial for both designers and those living with dementia to use a co-design approach.

Although such methods have yet to be used to guide the design of outdoor and nature-based activity interventions, user-centred methods have been encouraged with regards to the design of dementia-friendly outdoor environments (Brawley 2007; Chalfont and Rodiek 2005; Davis et al. 2009). An indication of how user-centred design principles have been applied in this research is outlined within the General Methods chapter as stated below in section 3.3.2.2 for study 2, and in section 3.3.3.2 and 3.3.3.3 in relation to study 3.

### **2.10.2. Dementia friendly environments in community settings**

Chalfont (2008: 61) stated “The way in which people experience the outside world can be enhanced through the design of their built and social environment”. Clark et al. (2013) suggested that several of the principles for designing dementia-friendly neighbourhoods presented by Mitchell and Burton (2006) were applicable to outdoor environments, including familiarity, distinctiveness, accessibility, comfort and safety. Mapes et al. (2016) highlighted key features that organisations designing and managing outdoor environments should address to increase accessibility for people living with dementia, such as clear signage, toilets, refreshment facilities, seating, and even walkways. There is a wealth of evidence about dementia-friendly design for outdoor environments, which is focused on accessibility, walkways, sheltered seating and features to encourage activity such as raised beds, although most of this is focused on garden design rather than community space design (Brawley 2006; Brawley 2007; Calkins 2005; Chalfont 2006; Chalfont 2007; Chalfont 2008; Chalfont and Rodiek 2005; Chalfont and Walker 2013; Cohen and Day 1993; Gonzalez and Kirkevold 2013; Thrive website).

Garden design has been discussed in section 2.2 in which different types of dementia-friendly garden design have been considered. Mapes et al. (2016) also highlighted that outdoor environments should encourage outdoor activities. Previous work by Chalfont (2006) has made clear that the design of the outdoor environment is crucial for the success of outdoor and nature-based activities. Chalfont (2008) provided guidance for using environments such as gardens for a range of activities including gardening and horticultural activities and walking. Chalfont (2008) focused on ensuring that the environment was suitable for delivering activities, by addressing issues such as storage and growing space, and considering accessibility and the provision of tables, chairs and raised beds to support participants.

Existing research has highlighted the benefits of engaging in outdoor and nature-based activities within a community garden, particularly on increased social interaction and social inclusion, for the general population (Fieldhouse and Sempik 2007; Parkinson, Lowe and Vecsey 2011; Sempik, Aldridge and Becker 2005). Furthermore, specific benefits in community settings have been found for people experiencing poor mental health and wellbeing (Sempik, Aldridge and Becker 2005). Whilst there remains a lack of research specifically exploring the benefits of taking part in activities within community gardens for people living with dementia, such environments may offer safe and supportive environments that would enable people living with dementia to connect to nature, spend time outdoors and participate in a variety of activities, all of which have potential to enhance their health and wellbeing (Thrive website).

Thrive, amongst other organisations such as the Royal Horticultural Society (RHS), have suggested that community gardens may be able to support people living with dementia, particularly those living in the community (RHS website; Thrive website). Therefore, further research exploring how effective outdoor and nature-based activities could be delivered within a community garden environment would be of value. Moreover, activities delivered within a community garden environment may involve collaborative working, which was recommended by Mapes et al. (2016) as a way of ensuring that people living with dementia can access

outdoor environment and have opportunities to engage in a range of activities. This was corroborated by Evans et al. (2019) who suggested that working with local organisations could enhance the delivery of green dementia care, by providing off-site visits and new experiences for people living with dementia, especially within an extra care and care home environment.

Given the need for community-based activities, there is potential for outdoor and nature-based activities to be delivered in other settings. Whilst existing research has been conducted within dementia day care centres (Gigliotti and Jarrott 2015; Gigliotti, Jarrott and Yorgason 2004; Hall et al. 2016; Jarrott and Gigliotti 2010; Jarrott, Kwack and Relf 2002; Smith-Carrier et al. 2019) there is a lack of well-established community-based provision of dementia day care in the UK (Morton et al. 2019). However, in the UK a rise in extra care housing providing specialised support for people living with dementia to live independently has been seen (Bäumker, Netten and Darton 2010). Extra care settings are one such place where community-based activities could be delivered, not only for residents but for people living within the local community as many of these settings are open to the wider community. Previous research has highlighted the benefits for people living in residential care when activities include people living in the wider community as it reduces social isolation (Brewin 2018). Evans et al. (2019) explored green dementia care within extra care settings, and suggested that a variety of outdoor and nature-based activities were taking place. This is the only study to have done this. However, there were limited opportunities for people living with dementia to engage in structured outdoor and nature-based activities. Therefore, community-gardens and extra care settings may be suitable environments to deliver outdoor and nature-based activities for people living with dementia, which warrants further research.

It is important to consider not only what outdoor and nature-based activities are offered, but how these activities are delivered in terms of the setting and structure. There is great heterogeneity amongst the design of the outdoor and nature-based activity interventions presented in the current literature. Much of the existing research has focused on a single type of outdoor and nature-based activities, such as gardening or walking, there is a lack of multi-

activity interventions which may be delivered in green dementia care. Green care farming has highlighted the potential benefits of delivering multiple outdoor and nature-based activities that are integrated into the farm environment rather than being delivered as a specific intervention (de Bruin et al. 2010). The variation within the existing research makes it difficult to draw conclusions about the most effect method of developing and delivering an outdoor and nature-based intervention to contribute to good green dementia care. In addition to the published research, consideration is given to guidance from organisations including Thrive and Dementia Adventure, as well as broader information about delivering creative activities for people living with dementia.

Firstly, in order to overcome several barriers faced by people living with dementia connecting to nature and accessing outdoor environments, Mapes (2017) presented a positive risk-taking approach when delivering outdoor and nature-based activities. A positive approach to risk-taking involves assessing the potential benefits of an activity as well as the possible risks and making good and well-informed decisions to take calculated and reasoned risks that enable people living with dementia to take part safely (Joseph Rowntree Foundation 2014; Mapes 2017). This approach was seen as important for supporting outdoor activities for people living with dementia (Mapes 2017). The considerations for positive risk-taking in outdoor activities identified by Mapes (2017) are shown in table 2.2.

Table 2.2. Consideration for positive risk-taking in outdoor activities presented by Mapes (2017)

<b>Considerations for positive risk-taking in outdoor activities</b>
<ul style="list-style-type: none"> <li>• Find out what people want – put the person living with dementia at the heart of the decision</li> <li>• Fear clouds our judgement – a more balanced approach is needed to weigh up the benefits and risks</li> <li>• Improve the environment to maximise the chances of success</li> <li>• Do not use “one size fits all” approach to establishing appetite for, or perception of risk</li> <li>• Success builds confidence over time, take a step-by-step approach – may start by bringing the outdoors indoors before planning outdoor activities</li> <li>• Safety and trust are key – crucial for those facilitating and supporting activities</li> <li>• Safety in numbers – people can feel safer in a group, consider the number of people without dementia who are there to provide support</li> <li>• Circle of support – sharing decision making can help make better decisions</li> <li>• Allow room for “no activity” – enable people to simply spend time outdoors</li> </ul>

### **2.10.3. Session structure**

Watts and Hsieh (2005) proposed a structure for the delivery of an effective and beneficial horticultural activity intervention for people living with dementia, however this was based on an average duration and frequency of the interventions in the existing studies rather than the overall effectiveness. They suggested the optimal timings for an intervention was sessions of 30-60 minutes twice a week for 6-10 week during spring and summer in order to maintain engagement and achieve tangible outcomes (Watts and Hsieh 2005). The guidance on the structure of sessions is relatively limited to timing, duration and frequency, and only one study has explicitly offered recommendations related to structure.

### **2.10.4. Delivery of the activities**

Regarding who facilitates the activities, Watts and Hsieh (2005) recommended someone who has been trained in activity delivery, horticulture and dementia. Both Thrive and Dementia Adventure have recognised a lack of training for people wishing to deliver and support outdoor and nature-based activities for people living with dementia and therefore, now offer specific training. Thrive offer practical guidance on supporting people living with dementia to engage and interact with gardens. Whilst Dementia Adventure look more broadly about making outdoor environments more inclusive for people living with dementia.

There is evidence to support group-based (rather than individual) delivery of outdoor and nature-based activities to support social interaction for people living with dementia (Gigliotti, Jarrott and Yorgason 2004; Hall et al. 2016; Hewitt et al. 2013; Jarrott and Gigliotti 2010; Mapes et al. 2011a, 2001b). Watts and Hsieh (2015) recommended that gardening and horticultural activities are delivered in a group setting to foster social interaction however, they did highlight that appropriate support would be needed for participants to enable them to fully participate with the activities. Evans et al. (2019) recommended recruiting volunteers to support with activities, as well as ensuring that staff/volunteers had appropriate training so they understood the benefits of engaging people living with dementia in outdoor activities and

how to deliver effective activities. Sufficient support for those taking part would also enable individualised adaptations to take place during the activities as recommended by Connell, Sanford and Lewis (2007) and Gigliotti and Jarrott (2010).

The use of simple and clear step-by-step instructions has also been shown to support the delivery of outdoor and nature-based activities to ensure people living with dementia were able to follow activities without becoming overwhelmed (Jarrott and Gigliotti 2010). Organisations such as Thrive have produced guidance for people delivering gardening and horticultural activities for people living with dementia, which include example instructions for simple and familiar gardening activities such as sowing seeds and potting up plants (Thrive 2016). Whilst not specific to outdoor and nature-based activities, Killick and Craig (2012) also recommended using written and pictorial instruction sheets to support people living with dementia to avoid reliance on short term memory, in their book focusing on creativity and art for people living with dementia. In addition, Killick and Craig (2012) also suggest key things to consider when beginning an activity session, such as ensuring that the environment is welcoming and reassuring so that those taking part feel comfortable and safe. Furthermore, they recommend preparing the room before, having activities ready so that attention can be focused on the people living with dementia taking part. Thrive (2016) also suggested laying out resources and equipment to stimulate conversations about the activity.

A summary of the considerations for developing an intervention are presented in table 2.3. Included in the table are a variety of outdoor and nature-based activities, and the inclusion of activities with a purpose. Further consideration is given to designing and delivering effective outdoor and nature-based activities in the following section.



Table 2.3. Components and features of outdoor and nature-based activity interventions attributed to the benefits for people living with dementia

<b>Component or feature</b>	<b>Associated benefits</b>	<b>Implications for designing effective activity interventions</b>
Positive approach to risk-taking	Increase access to outdoor and natural environments for people living with dementia, through overcoming barriers associated with risk-aversion  Enables people to experience the wide variety of benefits associated with outdoor and nature-based activities	Include an assessment of the benefits of an activity when assessing the risk  Positive risk-taking relies on knowledge of the person you are working with and ensuring to still adhere to policies, legislation and guidelines
Accessible, safe and supportive environment	Freedom to engage in activities, accessible for people living with dementia	Select an accessible and suitable environment for activities – or – explore how the environment you are working in can be made more accessible, safe and supportive for people living with dementia and enable them to engage in activities
Group-based activities	Increased social interaction, a greater sense of inclusion and belonging, opportunities to share interests and goals	Providing activities that are suitable for a group whilst ensuring that participants will have appropriate support, encourage social interaction amongst participants – asking questions, using prompts to evoke memory and reminiscence
Sufficient support for participants	Greater engagement in activities and active participation, promoting independence, maintaining existing skills and abilities	Method of assessing individual's physical and cognitive abilities and needs, staff/volunteer support – may need to recruit people to assist, select activities and adapt activities to allow participants to engage as independently as possible
Planned programme where individual adaptations are possible	Greater engagement and interest, increased active participation, positive behaviour and facial affect, more independence during activities, increased self-esteem	Be aware of participant's interests, abilities and needs when designing the programme, select activities that can be adapted to make them easier/harder or tailored to interests e.g. selecting particular flowers, establish a method of adapting – will this be done during activities or for future activities, draw on the use of reflection
Variety of activities	Autonomy through choice making, greater engagement and interest, relates to interests and hobbies, more varied benefits	Include different activities within the intervention e.g. different types of gardening and horticultural activities could be included in one intervention, or a multi-activity intervention with different types of outdoor and nature-based activities could be designed
Activities with a purpose	Increased self-esteem, a sense of achievement, satisfaction and accomplishment	Ensure activities have a purpose and an end goal participants are trying to achieve, explore how 'jobs' or 'work' within the environment could be included in an activity e.g. leaf raking

### **2.10.5. Selecting and designing effective outdoor and nature-based activities**

Chalfont (2008) provided some guidance on designing outdoor and nature-based activities for people living with dementia, based on the existing evidence, in a book titled 'Design for Nature in Dementia Care'. Chalfont (2008) encouraged people who were designing and planning activities to enable people living with dementia to connect to nature to consider both the person and the environment. As Mapes (2017) stated, it is vital to know who will be taking part in the activities in order to design them appropriately. This is also a key consideration for offering person-centred dementia care (Brooker 2003; Kitwood 1997) and meaningful activities (Harmer and Orrell 2008; Phinney, Chaudhury and O'Connor 2007).

Meeting individual interests and hobbies is a key feature of person-centred dementia care (Brooker 2003; Kitwood 1997). Outdoor and nature-based activities can involve a broad range of interests and hobbies which has been supported in the literature (Hendriks et al. 2016; Hewitt et al. 2013; Mapes 2011a; Mapes et al. 2016; Noone and Jenkins 2018; Smith-Carrier et al. 2019). For example, gardening is a popular and familiar hobby amongst older people (Haas, Simson and Stevenson 2003) with an estimated 6.5 million people taking part regularly in gardening activities in the UK (Thrive 2016). Blake and Mitchell (2016) highlight how gardening and horticultural activities met the needs of people living with dementia who had an interest in gardening, which contributed to a good person centred care approach. The individuals taking part in the activities should be the first consideration when developing and selecting which activities to deliver.

Hendriks et al. (2016) asked people living with dementia what types of outdoor activities they thought were important for their quality of life. This was in order to personalise outdoor activities to offer them as part of person-centred dementia care (Hendriks et al. (2016). People reported that being outdoors made them feel relaxed and reported enjoying gardening and walking, as well as sensory activities (Hendriks et al., 2016). No further detail about the

intervention was given other than people were put into one of three activities groups based on their personal interests.

Another consideration is meeting the cognitive and physical needs of people living with dementia and adapting the activities appropriately to enable them to take part (Kwack, Relf and Rudolph 2005; Thrive 2016). Activities should be designed to maintain existing skills and abilities not to exacerbate disabilities (Jarrott, Kwack and Relf 2002; Smith-Carrier et al. 2019). Outdoor and nature-based activities that draw upon people's knowledge and skills are also associated with promoting self-identity (Noone and Jenkins 2018). Several authors suggest that gardening and horticultural activities are effective, as they can easily be adapted to meet various physical and cognitive abilities however, the details on how are scant (Connell, Sanford and Lewis 2007; Hewitt et al. 2013; Gigliotti and Jarrott 2005; Gigliotti, Jarrott and Yorgason 2004; Gonzalez and Kirkevold 2013; Jarrott and Gigliotti 2010; Jarrott, Kwack and Relf 2002). An exception was Gigliotti, Jarrott and Yorgason (2004) who included details in an Appendix about the use of horizontal adaptations (changes that utilise similar abilities and skills) and vertical adaptations (increasing or decreasing the difficulty of an activity).

Kwack, Relf and Rudolph (2005) presented guidance on adapting gardening activities for people living with dementia. They suggest emphasis on familiarity should be considered throughout, relating to both materials and the processes of doing the activities (Kwack, Relf and Rudolph 2005). Successful gardening activities should avoid multiple steps, be short-duration and focused on small achievable goals (Kwack, Relf and Rudolph 2005). They also highlight the importance of ensuring that all plant materials are non-toxic, and provide a list of toxic plants to avoid, such as lily of the valley and foxgloves (Kwack, Relf and Rudolph 2005). Consideration about the tools and equipment should be in line with people's physical abilities however, Kwack, Relf and Rudolph (2005) did acknowledge the recommendation by Pitt-Nairn et al. (1992) who suggested that more familiar tools that people will know how to use may be more beneficial for people living with dementia.

Multi-sensory stimulation from plants and nature was associated with positive behaviours including reminiscence and increased social interaction, and has been noted in relation to a variety of outdoor and nature-based activities (Chalfont 2006; Gigliotti, Jarrott and Yorgason 2004; Gonzalez and Kirkevold 2013; Hernandez 2007; Mapes et al. 2011a; Smith-Carrier et al. 2019). Smith-Carrier et al. (2019) identified specific sensory interactions with the gardening and horticultural activities that were linked to reminiscence through the triggering of memories, these included the feel of soil, colour of flowers, sounds of birds, touch of plants such as lambs ear (a velvet like plant) and the smell of herbs. An association between olfactory stimulation (sense of smell) and the triggering of memories has been previously documented (Gray 1999; Relf 1978). Kwack, Relf and Rudolph (2005) recommended using strong and familiar smelling plants such as roses, honeysuckle and chrysanthemums, and a variety of plants with bright colours and different textures. Killick and Craig (2012) also suggested that creative and arts materials used for activities should be multi-sensory in order to evoke reminiscence and trigger memories. Although the research supports multi-sensory stimulation for people living with dementia, Kwack, Relf and Rudolph (2005) acknowledge that some people living with dementia may have sensory deficits, and reiterate the importance of knowing the person/people you are working with. Reminiscence is an important component of person-centred dementia care as it can help promote life histories and interests, and draws on long-term memories (Schweitzer and Bruce 2008). Reminiscence has been used as a way of encouraging conversation and communication within dementia care (Schweitzer and Bruce 2008).

Another feature of outdoor and nature-based activities which have been attributed to the benefits seen include, having a visual end goal, which is particularly relevant for gardening and horticultural activities (Smith-Carrier et al. 2019; Watts and Hsieh 2015). This has been associated with a sense of achievement and satisfaction, which in turn can lead to increased self-esteem. D'Andrea, Batavia and Sasson (2007) also suggested that people living with dementia gained a sense of accomplishment when their work was displayed to others, for

example having potted plants on display. People living with dementia and their caregivers have reported that engaging in outdoor and nature-based activities such as gardening, caring for animals and green care farming can offer a sense of purpose and usefulness through perceived work and contribute (Blake and Mitchell 2016; de Bruin et al. 2010; de Bruin et al. 2015; Evans et al. 2019; Hall et al. 2016; Hewitt et al. 2013; Smith-Carrier et al. 2019). Therefore, the inclusion of purposeful outdoor and nature-based activities may contribute to good person centred care by enabling people living with dementia to engage in activities which they consider as meaningful (Blake and Mitchell 2016). A summary of the components of outdoor and nature-based activities that have been attributed to achieving benefits for people living with dementia is presented in table 2.4. These should be considered when developing and implementing activities as part of green dementia care to promote health and wellbeing.

Table 2.4. Components of outdoor and nature-based activities considered to be effective and bring about benefits for people living with dementia

<b>Effective component of activity</b>	<b>Details relating to the activities</b>	<b>Associated benefit for people living with dementia</b>
Relating to interests and hobbies	The broad range of outdoor and nature-based activities available (gardening and horticulture, green exercise, animal-related) should reflect numerous or individual interests and hobbies	Increased engagement, continuation of existing skills and abilities, sharing of knowledge, promoting self-identity, contributing to person centred care
Ability to adapt to varying physical and cognitive abilities	Gardening and horticultural activities can be adapted horizontally and vertically to meet varying physical and cognitive abilities. Consideration should be given to tools and equipment and the environment in which the activity is taking place	Increased engagement, greater active participation, greater independence, supporting self-esteem
Offer multi-sensory stimulation	Plants and nature can stimulate all the senses, through touch, smell, sound, sight and taste. A strong association between smell and memory has been found. Avoid overstimulation for some people living with dementia and be mindful of sensory deficit. Walking outdoors was associated with multi-sensory stimulation from the environment.	Triggering memory, reminiscence, increased social interaction
Provide a visual end goal – so people can see a finished 'product'	Gardening and horticultural activities can lead to visual end goals, such as a completed flower bed, so people can see what has been achieved	Increased self-esteem through sense of achievement and satisfaction
Provide something that can be shared with others	Gardening and horticultural activities that provide an outcome that can be shared with others, such as displaying plants that have been grown	Increased sense of accomplishment
Offers purposeful and meaningful	Gardening and horticultural activities taking place in a garden environment can be viewed as making a valuable contribution to others and society offering purpose and meaning	Increasing self-identity and contributing to person centred care through maintaining occupation and purpose, and providing meaningful activity

### **2.10.6. Evaluating the effectiveness of outdoor and nature-based activity interventions**

A key challenge relating to the design and delivery of effective outdoor and nature-based activity interventions is the lack of a consistent and well-established method of evaluation. Currently, the effectiveness of outdoor and nature-based activity interventions for people living with dementia is based on the wellbeing benefits for people living with dementia. The components and features of the interventions and activities themselves have been poorly evaluated. The variation of data collection tools and outcome measures make comparisons between studies difficult to see if they agree or differ, or if the interventions could be transferred to other settings.

When evaluating the effectiveness of interventions to enhance health and wellbeing for people living with dementia it is important to recognise the objective and subjective components of wellbeing (Diener 2009). Therefore, a combination of quantitative and qualitative approaches would be beneficial and appropriate (Robinson et al. 2020). The use of quantitative tools to measure outcomes such as cognitive function, sleep and agitation are used inconsistently, and with small samples resulting in inconclusive findings (Connell, Sanford and Lewis 2007; D'Andrea, Batavia and Sasson 2007; Kang et al. 2010; Lee and Kim 2008; Luk et al. 2011; Vuolo 2003; Whear et al. 2014; Yasukawa 2009); Zhao, Liu and Wang 2020). Several studies have utilised direct participant observations through Dementia Care Mapping™ (Bradford Dementia Group 1997) however, this tool was designed to assess the quality of dementia care practice rather than the outcomes and effects of specific activity interventions (Brooker 2005). It is concluded that there are no consistent and recommended methods of evaluating outdoor and nature-based activities.

There is growing use of qualitative methods including interviews, surveys and focus groups, to explore people's views and opinions about the benefits associated with spending time outdoors and engaging in specific types of activity. However, there is a lack of research that seeks the experiences and perspectives of those living with dementia, instead asking family

caregivers and staff members. Only Noone and Jenkins (2018) and Smith-Carrier (2019) interviewed people living with dementia to explore the benefits of gardening and horticultural activities from their perspective. Mapes et al. (2016) demonstrated the value of asking people living with dementia directly about their engagement with outdoor environments which highlighted how people want to spend more time outdoors, and in which environments. It is surprising that there is a significant lack of research seeking the experiences and perspectives of people living with dementia given the growing awareness of person centred dementia care, in which the person living with dementia should be at the heart of their care (Kitwood 1997). In order to deliver effective outdoor and nature-based activities that align with a person centred approach to dementia care, it is imperative that the experiences and perspectives of people living with dementia are considered in both research and practice.

Two studies (D'Andrea, Batavia and Sasson 2007; Hewitt et al. 2013) did include group discussions that took place following the activity session, to reflect on what had happened. Whilst these did include participants living with dementia, no details about the methods were provided and the findings were not presented. Killick and Craig (2012) suggest that reflection following the delivery of a creative and arts-based activity, both by the person facilitating the activity, and with those taking part (including caregivers and staff) can support evaluation. The process of reflection can enhance learning and development through evaluating experiences and practice (Boud, Keogh and Walker 1985; Boyd and Fales 1983). Furthermore, Killick and Craig (2012: 162) conclude by stating that evaluation should be "flexible and responsive to the setting".

## **2.11. Gaps in existing knowledge**

Whilst there is growing awareness and support of the benefits associated with three types of outdoor and nature-based activities (gardening and horticultural activities, walking - a form of green exercise and animal-related activities) there are gaps in our existing knowledge about



how this contributes to good overall green dementia care. The gaps that the research in this thesis seeks to address are summarised below.

#### 1. A focus on the UK

The literature has highlighted that many studies exploring the impact of outdoor and nature-based activities for people living with dementia are conducted outside of the UK, especially in relation to gardening and horticultural activities, and green care farming. Whilst the national dementia strategies in the UK encourage the use of activity to support people living with dementia little clear guidance on what these activities should be or how they should be delivered is provided. Further research is needed to explore current practices and existing outdoor and nature-based activity provision for people living with dementia in the UK.

#### 2. A focus on community-based approaches

Recommendations have been made to support people living with dementia in the community, given that two-thirds of people living with dementia in the UK are residing in their own homes within the community. However, the majority of studies have been conducted with people living with dementia in care homes and nursing homes, or attending dementia day care centres which are not as widely offered in the UK. Again, the national dementia strategies in the UK highlight the importance of supporting people living with dementia to remain living in their own homes by improving the availability and access of community services. Although there is little evidence that this has been addressed in recent years, there is a small amount of research suggesting that community-based outdoor and nature-based activities including community gardening and walking groups can benefit people living with dementia and their caregivers. Further research is needed to explore how outdoor and nature-based activities within the community can benefit people living with dementia and their caregivers by providing opportunities to maintain connections within their local community, engage in social activities and connect to nature.

### 3. The effects of a multi-activity approach

Whilst the benefits of green care farming have been shown, there is a lack of evidence supporting the use of multiple types of outdoor and nature-based activities for people living with dementia. This may be due to practical logistics and difficulty delivering and evaluating multiple activities. However, the importance of meeting interest, supporting hobbies and enabling autonomy are key features of person-centred care that should be integrated into green dementia care. It is likely that an intervention including different types of outdoor and nature-based activities could meet a broader range of interests, increase engagement by reducing boredom and providing new opportunities, enable people to make choices about which activities to take part in and potentially offer a greater variety of benefits to health and wellbeing. Research exploring the impact of a multi-activity outdoor and nature-based activity intervention could support the development of green dementia care in practice.

### 4. Evaluation approaches

There is inconsistent and unclear methods of evaluating the overall effectiveness of outdoor and nature-based activities. A variety of different tools and methods make comparisons difficult and limit the ability to make conclusions about the overall effectiveness of the activities and of the interventions. There is much needed research that includes the direct experiences and perspectives of people living with dementia which would capture the subjective impacts of outdoor and nature-based activities, allowing for a more holistic insight into the benefits to health and wellbeing. This would also contribute to better person-centred care within green dementia care. Furthermore, research exploring the views and opinions of those delivering activities is lacking and could offer a greater understanding about how outdoor and nature-based activities are delivered in practice.

### 5. Guidance for designing effective interventions

As a result of the challenges concerning evaluation, there is very little guidance on designing and delivering effective outdoor and nature-based activity interventions for people living with

dementia or green dementia care overall. There is no nationwide outdoor and nature-based dementia strategy or official guidelines on best practice. This review of the literature has gathered the evidence to suggest the components and features of the interventions and activities which appear to have contributed to the benefits that have been shown. Further research is needed which uses the existing evidence to develop and implement outdoor and nature-based activities, and to evaluate not only the benefits but try and establish why particular activities and the interventions have been effective.

## **2.12. Chapter summary and conclusion**

This chapter highlights the benefits associated with a variety of outdoor and nature-based activities, specifically focusing on the benefits of engaging with gardening and horticultural activities, walking and animal-related activities. The benefits include, increased positive behaviour, mood and emotions, increased levels of engagement during activities, increased self-esteem through a sense of achievement and satisfaction, greater self-identity, reduced depression and symptoms of dementia, improved cognitive function, increased opportunities for social interaction and enhanced overall wellbeing.

The current research highlights that community-based activities, may help people living with dementia connect to nature, spend time outdoors and can promote greater social interaction amongst other benefits. Collaborative working between organisations has been recommended to ensure that outdoor environments are inclusive for people living with dementia and to support the delivery of different outdoor activities. The evidence supports a green care approach to person centred dementia care, which includes opportunities for people living with dementia to spend time in outdoor environments and take part in a variety of outdoor and nature-based activities, to improve their health and wellbeing and maintain connections in their community.

This chapter has also considered what types of outdoor and nature-based activities are effective, and has identified key features of gardening and horticultural activities that have

contributed to the benefits found. Furthermore, this chapter has also considered the design and delivery of effective outdoor and nature-based activity interventions. There is little UK based research and much of the research, particularly concerning gardening and horticultural activities has been conducted within residential care settings with fewer studies exploring the effectiveness of community-based interventions. The studies lack information and detail about the activities, including how they have been specifically adapted and delivered for people living with dementia, resulting in a lack of applicable and practical guidelines. There is also a gap in the current evidence about how different types of outdoor and nature-based activities could be delivered in an intervention, outside of the context of green care farming. Moreover, methods for evaluating activities and interventions are inconsistent and varied, making it difficult to draw comparisons and conclusions about the overall effectiveness of different types of outdoor and nature-based activities. There is a lack of attention to the experiences and perspectives of participants living with dementia who engage in outdoor and nature-based activities and interventions.

There is support for a green care approach within person centred dementia care that offers people living with dementia opportunities to connect to nature particularly through engagement in outdoor and nature-based activities. The research presented in this thesis seeks to address gaps in the existing literature by firstly exploring the current delivery of outdoor and nature-based activities for people living with dementia in practice in the UK. The findings, along with the current research and non-academic literature, were used to inform the design of two activity interventions which were tested in a community garden environment (Chapter 5) and extra care retirement village (Chapter 6). This was with the aim of developing recommendations on designing and delivering effective community-based outdoor and nature-based activities for people living with dementia. The next chapter will outline the methodological approach taken to achieve this, and will provide a critical justification for the methods of data collection and analysis that have been applied.

## **Chapter 3:**

### **General Methods**

#### **3.1. Introduction**

This chapter will outline the philosophical stance that underpins the methodology and the research approach applied. It will provide a critical justification for the selected approach and methods of data collection. This chapter is structured in line with the Good Reporting of Mixed Methods (GRAMMS) guidance (O’Cathain, Murphy and Nicholl 2008) to ensure that all aspects of the methodology are presented. Specific protocols for the measures used and adaptations of the data collection tools are described in the study chapters (Chapters 4-6).

Research exploring the impact of outdoor and nature-based activities in the UK is limited, making it difficult for evidence-based activities to be delivered in practice. As highlighted in the previous chapter, a stronger evidence base is required which not only demonstrates the benefits of outdoor and nature-based activities on the wellbeing and quality of life for people living with dementia in the UK, but provides sufficient detail about the development and delivery of effective activities.

#### **3.2. Rationale for study design**

This section describes the ontological, epistemological and methodological perspectives of this research. Firstly, my personal experience is outlined, followed by an overview of the research paradigm is provided and a description of the philosophical stance which underpins the research. Each study design and the rationale for selecting a mixed methods approach are described.

##### **3.2.1. Personal experience**

My professional and personal experience of working and supporting people living with dementia has been a significant motivator for conducting the research presented in this thesis. During my physiotherapy training (BSc Hons Physiotherapy awarded 2014), I worked with

people living with dementia and their caregivers across a number of health and social care settings including: acute hospitals, outpatients and community care. I am aware of the day-to-day challenges faced when navigating a dementia diagnosis and life with dementia. I also believe there are inadequacies within our current health and social care provision for people living with dementia and those caring for them. Much of the existing support for people living with dementia is focused on their acute health, and managing psychological and physical symptoms. Whilst both are important, I feel a more holistic perspective of protecting and promoting quality of life is lacking. Undertaking this research has enabled me to engage in research that has directly impacted on people living with dementia and their caregivers, whilst also contributing to the growing evidence-base demonstrating the potential benefits of outdoor and nature-based activities.

A pragmatic approach (as detailed below) was taken during this research, which was largely influenced by my practical experience of working with people living with dementia and their caregivers in real-world settings. Mixed methods were used to seek a holistic perspective of dementia acknowledging that some factors contributing to wellbeing can be measured quantitatively whilst others cannot. Dementia is a complex and unpredictable disease; symptoms can fluctuate and vary, which can be challenging to manage in practice and a research context. This in part may explain the underrepresentation of the views, experiences and voices of people living with dementia in the current literature. This is something which I sought to address through qualitative methods, whilst acknowledging that much of the existing research evaluating the impact of outdoor and nature-based activities focuses on measurable outcomes such as physical function and facial affect (scores). My previous research experience, as a research assistant and completing an MRes in Rehabilitation Sciences, led me to initially approach this research leaning towards a more quantitative focus. However, my clinical experience, and spending time in the social care sector during the first year of my PhD talking with staff, volunteers, people living with dementia and their families, has shaped my ontological and epistemological position to one that acknowledges the importance of human

experience to fully understand the reality of a phenomenon. Further consideration is given below to the pragmatic approach and philosophical underpinnings, and the mixed methods applied in this research.

### **3.2.2. Overview of the pragmatic paradigm**

The term 'paradigm' is used to describe the stance from which research is conducted, this includes the philosophical assumptions that guide the researcher (Lincoln, Lynham and Guba 2011). Each paradigm takes a different perspective on ontology (what composes reality), epistemology (what knowledge is), and methodology (how knowledge is obtained) (Crotty 2003; Creswell 2009; Johnson and Onwuegbuzie 2004; Lincoln, Lynham and Guba 2011). The paradigm determines and underpins the approach that is used to answer the research question.

A pragmatic research paradigm (Maxcy 2003) involves the use of a philosophical and/or methodological approach that is based on the purpose and the nature of the research phenomenon (Creswell 2003; Tashakkori and Teddlie 1998). Concerning ontology, pragmatism acknowledges that reality exists, but that it is constantly changing due the human experiences and actions making it impossible to fully determine (Morgan 2014). Pragmatic epistemology suggests that knowledge of reality is therefore based on these human experiences, which influence how one views the world around them (Kaushik and Walsh 2019). Thus, pragmatism focuses on methodologies which bring together epistemology and practical methods of acquiring the knowledge, with a focus on human experiences (Morgan 2007; Morgan 2014).

Pragmatism is considered as a set of philosophical tools for answering a research question rather than a philosophical position (Biesta 2010). A pragmatic research paradigm aims to address practical problems and solve research questions within a real-world setting (Morgan 2014). When working in the community and with people living with dementia, a pragmatic approach enabled a flexible approach that utilised methods that were suitable for the

population and the setting. A pragmatic stance acknowledges that the way the researcher views reality, and the world around them, can influence how they conduct research, and considers them as part of the research process (Morgan 2014). The research has been influenced by my educational background and prior experience working with people living with dementia throughout my physiotherapy training. It is through this training and experience working within a healthcare setting that I developed a pragmatic approach to seeking the most effective methods of understanding and addressing a problem or an issue.

The research was initiated with an expectation that it would involve quantitative data collection to analyse the impact of outdoor and nature-based activity interventions. However, it became apparent during the exploratory stages that qualitative research would enable a deeper understanding about the impact of the activity interventions through seeking participant's experiences and perspectives. Furthermore, the voices of people living with dementia are lacking within existing research, yet central to a person-centred approach to dementia care. A pragmatic stance was adopted to support the use of mixed methods, which allowed exploration of the impacts and benefits of the interventions in relation to both objective and subjective factors. A pragmatic stance underpinned the study design, and informed the mixed methods approach as described below.

### **3.2.3. Philosophical stance of the study design**

Pragmatism offers a flexible and practical approach that has shaped both the design and the delivery of the research. The present research is focused on enhancing green dementia care within a practical setting, and therefore lends itself to a pragmatic research paradigm. The lived experiences of people with dementia and those caring for them were central to understanding how outdoor and nature-based activities benefitted their health and wellbeing. The reality of the benefits is dependent on human experiences and the subjective interpretation of these experiences and consequent actions. A pragmatic approach was appropriate for utilising a range of methods in order to understand the benefits and impacts of the activities, from the experiences and perspectives of those taking part, in a practical setting.



Furthermore, the theoretical frameworks and models which informed this research is complementary to a pragmatic approach which is described below.

### **3.2.4. Theoretical frameworks and models and frameworks**

#### **3.2.4.1. *Person-centred care***

The research was conducted in line with a person-centred approach to dementia care through the provision of tailored and adapted outdoor and nature-based activities to meet the interests and capabilities of the participants living with dementia. Green dementia care recognises the potential benefits to health and wellbeing for people living with dementia by connecting to nature and spending time outdoors (Barrett, Evans and Mapes 2019) which may contribute to meeting the psychological needs of people living with dementia as outlined by Kitwood (1997). Whilst person-centred care has become the foundation of good dementia care practice (Brooker 2006; Dewing 2008), Brooker (2003) recognised that the term person-centred care was often used to describe individualised care, which did not have the same focus of supporting personhood that Kitwood (1997) had presented. Brooker (2003) presented the VIPS model of person-centred care to highlight four key components that retained the original concept of Kitwood's work. These four components are: valuing people with dementia and those who care for them (V), treating people as individuals (I), looking at the world from the perspective of the person with dementia (P), and a positive social environment in which the person living with dementia can experience relative wellbeing (S) (Brooker 2003; Brooker 2006; Brooker and Latham 2016).

The components of the VIPS model were considered within the present research. This research was built around valuing people living with dementia, by providing opportunities for people to engage in activities that were perceived to benefit their health and wellbeing, as well as contributing to the evidence-based to help develop green dementia care. Within the component of treating people as individuals, consideration should be given to the activities and occupation a person has available to them which can help them maintain purpose and

engagement with others. This was a critical factor in the design and delivery of purposeful and meaningful activities that supported and encouraged social interaction. The perspective of people living with dementia was highlighted as a gap in the existing literature and therefore, seeking the experiences and perspectives from people living with dementia was a core focus of the evaluation of the present research. Finally, the activity interventions developed and tested were designed to enhance the social opportunities for people living with dementia.

#### ***3.2.4.2. The Eden Alternative Philosophy***

Green dementia care, and the present research, align with the Eden Alternative, a care philosophy for older adults that was originally developed for nursing homes but has since been applied across other residential care settings as well as within the community (Thomas 1994). Although the principles of the Eden Alternative were not specifically designed for people living with dementia, this philosophy has been successfully applied in care settings for people living with dementia (Burgess 2015; Eden Alternative UK). The Eden Alternative includes providing purposeful and meaningful activities to combat loneliness and boredom, and encourages the use of plants, animals and nature (Thomas 1994). The outdoor and nature-based activities delivered in this research sought to provide people living with dementia living in the community, and in an extra care retirement village, opportunities to engage in purposeful and meaningful outdoor and nature-based activities, with a focus on connecting to nature and animals.

#### ***3.2.4.3. Enriched Opportunities Programme – an activity-model in dementia care***

The Enriched Opportunities Programme is a practical working model which promotes meaningful activity for people living with dementia in residential care settings, including extra care (Brooker and Woolley 2007). The Enriched Opportunities Programme involves an ongoing assessment of an individual's needs, carried out by the Locksmith through talking with the person living with dementia, their family and staff, as well carrying out observations (Brooker and Woolley 2007). This model was developed to offer a sustainable activity-based

programme that could be delivered within residential care settings and extra care villages. The Enriched Opportunities Programme includes a broad variety of activities, led by a specialist staff member referred to as a Locksmith, which are flexible and practical, are integrated with the local community, and seek to improve the wellbeing of older people, particularly people living with dementia (Brooker and Woolley 2007; Brooker, Woolley and Lee 2007).

Locksmiths are encouraged to design a programme of activities that meet the interests and needs of the individuals and groups of residents they are working with, which might include reminiscence, art, aromatherapy and sensory stimulation (Brooker and Woolley 2007). The benefits of engaging with the Enriched Opportunities Programme have been highlighted for nursing home residents, who displayed greater levels of wellbeing and participated in a wider variety of activities as a result of the programme (Brooker, Woolley and Lee 2007). This activity model has been applied within the ExtraCare Charitable Trust's retirement villages, which has led to improved quality of life and reduced symptoms of depression for residents living with dementia (Brooker et al. 2011). Furthermore, the research has found that residents living with dementia who engaged in the Enriched Opportunities Programme were less likely to move into a care home or be admitted to hospital (in-patient) (Brooker et al. 2011).

The Enriched Opportunities Programme was delivered at the ExtraCare retirement village in which study 3 (Chapter 6) was conducted – Bournville Gardens, Birmingham, UK. The village had a locksmith, who was called the Dementia and Mental Wellbeing Enabler, and whose role was to support residents living with dementia and poor mental health. In addition, the Dementia and Mental Wellbeing Enabler delivered a programme of activities, as part of the Enriched Opportunities Programme that included, reminiscence, art, knitting and cards, which aligned with the interests and needs of the residents they were working with. The outdoor and nature-based activity programme developed and tested in study 3 was aimed at integrating different activities within the Enriched Opportunities Programme of activities to enable people living with dementia (and cognitive impairment) to connect to nature and spend time outdoors.

Further consideration is given to how the activities were included in the programme, and how existing activities were adapted to incorporate nature in the study chapter.

#### **3.2.4.4. Cognitive stimulation therapy**

Whilst there is no framework for the delivery of outdoor and nature-based activities for people living with dementia, Cognitive Stimulation Therapy (CST) is an activity-based treatment for people living with dementia (Spector et al. 2003). CST was developed following an evaluation of two non-pharmacological therapies for people living with dementia, reality orientation (Spector et al. 2000) and reminiscence therapy (Woods et al. 2018). NICE guidelines recommend using group-based CST for people living with mild to moderate dementia (NICE 2006). CST is delivered as a set programme, across 14 or more sessions held twice weekly (Aguirre, Spector and Streater 2011). The benefits associated with CST include, improved cognitive function, particularly language skills and memory, improved overall quality of life (Spector et al. 2003) and increased social interaction (Spector, Gardner and Orrell 2011).

Eighteen principles guide the design and delivery of CST programmes, which facilitators must incorporate into sessions (Aguirre, Spector and Streater 2011). These principles were used in the design and delivery of the gardening and horticultural activities in study 2 (Chapter 5) and the broader range of outdoor and nature-based activities in study 3 (Chapter 6). Table 3.1 summarises how each principle was applied to outdoor and nature-based activities. Full details of how the principles guided the design and delivery of the activity interventions is presented in each study chapter.

Table 3.1. The principles of cognitive stimulation therapy and how they have been applied to outdoor and nature-based activities in this research

<b>Principle of cognitive stimulation therapy</b>	<b>Application to outdoor and nature-based activities</b>
Mental stimulation	Stimulation from outdoor environments as well as through different activities, including multi-sensory stimulation
New ideas, thoughts and associations	Introducing new ideas through novel activities,
Using orientation, both sensitively and implicitly	Orientation to a new environment through guided walks as well as getting people to orientate themselves when outdoors
Opinions rather than facts	Encouraging expression of opinion and seeking what people know rather than focusing on facts and lots of new information
Using reminiscence as an aid to the here-and-now	Encouraging reminiscence through asking questions about life histories and previous interests and hobbies, draw on familiar environments e.g. gardens and particular activities and plants that might stimulate reminiscence
Providing triggers to aid recall	Use of props linking to activities, involve multi-sensory stimulation e.g. tasting herbs, when delivering activities have instructions to remind people what they are doing – include photographs
Continuity and consistency between sessions	Use the life cycle of plants to continue activities e.g. sowing seeds, watering, harvesting produce Include weekly themes to link activities together
Implicit learning	Allowing people to learn by doing the activities and recognising where people may be able to carry out an activity if they are given the equipment and guided rather than a set of instructions
Stimulating language	Considered in the way activities are introduced and delivered,
Stimulating executive functioning	Engaging people in activities which require focus and attention, encouraging active participation and asking questions about interests and life history to prompt memory
Person-centeredness	Finding out individual interests, assessing cognitive and physical needs, activities providing social opportunities
Respect	Deliver activities in a respectful and ethical way, respect participants, be empathetic and patient
Involvement	Involve people in decision making and choice making, active involvement in the activities
Inclusion	Include people living with dementia both actively and passively, facilitate group so everyone is included, think about the environment and atmosphere
Choice	Offer choices during activities, do not force anyone to take part if they do not want to
Fun	Make activities fun and exciting, combination of new and familiar activities, focus on enjoyment, stimulate discussions
Maximising potential	Support people to be as independent as possible, tailor activities to interests and adapt activities for capabilities, encourage people to have a go
Building/strengthening relationships	Supporting social interactions, use group-based activities, encourage discussion and working together

### **3.2.5. Mixed methods research strategy**

In the context of dementia research, mixed methods provides a practical and flexible approach to conducting research which acknowledges the complexity of the disease (Pritchard and Dewing 2001; Robinson et al. 2011). A key priority within non-pharmacological dementia research is the wellbeing and quality of life of people living with dementia and their caregivers (Robinson et al. 2011; Stirling et al. 2010). Robinson et al. (2011) highlighted that whilst objective measures can indicate wellbeing (e.g. stress) these measures can only be fully understood within the context of people's lives (caregivers and people living with dementia). Robinson et al. (2011) presented a framework for mixed methods in dementia research, the Progressive Engagement approach, which guided the design of the research strategy for the present research.

Firstly, it is important to consider the relationship between a pragmatic approach to dementia research and the use of mixed methods. Pragmatism has been widely associated with the combining of qualitative and quantitative research methods (Creswell 2003; Kaushik and Walsh 2019; Tashakkori and Teddlie 1998) as it offers a "practical and outcome-orientated method of enquiry" (Johnson and Onwuegbuzie 2004). Furthermore, mixed methods have been used in real-world health and social care research (Creswell 2003; Johnstone 2004). Sale, Lochfeld and Brazil (2002) outlined how the use of mixed methods can be simultaneous and sequential to study different components of a phenomenon that have both objective and subjective components, such as wellbeing. Sale, Lochfeld and Brazil (2002) went on to argue that a mixed methods approach to research should be utilised to add to the overall outcome, rather than simply to overcome the weaknesses of qualitative or quantitative methods alone. The present research used simultaneous and sequential mixed methods, in which careful consideration was given to the purpose of the methods applied as well as how the methods were conducted in each study.

Concerning the overall research strategy, a mixed methods approach was used to conduct exploratory research about the delivery of outdoor and nature-based activities to benefit the

wellbeing of people living with dementia. A qualitative exploratory study was conducted first, to seek the experiences and perspectives of individuals delivering outdoor and nature-based activities for people living with dementia. The qualitative data was collected and analysed, and used to inform the design of the two activity interventions presented in Chapter 5 and Chapter 6.

A concurrent mixed methods design (Creswell et al. 2003) was used in both intervention studies to explore the phenomenon – the wellbeing of people living with dementia, from different perspectives, both objectively and subjective. Quantitative and qualitative methods were applied and analysed separately (as described in section 3.4.) and the findings were integrated in order to discuss the impact that two activity interventions had on the wellbeing of people living with dementia. Figure 3.1 depicts the overall research strategy and concurrent mixed methods design of study 2 and 3. Further justification of the mixed methods, with reference to the Progressive Engagement approach presented by Robinson et al. (2011) is provided for each intervention study in section 3.3.

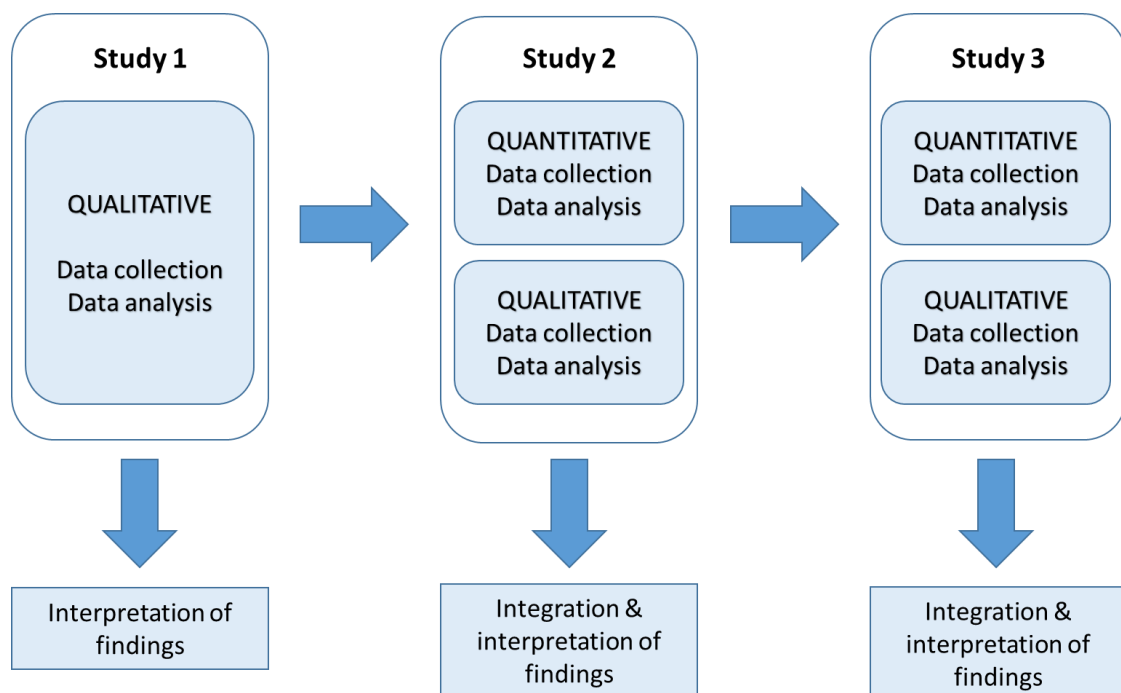


Figure 3.1. Overview of mixed-methods study design

### **3.3. Design of research and studies**

This research includes three studies. Study 1 (Chapter 4) is an exploratory qualitative study that captured the experiences and perspectives of individuals who are delivering and supporting outdoor and nature-based activities for people living with dementia in the UK. The findings from this study informed the design and development of two intervention studies. The first, study 2 (Chapter 5) built on the existing literature and findings from study 1 and involved the development, implementation and evaluation of a horticultural activity intervention delivered at a community garden for people living with dementia in the local community. Study 3 (Chapter 6) further developed an activity intervention that included a broader range of outdoor and nature-based activities, in addition to horticultural activities, delivered for people living with dementia at an extra care retirement village.

The following section outlines the context of each study and provides further justification for the methods of sampling and recruitment, and data collection. Table 3.2 presents a summary of the data collection tools used in each study, and will be referred to throughout the following section. A full description and justification for the design of the activity interventions are presented in Chapter 5 and Chapter 6 respectively.



Table 3.2. A summary of the data collection tools and data analysis

Study	Research method	Participants	Data collection tool	Data analysis	Mode and timing
Study 1: Explorative study	Semi-structured interviews	Activity facilitators	Interview schedule	Qualitative thematic analysis	Single face-to-face or telephone semi-structured interview
Study 2: Intervention study	Observation	People living with dementia	Direct participant observations using an adapted McCann Instrument and field notes	Qualitative thematic analysis	Direct participant observations, 5-minute intervals
	Reflective practice	Staff and volunteers	Gibbs' reflective cycle	Qualitative thematic analysis	Weekly group reflection
	Focus group	Caregivers	Interview schedule	Qualitative thematic analysis	Single focus group, post intervention
Study 2 and 3: Intervention studies	Standardised test with semi-structured interview	People living with dementia and their caregivers	Gottfries-Bråne-Steen Scale	Quantitative descriptive statistics/statistical analysis	Semi-structured interview and questionnaire, pre/post
	Standardised test	People living with dementia	Short Physical Performance Battery	Quantitative descriptive statistics/statistical analysis	Physical function assessment, recorded pre/post intervention
	Standardised test	People living with dementia	Dynamometer - Hand Grip Strength	Quantitative descriptive statistics/statistical analysis	Dynamometer, recorded pre/post intervention
Study 3: Intervention study	Self-report questionnaire	People living with dementia	DEMQOL	Quantitative statistical analysis	Questionnaire, pre/post intervention
	Self-report questionnaire	People living with dementia	Geriatric Depression Scale	Quantitative statistical analysis	Questionnaire, pre/post intervention
	Observation	People living with dementia	Field notes - Greater Cincinnati Chapter Well-being Observation Tool	Qualitative thematic analysis	Direct and retrospective participant observation
	Semi-structured interview	People living with dementia	Interview schedule	Qualitative thematic analysis	Single face-to-face semi-structured interview, post intervention
	Focus group	Student volunteers	Interview schedule	Qualitative thematic analysis	Single focus group post intervention
	Questionnaire	Student volunteers	Questionnaire	Qualitative thematic analysis	Self-reported questionnaire, post intervention
	Reflective practice	PhD researcher	Reflection	Qualitative thematic analysis	Daily self-reflection

### **3.3.1. Study 1**

Study 1 applied qualitative methods, using semi-structured interviews, to explore the experiences and perspectives of individuals delivering and supporting outdoor and nature-based activities for people living with dementia in the UK.

#### ***3.3.1.1. Participant recruitment and sampling***

Purposive and snowball sampling methods were used to recruit participants with expertise and related experience. Purposive sampling offers a technique that involves the recruitment of participants based on their experience and knowledge, in this case of providing outdoor and nature-based activities for people living with dementia (Bernard 2002; Creswell and Plano Clark 2011; Spradley 1979). None of the participants were known prior to beginning the research.

A target minimum sample size of 10 was established based on the concept of information power introduced by Malterud, Siersma and Guassora (2016). Information power poses an alternative to data saturation, which refers to the point at which data becomes repetitive and no new data is gained from additional data collection (Glaser and Staus 1999). Data saturation has been described as the gold standard approach for qualitative research that analyses the data through thematic analysis, as was done in study 1 (Guest, Bunce and Johnson 2006). However, when seeking individual experiences and perspectives it could be argued that new data will always emerge as each experience is unique (Braun and Clarke 2019). Information power offers a pragmatic approach to estimating sample size prior to data collection based on five components whilst also taking into consideration the time constraints and resources available (Green and Thorogood 2004; Malterud, Siersma and Guassora 2016). The five components of information power include: 1) the aim of the study, 2) sample specificity, 3) use of established theory, 4) quality of dialogue and 5) analysis strategy (Malterud, Siersma and Guassora 2016). Using this concept, the present research produced a high information power as the study had a narrow aim - to explore individual's experiences and perspectives of delivering outdoor and nature-based activities for people living with dementia in the UK (within which there is limited existing research and current practice is not well-established). Participants were selected based on expertise and specific experience; therefore,

it was anticipated that the interviews would be in-depth. A systematic and thorough process of thematic analysis was used to analyse the data, capturing the patterns and themes emerging from the data. Braun and Clarke (2019) have supported information power to establish sample size in research that has a narrow focus and specific participant sample and is appropriate for research using thematic analysis.

Malterud, Siersma and Guassora (2016) suggest that a sample of 6-10 can be sufficient in research with a higher information power. It was felt that 10 participants with different scopes of practice, experience and expertise might be sufficient for exploring patterns and answering the research question. From a pragmatic perspective, a minimum of 10 was feasible given the time and resources available during this exploratory phase of the research. Due to the snowball sampling methods applied and good response to the organisational and network emails, more participants than the target sample size were recruited (n=21). The participants represented great variation in their scopes of practice (their roles and the settings in which they worked), their experiences and their personal perspectives about outdoor and nature-based activities for people living with dementia, which resulted in sufficient rich data to conduct an in-depth thematic analysis.

### **3.3.1.2. Data collection methods**

Qualitative semi-structured interviews were used to gain an understanding about the experiences and perspectives of participants. Semi-structured interviews have been widely used within health-related research to seek individual experiences, perspectives and opinions (DiCicco-Bloom and Crabtree 2006; Jamshed 2014). The findings from the literature review (Chapter 2) guided the development of the interview schedule, which sought to explore the benefits of outdoor and nature-based activities from the perspectives of those delivering and supporting the activities in practice. In addition, given the lack of consistent evaluation about the effectiveness of outdoor and nature-based activities and interventions beyond the benefits, questions were included that asked participants about which activities that were successful and unsuccessful, and asked them to consider both group and individual activities, and the environment in which they delivered activities. The full interview schedule is presented in Chapter 4.

Interviews were chosen rather than a focus group as the aim of the research was to seek individual experiences and perspectives, to explore current practices relating to outdoor and nature-based activities across various scopes of practice and a range of settings. Furthermore, interviews were conducted at the convenience of the participants, as the majority were in full-time employment. A semi-structured approach was used to guide the interview, which allowed for further exploration and clarity of the experiences and perspectives that were discussed (Lingard and Kennedy 2010). In addition, it enabled the interview to be tailored to the individual's expertise, experiences and knowledge, and offered flexibility in asking the most relevant questions (McGarth, Palmgren and Liljedahl 2018). The interviews were audio recorded and transcribed; the completed transcripts were returned to participants to confirm accuracy and to improve trustworthiness (Lincoln and Guba 1985). The data was analysed using thematic analysis as presented in section 3.4.

### **3.3.2. Study 2**

Study 2 involved the development and testing of a horticultural activity intervention for people living with dementia, which was delivered at Martineau Gardens, a community garden in Birmingham, UK, that sought to enhance wellbeing.

#### **3.3.2.1. Research setting**

The horticultural activity intervention was delivered at Martineau Gardens by trained horticultural therapists and supported by volunteers. This allowed participants living with dementia to spend time within a garden environment which has shown to benefit health and wellbeing (Blake and Mitchell 2016; Gonzalez and Kirkevold 2013; Whear et al. 2014). Full details about Martineau Gardens is provided in Chapter 5.

#### **3.3.2.2. Participant recruitment and sampling**

Purposive sampling was used to recruit participants, which included people living with dementia and their primary caregiver, as well as staff members and volunteers at Martineau Gardens. No participants were known prior to beginning this research and recruitment was conducted by staff at Martineau Gardens with support from the Rare Dementia Service Birmingham, UK. Based on the

definitions of those involved in user-centred design by Druin (2002), people living with dementia and their caregivers might be seen as ‘users’ in this study as feedback about the intervention was sought at the end of the study as described below. User feedback has contributed to the successful design of assistive technology within health care (Dymond et al. 2012; Moody 2015; Robertson, Hawley and Heron 2010). In addition, staff members and volunteers at Martineau Garden provided weekly feedback to seek ‘expert opinion’ (Dymond et al. 2012; Moody, Long and McCarthy 2014). These data collection methods are outlined in full below.

For pragmatic reasons, recruitment was limited to 4 people living with dementia and their primary caregiver to enable activities to take place within an indoor space due to the time of year (October and November). Given the qualitative focus of this research and triangulation of data from different sources, four participants living with dementia was considered adequate in this study to conduct an in-depth exploration about the effectiveness of the activity intervention and to identify the benefits for people living with dementia based on the concept of information power (Malterud, Siersma and Guassora 2016).

At the time of recruitment, building works in the gardens prevented wheelchair access and therefore, requirement of a wheelchair was listed in the exclusion criteria. Participant involvement was voluntary and participants had the right to withdraw from the research to the point at which the analysis was conducted. As this research included people living with dementia, consideration was given to the way participants were recruited and the language used in written and verbal communication. Guidance from DEEP, the UK network of dementia voices, on language and writing for people living with dementia (DEEP 2013a) was used to develop the participant information sheet. Informed written consent was gained from participants, the ethical considerations of gaining consent from people living with dementia is outlined in section 3.5.2.

### **3.3.2.3. Overview of the intervention**

The development of the horticultural intervention was informed by existing literature and the findings from study 1 (Chapter 4). The 6-week intervention was created with ‘experts’ (Druin 2002), horticultural therapists at Martineau Gardens, who were delivering horticultural activities, and an

Occupational Therapist from the Rare Dementia Service Birmingham, supporting people living with dementia to engage in purposeful and meaningful activities. The horticultural activities were designed to engage participants living with dementia with horticultural processes including, sowing seeds, planting plants and cutting flowers. In addition, the development of the intervention was guided by the current evidence and included a number of the principles of Cognitive Stimulation Therapy (CST). The principles of CTS were utilised to design activities which may enhance wellbeing through mental stimulation, multi-sensory stimulation, implicit learning and would provide a fun and enjoyable experience. The horticultural activities were delivered during a 2-hour session held weekly, on a Monday, at Martineau Gardens. Full details about how the horticultural activity intervention was developed and implemented is presented in Chapter 5.

#### **3.3.2.4. Data collection methods**

Study 2 used a concurrent mixed methods design (Creswell et al. 2003) which applied quantitative and qualitative methods to explore whether the horticultural activity intervention benefitted participant wellbeing (participants living with dementia and their caregivers). Due to the small sample size, the quantitative methods were used to explore the feasibility of measuring objective components of wellbeing in a community garden setting with people living with dementia and included symptoms and physical function. As per the Progressive Engagement approach presented by Robinson et al. (2011), consideration was given to the order in which the data collection was conducted.

The quantitative methods were conducted pre-test and post-test and used standardised tests, as shown in table 3.2. Firstly, symptoms of dementia were assessed using the Gottfries-Bråne-Steen Scale (GBS Scale) (Bråne, Gottfries and Winblad 2001; Gottfries et al. 1982). This was conducted first as it involved an informal interview with the participants living with dementia and their caregivers which was used as an introduction to get to know the participants. Two physical function assessments were then carried out, the Short Physical Performance Battery (SPPB) (Guralnik et al. 1994) and hand grip strength. These were conducted following the GBS Scale in the hope that participants had settled into the garden environment and felt more comfortable carrying out

assessments which may be perceived as ‘tests’. To reassure participants it was clearly explained that the physical function assessments were to see whether the activity intervention had any impact on their overall function and hand grip strength for research interest rather than a pass/fail test.

During the intervention, direct participant observations were conducted using an adapted version of the McCann Instrument (McCann et al. 1997). This observational tool utilised mixed methods to assess participant’s behaviour, facial affect and level of engagement through recording the frequency of such behaviours (quantitative) and documenting the context in which these behaviours were displayed through field notes (qualitative). Qualitative methods were used to record a weekly group-reflection with staff and volunteers using the Gibb’s Reflective Cycle (Gibbs 1988) and to conduct a focus group with caregivers following at the end of the intervention. Justification for each of these data collection tools is presented below.

#### 3.3.2.4.4. Standardised quantitative tests

A summary of the standardised tests for assessing symptoms of dementia and physical function are presented table 3.3 and discussed in more detail below

Table 3.3. Standardised quantitative tests

<b>Tool</b>	<b>Purpose</b>	<b>Reference</b>	<b>Validity</b>	<b>Reliability</b>	<b>Study used in</b>	<b>Previous experience of using</b>
Gottfries-Bråne-Steen Scale	Assess symptoms of dementia	Bråne, Gottfries and Winblad (2001); Gottfries et al. (1982)	✓	✓	Study 2 and 3 Pre and post intervention	Not prior to study 2
Short Physical Performance Battery (SPPB)	Assess lower extremity function	Guralnik et al. (1994)	✓	✓	Study 2 and 3 Pre and post intervention	✓
Dynamometer - Hand Grip Strength	Assess upper limb strength	Roberts et al. (2011)	✓	✓	Study 2 and 3 Pre and post intervention	✓

#### **3.3.2.4.4.1. Gottfries-Bråne-Steen (GBS) Scale**

The GBS Scale (Bråne, Gottfries and Winblad 2001; Gottfries et al. 1982) was used to assess symptoms of dementia before and after the horticultural intervention (Appendix 1). The construction of this scale was influenced by a number of existing scales: Comprehensive Psychopathological Rating Scale (Asberg et al. 1978), Sandoz Clinical Assessment-Geriatric (Shader, Harmatz and Salzman 1974), Geriatric Rating Scale (Adolfsson et al. 1981), Mini Mental State Examination (Folstein, Folstein and McHugh 1975) and Hamilton Depression Rating Scale (Hamilton 1967) to offer more broad assessment of impairments and symptoms experienced by a person living with dementia (Bråne, Gottfries and Winblad 2001). The GBS Scale has demonstrated validity, reliability and sensitivity in identifying the impairments within aspects of a person's intellectual ability, emotional ability and activities of daily living (ADLs), as well as recording other common symptoms of dementia (Bråne, Gottfries and Winblad 2001). The GBS Scale was selected as it uses non-technical language which was straightforward to administer by non-specialists through an informal interview with a person living with dementia and their caregiver (where present) (Bråne and Karlsson 1999; Gottfries et al. 1982).

The GBS Scale assesses symptoms of dementia relating to the level of impairment across four categories: intellectual impairment (12 items), emotional impairment (3 items), and impairment of ADLs (6 items), and other symptoms common in dementia (6 items). Each item is scored between 0 (least impairment) and 6 (greatest impairment). An informal interview was conducted with each participant living with dementia and their caregiver to firstly ask about their dementia diagnosis and symptoms which they experienced, participants were also asked about their daily lives and general routine. A number of specific questions were asked that directly related to some of the items in the GBS Scale for example, whether the participants living with dementia require any assistance with washing and dressing and who carries out household tasks such as cooking and cleaning. Participants living with dementia were also asked about their personal interests and history such as where they grew up, questions about their family and what their occupation was/is. Other items in the scale were completed following the discussion based on an interpretation of the level of impairment for items such as orientation to space and language disturbance.



The GBS Scale provided an overview of the level of impairment and the symptoms experienced by the participants living with dementia. In addition, it gave insight into the dynamic of relationships between those living with dementia and their caregiver and their roles and responsibilities, as well as their hobbies and interests. It also highlighted where participants might need specific support to engage in the horticultural activity intervention which enabled adaptations to be made and the necessary support provided. The full protocol for conducting the GBS Scale is outlined below.

*Intellectual impairment (12 items):* Participants living with dementia were asked about their day and how they were feeling, as well as and what made them want to take part in the study. Participants were also asked when a diagnosis of dementia was given. Questions were included to assess orientation to time, space and people. Recent memory was assessed by asking the participants living with dementia what they had been doing in the previous week, particularly outdoor activities such as gardening or visiting parks. Participant's long-term memory was continually assessed through questions about their occupation and hobbies/leisure activities throughout their lifetime. Other items, wakefulness, concentration, ability to increase tempo, absentmindedness, distractibility and language disturbances, were observed throughout the interview and scored afterwards.

*Emotional impairment (3 items):* Emotional functions, emotional liability and motivation was observed throughout and scoring completed afterwards. Participants were asked what activities they like to do, and what they would like to do as part of the programme in order to assess their motivations.

*Impairment of ADLs (6 items):* Participants living with dementia were asked about their daily lives including what activities they like to do at home, what are their favourite meals, who does the food shopping and cooking. Specific questions about washing, dressing and toileting routines were asked as these were often not covered by participants initially. On a couple of occasions caregivers provided additional information about the level of support that the participant living with dementia required where this had not been identified or participants required more support than they indicated.

*Other symptoms of dementia (6 items):* Other symptoms included: confusion, irritability, anxiety, fear-panic, depressive mood and restlessness, and were observed throughout and scored afterwards.

A total score was reported which indicated the level of impairment and highlighted the severity of a person's symptoms of dementia.

#### **3.3.2.4.4.2. Short Physical Performance Battery (SPPB)**

The SPPB was used to assess lower extremity function in the participant's living with dementia (Guralnik et al. 1994) (Appendix 2). The SPPB is a valid and reliable measure that has been widely used both within research and practice (Mijnarends et al. 2013). In addition, the SPPB is low-risk to administer in an older adult population, therefore was considered safe to use in a community garden setting. The SPPB scores a person's ability to perform three tests that assess balance, walking speed and lower-limb strength using sit-to-stand. A total score for the SPPB is given ranging from 0 (worst performance) to 12 (best performance), this score was recorded as well as individual scores for each test. The SPPB has been shown to be a strong predictor of disability in older adults ( $\geq 65$  years) (Guralnik et al. 2000, 1995; Wennie Huang et al. 2010) and a predictor of institutionalisation (moving into a care home or nursing home) (Ferrucci et al. 2004; Miller et al. 2008). The SPPB was administered as per the following protocol:

*Balance Test (max score 4):* Participants performed 3 timed balance tests - feet side-by-side, a semi-tandem stance and a tandem stance with the aim of maintaining their balance unsupported for 10 seconds. Participants scored 1 if they could maintain side-by-side and semi-tandem stance and 2 if they maintained tandem stance for 10 seconds. If participant could not maintain their balance for 10 seconds, the total time held was recorded and scored as 0 for the side-by-side and semi-tandem stance and for the tandem stance a score of 1 was given for times between 3 and 9.99 seconds and 0 if less than 3 seconds. Participants were advised that they could use their arms to steady themselves or move their body and bend their knees to maintain balance but they could not move their feet. To reduce fear of falling, someone stood close by in case the participant become unsteady.

*Gait Speed:* Participants were asked to complete two timed walking tests over a 4m course. On the first test, participants were instructed to walk the length of the course at their normal walking speed, the speed they would walk to the shops or down the street at. Participants were asked to stop at the end of the course. The timer would start when participant began walking and would stop when one of their feet completely crossed the end line. The only difference on the second walking test was that participants were instructed to walk beyond the end of the course, the timer was stopped as soon as their first foot completely crossed the line. The faster of the two tests was scored as follows, 1 point >8.7 seconds, 2 points 6.21-8.7 seconds, 3 points 4.82-6.2 seconds and 4 points <4.82 seconds.

*Chair Stand:* Participants were asked to perform two chair stand tests, the same chair was used for each participant (different between participants). Participants began seated with their arms crossed over their chest and their feet flat on the floor shoulder width apart. They were asked to avoid using their arms to stand. The first test was a single sit-to-stand, and was used to assess whether the participant could carry out the test safely. If so, they progressed to the repeated sit-to-stand. Participants were instructed to repeat the sit to stand 5 times, and were timed whilst doing so. Scores were based on the time taken to complete 5 sit-to-stands as follows, 0 points if the participant was unable to complete 5 stands <60 seconds or did not complete 5 stands, 1 point >16.70 seconds, 2 points 13.7-16.69 seconds, 3 points 11.2-13.69 seconds and 4 points <11.19 seconds.

#### **3.3.2.4.4.3. Hand Grip Strength**

Hand grip strength offered a simple, reliable, valid and inexpensive method of assessing the muscular strength of the participants living with dementia, which has been found to indicate overall muscular strength (Al Snih et al. 2004; Duchowny, Clarke and Peterson 2018; Lauretani et al. 2003; McGrath et al. 2018). Furthermore, Stevens et al. (2012) suggested that hand grip strength offers a good marker of physical performance that is comparable with the SPPB, based on a group of 629 community-dwelling older adults. Hand grip strength was measured using a JAMAR handheld dynamometer (Model J00105, JAMAR Technologies; Philadelphia, USA).

Hand grip strength measurements were conducted following the protocol by Roberts et al. (2011) as follows. Participants were seated with their arm by the side of their body and the elbow flexed at 90°, their wrist was relaxed between 0-30°. Participants were asked to hold the dynamometer firstly in their right hand and when instructed, to squeeze their hand as hard as possible until the dynamometer recorded the strength before relaxing. Three measurements were recorded for the right hand and then the left hand. The maximum and average grip strength was recorded for each hand. Hand dominance was noted.

#### **3.3.2.4.1. Adapted McCann Instrument**

Participant observations were conducted using an adapted version of the McCann instrument (McCann et al. 1997) to record participant's behaviour, facial affect and level of engagement during the horticultural activity sessions (Appendix 3). Dementia Care Mapping™ (Bradford Dementia Group 1997) has been used previously to explore participant's behaviour, facial affect and level of engagement during gardening and horticultural activities (Hall et al. 2016; Gigliotti, Jarrott and Yorgason 2004; Jarrott and Gigliotti 2005). However, it was designed to assess the quality of person-centred dementia care within a formal care setting which was not the purpose of this research. Furthermore, costly and lengthy training is required to use Dementia Care Mapping™ (Bradford Dementia Group 1997) whilst the McCann Instrument was freely accessible. Although no formal training was required, the use of the McCann Instrument was piloted in a care home setting to record the behaviour, facial affect and levels of engagement in residents living with dementia.

The McCann Instrument has demonstrated convergent validity, and previous research demonstrated a more sensitive measure of a person's behaviour, facial affect and level of engagement using the McCann Instrument than that reported by staff (Curyto, van Haitsma and Vriesman 2008; McCann et al. 1997). This is important as inconsistencies with staff reported data was included as a limitation within the existing evidence-based of gardening and horticultural activities for people living with dementia. It has also been previously used to observe behaviour, facial affect and levels of engagement during specific recreational activity for people living with dementia (Schreiner, Yamamoto and Shiotani 2005).

As stated, the McCann Instrument uses a quantitative method to record the frequency of specific behaviours, facial affect presentations, and levels of engagement. Qualitative field notes are recorded to provide detail about the context and further information about the participant's behaviours, facial affect, and levels of engagement. This approach supports the approach by Robinson et al. (2011) who stated that objective measures were only meaningful if considered in the context.

Observations were conducted during the activity sessions at 5-minute intervals, the order of participant observations was randomly generated. Full details are provided in Chapter 5.

#### **3.3.2.4.3. Gibbs' Reflective Cycle**

The Gibbs' Reflective Cycle (Gibbs 1988) was used to conduct weekly group reflections involving staff and volunteers (Appendix 4). Undertaking reflective practice contributes to the process of learning and developing through evaluating experiences and practices and is commonly undertaken by healthcare professionals as a key component of professional and service development (Boud, Keogh and Walker 1985; Boyd and Fales 1983). Benefits of undertaking reflective practice include: increased learning from a specific situation, identification of strengths and weaknesses, provision of feedback and improvements to personal and professional confidence (Davies 2012). In addition, a relationship between the process of reflection and the development of person-centred practice has been highlighted (McCormack and McCance 2010; McCormack et al. 2015).

D'Andrea, Batavia and Sasson (2007) and Hewitt et al. (2013) both reported using group discussions following the gardening and horticultural activity sessions to reflect on the activities but neither included details about whether reflective tools were used and no data was formally collected during these discussions. The group reflection was used to evaluate the successes and challenges of the activities and the overall session. This highlighted issues and prompted future adaptations for subsequent session and develop a future action plan for the remaining activities (Davies 2012). The Gibbs' Reflective Cycle was used over other reflective tools (such as those by Driscoll 2007; Gibbs 1988; Kolb and Fry 1975; Rolfe, Freshwater and Jasper 2001) as it provided a clear, simple

and efficient method of guiding and recording reflective discussions. In addition, one of the horticultural therapists regularly used this tool within their practice. Gibbs (1988) advocated the use of the cycle to reflect on repeated experiences, such as ongoing activity sessions with the same group of participants, as was the case in study 2.

The process of reflection also provided an opportunity for staff and volunteers to share their observations about participant's behaviour, facial affect and levels of engagement during each session that may not have been identified or recorded during the direct observations offering a broader and more truthful insight into the impact of the activities.

#### **3.3.2.4.2. Focus group**

At the end of the intervention, a focus group was conducted with caregivers to seek their views and opinions about the horticultural activity intervention. Focus groups are a long-standing method of collecting the personal views of a similar group of people with a shared experience (Merton, Fiske and Kendall 1990; McLafferty 2004; Morgan 1996). A focus group was selected over one-to-one interviews as it is recognised that caregivers often have a heavy burden as a result of their caregiving role and responsibilities (Michon et al. 2005) and it was thought that a group environment may be more supportive, and not add to their stress (Robinson et al. 2011).

The focus group followed a semi-structured, open-ended interview schedule that allowed flexibility and for all participants to contribute. Questions were informed by the existing research which has predominantly focused on the perspective of caregivers when considering the benefits associated with outdoor and nature-based activities. Care was taken to welcome everyone to the group and make them feel comfortable (using the lounge area and providing hot drinks and biscuits). During the focus group, efforts were made to include each participant in the discussion and seek answers from everyone. The focus group was audio recorded and transcribed, the data was included in the thematic analysis.

### **3.3.3. Study 3**

Study 3 expanded on the horticultural activity intervention and involved the development and testing of a broader outdoor and nature-based activity intervention which included gardening and horticultural activities, walking, outdoor games, nature-based indoor activities and animal-related activities. This outdoor and nature-based activity intervention was delivered for people living with dementia and cognitive impairment in Bournville Gardens, an ExtraCare retirement village, in Birmingham, UK. The activity intervention aimed to support the wellbeing of residents living with dementia and cognitive impairment at Bournville Gardens and to explore how outdoor and nature-based activities could be integrated into the existing Enriched Opportunities Programme delivered by the Dementia and Mental Wellbeing Enabler to promote green dementia care.

#### **3.3.3.1. Research setting**

This study was based at Bournville Gardens. Although there is a lack of provision for people living with dementia in the community to engage in outdoor and nature-based activities (Clark et al. 2013) this research was conducted in an extra care village that is open to members of the wider community. Only residents were recruited in this study, however, it was hoped that if this research could show that effective outdoor and nature-based activities could be delivered on-site, people living with dementia in the local community may be able to attend in the future to address the lack of provision. Furthermore, residents at Bournville Gardens have the freedom to engage in community-based activities, which enabled a range of off-site activities to be included in the activity intervention. The rationale behind the different off-site activities can be found in Chapter 6. The majority of the activities were delivered at Bournville Gardens, however as stated, weekly off-site activities were organised in the local community. These off-site activities were all within a 5-mile radius of Bournville Gardens to increase the ease of visiting and introduce participants to organisations and outdoor environments within their local community.

### **3.3.3.2. Participant recruitment and sampling**

Purposive sampling was used to recruit people living with dementia and/or cognitive impairment residing at Bournville Gardens, who had an interest in outdoor and nature-based activities. The inclusion of people living with cognitive impairment recognised a number of residents who had mild cognitive impairment (MCI) as well as those with suspected dementia without a formal diagnosis. Research has shown that 14-17% of extra care residents are living with dementia and a further 7-8% have suspected/undiagnosed dementia (Housing and Dementia Research Consortium, in Barrett, Evans and Mapes 2019). User feedback (Dymond et al. 2012; Moody 2015; Robertson, Hawley and Heron 2010) and expert opinion (Dymond et al. 2012; Moody, Long and McCarthy 2014) sought in the previous study, contributed to the design of the activity intervention delivered here. As well as providing feedback at the end of the intervention, participants living with dementia and cognitive impairment were invited as 'informants' (Druin 2002) to contribute to the design of the activity programme as detailed below.

Due to the practical logistics of delivering activities, especially off-site activities, recruitment for this study was 20 residents. This number was felt sufficient to collect rich in-depth data and meet the aims and objectives of this study (Malterud, Siersma and Guassora 2016). Sample sizes within existing outdoor and nature-based activities vary greatly. Whilst group-based activities are recommended, consideration must be given to the support available for participants to ensure they can engage in the activities (Jarrott and Gigliotti 2010; Watts and Hsieh 2015). The Dementia and Mental Wellbeing Enabler supported recruitment as outlined in Chapter 6.

As participants at Bournville Gardens live independently there was no formal requirement to provide additional support during the activities (to satisfy the risk assessment). However, based on the existing literature and findings from study 1, student volunteers were recruited to support participants and assist with the delivery of activities. Student volunteers were also recruited using purposive sampling, as students studying occupational therapy and physiotherapy at Coventry University were approached.



### **3.3.3.3. Overview of the intervention**

The development of the 12-week outdoor and nature-based activity intervention was informed by existing literature and the findings from study 1 and study 2. Activities were included that represented the three main areas of outdoor and nature-based activity, gardening and horticulture, green exercise and animal-related. The outdoor and nature-based activity intervention was created with the Dementia and Mental Wellbeing Enabler to align with the existing Enriched Opportunities Programme they delivered for residents living with dementia and poor mental health. In addition, participants living with dementia and/or cognitive impairment were involved as informants (Druin 2002) in the design of the activity programme prior to the start of the intervention and throughout. This was to ensure that a broad variety of activities were included to meet specific interests, preferences and hobbies of participants. Designing and planning activities also involved a number of local organisations, including Martineau Gardens. Staff and volunteers at these organisations acted as both experts and informants (Druin 2002) to share their experiences of supporting a wide variety of people within their settings and to engage in outdoor and nature-based activities. The outdoor and nature-based activities were designed to connect participants living with dementia and cognitive impairment at Bournville Gardens to nature and encourage them to spend time outdoors, and to engage with activities within the wider community.

Following the successful utilisation of the principles of CTS to guide the development of the horticultural activity intervention in study 2, the principles were considered in relation to the outdoor and nature-based activities in study 3. This also assisted in tailoring activities that were not designed solely for people living with dementia to focus on providing mental stimulation and sensory stimulation, and meeting the needs of the participants. Full details about how the outdoor and nature-based activity intervention was developed is presented in Chapter 6. The outdoor and nature-based activities were delivered during 2-hour sessions over 4 days of the week (to reflect the days the Dementia and Mental Wellbeing Enabler worked).

#### **3.3.3.4. Data collection methods**

Study 3 used a concurrent mixed method design (Creswell et al. 2003) which applied quantitative and qualitative methods to explore how an outdoor and nature-based activity intervention could benefit the wellbeing of residents living with dementia and cognitive impairment in an extra care retirement village. The quantitative methods were conducted pre-test and post-test and included the GBS Scale, and SPPB and handgrip strength. Following the positive experiences of conducting the GBS Scale prior to the SPPB and hand grip strength measurements in study 2, the same approach was used in this study. In addition, the GBS Scale highlighted where participants had cognitive impairments which may impact on their ability to complete the two subsequent assessments that were conducted pre-test and post-test. Again, based on person-centred considerations about the order of data collection (Robinson et al. 2011) two researcher administered questionnaires that assessed participant's perceived quality of life and depressive symptoms were conducted after the GBS Scale and physical function assessments had been carried out. This was to make participants feel more comfortable and relaxed prior to asking them to respond to both questionnaires.

The DEMQOL (Smith et al. 2005), a dementia-specific quality of life measure, was conducted first to assess perceived quality of life. Following this, the Geriatric Depression Scale (GDS) (Yesavage et al. 1983) was used to assess depressive symptoms. A decision was made to conduct the DEMQOL first, although it included potentially sensitive questions, it was felt that the some of the questions in the GDS may cause participants to become upset and may impact on the DEMQOL results. Ethical consideration was given when selecting and administering both questionnaires, which is outlined in section 3.5.

During the outdoor and nature-based activity intervention, observations and reflections were used to record the participant's behaviour, levels of engagement and activities. The approach used in study 3 differed to that used in study 2, and was driven by a more pragmatic approach to enable a more flexible method of conducting observations on the whole group. The Greater Cincinnati Chapter Well-being Observational Tool, based on Lawton's domains of quality of life (Lawton 1991),

was used to record participant's behaviour, levels of engagement and activities within the 7 domains of wellbeing. Further details are provided below.

At the end of the outdoor and nature-based activity intervention a focus group was held with student volunteers to explore their experiences and perspectives. Qualitative methods were also utilised through the use of semi-structured interviews with participants living with dementia and/or cognitive impairment. These interviews were conducted prior to repeating the quantitative assessments (GBS Scale, SPPB, hand grip strength, DEMQOL and GDS). Justification for each of these data collection tools is presented below.

#### **3.3.3.4.1. Standardised quantitative tests**

##### **3.3.3.4.1.1. Gottfries-Bråne-Steen Scale**

The GBS-Scale was conducted as per the protocol outlined above (in relation to study 2) however, a number of participants lived alone and therefore the informal interview was only conducted with the participant living with dementia and/or cognitive impairment.

##### **3.3.3.4.1.2. The SPPB and hand grip strength**

The SPPB and hand grip strength were assessed following the protocols outlined above (in relation to study 2). As assessments were conducted in participant's own homes, a note was made during the SPPB about the chair used for the sit-to-stand test to ensure the same chair was used at pre-test and post-test.

##### **3.3.3.4.2. DEMQOL**

The DEMQOL, a dementia specific quality of life measure, was used to assess the health-related quality of life of participants living with dementia and/or cognitive impairment (Smith et al. 2005) (Appendix 5). This interviewer administered questionnaire (in this case researcher) helps avoid misinterpretation and confusion when answering a series of 28 questions which indicate quality of life. The DEMQOL has demonstrated validity and reliability for evaluating health-related quality of life in people living with dementia and cognitive impairment, and has shown comparable

psychometric properties to the highest standard of other dementia-specific measures (Banerjee et al. 2008; Smith et al. 2005; Smith et al. 2007).

Participants were asked to select one of four options - a lot, quite a bit, a little or not at all, to describe how they had felt in the past week about their feelings (13 items), memory (6 items) and their everyday life (9 items). Follow-up questions were used to gain more information about why the person was feeling like that. Participants were then asked to rate their overall quality of life as very good, good, fair or poor. For each item, and their overall quality of life, a score is given. The overall score provides an indicator of how they perceive their quality of life, a higher score indicates a greater quality of life. The DEMQOL was used to assess whether the outdoor and nature-based activity intervention had an impact on perceived quality of life. This assessment tool was selected as there also a DEMQOL-proxy that can be used to ask caregivers to provide a proxy report of a person's quality of life if they are unable to complete the DEMQOL themselves, this was not necessary for any participants included in the study but was included in the ethics application. Full details of how the DEMQOL was conducted is presented in Chapter 6.

#### **3.3.3.4.3. Geriatric Depression Scale**

The Geriatric Depression Scale (GDS) was used to measure self-reported depression (Appendix 6). The GDS is a 30-item rating scale shown to be a valid and reliable measure of depression in elderly populations (Yesavage et al. 1983) and for people living with dementia (Crook, Feher and Larrabee 1992; Lach, Chang and Edwards 2010). There is also the 15-item version of the GDS which has shown to be useful for elderly people (> 85 years) with greater cognitive impairment (Conradsson et al. 2013; Sheikh and Yesavage 1986) however, this was not required in this study. Although the Cornell Scale for Depression in Dementia (Alexopoulos et al. 1998) has been described as the gold standard, it requires an 'informant' to be present (most commonly family caregiver) which could not be guaranteed in this study (Kørner et al. 2006). Therefore, the GDS was selected as it is completed based on only the responses of the person living with dementia.

#### **3.3.3.4.4. Greater Cincinnati Chapter Well-being Observational Tool©**

The participant observation conducted in study 3 was driven by a pragmatic approach, which enabled a more flexible method to be used. The Greater Cincinnati Chapter Well-being Observational Tool, based on Lawton's domains of quality of life (Lawton 1991) was used, to record field notes about participant's behaviours, levels of engagement and activities within the 7 domains of wellbeing. An additional category 'other' was added to capture any other behaviours or incidences that were considered important (Appendix 7).

The Greater Cincinnati Chapter Well-being Observational Tool has been used with people living with dementia who are engaged in an activity (Kinney and Rentz 2005) and has been successfully used to evaluate an arts-based activity programme for people living with dementia (Algar, Woods and Windle 2014; Rentz 2002). Test-retest reliability for the Greater Cincinnati Chapter Well-being Observational Tool was not determined by Kinney and Rentz (2005) who justified omitting this test based on the "inherent variability in the behaviour of individuals with dementia" (p.222). Whilst not specifically measured in this research, validity of the Greater Cincinnati Chapter Well-being Observational Tool is evident due to the strong correlation with the theoretical constructs (works of Lawton 1991) underpinning the measure (Algar, Woods and Windle 2014). Pilot observations were conducted at Bournville Gardens prior to the intervention beginning, this data was not included in the analysis. This tool was selected as it offered flexibility to record the behaviour, engagement and activity of the whole group and of individuals, whilst activities were being delivered. It also focused the observations that related to participant wellbeing.

#### **3.3.3.4.5. *Researcher reflection***

Daily reflections were conducted using Gibbs' Reflective Cycle (Gibbs 1998) to evaluate the successes and challenges associated with the outdoor and nature-based activities. During these reflections, consideration was given to how effective the activities had been in meeting the CST principles.

### 3.3.3.4.6. Interviews

Semi-structured interviews were carried out with the participants living with dementia and/or cognitive impairment at the end of the 12-week intervention. The purpose of the interviews was to explore each participant's experience and perspective, as well as seek their overall opinion about the importance of connecting to nature. As participants were able to select which activities to attend, each person's experience was likely to be very different. Using semi-structured interviews within a pragmatic approach enabled the interview to be tailored to the aspects of the activity intervention that the participant engaged with, to ask the most relevant questions (for example, not asking participants about the off-site activities where they didn't attend, instead asking why they didn't attend) (McGarth, Palmgren and Liljedahl 2018).

The perspectives of participants living with dementia were sought during an informal discussion at the end of the activity sessions in study 2, which was captured in the observations to an extent. However, this did not provide the in-depth insight into the participant's experiences and perspectives and therefore, semi-structured interviews were conducted in study 3. Interviews with participants have contributed to a greater understanding about the benefits of outdoor and nature-based activities (Mapes et al. 2016; Noone and Jenkins 2018; Smith-Carrier et al. 2019). It is also important to recognise that wellbeing includes subjective components, and therefore, to fully understand the impact of the activities on an individual's wellbeing qualitative semi-structured interviews enabled and understanding of the subjective experiences of participants. Furthermore, in order to conduct research that is truly person-centred and ethical, it was important to recognise and value the contribution that participants made to the research and enable them to share their views and opinions about the activities and the intervention.

The interviews were audio recorded and transcribed, notes were also made during the interview which were summarised to the participant. This was done rather than sending them the transcript to review, to avoid participant burden and due to levels of cognitive impairment, it provided a more reliable confirmation that the responses given in the interview reflected how participants were feeling after the activity intervention had ended.

#### **3.3.3.4.7. Focus group and questionnaire**

To collect the experiences and perspectives of student volunteers, a focus group was conducted at the end of the intervention. A semi-structured schedule allowed for flexibility and captured contributions from all participants. The focus group was audio recorded and transcribed for the analysis. Two participants were not able to attend the focus group therefore, their feedback was sought through questionnaires using the same questions that were included in the focus group.

### **3.4. Data Analysis**

An overview of the data analysis methods for the quantitative and qualitative data collected in this research is given below. Full details about how each analysis was conducted is presented for each study in Chapters 4, 5, and 6.

#### **3.4.1. Descriptive and statistical analysis**

Quantitative data was collected in study 2 and study 3, table 3.4 provides an overview of the data analysis methods used for each tool. Quantitative data was analysed using IBM SPSS (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp).

Table 3.4. Quantitative data collection tools and analysis

<b>Data Collection Tool</b>	<b>Output</b>	<b>Analysis</b>
Gottfries-Bråne-Stein (GBS) Scale	Total score Sub-section scores: GBS-I, GBS-E, GBS-ADL	Study 2: descriptive statistics comparing pre/post measures  Study 3: statistical analysis comparing pre/post measures
Short Physical Performance Battery (SPPB)	Total score Sub-section scores: balance, gait, sit-to-stand	Study 2: descriptive statistics comparing pre/post measures  Study 3: statistical analysis comparing pre/post measures
Hand Grip Strength	Mean and peak score for left and right hand	Study 2: descriptive statistics comparing pre/post measures  Study 3: statistical analysis comparing pre/post measures
DEMQOL	Each item scored Total score	Study 3: statistical analysis comparing pre/post measures
Geriatric Depression Scale (GDS)	Total score	Study 3: statistical analysis comparing pre/post measures

Due to the small sample size in study 2, and the primary purpose of conducting the GBS Scale, SPPB and hand grip strength measures to check the feasibility of using the tools, only descriptive statistics were carried out to comment on the difference between participants and any changes in pre and post intervention measures.

In study 3, statistical analysis was performed to test for differences in scores from the GBS Scale, SPPB, DEMQOL, GDS and hand grip strength measures, following the intervention. Data was assessed for normal distribution using the Shapiro-Wilk Test. Normally distributed data was analysed using a Paired T-Test (hand grip strength, DEMQOL and GDS scores), whilst non-normally distributed data was analysed using the Wilcoxon test (SPPB and GBS Scale scores). Full details can be found in Chapter 6.



### 3.4.2. Thematic analysis

Consideration was given to the type of analysis used to explore the qualitative data collected in this research. For the reasons outlined below, thematic analysis was used in each study. Table 3.5 provides an overview of the qualitative data outputs that were included in this analysis.

Table 3.5. Qualitative data collection methods and analysis

<b>Data Collection Tool</b>	<b>Output</b>	<b>Analysis</b>
Interview	Audio recordings transcribed verbatim	Study 1: thematic analysis Study 3: thematic analysis
Observation	Written field notes	Study 2: thematic analysis Study 3: thematic analysis
Reflection	Written notes	Study 2: thematic analysis Study 3: thematic analysis
Focus group	Audio recordings transcribed verbatim	Study 2: thematic analysis Study 3: thematic analysis
Questionnaire	Written response	Study 3: thematic analysis

Boyatzis (1998) presented thematic analysis as a systematic method of identifying, organising, analysing and describing themes which emerge from the data that could be utilised for a number of qualitative methodologies and is situated within a realist/post-positivist position. Later, Braun and Clarke (2006) proposed that thematic analysis was a qualitative method in its own right and provided a protocol for in-depth thematic analysis. In this research a systematic process in line with Boyatzis (1998) and the guidance of Braun and Clarke (2006) was followed to allow for an organised but flexible approach to conducting thematic analysis. The thematic analysis was conducted using a pragmatic approach and included data triangulation of qualitative data in study 2 and 3 to increase the credibility and overall trustworthiness of the analysis (Bryman and Bell 2003). The aim of the analysis was to identify, analyse and report patterns and themes within the data enabling the evaluation of the themes within the wider research topic as suggested by Braun and Clarke (2006).

It is important to acknowledge that one's own philosophical positions and values are relevant to not only the methodological approach but the process of data analysis (Braun and Clarke 2006). This

research was conducted from a pragmatic perspective and consequently, the thematic analysis conducted in this thesis reflected the personal experiences and the world-view of both the participants and myself as the researcher and person undertaking the analysis. The process presented by Braun and Clarke (2006) was used to increase the trustworthiness and rigor of the research.

The thematic analysis consisted of six phases: 1) Familiarisation of the data, 2) Generating initial codes, 3) Searching for themes, 4) Reviewing themes, 5) Defining and naming themes, 6) Presenting the findings (Braun and Clarke 2006). NVivo (Version 12 Pro for Windows, ©QSR International), a qualitative data analysis computer software, was used to aid the analysis process. Specific terminology used within the description of the thematic analysis process include 'dataset' to refer to all the data within one analysis, and 'codebook' which refers to the compilation of codes for each analysis, sometimes with codes at different hierarchical level.

As the data in this research was primary data there was prior knowledge of what the data consisted of at the beginning of phase 1, familiarisation of the data. This included the processes of transcribing and preparing the data, as well as reading and re-reading both the raw data and transcripts to ensure I was familiar with the content. During phase 2, initial codes were generated based on the potential ideas and themes that had emerged from within the data. Data was coded systematically, taking time to understand the context, to avoid missing anything of importance or interest. This process was done systematically as advised by (Braun and Clarke 2006) to ensure no data was missed, and whilst it was beneficial to organise codes into meaningful groups, this was not confused with the generation of themes (Tuckett 2005). Addressing criticisms of Bryman (2001) the data was coded inclusively to avoid loss of context. In the first wave of coding a sub-sample of the data was coded, during which the codes were developed and modified. This resulted in an initial codebook.

The codebook was discussed with the supervisory team following guidance from Lincoln and Guba (1985). At this point, an intra-coder reliability test was carried, as suggested by Boyatzis (1998), as there was only one coder. The data nor codebook were looked at for 2 weeks, after which the same sub-sample of data was recoded. A reliability comparison was conducted to compare the similarity

of two sets of coded data using a Kappa co-efficient value to determine the intra-coder reliability (Altman 1991). The Kappa co-efficient for each analysis is detailed in the study chapter (Chapters 4, 5, and 6). Braun and Clarke (2006) have criticised this process claiming it does not allow for full flexibility of the person conducting the analysis however, it does highlight the reliability of a single coder and validate them using the codebook which was appropriate for this research.

Following this intra-coder reliability test, the codebook was modified to differentiate between data that had been inconsistently coded (Kappa co-efficient value  $<0.80$ ). The remaining data was then coded and further codes were added as needed. To support the coding process, criteria for each code was outlined with a full description and guidance about when to use and not. An excerpt of each codebook including the criteria can be found in each study chapter and each full codebook is in the appendices. After the data was coded, themes were developed through a process of sorting and organising the codes. During this third phase, the coded data was reviewed to ensure its relevance to the code and proposed theme. Using the 'Explore' function in NVivo, a 'Text Search Query' using key words relating to the proposed themes was conducted to search the full dataset to check for any data that had been missed from the coding. A thematic map was produced for each analysis to explore the relationship between codes and how they contributed to the themes. The proposed themes were discussed with the supervisory team who provided feedback on the suitability and credibility of each theme, the codebook and the data (Lincoln and Guba 1985).

Following this discussion, the themes were reviewed and refined to ensure they accurately represented the data and had sufficient supporting data. In this fourth phase, the coded extracts were reviewed to ensure they formed a coherent pattern and related to the theme. The thematic map was reviewed until it was representative of the coded data and the themes identified and a final review of the entire data set was carried out. Again, these themes were shared with the supervisory team for feedback. The final thematic maps for each analysis, which shows the relationship between themes and codes, can be found in each study chapter. Phase 5 began once the themes had been confirmed, and involved defining and naming each theme that would be presented in the analysis reporting (phase 6). For each analysis, a table showing the themes and a brief description is given in each study chapter.

### **3.4.3. Data quality and integrity**

Quantitative data was checked against raw data twice to ensure accuracy. The statistical analysis was also performed twice to ensure it had been done correctly. The use of standardised, valid and reliable measures increased the quality of data collection. In order to establish trustworthiness within the qualitative research, the criteria recognised by Lincoln and Guba (1985) was used. Credibility relates to the agreeability between the participant's perspectives and the researcher's representation of them, and the extent at which the research represents the truth (Lincoln and Guba 1985; Mills, Durepos and Wiebe 2010; Tobin and Begley 2004). Purposive sampling was used in all studies to select participants with specific expertise, experiences and/or characteristics that related to the aims and objectives of each study, which aids the credibility of the research findings. Across all three studies, interviews and focus groups were audio recorded and transcribed verbatim to ensure the transcripts were an accurate representation of the original perspectives and voices of the participants. Furthermore, member checking was used in study 1 to confirm that the transcript represented the interview conversation. Member checking was conducted with participants living with dementia in study 3 by repeating their responses back to them.

Credibility was addressed in study 2 and 3 by using data triangulation, which included the use of participant observations that allowed for familiarity of the setting and context in which the data was collected (Lincoln and Guba 1985). In study 3, although participants living with dementia had varying severities of cognitive impairment, the credibility of the data collected of their views and opinions was strengthened by using triangulation for the analysis. Qualitative data from interviews conducted with people living with dementia was analysed with qualitative data from participant observations, reflections and the student volunteer focus group/questionnaire.

Transferability refers to whether the results could be transferred to other contexts and settings (Lincoln and Guba 1985). The use of purposive participant sampling reduces the generalisability of the findings. However, the clear and thorough reporting of the data collection methods and thematic analysis process is hoped to support others to analyse the transferability of these research findings in relation to their own context and settings.

The clear and thorough reporting of the thematic analysis strengthened the dependability of the research findings. Tobin and Begley (2004) suggested that dependability is achieved when the research process is logical and well-documented, and can be understood by others. The presentation of the codebook and thematic map for each study (found in Chapters 4, 5 and 6) contributes to the dependability of the findings.

Confirmability is somewhat dependent on the level of credibility, transferability and dependability (Guba and Lincoln 1989). In addition, confirmability relates to the research findings being grounded in the data and not in the personal opinions or views of the person conducting the research (Lincoln and Guba 1985). The systematic process of thematic analysis taken and ongoing discussions with the supervisory team during this process, ensured that the themes that were identified were generated and supported by the qualitative data.

### **3.5. Ethical considerations**

There are complex ethical considerations when involving people living with dementia in research, due to the possibility that some people will not have the capacity to consent. Despite the National Institute of Health Research (NIHR 2015) highlighting the importance of patient/public involvement in research there remains a lack of inclusion of people living with dementia, and their direct perspectives and opinions, instead favouring the views of family and caregivers (Dewing 2007; Wilkinson 2002). Involvement in research for people living with dementia not only enables insight into their lived experience with the disease but has been found to increase confidence and self-esteem through the person feeling that they are making a valuable contribution (Aggarwal et al. 2003). Often, the inclusion of people living with dementia who may lack capacity to consent will require an external and more rigorous ethical review process. There has been criticism of such processes due to review committees not approving projects involving people living with dementia as they worry that it will practically be too challenging to involve this participant group, they deem the risks too great or they feel that alternatives to standard informed written consent processes are insufficient (Dewing and Pritchard 2004). This ethical review process has also been thought to deter

some researchers in the first instance from including people living with dementia in their research, particularly when involving interviews (Dewing 2007; Rivett 2017).

### **3.5.1. Approval process**

Ethical approval was awarded by Coventry University Ethics Committee for the three studies and the research proposals complied with Coventry University's policy on Principles and Standards of Conduction on the Governance of Applied Research. In addition, an application was submitted to the NHS Health Research Authority Social Care Research Ethics Committee to include people living with dementia and cognitive impairment who might lack capacity to consent in study 3. The application gained approval on 10<sup>th</sup> May 2019 following a panel review.

### **3.5.2. Consent**

People living with dementia can lack capacity to consent as a result of cognitive impairment, the Mental Capacity Act (2005) was developed to ensure people lacking capacity are treated fairly and are at no risk of harm. The British Psychological Society Guidance on 'Conducting Research with People Not Having the Capacity to Consent to Their Participation' (The British Psychological Society 2008) was used to guide the process of gaining consent during this research. This included identifying a personal consultee to provide informed written consent on behalf of one participant in study 2 who could give verbal consent but not written consent.

In study 2 and 3, the procedure of gaining consent adhered to the Mental Capacity Act (2005) and World Medical Association Declaration of Helsinki (2013). As study 3 intended to include people lacking capacity to consent, an application to the NHS Health Research Authority's Social Care Research Ethics Committee was submitted. The proposal justified the inclusion of people living with dementia who lacked the capacity to consent as the research was seen to offer potential benefit for the person taking part and support knowledge that could enhance and develop future treatment and care for other people living with dementia, in line with the Mental Capacity Act (2005). All prospective participants who lacked capacity would already have a personal consultee in place who would be asked to consent to their participation if it was deemed to be in the person's best interest,

following the World Medical Association Declaration of Helsinki (2013). Despite this, the ethics committee felt that the research had no specific benefit for people living with more severe dementia, where they lacked capacity to consent, and therefore insisted that only those with capacity to consent were included in this research. Although a case for including people living with more severe dementia who lacked capacity to consent was made, the ethics committee decision remained. Consequently, only people who had capacity to consent were recruited in study 3.

The Dementia and Mental Wellbeing Enabler was able to identify prospective participants who had capacity to consent. Throughout the research project, the Dementia and Mental Wellbeing Enabler monitored capacity and it was agreed that should any participant's display reduced capacity then a review would be undertaken – this did not happen during the research. The participant information sheet and consent form followed guidance from DEEP - The UK Network of Dementia Voices titled 'Writing dementia-friendly information' (DEEP 2013a) to ensure that any written content was clear and could be verbally communicated for people living with dementia. Furthermore, the DEEP guidance on 'Collecting the views of people living with dementia' (DEEP 2013b) outlined practical tips for engaging people living with dementia in discussions. This guidance was followed during the meetings with prospective participants in study 3. Whilst written informed consent was gained at the beginning of each study (consent forms in the appendices). Participant attendance at the activity sessions during study 2 and 3 was voluntary, in study 3 participants could decide which activities they wished to attend.

### **3.5.3. Key issues for people living with dementia**

A key ethical consideration for this research was associated with disclosure of a participant's diagnosis of dementia and/or cognitive impairment. During study 2 and 3, participants were informed about the research project using participant information sheets which specified the inclusion of people living with dementia and cognitive impairment. However, references to dementia were only used during the interventions when participant's discussed their own diagnosis (as per Bartlett and Martin's (2002) recommendation). In study 3, approval was sought through the ethics application and the gatekeepers at Bournville Gardens (Manager and the Dementia and Mental

Wellbeing Enabler) to seek individual diagnosis, with the participant's consent. Participant diagnosis was strictly confidential and all data was anonymised.

Including people living with dementia, whose voices are often missed in the research, was considered as a key ethical principle within this research. In addition, the perceived and expected benefits of participation in research beyond the impact of the intervention for people living with dementia was considered. Involvement in research has been found to enhance a person's dignity and self-esteem through a feeling of recognition and value (Hellstrom et al 2007). Furthermore, participation in research was associated with increased social wellbeing for people living with dementia as they interacted with others (Berghmans and Ter Muelen 1995). These are important factors to consider when including people living with dementia in research.

Autonomy of participant's living with dementia was considered during study 3 which informed the design of the study. Participants were able to decide which activities they wished to attend, and were not excluded from the research based on their attendance. Participants were also encouraged to suggest activities that could be included in the intervention to meet individual's interests and preferences. Throughout the entire research process participants were treated with respect and their contribution to the research was valued and appreciated. All participants were seen as individuals and treated as such.

#### **3.5.4. Community and off-site working**

To ensure the research was conducted in an ethical manner, the protocols referring to community and off-site working detailed in the ethics applications were strictly adhered to. Gatekeeper permissions were sought at Martineau Gardens in study 2 and Bournville Gardens in study 3 to ensure the protection of participants and researchers during the research. A risk assessment for each study was approved by the ethics committees. In line with Mapes (2017) a positive approach to risk-taking was adopted in which the benefits of activities were assessed as well as the risks. A risk assessment was completed for all activities across both interventions so that the risk of harm to participants and volunteers was minimised and managed.



Consideration was given when going into participant's homes in study 3 to minimise disruption during data collection and to ensure participant safeguarding, by treating them with respect and not posing a threat or harm. The DEMQOL and GDS questions both included sensitive questions such as, "In the last week, how worried have you been about not having enough company?" (DEMQOL) and "Do you feel that your situation is hopeless?" (GDS). It was anticipated that these questions may cause some participants to become upset. An empathetic approach to delivering the questionnaires was used so if participants did become upset, they could talk about their feelings and be listened to. They also had the choice of stopping the questionnaire if they wished. Participants were also advised that the responses would be confidential however, if it was believed that any of their responses suggested they were at any risk of harm then a meeting would be arranged with the Dementia and Mental Wellbeing Enabler to support them. No incidences did occur during the data collection.

Consideration was also given to the wellbeing of the student volunteers who supported study 3. All student volunteers were undertaking clinical professional training in occupational therapy or physiotherapy therefore, had received some prior training of working with older adults. They also had a DBS check. During one activity, a participant became unwell, following this an informal reflection was held to make sure that all the student volunteers who had been there were okay. Communication was maintained with student volunteers between sessions and over the course of the intervention to offer them both emotional and practical support.

### **3.6. Chapter Summary**

Chapter 3 provides a rationale for the study design, including an overview of the pragmatic approach taken in this research and describes how this approach underpins the overall methodology. A justification for the chosen methods for each study is presented, as well as the data analysis. Further detail is given in each study chapter (Chapter 4, 5, and 6) concerning specific methods and protocols.

The next chapter presents study 1. This is an exploratory study to seek the experiences and perspectives of individuals delivering outdoor and nature-based activities for people living with dementia in the UK.

## **Chapter 4:**

### **Study 1 – The experiences and perspectives of individuals delivering outdoor and nature-based activities for people living with dementia in the UK**

#### **4.1. Introduction**

The literature review highlighted the wide variety of benefits associated with different types of outdoor and nature-based activities, including gardening and horticultural activities, walking and animal-related activities. This has led to the concept of green dementia care, which refers to enhancing the health and wellbeing of people living with dementia through interactions with nature and engagement in outdoor and nature-based activities (Barrett, Evans and Mapes 2019).

Whilst the benefits have been shown, there is a lack of detail and information about how the activities were delivered in the existing research. The benefits associated with gardening and horticultural activities are from studies conducted outside of the UK, therefore it is not known whether the findings are transferable to a UK setting. Furthermore, much of the research included people living with dementia in residential care settings; there is a lack of research exploring the benefits for people living with dementia in the community or in an extra care setting (Barrett, Evans and Mapes 2019; Mapes et al. 2016).

There is a lack of exploration of the experiences and perspectives of those responsible for developing and delivering outdoor and nature-based activities. Therefore, this study was developed to seek the experiences and perspectives of individuals delivering outdoor and nature-based activities, specifically in a UK setting for people living with dementia. This study included participants with a broad scope of practice who were delivering activities in a range of settings, including the community and in extra care settings. This was in order to explore the perceived benefits of outdoor and nature-based activities within the UK and to identify which types of activity were successful and why, which is lacking in the literature. Furthermore, this study sought to highlight the challenges of delivering outdoor and nature-based activities in the UK and explore how people delivered effective activities in practice.

#### **4.1.1. Aim and objectives**

The aim of this study was to explore the experiences and perspectives of individuals delivering and supporting outdoor and nature-based activities for people living with dementia in the UK. The specific objectives were to:

- To explore the perceived value of outdoor and nature-based activities for people living with dementia.
- To identify which outdoor and nature-based activities have been successful with people living with dementia.
- To identify what makes a supportive environment for delivering outdoor and nature-based activities for people living with dementia.
- To consider the logistics of planning and delivering successful outdoor and nature-based activities for people living with dementia.

#### **4.2. Methods**

To ensure thorough and transparent reporting of this qualitative research this study was guided by the COREQ Checklist (COnsolidated criteria for Reporting Qualitative research) (Tong, Sainsbury and Craig 2007).

##### **4.2.1. Methodological orientation**

Semi-structured interviews were undertaken to seek the experiences and perspectives of individuals delivering outdoor and nature-based activities for people living with dementia. This study was conducted within a pragmatic approach to qualitative research and utilised thematic analysis.

##### **4.2.2. Ethical approval**

This study was approved by Coventry University Ethics Committee on 26<sup>th</sup> January 2018 (project reference number: P63662, see Appendix 8). This study was conducted in compliance with Coventry University's policy on Principles and Standards of Conduction of the Governance of

Applied Research. Informed written consent was gained from each participant prior to the interview taking place.

A risk assessment was conducted for off-site and lone working in accordance with Coventry University Policy, this was included in the ethics application. Data collection was deemed low-risk and all interviews were scheduled in advance and the supervisor was notified of the time and location.

### **4.2.3. Participants and sampling**

This study included individuals who had experience, and knowledge of delivering and supporting outdoor and nature-based activities for people living with dementia in the UK. Twenty-one participants were recruited through purposive and snowball sampling to take part in a semi-structured interview to share their experience and perspectives, as outlined in Chapter 3. Recruitment was carried out between February and June 2018. Emails were sent to known individuals, organisations specialising in outdoor and nature-based activities for older adults and people living with dementia (e.g. Thrive, Martineau Gardens and Umberslade Gardens), charities (e.g. Age UK, Alzheimer's Society), care providers (e.g. WCS and ExtraCare Charitable Trust), the AGILE network (for chartered physiotherapists working with older people) and the Housing and Dementia Research Consortium members (including a wide variety of dementia care organisations, community organisations and individuals working with people living with dementia. Prospective participants were sent the participant information sheet (Appendix 9) which outlined the protocol and details about their involvement. Those wishing to take part were offered a face-to-face interview or a telephone interview and asked to complete a written informed consent form (Appendix 10).

Recruitment continued beyond the minimum target of 10 participants to represent a broad range of experiences and perspectives and scopes of practice. The participants had different roles and worked across different settings with people living with dementia. Table 4.1 summarises the participants' job roles and settings.

Table 4.1. Overview of participants

<b>Participant</b>	<b>Job Role</b>	<b>Setting and experience</b>
1	Horticultural Therapist	Community garden and self-employed working in care homes with older adults, particularly people living with dementia
2	Group leader (volunteer)	Charity (nationwide) local community group for older adults including people living with dementia
3	Outdoor Education Officer	Working outdoors in a variety of settings e.g. parks, woodlands, with individuals and groups of people living with dementia
4	Project manager	Community charity offering befriending and linking older people in the community, including those living with dementia, with local groups and activities
5	Project Leader - Healthy Lifestyles	Supporting activities, including growing food and cooking, for older people including people living with dementia
6	Community group leader	Community activity group for older adults including those living with dementia
7	Horticultural Therapist	Community garden delivering horticultural activities on-site
8	Occupational Therapist	Working in a hospital with people living with dementia, supporting activities in the hospital garden
9	Care home manager	Specialist care home for people living with advanced dementia and complex mental health conditions
10	Horticultural Therapist and Speech and Language Therapist	Self-employed, delivering horticultural activities in care homes and nursing homes
11	Locksmith (dementia and mental health specialist)	ExtraCare retirement village supporting residents living with dementia, cognitive impairment and mental health conditions, delivering Enriched Opportunities Programme® of activities
12	Occupational Therapist	Working with people living with rare types of dementia in the community, engaging in occupational activities and supporting independent living
13	Physiotherapist	Supporting long-term patients in a mental health facility, working with people living with severe dementia and complex symptoms
14	Specialist horticulture instructor	Specialist mental health setting for people living with complex dementia, provision of a wide variety of occupational activities
15	Care home manager	Novel dementia specialist care home designed based on a Dutch model to increase wellbeing for people living with dementia
16	Activity coordinator – animals	Specialist care home for people with advanced dementia with a small pet farm on-site
17	Social worker and research student	Community working with individuals living with dementia to maintain connections to sport and recreation
18	Activity coordinator	Care home for older people and people living with dementia, coordinating on-site activities
19	Community-based Locksmith (dementia and mental health specialist)	Supporting people living with dementia in the community to engage in community-based activities
20	Experience coordinator	Care home and village for older adults people living with dementia, coordinating on-site and off-site activities
21	Senior physiotherapist	Dementia ward in an acute mental health unit supporting patients and activities

#### **4.2.4. Setting**

Data collection was conducted at Coventry University, participant's place of work or via telephone. During all face-to-face interviews only the researcher and interviewee were present. Participants were asked to find a quiet place to conduct telephone interviews so the conversation was confidential.

#### **4.2.5. Data collection**

A semi-structured, open-ended interview schedule informed by findings from a literature review, informal conversations with individuals providing activities, and previous experience working within a healthcare setting and with people living with dementia was developed. A pilot interview was conducted with a researcher at Coventry University who works with older adults. The purpose of this pilot interview was to assess the suitability of the questions and test the audio recording equipment. As well as practice transcribing verbatim and reviewing the interview; this interview was not included in the data analysis.

The interview schedule is presented in table 4.2. Once informed written consent had been gained the interview began. Interviews were audio recorded using a Zoom H2n Recorder (Zoom; New York, USA) and later transcribed verbatim using Microsoft Word 2016 (Microsoft; Washington, USA). Interview length ranged from 30 minutes to just over 1 hour. Interview transcripts were returned to participants for them to verify for accuracy and offer any comments before they were included in the analysis. An example interview transcript can be found in the appendices (Appendix 11).

Table 4.2. Semi-structured interview schedule

<b>Interview Questions</b>
<ul style="list-style-type: none"> <li>• What is/has been your involvement and experience of working with older adults who have dementia? (Specifically: What was your role? Who were you working with? Where did you do this?)</li> <li>• Have you specific experience of delivering or supporting outdoor activities or activities involving gardening or horticulture?</li> <li>• What activities would you say have been successful when working with people living with dementia and why?</li> <li>• What activities have you found to be unsuccessful when working with people living with dementia and why?</li> <li>• What types of outdoor activities would you recommend for an older adult population living with dementia in care homes?</li> <li>• What are the challenges of working with this population? Specifically, when trying to engage them in activities.</li> <li>• How have you had to/would you deal with the variability of individual needs within this population?</li> <li>• Is group working or individual working best?</li> <li>• What have you found that works well and doesn't work well?</li> <li>• What considerations should be taken regarding the design of outdoor spaces in care homes?</li> <li>• Is there anything else you would like to add about the care for people living with dementia?</li> <li>• Would you recommend we speak with any other 'experts' that you are aware of within this area?</li> </ul>

#### **4.2.6. Data Analysis**

A thematic analysis was conducted following the phases presented by Braun and Clarke (2006) as described in the general methods (Chapter 3) using NVivo (Version 12 Pro for Windows, ©QSR International). The intra-coder reliability coding comparison of a sub-sample of data produced a Kappa co-efficient value of 0.88, which demonstrates a high level of agreement and reliability (Altman 1991; Boyatzis 1998; Landis and Koch 1977; Miles and Huberman 1994; Neuendorf 2002). The remaining data was coded, an excerpt of the codebook is shown in table 4.3 and the full codebook is in the appendices (Appendix 12). Throughout phases 3 and 4, a thematic map was produced, the final thematic map is shown in figure 4.1. The themes, subthemes and a brief description are shown in table 4.4 (page 116). The findings from the thematic analysis are presented below.



Table 4.3. Excerpt of codebook

<b>Parent node</b>	<b>Child node</b>	<b>Short definition</b>	<b>Long definition</b>	<b>When to use</b>	<b>When not to use</b>
Challenges	Engaging people living with dementia	Challenges associated with engaging people living with dementia	Data relating to challenges of engaging people living with dementia in outdoor and nature-based activities	Use to code any data relating to the challenges of engaging people living with dementia in outdoor and nature-based activities	Do not use to code challenges relating to specific symptoms associated with dementia, use the node "symptoms of dementia"
Environmental considerations	Functionality	Considerations relating to functionality of outdoor environments	Data relating to the functionality of outdoor environments and settings in which outdoor and nature-based activities are taking place	Use to code any data relating specifically to the functionality of the environment	Do not use to code data relating to the accessibility of the environment, use the node "accessibility"
Impact on people living with dementia	Engagement and interest	The impact on levels of engagement and interest	Data relating to the impact of outdoor and nature-based activities on the levels of engagement and interest of people living with dementia	Use to code any data that reflects the impact on levels of engagement and interest	Do not use to code data relating to specific symptoms of dementia, use the node "easing of symptoms"

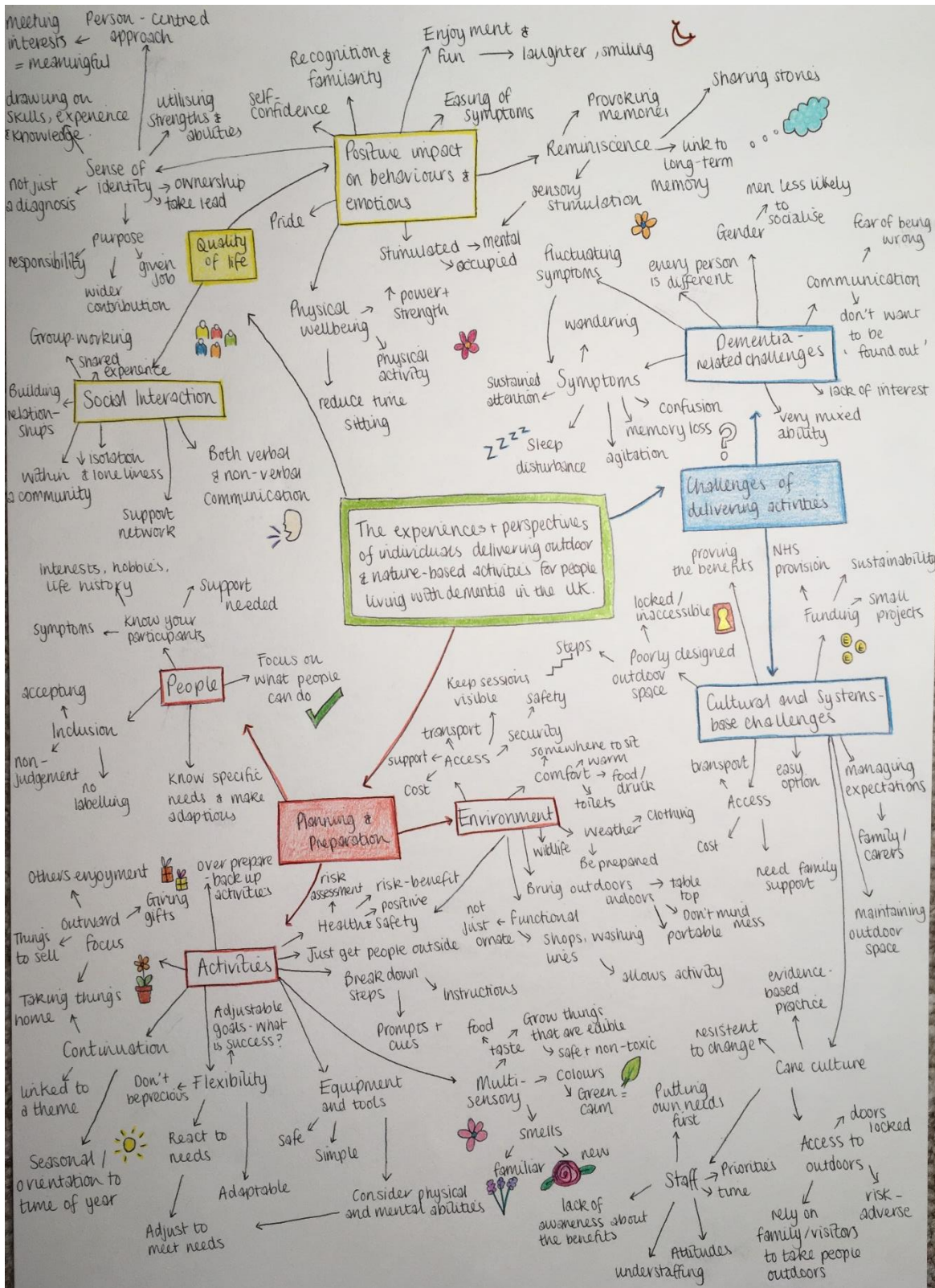


Figure 4.1. Thematic Map

### 4.3. Results

The questions explored participant experiences of delivering outdoor and nature-based activities for people living with dementia, and sought their perspectives on the most effective types of activities. Participants were also asked to reflect on the challenges they have experienced during their work. Across the responses, three themes emerged through the thematic analysis reflecting the experiences and perspectives of individuals facilitating outdoor and nature-based activities for people living with dementia: **quality of life**, **challenges of delivering activities**, and **planning and preparation**. Table 4.4 outlines these themes and provides a short description.

Table 4.4. Themes and sub-themes identified, with descriptions

Theme	Sub-Theme	Description
Quality of life	Positive impact on behaviours and emotions	Perceived and observed positive responses to activities from people living with dementia. Such behaviours include positive affect, signs of enjoyment and pleasure (smiling, laughing), reminiscence, and a positive impact on symptoms associated with dementia.
	Social interaction	Interaction between people living with dementia and others, including verbal and non-verbal interaction, and shared working.
Challenges of delivering activities	Cultural and systems-based challenges	Challenges associated with care (health and social care) cultures and systems, relating to the care environment, wider care system and care staff.
	Dementia-related challenges	Challenges relating to dementia, and associated symptoms and impairments.
Planning and Preparation	People	Focusing on the individual people living with dementia and acknowledging their needs in the planning and preparation process.
	Activities	The considerations give to the planning and preparation of the activities themselves.
	Environment	Components of planning and preparation relating to the environment in which activities were delivered.

#### 4.3.1. Quality of life

Participants perceived that outdoor and nature-based activities can benefit the quality of life of people living with dementia. Participants reported that they felt that activities increased positive

behaviours and emotions, and resulted in greater social interaction, which were associated with enhanced wellbeing and overall quality of life.

#### **4.3.1.1. Positive impact on behaviours and emotions**

A range of positive behaviours and emotions were reported, including high levels of happiness, enjoyment and pleasure, and smiling, laughter and clapping. Participants noted that many people living with dementia simply enjoyed being outdoors, one participant recalled the “fresh air and green-ness” (participant 14) and another on the “calming” effects of a garden for people living with dementia (participant 7) that appeared to increase positive behaviours and emotions. Participants identified an association between activities with a strong sensory element and greater positive behaviours and emotions.

“I could have somebody who has no verbal communication at all, and yet we can make a flower arrangement and they can smile and they can laugh and clap their hands you know because they’ve enjoyed the sensory and looking at things and seeing things and the smell and the pleasure of achieving something and creating something” (participant 10).

Activities that linked to a person’s interests were also associated with high levels of positive behaviours and emotions.

“They [client living with dementia] knew how to use the tools, they couldn’t dress themselves, but they could remember how to plant a bulb or do the watering, it is fascinating how those memories came back” (participant 8).

Participants reported that engagement in familiar activities, especially horticultural activities, led to increased confidence and self-esteem, and restored self-identity for people living with dementia. One participant commented “most of them do remember the names of plants as it has been ingrained for so many years, it is a long-term memory” (participant 16). Participants felt that it was important to draw on the interests but also capabilities of people living with dementia.

Several participants shared that reminiscence frequently occurred as a result of outdoor and nature-based activities, especially when people living with dementia spent time in a garden environment.

One interviewee shared that people would “talk about [their] memories and experiences of gardening” (participant 10). In addition, reminiscence also occurred more during activities with strong sensory elements, especially strong and familiar scents.

“We put lavender in her hand and rubbed it, it was almost spooky. She sat up and stated talking about her mother doing the washing on washing day and this was the smell of the soap” (participant 8).

Several participants reflected on the positive impact of using herbs, such as lavender, to prompt memories. Although they noted how the responses could be inconsistent.

Participants working within residential care settings also reported that taking residents living with dementia outdoors helped reducing sleep disturbance and sun downing – late afternoon agitation and confusion. “On a day you can get them into the garden into the fresh air for half an hour to an hour, it seems to knock sun downing back a bit” (participant 18).

#### **4.3.1.2. Social interaction**

Increased social interaction during activities was widely reported. Participants indicated how well-designed outdoor environments offered people somewhere to sit and socialise, particularly in care homes and hospitals. They felt that delivering activities in a group setting provided greater opportunity for social interaction for people living with dementia to talk, which they suggested led to reduced isolation and loneliness, as well as increasing a sense of belonging.

“What always used to amaze me during any activity that we did where we would bring the patients off the ward, and they’d be different people. They’d be interacting with each other and then you’d take them back to the ward and they’d go and sit in their chairs around the ward and there was no interaction” (participant 8).

Several participants reported increased social interaction during animal-related activities, for example Pets as Therapy dog visits in a care home. “Animal interaction is just amazing, people that don’t communicate are suddenly talking to the dog” (participant 9). Participants suggested that the

presence of animals offers a familiar prompt for conversation. In addition, one participant noted how residents enjoyed caring for the animals by helping to feed and wash them.

Most participants reported that they actively encouraged social interaction during their activities by asking questions about people's life histories and interests. However, one interviewee highlighted that the opportunity to interact with others should be optional, and not prevent people who do not wish to interact from taking part in the activities. They suggested that walking allowed people to "form into little groups so they can talk if they want to, or to walk and not talk" (participant 12) yet still enjoy and participate in an outdoor activity.

#### **4.3.2. Challenges of delivering activities**

Participants highlighted the challenges associated with delivering outdoor and nature-based activities for people living with dementia. These challenges included cultural and system-based challenges which related to the health and social care environment and systems, and management and staff, and other challenges relating to dementia, which were linked to managing symptoms and levels of impairment.

##### ***4.3.2.1. Cultural and system-based challenges***

Participants suggested that a key challenge was that existing health and social care systems within the UK are not suitable or effective for people living with dementia.

"It [health and social care] is not geared up to working with people living with dementia, rather it is geared up to an institutionalised care system that might work for other conditions, but it doesn't work for someone with dementia" (participant 3).

Several participants reported a lack of person-centred dementia care in practice which included a lack of activities, stating that existing care is often very task-orientated and the individual needs of people living with dementia is forgotten. Participants felt that often, management and care staff do not prioritise activities for people living with dementia, especially outdoor activities. This was reportedly due to a lack of understanding about the benefits of outdoor and nature-based activities for people living with dementia and training about how to deliver and support such activities e.g.

“there is not really any activity training” (participant 16). Many participants felt that staff would be more supportive if they understood the benefits and felt confident in delivering effective activities.

Barriers to accessing outdoor environments was noted by participants working in residential care settings and hospitals, where people living with dementia could not go outdoors on their own. Participants reported not enough staff and a lack of staff time to support people living with dementia to go outdoors and a risk-averse culture whereby outdoor environments were viewed as dangerous.

#### **4.3.2.2. Dementia-related challenges**

Participants also reflected on the challenges of supporting people living with dementia due to various symptoms and levels of cognitive impairment. Several participants reported that a lack of confidence and motivation amongst people living with dementia can stop them taking part in activities, “What scares people is the thought of being involved in a task that you can get wrong and that people could criticise you for” (participant 12). Participants suggested that a lack of confidence can prevent people living with dementia from spending time outdoors and leaving their home, particularly people living in the community. “It’s never really the challenging behaviour that upsets them [caregivers], it’s that people don’t want to do very much at all. That is the most difficult thing” (participant 17).

Participants shared the challenges of managing fluctuating and varying symptoms, such as confusion and agitation, when working with a group of people living with dementia. One participant shared an instance where a resident became very confused and agitated when horticultural activities were being delivered indoors, as they couldn’t understand why there was compost and plants indoors. Interviewees felt that high levels of confusion could make it difficult to engage people living with dementia in an activity, and also to maintain levels of engagement as people would lose attention. It could also be challenging to plan activities for a group, taking into consideration each individual’s needs. “If you’ve met one person with dementia you’ve met one person with dementia, on the day in question as well, things can vary can’t they” (participant 17). Participants reflected on the nature of dementia and associated symptoms, recognising the need for them to be reactive and adaptive when engaging people in outdoor and nature-based activities.

### **4.3.3. Planning and preparation**

Participants suggested ways in which the activities should be planned and prepared to increase success. These considerations relating to the planning and preparation of outdoor and nature-based activities included those taking part, those supporting the activities, the activities themselves and the environment.

#### **4.3.3.1. People**

Participants suggested that knowing the people they were working with and establishing relationships was fundamental to delivering successful activities. This included an awareness of a person's capabilities, their level of dementia, and their interests and hobbies. Several participants highlighted that an initial individual assessment was useful. One participant commented:

“A good assessment is important; I think you have to know who is in the room with you don't you. You have to know who is doing the group and you have to have a good understanding before you start of the capabilities, the preferences, the strengths and maybe the weaknesses of the folk who are with you. So I think that is very important” (participant 17).

Participants recognised that good person-centred care should be driven by an individual's interests and values. One participant shared:

“I would want to have an idea of whether the person is going to value going outside at all, and if so, I would want to look at what needs could be met by the staff at the elderly home if that's what is going to be involved. So a person should have really, an individual plan of some sort and the individual plan might involve what they can do outside” (participant 12).

Participants felt that people living with dementia benefitted from activities that related to their interests and hobbies, which often led to high levels of enjoyment. Several noted that some people living with dementia might not be able to recall their interests and hobbies, and suggested that building a relationship with family members and caregivers is important for gaining this information.



#### **4.3.3.2. Activities**

Participants reported that activities should be tailored and adapted for the individuals they were working with in order to provide the most benefit. Horticultural activities were widely used, as participants felt they were easily adaptable for individuals and across settings, including indoors.

“Gardening is amazing for being able to involve people in all different stages in dementia, even in the same group ...“you could sort of adapt it [referring to flower arranging] to make it really high level for someone [by them doing it independently] and in the same group you could have somebody who has no verbal communication at all and yet we can make a flower arrangement and they can smile and they can laugh and clap their hands you know, because they’ve enjoyed the sensory [aspect] and looking at things and seeing things and the smell and the pleasure of achieving something and creating something” (participant 10).

Participants noted that a broad range of activities are included within horticultural and gardening activities, such as flower arranging and planting seeds, that can link to a variety of interests and hobbies, as well as individual capabilities.

Participants advocated for activities that had a strong sensory element. Again, horticultural and gardening activities were favoured as they were multi-sensory, which appeared to trigger memories and reminiscence. Sensory activities were also selected to stimulate social interaction and conversation through reminiscence which was perceived as highly beneficial for people living with dementia. Several participants also recognised that activities with an element of continuation between sessions helped prompt memory and maintain engagement. Participants also noted that giving people living with dementia things to take away provided a point of discussion for people after the session and a reminder of the activity.

Another consideration relating to the activities related to equipment and tools. Participants gave examples of incidences where equipment had exacerbated the impairments of people living with dementia, such as using black plant pots and trays where people could not see the compost within them due to visual deficits. Several participants noted that insufficient equipment can prevent people living with dementia from engaging in activities. In general, participants advocated easy to

use and adaptive equipment for activities such as gardening however, a number of participants spoke about the familiarity of equipment. One participant spoke about taking a person living with dementia fishing, a lifelong hobby, and the modern fishing equipment being unrecognisable for that person. Participants suggested that it was also important to appreciate and understand how a person might remember doing an activity and trying to facilitate and replicate this as much as possible.

Participants agreed that planning activities and making adaptations prior to delivery was important, however, ongoing flexibility and reactivity was needed. Having a “flexible plan” was commonly reported. Participants felt that their own experience, and their knowledge of who they were working with enabled them to work in a flexible manner and react to changing needs of the individuals and the group.

#### **4.3.3.3. Environments**

Two factors were identified in relation to environmental considerations: accessibility and functionality of the environment. Accessibility related to the physical access of outdoor environments for people living with dementia. Participants identified important features of an outdoor environment to increase accessibility which included, continuous circular pathways, even and consistent surfaces, handrails, seating, sheltered areas with seating, avoiding steps and visual and stimulating features, such as plants with strong smells and brightly coloured flowers, to encourage people outdoors. Participants also suggested that a positive approach to assessing the risks of people living with dementia spending time outdoors was needed, and posed a risk-benefit analysis approach.

The functionality of the outdoor environment was a key consideration for participants to support a range of activities: “Going outside should be exciting or have a purpose, because I’ve never known anybody do something for the sake of it” (participant 18). Several participants suggested that more features associated with daily activities, such as washing lines and bird feeders, could encourage people living with dementia to go outdoors and engage in a familiar activity. In the care home where one participant worked, they had a number of small shops including a café and a pub that could be

used by residents and their families, friends and visitors. Participants felt that gardens and outdoor environments should allow people to take part in activities for example, growing plants, watering flowers and picking herbs for cooking.

#### **4.4. Discussion**

This study explored the experiences and perspectives of individuals delivering outdoor and nature-based activities for people living with dementia in the UK. The findings highlight a variety of perceived benefits for people living with dementia, including high levels of positive behaviours and emotions, and increased social interaction. The challenges of delivering outdoor and nature-based activities are reported, along with practical considerations for overcoming these challenges to deliver effective outdoor and nature-based activities. The findings have led to guidance for planning, preparing and delivering outdoor and nature-based activities which have been used to inform the subsequent studies.

##### **4.4.1. Outdoor and nature-based activities are beneficial for people living with dementia**

Outdoor and nature-based activities, particularly gardening and horticultural activities, were thought to benefit people living with dementia by increasing positive behaviours and emotions such as happiness and pleasure, and offering opportunities for social interaction through prompting discussions about the activities and people's interests, and through reminiscence. These benefits have been associated with good quality of life for people living with dementia (Moyle et al. 2015; Jing, Willis and Feng 2016). Furthermore, the findings corroborate the existing evidence of the benefits of outdoor and nature-based activities (Blake and Mitchell 2016; Gonzalez and Kirkevold 2013; Mapes et al. 2016; Whear et al. 2014).

Activities that met people's interests, such as flower arranging and therapy dog visits, and those that had a strong multi-sensory element, such as making lavender bags, were associated with high levels of positive behaviours and emotions, and stimulated social interaction through the sharing of memories and reminiscence. Tailoring activities to meeting individual interests as well drawing on existing skills and knowledge can support self-esteem and a sense of identity (Jarrott, Kwack and

Relf 2002; Noone and Jenkins 2018) and can support person-centred care (Brooker 2003; Kitwood 1997). The link between sensory stimulation from plants and nature and increased positive behaviours, reminiscence and overall wellbeing has been noted in the literature (Blake and Mitchell 2016; Cox, Burns and Savage 2004; Hall et al. 2016; Hernandez 2007; Smith-Carrier et al. 2019). Reminiscence therapy is widely used to enhance for people living with dementia, as a way of maintaining and promoting past memories and improving self-esteem (Cui et al. 2017) despite the limited evidence (Woods et al. 2018).

Most activities were delivered in a group setting which provided opportunities for social interaction. This finding supports the existing literature (Blake and Mitchell 2016; Duggan et al. 2008; Gigliotti and Jarrott 2005; Gigliotti, Jarrott and Yorgason 2004; Hall et al. 2016; Hewitt et al. 2013; Jarrott and Gigliotti 2010; Mapes 2010; Smith-Carrier et al. 2019). Furthermore, plants and nature, particularly animals, provided prompts for conversation as was noted by Rappe and Topo (2007) and Smith-Carrier et al. (2019). Increasing social interaction can help people feel more connected to others which can improve wellbeing quality of life (Milte et al. 2016; Moyle 2015; Jing, Willis and Feng 2016) and contribute to increased sense of personhood (Kitwood 1997). It can also help alleviate isolation and loneliness that is commonly experienced by people living with dementia (Duggan et al. 2008; Kane and Cook 2013; Moyle et al. 2011; Smith-Carrier et al. 2019).

In order to achieve these benefits for people living with dementia, the participants suggested ways of overcoming the barriers to delivering outdoor and nature-based activities that they identified, a summary is shown in table 4.5. Participants also highlighted practical considerations for delivering effective activities which are discussed below.

Table 4.5. The challenges experienced when delivering outdoor and nature-based activities, and how to overcome/manage them

<b>Challenge</b>	<b>How to overcome/manage</b>
A lack of person-centred dementia care in practice	Focus on getting to know the people living with dementia to understand their capabilities, symptoms, interests and preferences. Building a rapport with people.
Pressures on dementia care providers – funding and time	The system needs enough funding to support person-centred dementia care, including the delivery of meaningful activity
A lack of training for care staff about the benefits of outdoor and nature-based activities	Freely accessible training for care staff and caregivers about the benefits of outdoor and nature-based activities, and how to deliver effective and successful activities
Limited access to outdoor environments for people living with dementia	A risk-benefit approach to activities and access to outdoor environments to ensure people living with dementia have more opportunities to go outdoors
Cognitive impairment amongst people living with dementia	Recognising the individual needs as a result of cognitive impairment, adapting and tailoring activities to support these needs
A lack of confidence amongst people living with dementia	Reassuring people living with dementia about taking part in activities, and creating a supportive and welcoming environment where limitations and symptoms do not prevent people from taking part. Adapting activities so they enable rather than disable
A lack of interest and motivation amongst people living with dementia, leading to apathy	Providing activities that relate to people’s interests, hobbies and preferences so they are more likely to be interested in taking part. Adapt activities so people can actively engage to gain enjoyment, as well as other benefits
Increased confusion and agitation amongst people living with dementia	Make instructions very easy to follow and ensure they do not rely on memory. Recognise the needs of individuals and make sure they have the appropriate support. Understand how people can become confused and try to tailor the activities and environment to mitigate confusion

#### **4.4.2. Delivering effective outdoor and nature-based activities**

Participants highlighted key considerations for planning and delivering effective outdoor and nature-based activities which informed a list of recommendations that relate to four areas: support, environment, activities and adaptations, which are presented in table 4.6.

Table 6. Recommendations for planning and delivering person-centred outdoor and nature-based activities for people living with dementia

Support	<ul style="list-style-type: none"> <li>• Adequate support is needed during activities to enable people living with dementia to take part. Assess the needs and abilities of individuals to establish the level of support needed. Make use of staff and volunteers.</li> <li>• Find out the level of experience and confidence that staff and volunteers have, and whether additional training in either dementia care or specific to outdoor and nature-based activities might be useful.</li> <li>• Encourage a positive-risk taking approach to outdoor and nature-based activities, particularly when going outdoors with people living with dementia. In addition to assessing risk, try and assess the potential benefits of spending time outdoors for individuals. Explore how risks can be managed to enable people to spend time outdoors and engage in activities.</li> </ul>
Environment	<ul style="list-style-type: none"> <li>• Explore whether there is a suitable environment which is accessible for people living with dementia to spend time outdoors.</li> <li>• Consider the ease of access: can someone go outside independently? how close is it? are walkways clear and level? is there seating available? where are the nearest toilets? how can someone be made comfortable?</li> <li>• Where possible, try and support people living with dementia to spend time in an outdoor environment such as a garden or park.</li> <li>• Ensure that the environment is functional and encourages people to engage with the outdoor space and have the opportunity to take part in a variety of activities.</li> <li>• Think about how the environment could support activities of daily living such as hanging out washing, feeding the birds or gardening.</li> <li>• Try and enable people to interact with safe, non-toxic plants – raised beds can make them more accessible and use plants with strong familiar scents.</li> </ul>
Activities	<ul style="list-style-type: none"> <li>• Utilise the multi-sensory nature of plants, nature and the outdoor environment such as scents, touch and sounds. This can be applied indoors as well as outdoors but do consider whether some people might become confused.</li> <li>• Encourage active engagement in specific activities that have been shown to benefit people living with dementia and include gardening, spending time with animals and walking.</li> <li>• Allow people to engage in a variety of activities and offer some choice, be flexible to supporting (where possible) the wishes and preferences of individuals.</li> <li>• Many people will have engaged in outdoor and nature-based activities such as gardening and walking throughout their lifetime. Try and support previous hobbies, interests and skills through the activities you deliver and support. Speak to people living with dementia and their families and caregivers to find out what they enjoy doing.</li> <li>• Design activities that have a tangible end goal that so that someone can see what they are trying to achieve. Although, recognise where activities are more about the 'doing' and just enjoying the moment, and focus on active involvement and having fun.</li> <li>• Group-based activities can be really supporting and enable people to work together on shared tasks and to engage in social interaction. This can encourage people sharing stories and memories, and engaging in discussions.</li> </ul>
Adaptation	<ul style="list-style-type: none"> <li>• Consider the resources, equipment and tools you will need. You might need to decide where specialised equipment that has been adapted for physical impairments are required, or whether more traditional and familiar equipment would enable someone to use it effectively. This will rely on you knowing who you are working with.</li> <li>• Using step-by-step instructions with pictures, and visual demonstrations can help people to do the activity at a manageable pace and does not rely on memory. It can also help some people to be more independent if they are able to follow the instructions.</li> <li>• Be prepared to adapt activities as you go, work with those supporting you, to recognise the changing needs of those taking part.</li> <li>• Be mindful to only adapt activities if someone is not able to do things, or to enable them to do things, don't assume people living with dementia won't be able to do things – especially physically.</li> <li>• Symptoms of dementia fluctuate, and you do need to be able to react to this by having a flexible approach to delivering activities. It is always good to have a back-up plan, and someone to quickly offer support 1:1 if needed.</li> </ul>

In line with a person-centred approach to dementia care, it is important to put the person or people living with dementia at the centre of the planning, preparation and delivering of activities (Brooker 2003; Kitwood 1997). It is important to establish their interests, capabilities and needs in order to adapt and tailor activities. Support is required for the delivery of effective outdoor and nature-based activities. Participants highlighted a lack of staff training about the potential benefits of being outdoors and taking part in activities for people living with dementia as well as how to deliver effective activities. Within dementia care, specific training for staff, as well as better support for management, has led to increased quality of dementia care and shift from task-orientated care to person-centred care (Handley, Bunn and Goodman 2017). Evans et al. (2019) also highlighted the importance of staff training and knowledge in the successful delivery of green dementia care. It was thought that more staff and volunteer training may increase the willingness to support outdoor and nature-based activities.

A positive approach to risk-taking would overcome the barriers preventing people living with dementia from spending outdoors, especially within a residential care setting. Mapes (2017) has provided recommendations for a positive approach to risk-taking which includes consideration for the benefits associated with outdoor activities. Indoor environments are often assumed lower risk when compared to outdoor environments (Morgan and Williamson 2014) however, risks such as inactivity and loneliness are not considered. Outdoor and nature-based activities have been found to increase physical activities and increase social interaction, and therefore could address both of these risks (Barrett, Evans and Mapes 2019; Blake and Mitchell 2016; Gonzalez and Kirkevold 2013; Whear et al. 2014).

The types of outdoor and nature-based activities that were reported to be effective included gardening and horticultural activities, animal-related activities and walking. Key features of the activities were highlighted in relation to the benefits which were multi-sensory stimulation, meeting individual interests and having an achievable visual end goal. The support for gardening and horticultural activities has been widely reported (Blake and Mitchel 2016; Gonzelez and Kirkevold 2013; Whear et al. 2014) whilst the evidence for animal-related activities and walking is more limited (Barrett et al. 2019; Mapes 2011a, 20011b). Multi-sensory stimulation was highlighted by Watts and

Hsieh (2015) in the delivery of effective horticultural activities. Whilst the evidence of the effectiveness of multi-sensory stimulation is limited, these findings suggest benefits associated with multi-sensory stimulation from nature and plants. Tailoring activities to meeting individual's interests can contribute to good person-centred care by promoting their sense of identity and personhood (Brooker 2003; Kitwood 1997). Having a visual end goal so that people can see what they have achieved, such as a plant pot or flower arrangement, has been found to offer people living with dementia a sense of satisfaction and achievement (Smith-Carrier et al. 2019) and was recommended by Watts and Hsieh (2015).

Activities need to be adapted for people living with dementia to support individual's needs, and recognise cognitive and physical impairments. This could be achieved as part of the planning and preparation but also a flexible approach to delivery was needed to ensure that spontaneous adaptations could be made. Specialist adapted equipment was recommended by Kwack, Relf and Rudolph (2005) to enable people living with dementia to take part in gardening activities. However, Pitt-Nairn, Relf and McDaniel (1993) suggested that using familiar equipment is more appropriate for people living with dementia as it utilises existing skills and knowledge, which was highlighted in the present study. The choice of equipment and tools relates back to the person or people you are working with, and establishing their needs and capabilities. Simple step-by-step instructions were also recommended, which is noted in the literature (Jarrott and Gigliotti 2010) and included in the guidance from Thrive (2016).

Finally, considerations about the environment need to include accessibility and functionality. There is a lot of published guidance on making accessible outdoor environments for people living with dementia (such as Chalfont 2006) which reflect the views of participants in this study. The functionality of the outdoor environment was critical to the delivery of effective outdoor and nature-based activities and the opportunities for people living with dementia to freely engage in a variety of activities. Outdoor environments should enable people living with dementia to do gardening activities such as watering plants and picking flowers, simple features such as a washing line and bird feeder could encourage spontaneous outdoor activities. Evans et al. (2019) suggested that



organisations must start considering the outdoor environment as a core part of a care setting in order to deliver effective green dementia care.

#### **4.5. Limitations**

There were a number of potential limitations within this study. Although purposive sampling was utilised to seek expertise, the majority of participants were recruited within the West Midlands, UK. Therefore, the findings may not be transferable or comparable to the experiences of people working in other parts of the country where dementia care services may differ. Some of the charities and organisations that were contacted did not respond, for example a local charity that organised walking groups for people living with dementia, which may have contributed additional findings. Although people delivering activities within the community and extra care settings were included, not all participants were working in these environments. Therefore, the recommendations are based on activities that were delivered across a variety of settings and not specific to the settings in which study 2 and study 3 were conducted. However, this study was exploratory to gain insight into current practices in the UK across different scopes of practice and settings, which it did achieve.

It is possible that bias occurred through purposive sampling as the people more willing to be interviewed about delivering outdoor and nature-based activities may have been more supportive and have stronger feelings about the benefits. Whilst this was noted, to increase trustworthiness and credibility of the data the interviews were transcribed verbatim and then member checking was used for participants to confirm the accuracy. The thematic analysis followed a systematic and rigours process to further support trustworthiness and credibility.

#### **4.6. Conclusion**

This semi-structured interview-based study has highlighted the experiences and perspectives of individuals delivering outdoor and nature-based activities for people living with dementia across a variety of settings in the UK. Participants reported benefits associated with the activities which included, increased positive behaviours and emotions, and increased social interaction, which was thought to enhance wellbeing for people living with dementia and motivated them to deliver activities. The interviews also identified some of the challenges of delivering effective green

dementia care that related to a lack of person-centred care, lack of staff training and understanding about the benefits of engaging people living with dementia in outdoor and nature-based activities and meeting the changing and variable needs of those taking part.

Despite the challenges, participants shared how they overcame these challenges to deliver effective outdoor and nature-based activities identifying the need to consider the people (those living with dementia taking part and staff/volunteers to support activities), the activities and the environment. This led to a list of recommendations to guide the development of outdoor and nature-based activities and interventions for people living with dementia that was based on the findings from different care and community settings. These recommendations were used to inform the development of the horticultural activity intervention in Chapter 5 and the outdoor and nature-based activity intervention in Chapter 6.

#### **4.7. Chapter summary**

Chapter 4 presents a qualitative study using semi-structured interviews to explore the experiences and perspectives of individuals delivering outdoor and nature-based activities for people living with dementia in the UK. The development of the study was based on a lack of UK research about the impact of outdoor and nature-based activities for people living with dementia, and a lack of insight into the experiences and perspectives of those delivering the activities.

A thematic analysis was conducted which captured three themes, **quality of life**, **challenges of delivering activities** and **planning and preparation**. Participants perceived benefits to the quality of life and wellbeing of people living with dementia, which included high levels of positive behaviours and emotions, and increased social interaction. The findings highlight some of the challenges of delivering outdoor and nature-based activities, which included the health and social care system and culture amongst staff and management, and the challenges relating to supporting people living with dementia as a result of their symptoms and needs. Participants shared their experiences of overcoming these challenges, which related to knowing the people you are working with, considerations about what activities to include and how to adapt them for people living with dementia and ensuring the environment is both accessible and functional. This led to a list of

recommendations to guide the development of outdoor and nature-based activities for people living with dementia which is presented in this chapter and has been used to inform the development and implementation of the activity interventions in the subsequent studies.

## **Chapter 5:**

### **Study 2 – The development and testing of a horticultural activity intervention delivered in a community garden for people living with dementia**

#### **5.1. Introduction**

The research so far has identified the need for opportunities for people living with dementia to engage in outdoor and nature-based activities, particularly people living in the community and extra care retirement villages where there is less provision of structured outdoor and nature-based activities. The interviews in Chapter 4 highlight recommendations for planning and delivering a range of outdoor and nature-based activities for people living with dementia. In this chapter, the findings from the literature and study 1 are brought together through the development of a horticultural activity intervention for people living with dementia in the community. The intervention was delivered over 6-weeks at a community garden in Birmingham, UK, and is evaluated to explore the benefits offered in the community and the overall effectiveness of horticultural activities in this setting. The findings will further inform recommendations for the development and delivery of outdoor and nature-based activities for people living with dementia.

Clark et al. (2013) recommended that more research was needed to explore the benefits associated with outdoor and nature-based activities, for people living in the community. Not only does this group represent the largest group living with dementia (two-thirds), they can face additional barriers and challenges, such as adequate support and a lack of available activities, when trying to connect to nature and spend time outdoors (Clark et al. 2013; Duggan et al. 2008; Mapes et al. 2016). Community-based activities have been advocated (Evans et al. 2019; Mapes et al. 2016) and research has shown that community garden environments benefit not only the health and wellbeing of the general population (Hawkins et al. 2013; Marsh and Spinaze 2016; Milligan, Gatrell and Bingley 2004; Parr 2007; Winterbottom and Wagenfeld 2015) but more specifically, they can offer people living with dementia opportunities for increased social interaction and engagement in a

range of activities (Hewitt et al. 2013; Noone and Jenkins 2018, and later supported by Smith-Carrier et al. 2019).

Research has shown that horticultural activities and other gardening activities benefit the overall wellbeing of people living with dementia through increasing positive behaviour and mood (Gigliotti and Jarrott 2005; Gigliotti, Jarrott and Yorgason 2004; Jarrott and Gigliotti 2010; Jarrott, Kwack and Relf 2002), increasing levels of engagement with a variety of activities (Blake and Mitchell 2015), offering greater opportunities for social interaction leading to increased sense of belonging and inclusion (Gonzalez and Kirkevold 2013; Hall et al. 2016; Hewitt et al. 2013), increasing self-identity, increasing self-esteem, reducing depression and other symptoms associated with dementia as well as improving cognitive function (Connell, Sanford and Lewis 2007; D'Andrea, Batavia and Sasson 2007; Lee and Kim 2008).

The existing literature and findings from study 1 suggest that group-based activities delivered to a small number of people living with dementia are most effective (Jarrott and Gigliotti 2010; Watts and Hsieh 2015) as participants living with dementia can be supported (Jarrott and Gigliotti 2010) and individual adaptations can be made appropriately (Gonzalez and Kirkevold 2013; Watts and Hsieh 2015). Consideration during the planning and preparation for activities includes knowing who you will be working with, assessing the suitability of the environments and selecting activities which will meet the interests and the needs of the participants (Hewitt et al. 2013; Watts and Hsieh 2015 and findings in section 4.4).

The community garden environment and horticultural activities can offer a multi-sensory experience for people living with dementia which can benefit their wellbeing by triggering memories and reminiscence, and prompting conversation leading to increased social interaction (Chalfont 2006; Gigliotti, Jarrott and Yorgason 2004; Gonzalez and Kirkevold 2013; Hernandez 2007; Smith-Carrier et al. 2019). A strong association between olfactory stimulation and reminiscence has been previously noted (Gray 1999; Relf 1978) and therefore, the strong scents from plants and nature, such as herbs and flowers, can be used to trigger memories. The horticultural activity intervention was developed and tested at Martineau Gardens (a community garden in Birmingham). It sought

to provide small group-based activities within a community garden environment to enable people to engage in a variety of activities that stimulated the senses and encouraged connection to nature. It also sought to explore the challenges of evaluating the benefits in a community setting.

### **5.1.1. Aim and objectives**

The aim of this study was to develop and implement a horticultural activity intervention for people living with dementia in the community (based at a community garden) and evaluate the benefits for those taking part and their caregivers.

The objectives were:

- To design, develop and implement an evidence-based programme of horticultural activities for people living with dementia.
- To observe the behaviour and levels of engagement of during the horticultural activities.
- To reflect on the successes and improvements required following each activity session to improve the experience for participants living with dementia.
- To explore the perspectives and experiences of participants who are caregivers about the activity programme.
- To explore the feasibility of carrying out assessments of symptoms of dementia, and measuring physical function, with people living with dementia in a community garden environment.

## **5.2. Methods**

### **5.2.1. Study design**

A 6-week horticultural activity intervention was developed and implemented. As described in Chapter 3, the development of this study was based on the existing evidence and recommendations gathered and presented in study 1 (Chapter 4) and was guided by the experience and expertise of the horticultural therapists at Martineau Gardens and an occupational therapist from the Rare Dementia Service, Birmingham, UK. The Rare Dementia Service provide community-based support

and specialise in working with people living with less common types of dementia (such as semantic dementia). The occupational therapist had expertise and knowledge of working with people in the community and of supporting engagement in a range of activities. Full details about how the activity intervention was developed is outlined below (section 5.3). This study applied mixed methods. Quantitative measures of symptoms of dementia and physical function were taken using a pre-test and post-test design. This was to explore the feasibility of the measures with people living with dementia in a community setting, which is lacking in the literature. The data collection included use of an observational protocol to capture participant behaviour, and a protocol to capture weekly staff and volunteer's reflections. The week following the final activity session (week 8), a qualitative focus group was carried out with caregivers.

The ethical considerations of the research were discussed in Chapter 3. The study was approved by Coventry University Ethics Committee (July 2018 Project ref. P708094) (appendix 13) and conducted in compliance with Coventry University's policy on Principles and Standards of Conduction on the Governance of Applied Research. The horticultural activities carried out during this study were risk assessed by trained horticultural therapists at Martineau Gardens. This included considerations about participants arriving at the gardens and walking around the different areas, as well as engaging in specific activities. As part of the ethical approval, a full risk assessment was carried out for participant involvement which assessed the study to be low risk of causing physical or psychological harm.

### **5.2.2. Setting**

All data collection and delivery of the horticultural activity intervention was carried out at Martineau Gardens, charitable community garden in Birmingham, UK, between September and November 2018. Martineau Gardens' main charitable objective is "to protect and preserve good health for the benefit of the general public, in particular but not exclusively through horticulture and complementary therapies" (Martineau Gardens website). They offer a variety of therapeutic horticultural activities for a wide range of people, many of whom are living with mental health issues, physical health conditions, and long-term illness and/or learning difficulties. People are referred

through a spectrum of local charities and organisations, and can approach the gardens independently to get involved.

The horticultural activities took place within the two and a half acres of woodland and gardens at Martineau Gardens. The pavilion, an indoor space complete with kitchen and log burner, was used for the majority of activities due to the study taking place during the autumn to ensure the comfort of participants. Although activities were predominantly delivered as table-top activities, each week participants would engage with a different area within the gardens and spend time outdoors (approximately half an hour). Figure 5.1 shows photographs of different areas of the outdoor gardens at Martineau Gardens that were included in the outdoor activities. Martineau Gardens received funding from Jo Malone to create a therapeutic garden and provide activities for people experiencing cognitive impairment. This funding was used for resources and equipment, staff time and to cover the hire cost of the pavilion during this study.





Figure 5.1. Martineau Gardens from top left clockwise: green houses and wild flower garden, bench in gardens, vegetable patch and entrance to woodland and pavilion

### 5.2.3. Participants and sampling

Fifteen participants were recruited in total for this study. Four People living with dementia in the local community were recruited to join the activity intervention and attend a weekly activity group (for reasons outlined in section 3.3.3.2.). Their caregiver who accompanied them to the gardens was recruited to attend a focus group at the end of the final session (n=4). In addition, staff and volunteers (n=7) (those supporting existing activities within the garden) who were involved in the delivery of the intervention were invited to a weekly reflection following each session. The sample enabled exploration of the effectiveness of the activity intervention from different perspectives.

All recruitment was undertaken directly by Martineau Gardens in conjunction with the Rare Dementia Service Birmingham and Alzheimer's Society. Recruitment to the activity group was undertaken between August and September 2018, using volunteer sampling to seek people living with dementia in the local community and their caregivers. Recruitment was guided by inclusion criteria established for the research study, and included a diagnosis of dementia, residence in the local community and the ability to attend weekly sessions at Martineau Gardens. Exclusion criteria

included people who had been assessed as a risk to themselves or others, (based on Martineau Gardens' policy, and due to redevelopment works in the garden at the time of the research, the environment was not suitable for people who required wheelchair access.

Prospective participants living with dementia and their primary caregiver received a participant information sheet via email (postal option was also available if preferred) (Appendix 14) that provided an overview of the research and detailed the involvement of participants (both those living with dementia and their caregivers). Those who were interested in taking part were invited to visit the gardens to meet the delivery team and familiarise themselves with the environment. They were able to ask any questions about the activity programme and research study before volunteering to participate.

#### **5.2.4. Informed consent**

Following the visit to Martineau Gardens, those wishing to take part in the study were asked to provide informed written consent (Appendix 15). Participants living with dementia, their caregivers and staff and volunteers all gave informed written consent. Although one participant was able to give informed verbal consent to take part in the study, their primary caregiver provided informed written consent on their behalf as their personal consultee (as per The British Psychological Society Guidance on 'Conducting Research with People Not Having the Capacity to Consent to Their Participation' (The British Psychological Society 2008). Participants were reminded that they could withdraw from the study at any point until data analysis commenced one week after the study had ended (December 2018).

#### **5.2.5. Development of the activity intervention**

The following sections describe how the horticultural activity intervention was developed and delivered.

##### **5.2.5.1. Collaborative working**

The horticultural activity intervention was developed through a collaborative approach with staff members from Martineau Gardens, including two horticultural therapists and the deputy director

who had previous research experience, and an occupational therapist from the Rare Dementia Service Birmingham, UK with experience of working within the community supporting people living with dementia. A series of planning meetings were held between August and October 2018 at Martineau Gardens. The horticultural therapists had experience and knowledge of delivering a wide variety of gardening and horticultural activities within Martineau Gardens (as well as other settings) and both had previously worked with people living with dementia. Their expertise contributed to the selection and design of the horticultural activities that would be included in the intervention, as well as suggesting how planned adaptations could be offered for participants with specific needs relating to their cognitive impairment and/or physical limitations. Through their extensive experience of delivering horticultural activities, they helped shape the development of the activity programme and the structure of the sessions (Druin 2002).

The deputy director had previous experience of supporting research and therefore understood the need to adhere to an ethical and well developed research protocol. They provided gatekeeper approval on behalf of Martineau Gardens (Appendix 16), supporting the research component of the activity intervention and took responsibility for participant recruitment. The deputy director also had practical knowledge about delivering horticultural activities to a range of people at Martineau Gardens, as well as experience of supporting people living with dementia.

The occupational therapist provided recommendations for the delivery of the activity intervention based on their knowledge and experience of supporting people living with dementia in the community to engage in a wide variety of purposeful and meaningful activities. They highlighted several important practical considerations about support needs and requirements from an occupation therapy perspective (such as access to toilets, seated activities and equipment choice). In addition, the occupational therapist shared their experience of delivering activities with caregivers present, raising the challenges associated with caregivers not allowing the person living with dementia to engage in the activities as independently as might be possible. This led to the decision to deliver the horticultural activities only to the participants living with dementia, whilst inviting caregivers to stay and enjoy time in the gardens themselves. The occupational therapist also

supported recruitment through sharing the invitation with people living with dementia in the community who engaged with the Rare Dementia Service.

#### **5.2.5.2. Participants**

Participants made their own way to the activity sessions, Martineau Gardens is located on one of Birmingham's main bus routes, although all participants travelled by car. Whilst the intervention was designed for only the participants living with dementia taking part, following the first weekly staff and volunteer reflection, caregivers were invited to join the final 15-minutes of the session so that participants could share with them what they had achieved and created.

#### **5.2.5.3. Duration and frequency**

The duration of gardening and horticultural activity interventions varies greatly in the existing literature (Watts and Hsieh 2015). The 6-week duration of this intervention was based largely on pragmatic and logistical reasons, relating to the time of year as weather was likely to be poor and a lot of the usual activities within the garden take place in spring and summer. The 6-week duration is also included in the recommendations outlined by Watts and Hsieh (2015). The frequency of activity sessions was based on two factors, availability of staff and the indoor facility at Martineau Gardens, and the fact that participants did have to travel to attend the activities at the gardens. A 2-hour session was recommended by the horticultural therapists as it enabled participants to settle upon arrival to the gardens, and it allowed the delivery of two activities where participants would not be rushed, whilst also providing time for a refreshment break in the middle. The activities were delivered for 30-45 minutes, which is in line with the timings outlined by Watts and Hsieh (2015) which was thought to be enough time to complete the activities and maintain levels of engagement.

#### **5.2.5.4. Structure of the activity intervention**

The development of the horticultural activity intervention was informed by the exiting research and the findings and recommendations presented in Chapter 4. In addition, it was guided by the principles of CST. The activity intervention was designed to be delivered in a group environment, to support and encourage social interaction for participants living with dementia. Previous research

has shown that group-based activities can take place within a community garden environment (Hall et al. 2016; Hewitt et al. 2013). Although the small group size was predominantly pragmatic, Jarrott and Gigliotti (2010) delivered horticultural activities to a maximum group size of 8 to ensure that the necessary support could be provided. In the present study, volunteers were included to provide 1:1 support for participants and ensure that all needs and abilities were addressed for full engagement with the activities (as recognised by Thelander et al. 2008). The 1:1 support also allowed for individualised adaptations to be made to the activities in the intervention, as suggested by Connell, Sanford and Lewis (2007) who reported that some participants would only require verbal prompting to plant bulbs whereas others might need someone to hold the plant pot or provide hands-on assistance.

Due to the time of year, the activity intervention was planned so that the majority of the activities were based in the indoor pavilion, including the welcome and refreshments. Most activities were delivered as table-top horticultural activities so participants had the opportunity to sit down and could still fully participate in the activities. At least one outdoor activity was planned each week, including a walk, so that participants would spend time outdoors and could engage with different areas within the garden. Each week had a theme which linked the activities within each session and was used to orientate participants to the time of year for example, autumn harvest and Halloween, or to an area within the gardens, such as the vegetable patch and woodland. Luk et al. (2011) also used themes to centre their weekly horticultural sessions around. The use of weekly themes (see table 5.2) related to the principle of CST and the continuity and consistency between sessions (in section 2.3.4).

As participants arrived each week they were met at the entrance to the garden and staff and volunteers would walk them through the gardens to the pavilion. During this time, staff and volunteers encouraged participants to look at the gardens and pointed out different things, for example the growing pumpkins and changing colour of the leaves. Participants were invited into the lounge area of the pavilion for a hot drink before the activities began. The equipment and resources for the first horticultural activity were laid out for when participants arrived, as suggested by Thrive (2016), to stimulate conversation and discussion around the theme and the activities. In

addition, props relating to the weekly theme were laid out in the lounge area for participants to pass around. This related to the principles of CST about reminiscence and providing triggers to aid recall. Staff and volunteers encouraged reminiscence and discussion by asking participants questions about their life history and memories, particularly associated with the weekly theme (as was done by Gigliotti, Jarrott and Yorgason 2004; Jarrott and Gigliotti 2010).

Once participants had settled, the horticultural therapists began the session. The planned structure of the sessions was kept the same each week: a short introduction of the theme and the activities followed by the first horticultural activity, then a guided walk around the garden before a second horticultural activity. It was intended that the group would finish with refreshments and reflect on the activities. However, following the first staff and volunteer reflection, the structure was changed slightly. Refreshments was moved to immediately after the guided walk, this was due to the weather and to help participants to warm up. It also allowed one of the horticultural therapists the time to introduce the next activities whilst the other, with support from the volunteers, set up the equipment and resources. Table 5.1 outlines the session structure for weeks 2-6.

Table 5.1. Overview of horticultural activity session structure

Time	Activity outline	Sensory stimulus ✓		Resource outline
10.30	<b>Arrival, Settling In &amp; Refreshment</b> Welcome board Arrival music: e.g. Vivaldi: Four Seasons; Autumn David Mallett: Garden Song, Inch by Inch	Hear	✓	Photographs Place name cards Music system and recordings
		Vision	✓	
		Smell		
		Taste		
		Touch		
10.45	<b>Orientation Session</b> introducing topic, using: <ul style="list-style-type: none"> <li>Variety of fresh herbs and dried herbs</li> <li>Smelling lavender oil</li> <li>Photographs &amp; Music</li> </ul>	Hear	✓	Objects: herbs – fresh and dried, lavender oil Photo: herbs, recipes using herbs,
		Vision	✓	
		Smell		
		Taste		
		Touch		
11.00	<b>Group Activity 1</b> Making lavender bags, using dried lavender – pulling off the dried lavender flowers into a bowl, selecting fabric to make the bag and choosing ribbon, placing lavender in the fabric and bunching the edges, tie with string and then ribbon	Hear		2-3 pots of potatoes Activity table cloth Hand forks, gloves collecting bowls, dustpan and bucket, instruction sheets
		Vision	✓	
		Smell	✓	
		Taste		
		Touch	✓	
	<b>Breakout/Extension Activities</b> Discussion around other uses for lavender and the relaxation properties Chopping fresh herbs to use for drying and cooking	Hear		Chopping boards, bowls and knives
		Vision	✓	
		Smell	✓	
		Taste		
		Touch	✓	
11.30	<b>Guided Walk</b> A walk to look at the herb garden, participants encouraged to smell and taste herbs to identify Cutting rosemary to use in the next activity	Hear		Walk up the main path to the herb garden, picking and tasting herbs, cutting rosemary – secateurs and tray
		Vision	✓	
		Smell	✓	
		Taste	✓	
		Touch	✓	
11.45	<b>Refreshment &amp; Preparing to Leave</b> Hot drink and biscuits Opportunity to try some herb crackers/snacks	Hear		Bowls, cutlery, napkins Refreshments
		Vision		
		Smell	✓	
		Taste	✓	
		Touch	✓	
12:00	<b>Group Activity 2</b> Taking the rosemary cuttings and planting into separate containers, using compost, small plant pots and watering them once completed	Hear		Large clean pots Potting compost and scoops, rosemary cuttings, labels, watering can, instruction sheets
		Vision	✓	
		Smell	✓	
		Taste		
		Touch	✓	
	<b>Breakout/Extension Activities</b> Taking the pots to the green house, leaving one for each participant to take home	Hear		Cuttings in pots
		Vision	✓	
		Smell	✓	
		Taste		
		Touch		
12.30	<b>Session Finish</b> - Staff to reflect & discuss session; what went well, changes to be introduced, individuals' needs & outcomes			Standard form to complete

For each activity, simple step-by-step instructions were provided so that participants who were able to follow these independently could do so. Thrive (2016) recommend the use of instruction sheets and the ones produced in the present study were informed by the examples given by Thrive (Appendix 17). Each step of the activity was demonstrated by one of the horticultural therapists as some participants found it easier to see visually how to do the activities. Initially, each participant was given their own equipment and resources (e.g. a tray of compost, a set of seeds, and a trowel). However, after the first session staff and volunteers reflected that there was minimal social interaction between participants during the horticultural activities themselves. In an attempt to encourage more shared working, resources were placed in the centre of the table so they were shared amongst participants.

Photographs were taken throughout the sessions, with participant's and staff and volunteer's permissions. Hewitt et al. (2013) produced a book with photographs for the participants who attended their gardening and horticultural activities take home with them at the end of the intervention. Over the course of the intervention in the present study, the instructions for each activity and photographs were included in a folder for each participant as a momentum of their involvement and a reminder of everything they had achieved and created.

Throughout the whole horticultural activity intervention several of the principles of CST were addressed. Stimulating language was used to engage participants in discussions at the start of the sessions, encouraging them to share their memories and life stories, it was also used throughout the delivery of the activities to capture participant's interest. One of the key aims of the sessions was to provide enjoyable and fun activities that participants living with dementia could take part in, giving them opportunities for decision making and active involvement in all aspects of the activities. All participants were treated with respect and ensuring inclusion and comfort were at the core of all activities delivered at Martineau Gardens. Another feature of the intervention that aligned with the principles of CST was a focus on social interaction and building relationships through group-based activities. Further consideration is given to the choice and design of the activities below.



Once the 6-week activity intervention was completed. Participants living with dementia and their caregivers were invited to a final visit in which the post-test repeated measures were conducted with participants living with dementia and the focus group with caregivers was carried out. During this visit, the horticultural therapists delivered a fun Christmas activity which involved making decorations with foliage and red flowers that the participants could take home.

#### **5.2.5.5. Activities**

The horticultural activities included in the intervention were designed to focus on multi-sensory stimulation, through all of the senses, which relates to CST. Flowers and plants were selected for their bright colours, strong scents (eucalyptus, herbs and roses), different textures (foliage, soft petals) and tastes (herbs). Participants were encouraged to explore other sensory aspects of the activities and garden environment by feeling the soil and listening to sounds in the gardens. The plan for each activity session highlighted how each of the activities included sensory stimulation (see table 5.1 above).

It was considered important that whilst a lot of the focus of the activity was the process of doing it, there was a visual end goal. Implicit learning (CST principle) was encouraged by getting participants to do the activities themselves, describing and showing them how to fill pots with soil and make space for plants, rather than giving complex instructions and direction. Based on existing research, it was important that participants had something to show their caregivers and take away with them at the end of each session (D'Andrea, Batavia and Sasson 2007). This was also highlighted in study 1, particularly in relation to being able to give things as gifts. A combination of horticultural activities were included, such as planting and crafts (as per Gigliotti, Jarrott and Yorgason 2004;) to offer a variety of both familiar and new activities for participants, to meet the interests of individuals, to link to the different themes and to allow participants to engage with different areas of the gardens. Familiar activities included, planting seeds, potting up plants, making lavender bags and digging vegetables (potatoes). New activities included: making pressed flower bookmarks and onion plaiting. Careful consideration was given to ensure that non-toxic plants and compost was used throughout (Gigliotti, Jarrott and Yorgason 2004; Kwack, Relf and Rudolph 2005).

Activities that involved 'work' in the gardens were included following the positive findings relating to self-esteem and self-identity for people living with dementia (de Bruin et al. 2015; Hall et al. 2016; Hewitt et al. 2013). A guided walk enabled participants to explore the gardens and spend time outdoors and in a garden environment which has been shown to benefit their wellbeing (Gonzalez and Kirkevold 2013; Hewitt et al. 2013; Mapes et al. 2016; Whear et al. 2014). Table 5.2 summarises the activities that were included in the intervention, and the weekly theme. A sample of the activities is shown in figure 5.2.

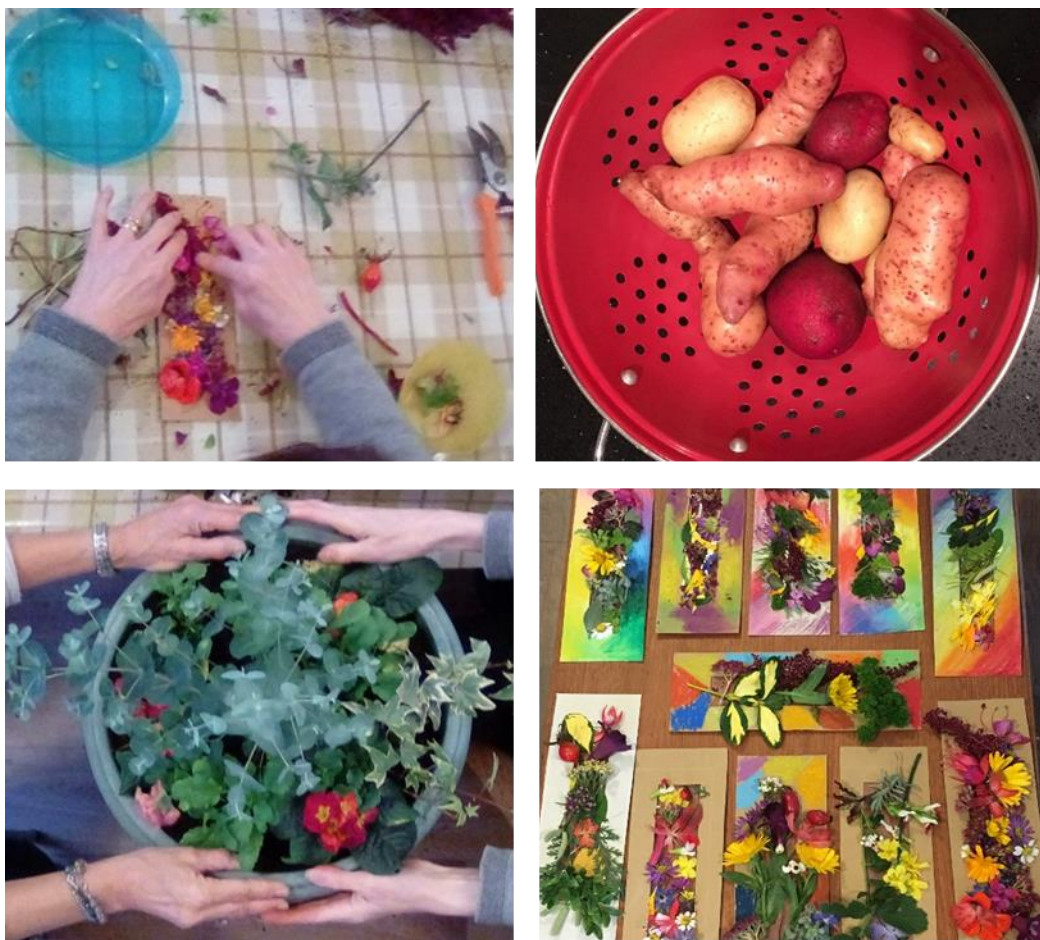


Figure 2.2. Horticultural activities at Martineau Gardens from top left clockwise: participant making a pressed flower bookmark, potatoes harvested from the vegetable patch, finished flower bookmarks, planters that were displayed at the gardens

Table 5.2. Weekly overview including themes and activities

<b>Week</b>	<b>Theme</b>	<b>Activity One</b>	<b>Walk</b>	<b>Activity Two</b>
One	Flowers	Planting large winter pots to be on display on the patio area in Martineau Gardens	A walk around the wild flower garden, choosing flowers to cut and arrange in a jar to take home	Sowing sweet pea seeds into small pots and taking them to the green house
Two	Trees	Raking leaves outside on the grass, filling the wheelbarrows, taking them to the leaf pile and emptying the leaves	A woodland walk through the trees, talking about the different trees and wildlife	Making and decorating bookmarks using tree leaves that had been pressed and dried before the session
Three	Harvest	Harvesting potatoes from large buckets as a group	A walk outside to dig up potatoes in the garden and harvest pumpkins on the vegetable patch in preparation for Halloween	Making onion bundles, plaiting naturally dyed fabrics (pre-prepared) to tie around the stalks of the onions to form bunches
Four	Seeds	Sowing broad bean seeds into small containers to go into the poly tunnel	A walk to the poly tunnel to put the seeds in for the winter and have a look at the other seeds that have been planted and begun to grow	Music as an activity – extending the music and tea break due to longer activity one  Sorting through a pile of leaves and nuts/seeds to match them to a set of cards with a picture and name of common seeds and nuts found in woodlands (e.g. acorn)
Five	Herbs	Making lavender bags – using dried lavender, pulling off the dried flowers and using fabric and ribbon to make small lavender bags	A walk around the herb garden, identifying different herbs based on appearance and smell and discussing what the different herbs can be used for, taking cuttings	Taking cuttings of a rosemary bush and planting into separate containers
Six	Birds	Planting strawberry runners in stacking trays, linked to discussions about providing berries as food for the birds	No walk due to poor weather – instead the group discussed common British garden birds and the decline in recent years and moved onto activity 2	Making and filling a range of bird feeders, filling metal cages with suet balls and seeds. Making feeders out of apples and oranges and filling with a mix of peanut butter and seeds

## **5.2.6. Data collection procedure**

Participants were invited to attend Martineau Gardens for 8 visits in total. The first visit involved the familiarisation of the environment, gaining informed consent and pre-testing if participants were happy to do so in this visit. Following this, participants were invited to attend a weekly 2-hour activity session for 6 weeks during which direct participant observations were conducted. During their final visit, post-test measures were completed and a focus group with caregivers was conducted. The study protocol is detailed below, including a description of the horticultural activity programme.

### ***5.2.6.1. Initial visit to Martineau Gardens – pre-test***

Once informed written consent was gained, participants completed the pre-test standardised tests to assess symptoms of dementia and physical function as described below.

#### **5.2.6.1.1. Gottfries-Bråne-Steen (GBS) Scale**

Full details and justification for the GBS Scale are presented in Chapter 3. In study 2, an informal discussion was conducted with the participants living with dementia and their caregiver (~20 minutes' duration) to complete the GBS Scale (Bråne, Gottfries and Winblad 2001; Gottfries et al. 1982) pre-test and post-test. This was conducted as they walked around the garden. Mapes et al. (2016) suggested that walking interviews encourage greater verbal interaction from people living with dementia. Scoring were completed following the discussion, based on both the participant's (living with dementia and caregiver) responses which indicated the person's symptoms associated with dementia. This scale was conducted for feasibility due to the small sample sizes. However, it provided insight into the cognitive and physical impairments of the participant's living with dementia which were discussed with the staff and volunteers in order to make individualised adaptations to the planned activities, as was recommended by Connell, Sanford and Lewis (2007), Thelander et al. (2008) and the findings from study 1.

#### **5.2.6.1.2. Physical Function Assessment**

The tests for physical function were conducted in the pavilion, a 4m walking path was marked out and cleared (rug removed off the floor). A note was made about the chair used for the Short Physical

Performance Battery (SPPB) (Guralnik et al. 1994) to ensure the same chair was used for all participants and at pre-test and post-test. The protocol outlined in section 3.3.2.4 was used, participants completed the balance test, followed by the walking test and finished with the sit-to-stand. A volunteer stood nearby to reassure them that they would not fall. Hand grip strength was measured using a JAMAR handheld dynamometer (Model J00105, JAMAR Technologies; Philadelphia, USA) following the Southampton Protocol outlined by Roberts et al. (2011) in Chapter 3. Participants performed 3 grip tests on each hand, and their dominant hand was noted. The total scores for the SPPB and the mean and peak hand grip strength for each hand was recorded and included in the analysis.

#### **5.2.6.2. Horticultural Activity Intervention**

The horticultural activities were delivered in 2-hour weekly sessions for 6 weeks at Martineau Gardens. Details of the activity intervention is presented above (section 5.3.). During the intervention, participant observations were conducted and staff and volunteer reflections carried out.

##### **5.2.6.2.1. Participant observations**

Direct participant observation was conducted during the 2-hour activity session to record the behaviour, facial affect, and level of engagement of the participants living with dementia. The order of observations was randomly generated using participant codes. The observations began once the theme and activities had been introduced for the session. Observations were conducted from the edge of the room to minimise interference or distraction however, if participants did engage in conversation then the observer responded so that participants were not made to feel as though they were being assessed or uncomfortable.

Observations were carried out at 5-minute intervals using an adapted version of the McCann Instrument (McCann et al. 1997) where the frequency of specific behaviours, facial affect and levels of engagement were recorded along with qualitative field notes to provide further detail and context. Participant quotes were included in the field notes. At the end of the activity session, staff and volunteers sought feedback from the participant's living with dementia about the session and the

activities. This was recorded in the field notes. The observational notes were typed up using Microsoft Word 2016 (Microsoft; Washington, USA) and were included in the thematic analysis (example transcript, Appendix 18).

#### **5.2.6.2.2. Staff and volunteer group reflection**

Once the participants had departed Martineau Gardens, the staff and volunteers engaged in a reflective discussion, guided by Gibbs' reflective cycle (Gibbs 1998). This included a reflection about whether the intended outcomes and goals for the session had been achieved, what happened during the session, and feedback on participant's behaviour, facial affect and levels of engagement that may not have been captured in the observations. Discussions about the successes and challenges of the activities were had, and suggestions for how to adapt activities that went less well were shared. During this reflection, staff and volunteers also planned the next week's activities, particularly focusing on the potential adaptations for each participant. A record of the reflective discussion was done using Gibb's reflective cycle framework, and typed up using Microsoft Word 2010 (Microsoft; Washington, USA). This was also included in the thematic analysis to explore the benefits for participants but also to highlight practical considerations and evaluate the activity intervention (example reflection, Appendix 19).

#### **5.2.6.3. Final visit – post-test and focus group**

Following the 6-week activity intervention, participants living with dementia and their caregivers were invited to the gardens to celebrate the end of the programme. This visit involved repeating the measures for symptoms of dementia (GBS Scale) and physical function (SPPB and hand grip strength). Once this was completed, the participants living with dementia were invited to take part in a horticultural activity making Christmas decorations whilst their caregivers took part in a focus group.

##### **5.2.6.3.1. Caregiver focus group**

An informal semi-structured focus group was conducted with caregivers to explore their views and opinions about the horticultural activity intervention. A set of questions (shown in table 5.3) guided

the focus group but a flexible approach was taken to ensure participants could share their own perspectives and opinions as they arose within discussions. One caregiver was unable to attend the focus group due to an appointment but had agreed to participate in a 1:1 interview which included the same questions when they came to collect the participant living with dementia. The focus group and 1:1 interview were audio recorded using a Zoom H2n Recorder (Zoom; New York, USA) audio device, recordings were transcribed verbatim using Microsoft Word 2016 (Microsoft; Washington, USA) and included in the thematic analysis.

Table 5.3. Focus group schedule

<b>Questions</b>
<ul style="list-style-type: none"> <li>• What are your general feelings about the programme?</li> <li>• Do you think your partners/friends (the participants living with dementia) have enjoyed their visits and the activities?</li> <li>• Have you noticed any changes in behaviour following the sessions?</li> <li>• Have you spoken about the activities or Martineau Gardens between the sessions?</li> <li>• How have you felt about the participants having something to take away from each session?</li> <li>• Do you think it has been useful to have a group for the activities?</li> <li>• Have you benefitted from the sessions in any way?</li> </ul>

### **5.2.7. Data Analysis**

Data analysis began one week after the final visit. Descriptive statistics were used to analysis the small amount of quantitative data, including the frequencies of behaviours, facial affect and levels of engagement. The qualitative data (observation field notes, reflections and focus group data) were triangulated and analysed using thematic analysis.

#### ***5.2.7.1. Symptoms of dementia and physical function***

Given the small sample size and feasibility nature of this study descriptive analysis is reported for the GBS Scale scores, SPPB scores and hand grip strength.

#### ***5.2.7.2. Participant's behaviours, facial affect and levels of engagement***

The frequency of recorded behaviours, facial affect and levels of engagement were calculated for each activity session using Microsoft Excel 2016 (Microsoft; Washington, USA). A descriptive

analysis was conducted. The qualitative field notes were included in the thematic analysis as outlined below.

### **5.2.7.3. *Impact of the horticultural activities on participants***

Thematic analysis was used to analysis the qualitative data from the observational field notes, reflections and focus group using a triangulation method. This analysis followed the phases presented by Braun and Clarke (2006) as described in Chapter 3. NVivo (Version 12 Pro for Windows, ©QSR International) was used to record the thematic analysis, including the creation of the codebook and coding of the data. The intra-coder reliability coding comparison of a sub-sample of data produced a Kappa co-efficient value of 0.91, 0.75 and 0.82 (this was done separately for a sub-sample of each type of data: observational field notes, reflections and focus group data). The Kappa co-efficient values demonstrated excellent to good levels of agreement and reliability (Altman 1991; Boyatzis 1998; Landis and Koch 1977; Miles and Huberman 1994; Neuendorf 2002). The remaining data was coded, an excerpt of the codebook is shown in table 5.4 and the full codebook is in the appendices (Appendix 20). Throughout phases 3 and 4, a thematic map was produced, the final thematic map is shown in figure 5.3. The themes, subthemes and a brief description are shown in table 5.7 in the following section (page 160). The findings from the thematic analysis are presented below.



Table 5.4. Excerpt of codebook

<b>Parent node</b>	<b>Child node</b>	<b>Short definition</b>	<b>Long definition</b>	<b>When to use</b>	<b>When not to use</b>
Sensory stimulation	Response to sensory stimulation	Participant response to sensory stimulation	Participant response and reaction to sensory stimulation, relating to their behaviour and actions	Use to code the response to/reaction to/result of sensory stimulation	Do not use this to code participants actively seeking sensory stimulation, use the node "seeking sensory stimulation"
Facial affect	Happiness/pleasure	Participants displaying signs of happiness/pleasure	Participant's facial affect and behaviour suggesting happiness and/or pleasure during activities	Use to code behaviours suggesting happiness and/or pleasure during activities	Do not use to code facial affect and behaviour relating to interest, use the node "interest"
Behaviour	Reminiscence	Participant engagement in reminiscence behaviour	Participant's engagement in reminiscence during or relating to an activity	Use to code behaviour and activity relating to reminiscence	Do not code in isolation if possible to suggest causation of reminiscence (questioning, sensory stimulation) and effect of reminiscence

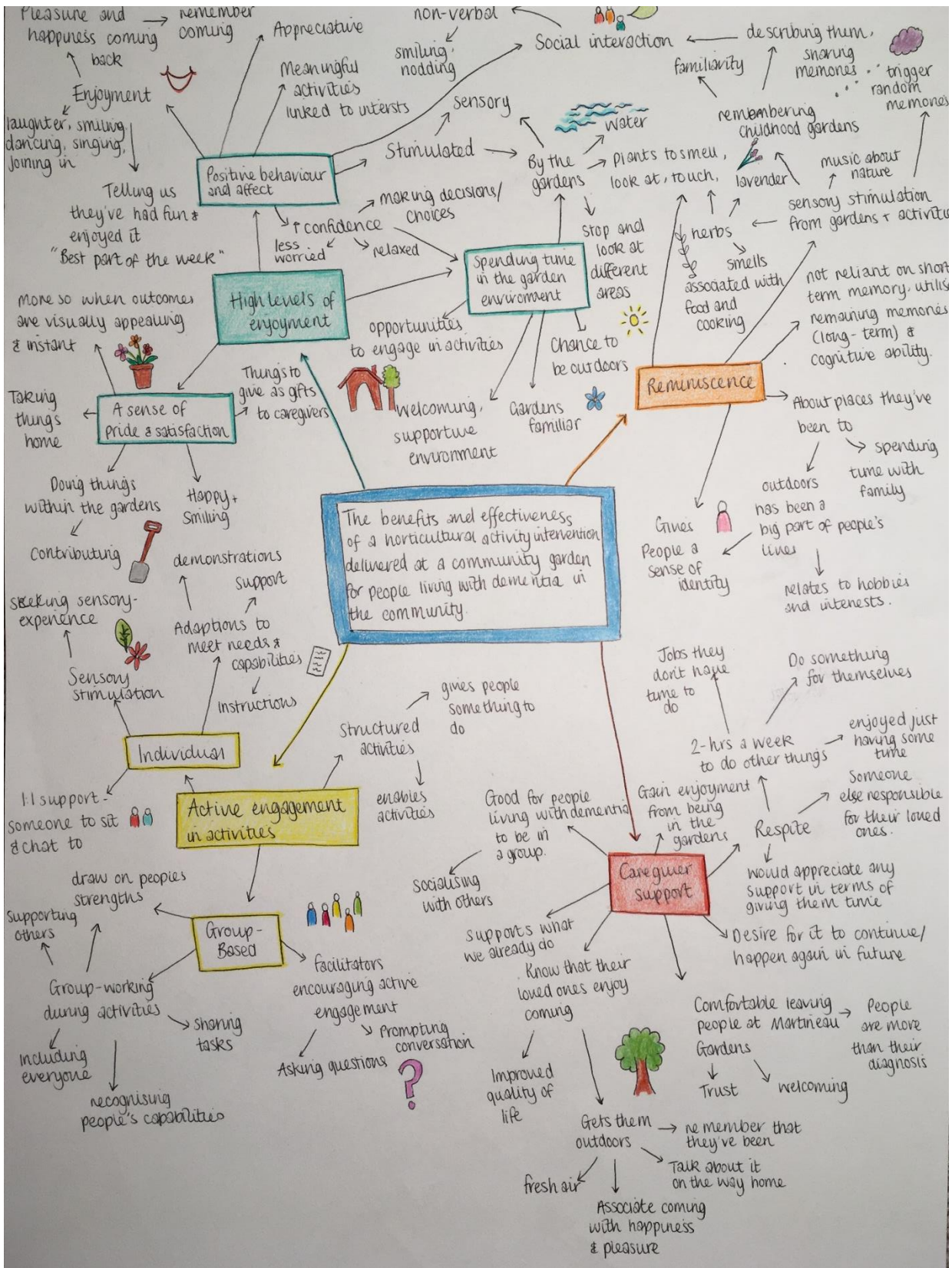


Figure 5.3. Thematic Map

#### **5.2.7.4. Missing data**

There is missing data for mean left and right hand grip strength as one participant only completed one measure, their peak hand grip strength was included in the analysis. Two participants did not attend the first activity session and one participant did not attend the second activity session, therefore observational data is missing for these participants.

### **5.3. Results**

#### **5.3.1. Participants**

The characteristics of the four participants living with dementia is shown in table 5.5.

Table 5.5. Characteristics of participants living with dementia

<b>Participant</b>	<b>Gender</b>	<b>Age</b>	<b>Diagnosis</b>
1	Female	56	Semantic Dementia
2	Female	72	Alzheimer's Disease
3	Male	82	Alzheimer's Disease
4	Female	85	Alzheimer's Disease

Four caregivers were included (n=3 female, n=1 male) and 3 staff members (n=3 female) and 4 volunteers (n=3 female, n=1 male).

##### **5.3.1.1. Symptoms of dementia and physical function**

Table 5.6 shows the descriptive statistics for the range and mean pre-test and post-test SPPB scores, hand grip strength measures and GBS Scale scores. The range highlights the variation between participants, the mean was used to compare pre-test and post-test measures to note any trends as statistical analysis was not conducted. The results show only one positive change in the post-test mean for left hand grip strength peak measure. The range of measures and changes pre-test and post-test for individual participants varied.

Table 5.6. Descriptive statistics showing range and mean values

Measure	N	Range	Mean
Short Physical Performance Battery			
SPPB Pre	4	5.00	5.00
SPPB Post	4	6.00	4.25
Hand grip strength			
HGS R Mean Pre	3	14.00	21.73
HGS R Mean Post	3	11.70	20.87
HGS L Mean Pre	3	14.90	20.50
HGS L Mean Post	3	13.50	20.00
HGS R Peak Pre	4	12.80	21.10
HGS R Peak Post	4	22.90	19.50
HGS L Peak Pre	4	2.00	18.85
HGS L Peak Post	4	0.50	20.55
Gottfries-Bråne-Steen (GBS) Scale			
GBS Pre	4	76.00	35.50
GBS Post	4	86.00	48.75

Severity of symptoms associated with dementia varied greatly as indicated by GBS Scale scores ranging from 8-84. Post-test scores increased by 10-27 points, beyond what would be expected over such a short time frame (Brane, Gottfries and Winblad 2001). The changes in scores was attributed to participant's openness and willingness to share more information during the post-test interview. Having observed the participants for 6 weeks, it was also likely that a more in-depth understanding about their impairments occurred during the post-test assessment from a research perspective. A trend was noted between levels of cognitive impairment and physical function, participants who had greater GBS Scale Scores had lower scores on the SPPB. The correlation between declining cognitive function and physical function has been noted (Auyeung et al. 2008; Kuo et al. 2007) and lower performance in gait speed, balance and sit-to-stand tests have been found (Fitzpatrick et al. 2007). A similar trend was noted in three participants between GBS Scale Score and hand grip strength.

The GBS Scale also provided insight into the needs of the participants living with dementia that enabled the appropriate support to be given throughout the study. It was concluded that the GBS Scale, SPPB and hand grip strength tests could be easily carried out with the participants living with dementia in a community garden setting. However, these measures may not be appropriate for people living with severe dementia who are unable to understand instructions, including visual demonstrations, and for people with physical mobility limitations.

### 5.3.2. Frequency of behaviour, engagement and activity

The frequency of activity, facial affect and behaviour for each session was recorded. An overview of the frequency of participant's activity across all weeks and activities shown in figure 5.4. Observations took place most frequently in the pavilion (recreation room) where participants were most commonly in a small group structured activity (table-top horticultural activities) or a large group structured activity (outdoor whole group activities) (figure 5.4).

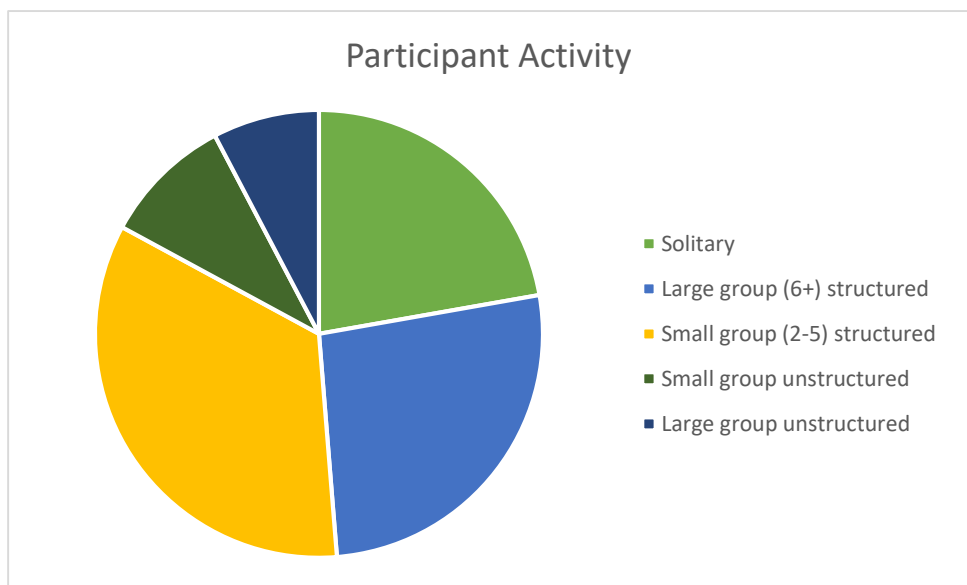


Figure 5.4. Participant activity

Participants were alert throughout the observations, and displayed positive facial affect such as expressions of pleasure and interest when engaged in the horticultural activities, particularly those with strong visual stimulation such as flower arranging and making pressed flower bookmarks (figure 5.5).

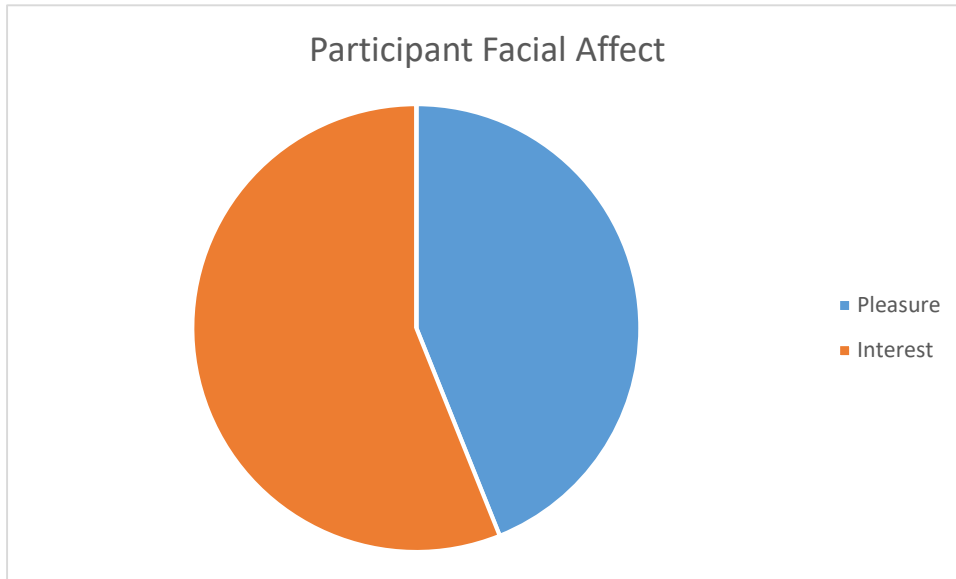


Figure 5.5. Participant facial affect

The most common behaviours observed included talking to others, positive physical expression, and participation in group activity (figure 5.6). Such behaviours indicated enjoyment. These behaviours occurred consistently during the sessions, from when participants arrived and engaged in discussions about the activities and throughout both indoor and outdoor horticultural activities. Frequent verbal communication was observed as participants engaged in conversations about the activities, and shared memories and stories.

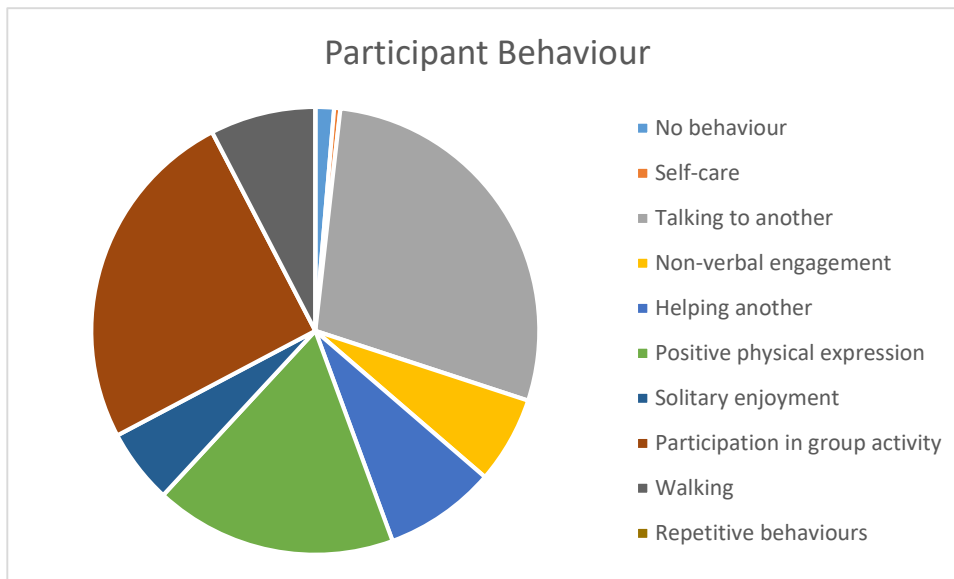


Figure 5.6. Participant behaviour

### 5.3.3. The effectiveness and benefits associated with horticultural activities

From the data collected during the participant observations, reflections with staff and volunteers, and focus group with caregivers, four themes capture the benefits associated with the activity intervention. The themes were, **High levels of enjoyment**, **reminiscence** and **active engagement in activities** and **caregiver support and wellbeing**. Table 5.7 provides an overview of the themes, sub-themes and brief description. Each theme is described below.

Table 5.7. Themes and sub-themes with descriptions

Theme	Sub-Theme	Description
High levels of enjoyment	Spending time in a garden environment	Displayed and reported enjoyment and pleasure associated with Martineau Gardens and the garden environment.
	Positive behaviours and affect	Positive behaviours and facial affect, such as laughing and interaction, expressed by participants indicating enjoyment and pleasure.
	A sense of pride and satisfaction	Displayed and reported signs of pride and satisfaction.
Reminiscence		The sharing of life experiences, memories and stories from the past.
Active engagement in the activities	Individual activities	Participants actively engaging with the activities and working independently.
	Group activities	Participants actively engaging within group activities and interacting with one another.
Caregiver support and wellbeing		The positive impact of the activity programme for caregivers.

### **5.3.3.1. High levels of enjoyment**

This theme reflects the high levels of enjoyment and pleasure displayed and reported throughout the activity programme. Enjoyment was seen in relation to spending time at Martineau Gardens through being in the garden environment and attending the activity sessions. Frequent displays of positive behaviours and facial affect (emotion) indicated high levels of enjoyment and pleasure, which was observed and reported by staff and volunteers. Enjoyment was also linked to a perceived sense of pride and satisfaction throughout the activities, and is supported by the frequencies of positive behaviours shown in figure 5.6.

#### **5.3.3.1.1. Spending time in a garden environment**

High levels of enjoyment were associated with spending time at Martineau Gardens, being in a garden environment and engaging in an activity intervention. Recorded through the observations and reflections, participant's often shared how they enjoyed visiting the gardens and attending the activity sessions, with one participant stating "[it] was the best part of the week" (participant 3).



Caregivers also commented that they perceived the participants living with dementia had enjoyed the activities. One caregiver shared:

“I know they have thoroughly enjoyed it ... because they will actually remember if you say you are going to the gardens today, they will remember they have been there before even if not what they have done. The feeling they have is of pleasure and happiness and they are happy to come again, it has been absolutely brilliant” (participant 7).

The caregivers recalled how the participants living with dementia would continue to discuss the activities on the journey home and in the days following the sessions. One caregiver described how one of the participants living with dementia often forgot about going to Martineau Gardens, but each week when they found out they were going they were very happy. They commented:

“Although they cannot remember things, and very much live in the moment, they can remember whether they had a positive or negative experience previously with a person or place. They feel comfortable at Martineau Gardens” (participant 6).

Martineau Gardens was noted for its “non-judgemental environment” and “welcoming setting” that made the caregivers comfortable leaving the living with dementia during the sessions. The caregivers described the gardens as “peaceful” and “beautiful”, as two of the caregivers chose to stay during the sessions and reported enjoying spending time in the gardens themselves.

Participants living with dementia appeared to enjoy spending time outdoors, during the weekly walk and other outdoor activities. Participants took interest in plants and flowers, commenting on plants and features, such as the pond, that captured their eyes. Participants seemed to enjoy visiting different areas within the garden and learning about the vegetable patch and the woodland. During the reflections, staff and volunteers reported the high levels of enjoyment that participants displayed when outdoors, perceived through their interest and high levels of engagement with nature and with each other. In addition, positive behaviours and facial affect that indicated high levels of enjoyment (e.g. smiling and laughing) were reported.

#### **5.3.3.1.2. Positive behaviours and facial affect**

Frequent displays of positive behaviours and facial affect were observed and reported consistently throughout the activities amongst the participants living with dementia. Positive behaviours included, positive physical expression, engagement with others and participation in the activities, positive facial affect related to pleasure and interest. Other positive behaviours were recorded, such as participants helping each other during the activities, thanking staff at the end of the session and verbally reporting their enjoyment during the activities and at the end of the session as they were leaving.

Staff and volunteers noted that activities that involved working together, such as the group digging up the potatoes, and those with a strong sensory component, including making lavender bags and flower arrangements, were associated with the greatest display of positive behaviours and facial affect. Participants engaged in social interaction through chatting about the activities and would often say how much they were enjoying it, commenting on the bright colours and smells that appeared to be pleasurable. Participants seemed to enjoy familiar plants, such as roses and lavender, they shared what the smells reminded them of and displays of positive behaviours and facial affect increased. Participants engaged in reminiscence throughout the activity intervention which is captured in a separate theme however, as memories were triggered and participants shared stories, positive behaviours and facial affect were observed.

As well as reminiscence, positive behaviour was increased during social interaction and engagement with others. Amongst the group, participants living with dementia would chat to each other about the activities, would complement each other's work and share stories. Other participant's engaged through smiling, laughing and verbally responding through asking questions and sharing their own stories. Positive interactions were also observed between the participants living with dementia and the staff and volunteers. One participant said to the volunteer who was supporting them "I am so glad I sat by you" (participant 4) whilst holding their hand. Caregivers felt that participants enjoyed the sessions as they felt well supported by the staff and volunteers.

High levels of enjoyment, through positive behaviours and facial affect were noted when the music was played. After the first week, the music became a core feature of the activity session during the refreshments. Participant's would sing along to the music, dance, clap their hands and even suggest other songs that should be played.

#### **5.3.3.1.3. A sense of pride and satisfaction**

The behaviour of the participants living with dementia indicated a sense of pride and satisfaction as a result of making things during the activities. Participants would smile and comment on what they had made, and wanted to pose for photographs and show their caregivers at the end of the session. During the reflection, one staff member commented:

“Being able to see what they've created straight away seems to give a sense of accomplishment and something to be proud of. We make a point of showing their partners and caregivers after the session finishes” (participant 9).

The staff and volunteers made an effort to compliment and encourage participants, which did appear to contribute to participant's sense of pride and satisfaction, and display of positive behaviours. This was even more evidence for two participants who seemed quite shy and nervous at the start of the activity intervention, and were not confident in making decisions about how they wanted to do the activities.

It was observed that all the participants living with dementia seemed to gain satisfaction through the completion of the activity, once they could see the finished product. The staff and volunteers reflected on the large plant pots that the participants made during the first session, say that when they reminded the participants each week they had made them, they appeared to be both satisfied and proud that they could be enjoyed by everyone who visited the gardens.

Following the first staff and volunteer reflection, caregivers were invited to join at the end of the session to see what the participants living with dementia had achieved. This gave participants an opportunity to share with their caregiver what they had been doing during the session. On a number of occasions, the participants were able to give their caregivers a gift, which was seen to elicit

greater positive behaviours and indicate a sense of pride. Through the focus group, one caregiver spoke about a continued sense of pride as the participant living with dementia was able to tell their family when they phoned about what they had achieved at Martineau Gardens.

### **5.3.3.2. Reminiscence**

The observations showed that participants regularly engaged in reminiscence, through the sharing of memories and stories. Reminiscence was also encouraged by staff and volunteers who would use the props laid out each week during the start of the session to ask participants questions about their interests and life histories. Being outdoors in the garden environment led to participants sharing memories about their childhood gardens, one participant told how their mother had scolded them for bashing the lavender as they were running around. Another participant went into great detail using hand gestures to describe the design of their childhood garden to other participants and staff. Once one participant engaged in reminiscence, it often triggered memories of other participants who then contributed to the discussions. A lot of the discussion during the activities and sessions revolved around reminiscence, which drew on long-term memories and resulted in the sharing of pleasurable memories which led to positive behaviours and facial affect.

As noted above, a link between the activities with a strong sensory element and reminiscence was seen. Strong familiar scents, including lavender, trigger participant's memories. Reminiscence was also seen when the participants were smelling the different herbs, which led to sharing stories about using herbs for cooking and childhood memories of their mothers cooking. The activity of making lavender bags led to reminiscence as a few participants were reminded of picking lavender as a child, and having lavender bags in their clothing drawers. One participant, who did not often engage in verbal interactions with other participants, joined discussion by nodding and saying "yes" (participant 2) when other participants shared their memories. It seemed that although they did not verbalise their own memories, they did remember making lavender bags before. Other activities triggered memories, for example whilst digging potatoes, one participant commented "it reminded me of building trains" (participant 4). They expanded by saying that whilst they were working as a train engineer they had an allotment garden to take care of. The process of engaging in familiar

actions led to reminiscence, when plaiting ribbons for the onion bunches one participant spoke how it reminded them of a book they had as a child about a girl with plaits.

The playing of music also led to reminiscence, as well as increasing positive behaviours and enjoyment. All the participants living with dementia recognised the music and began singing along, two participants knew the words to most songs. They also shared stories, again relating mostly to their childhood, for example their mother singing a particular song to them. Playing a piece of music often led to the participants suggesting other music, either by the same composer/artist or relating to the theme. On one occasion, participants engaged in reminiscence about all the nursery rhymes they could remember from childhood that involved flowers. This led to further discussion about different types of flowers, which drew on participant's knowledge and experience of gardening.

#### ***5.3.3.3. Active engagement in the activities***

This theme reflects the participants living with dementia showing high levels of engagement throughout the intervention during individual and group activities.

##### **5.3.3.3.1. Individual activities**

Participants living with dementia had 1:1 support throughout the intervention however, they were encouraged to be as independent as possible during the activities. Although this was expected based on the results from the GBS Scale, they varied greatly in their ability to work independently. Staff and volunteers reflected that the levels of independence were linked to a participant's level of cognitive impairment. One participant, with a rare type of dementia, experienced word disassociation which meant they required help to match words/names to objects and to understand written instructions. Staff noted that visual demonstrations enabled this participant to work more independently as their physical capabilities were high. It was observed that staff and volunteers were reactive to the needs of participants which changed throughout the activities, and were able to apply their experience and knowledge to adapt the activities and provide support when needed. It was clear that the 1:1 support did help participants to be more actively engaged in the activities, as they had someone to guide and prompt them.

Engagement was noted in relation to seeking sensory stimulation. Even where participants did require a lot of support to engage with the activities, the sensory component of nature was something that all participants, regardless of their cognitive abilities showed high levels of active engagement with. This was observed through participants sifting soil through their fingers, rubbing different leaves, smelling flowers and herbs, commenting on the colours of flowers and leaves in the gardens, and sitting and listening to the water flowing down the stream and into the pond. Participants appeared very engaged with nature when they were outdoors, and would often stop to look at flowers and comment on the sound of birds.

Participants living with dementia were seen actively engaging in decision making, for example through choosing the flowers to pick and selecting fabric and ribbons for the lavender bags. This was associated with the positive behaviours and sense of pride and satisfaction previously mentioned. As the intervention went on, participants seemed to increase in confidence relating to decision making. One lady who would not make decisions at first, went on to actively suggest what they would like to do during the activities.

#### **5.3.3.3.2. Group activities**

All participants living with dementia actively engaged in group activities throughout the programme. One caregiver commented on the benefits of delivering the activities in a group setting "It's the social element of the group as well as the activities. To be here and to be something other than your diagnosis, whatever that may be" (participant 7). Participants actively engaged in social interaction, both verbally (talking, sharing stories, asking questions) and non-verbally (nodding, smiling in response). Over the course of the intervention, participants seemed to be more comfortable within the group and therefore they showed greater active engagement in the activities, increased social interaction and more positive behaviours. One staff member reflected on a particular participant, commenting:

"They change in behaviour from when they arrive. At first they are very reserved and nervous, but they relax and they are smiling during the session. They are aware when things

are being said that they remember, or know about them, but they can't always articulate to join in the conversation" (participant 9).

Two participants living with dementia were observed taking on an active role in supporting others during the whole-group activities, such as the digging up potatoes and harvesting pumpkins. For example, the two participants, who were also more physically able, gave themselves the task of digging up the potatoes before passing them to the other two participants who would put them into the buckets. Participants did seem to be aware of other's capabilities and limitations and tried to support these. Participants also showed positive behaviours and reported enjoying activities that were done as a group, as it was "fun" working together and helping each other to get the job done.

#### ***5.3.3.4. Caregiver support and wellbeing***

This theme reflects the benefits associated with the horticultural activity programme on providing caregiver support and wellbeing that was reported through the focus group. All caregivers were happy to use the time during the session for themselves, and found it useful that they were not expected to stay and support the participants living with dementia. One caregiver shared that they "go to the MAC, order a large hot chocolate and sit down in silence", they said "I just thoroughly enjoy it" (participant 8). Other caregivers also chose to spend the time reading in the gardens or meditating, taking time away from their caregiving role and responsibilities for a short time. One caregiver shared that they "enjoyed being able to join in and see at the end of the session how happy they [participant living with dementia] is coming here, and what they have been up to" (participant 6). The caregivers agreed that they could go and do other things knowing that the participants living with dementia were safe and were enjoying themselves.

The caregivers reported on the benefits they perceived the activity intervention to have had for the participants living with dementia. They felt that levels of enjoyment were high: It's a big boost to their [participant living with dementia] confidence, after the session for a couple of days they are on quite a high afterwards. It lasts a couple of days" (participant 5). Caregivers shared that participants did display improved mood and behaviour, which helped them once they got home as the participants living with dementia were happier. Another benefit that was seen when they got home

related to the participants taking things home each week they had created. Caregivers spoke about it giving them new things to talk about with each other and with their family and friends, and a visual reminder of their time at Martineau Gardens.

Commenting on the environment, caregivers agreed that the welcoming and inclusive environment at Martineau Gardens made the participants living with dementia more comfortable. One caregiver commented, “at the end of the session they seem more relaxed and is visibly more engaged and upright (participant 6). Another person shared, “sometimes [the participant living with dementia] feels very anxious in groups and is anxious before coming each week, but they relax into the session and feels comfortable coming here” (participant 5). Caregivers perceived that attending the group activities made participants living with dementia more relaxed and less anxious.

Caregivers added that they would like to see more opportunities for activities at Martineau Gardens for participants living with dementia as they felt the activities were very beneficial but they highlighted the challenges of trying to provide them themselves at home. A community-based activity enabled them to get outdoors and leave the home, as well as allowing caregivers opportunities to do other things while they were out of the home. They did suggest that it may benefit participants living with dementia further to get more involved in the work and general day-to-day running of the garden which would enable them to feel like they were making a contribution.

#### **5.4. Discussion**

This study has outlined the development and testing of an evidence-based horticultural activity intervention that was designed collaboratively with Martineau Gardens. The development and implantation of the activity intervention was also informed by the findings from Chapter 4, namely group-based activities, consideration about accessible and familiar equipment (which Martineau Garden already account for), the inclusion of sensory activities, the use of clear step-by-step instructions and making things that could be given as gifts to caregivers. Martineau Gardens is a community garden that is free to attend for anyone in the local community, including people living with dementia and their caregivers, and its core purpose is to provide gardening and horticultural activities that have the potential to benefit health and wellbeing.



A mixed methods approach to the evaluation of the intervention was implemented to explore the benefits to participant wellbeing from different perspectives, and to acknowledge the objective and subjective components of wellbeing. Mixed methods also allowed flexibility in the choice of data collection methods that were most appropriate for a population living with dementia and community garden setting, in keeping with the pragmatic approach. Quantitative data collection (symptoms of dementia and physical function) was conducted to primarily assess the feasibility of using the measures with people living with dementia in a community garden setting, due to the small sample size.

Descriptive statistics were provided which highlight the heterogeneity between participants in their symptoms of dementia and their physical function. There was no apparent trend in the pre-test and post-test findings, this is likely due to the short duration of the programme in which changes to symptoms of dementia and physical function could not be achieved or there was a lack of sensitivity of the tools to such acute changes. The trend noted between GBS Scale scores and SPPB scores, and hand grip strength measures, suggests that cognitive impairment may be associated with a decline in physical function. Research suggests that the hippocampus of the brain, which is affected by dementia, plays an important role in both cognitive functioning and mobility (Monterro-Odasso et al. 2012). Furthermore, reduced cognitive function has been associated with reduced functional mobility amongst people living with dementia (Borges, Radanovic and Forlenza 2018), specifically slower gait speed and weaker grip strength (Hooghlemstra et al. 2017) as was suggested in this study. Whilst the GBS Scale did not provide reliable insight into acute changes to cognitive function, it was useful in identifying the levels of cognitive impairment and physical limitations of participants living with dementia, gaining insight into their interests, hobbies and existing activities, which enabled the appropriate adaptations to be made and support to be provided during the activities.

A mixed methods approach to recording behaviour, facial affect and the level of engagement of participants living with dementia during the activities indicated the frequency of behaviours (quantitative component) as well as providing greater insight into the context in which these behaviours occurred (qualitative field notes). Feedback was also collected from staff and volunteers (weekly reflection) and caregivers (focus group) to explore the benefits of the activity intervention

on the wellbeing of people living with dementia, and caregivers, from different perspectives. In addition, the weekly reflections provided insight into the overall effectiveness of the activities and the activity intervention.

This study has shown several benefits to the wellbeing of participants living with dementia as a result of taking part in the intervention, including increased enjoyment, greater positive behaviours and facial affect, increased active engagement, a sense of pride and satisfaction, and increased social interaction and reminiscence, which corroborates the existing evidence-based. Furthermore, benefits to caregiver wellbeing were also found in relation to providing support, comfort and respite. The benefits for people living with dementia and caregivers are discussed below.

#### **5.4.1. Benefits for people living with dementia**

Participants benefitted from being outdoors and spending time in a garden environment, seen through increased positive behaviours and opportunities to engage in gardening and horticultural activities, which has been noted within the existing literature (Blake and Mitchell 2016; Chalfont 2006; Detweiler et al. 2008; Gonzalez and Kirkevold 2013; Hall et al. 2016; Hewitt et al. 2013; Noone and Jenkins 2018; Watts and Hsieh 2015; Whear et al. 2014). The gardens provided a multi-sensory environment (Cox et al. 2004; Gonzalez and Kirkevold 2013) which encouraged participants to engage with nature through touching and smelling plants and admiring the colours of flowers as seen in this study. The garden environment was also associated with triggering childhood memories which led to reminiscence, which appeared to benefit the participants living with dementia as it evoked pleasurable memories and positive behaviours. This was noted by Hall et al. (2016) and more recently by Smith-Carrier et al. (2019) within a garden environment. Smith-Carrier et al. (2019) suggested that garden environments were beneficial for people living with dementia as it drew on their long term memories which are less impacted by dementia.

Being outdoors was also linked to increased social interaction, which occurred through reminiscence and general conversation about the gardens. When walking round the garden participants living with dementia would engage in discussions with staff and volunteers, supporting the observations made by Mapes et al. (2016) about the benefits of increased social interaction

through walking activities. Many of the outdoor activities involved group working, this has also been found to increase social interaction as participants living with dementia could discuss the activities, share their own knowledge and experience and work together (de Bruin et al. 2015; Gibson et al. 2007; Hall et al. 2016; Hewitt et al. 2013; Smith-Carrier et al. 2019; Watts and Hsieh 2015).

A range of benefits were found in relation to the horticultural activities. Firstly, the inclusion of a broad variety of activities maintained participant's interests and contributed to high levels of enjoyment as participants could experience different things, including areas of the garden. Hewitt et al. (2013) highlighted the benefits of offering a choice of activities. Activities with a strong sensory element, such as the lavender bags and flower arranging, were associated with increased positive behaviours and facial affect, active participation – regardless of whether the activities were done individually or in a group, and reminiscence as memories were triggered, all of which indicate greater wellbeing (Han et al. 2016). The findings from study 1 also highlight the association between sensory stimulation from nature and plants, and wellbeing, which has been documented in the existing literature (Smith-Carrier et al. 2019). Many participants actively sought sensory stimulation throughout the activities, Behrman, Chouliaras and Ebmeier (2014) recognised the increasing importance of sensory experiences for people living with dementia as their dementia progresses, noting that even though they may not understand the context of the sensory experience, it can still benefit their wellbeing. As well as sensory stimulation triggering memories and reminiscence, familiar activities such as digging potatoes and the action of plaiting during the onion plaiting activity also led to reminiscence. Visual stimuli and the action of doing the activities may have contributed to this reminiscence.

Based on the positive findings within the literature (D'Andrea, Batavia and Sasson 2007; recently supported by Smith-Carrier et al. 2019) and guidance from Thrive (2016) the activities were designed so that there was a visual end goal and participants produced something that could be displayed in the garden (e.g. large planters and pumpkins) or taken home (e.g. pressed flower bookmarks, rosemary cuttings potted up). The benefits associated with this included a sense of pride and satisfaction through being able to see that something has been achieved and sharing this with others, which was highlighted by Blake and Mitchell (2016); Hall et al. (2016), Hewitt et al.

(2013) and Smith-Carrier et al. (2019) as contributing to self-esteem and also a sense of identity for people living with dementia.

Also relating to a sense of identity, some of the horticultural activities related to participant's interests and previous experiences, for example one participant who had enjoyed gardening all their life enjoyed the planting activities whilst another participant shared how digging for potatoes reminded them of being in charge of the vegetable patch when they worked overseas building train lines. Several authors have identified that horticultural activities can relate to individual's interests and hobbies, and allow them to continue using skills and knowledge which can promote self-esteem and contribute to their self-identity (Blake and Mitchell 2016; Hewitt et al. 2013; Jarrott, Kwack and Relf 2002; Noone and Jenkins 2018; Smith-Carrier et al; 2019). In addition, the findings from study 1 also reported the benefits associated with engaging people living with dementia in activities that were familiar to them and related to their interests and hobbies. Maintaining self-identity is a key consideration in delivering person-centred dementia care, as it can be lost as dementia progresses (Kitwood 1997; Mitchell and Agnelli 2015).

The group-based delivery during this activity intervention also contributed to the benefits for participants living with dementia through providing opportunities for social interaction. Participants were seen to support each other and show awareness to others abilities, Smith-Carrier et al. (2019) also observed peer support throughout their intervention as participants helped each other to complete gardening and horticultural activities. Previous research has demonstrated that group working and peer support as a result of engagement in gardening and horticultural activities can lead to a sense of belonging and friendship between people living with dementia (Duggan et al. 2018; Smith-Carrier et al. 2019) which may address the high prevalence of loneliness and isolation amongst people living with dementia (Kane and Cook 2013; Maas et al. 2009). Furthermore, the provision of social opportunities for people living with dementia is a key component of person-centred care according to the VIPS framework (Brooker 2003; Brooker 2006; Brooker and Latham 2016).

An unexpected finding during this activity intervention was the value of the inclusion of music in each activity session. The music was intended to be played in the background however after the first week it became a key part of the session during the refreshments. Music has been shown to benefit people living with dementia by increasing their levels of engagement and connection to others (Hays and Minichiello 2005a; Hays and Minichiello 2005b; McDermott, Orrell and Ridder 2014). This was seen in the activity intervention as participants interacted with each other by singing along, clapping and dancing. The music also increased positive behaviours and facial affect and became an enjoyable part of each session. Whilst not a horticultural activity, selecting music which related to each theme did support discussions that were still linked to the theme, such as naming different types of flowers.

The horticultural activity programme benefitted the wellbeing of participants living with dementia by supporting them to spend time outdoors and engage in a variety of horticultural activities to meet different interests and hobbies as well as providing new and interesting experiences and offered increased opportunities for social interaction through group working. Moreover, the intervention used multi-sensory stimulation and familiar activities to trigger memories and reminiscence, and enabled participants to experience a sense of pride and satisfaction through achieving and making things during each session which they could share with their caregivers and visitors to the gardens. Further consideration is given to evaluating the effectiveness of the activities and the activity intervention below.

#### **5.4.2. Benefits for caregivers**

The activity intervention also benefitted the wellbeing of caregivers by providing support, comfort and respite from their caregiving role. Caregivers for people living with dementia, especially family members, are at risk of depression, isolation and poor health (Joling et al. 2015) due to high levels of pressure often referred to as caregiver burden (Borycki 2001). Caregivers reported that the activity intervention gave them time to do other things, either jobs that were difficult to do whilst caring for the person living with dementia or enjoying some time to themselves which may contribute to reduced caregiver burden (Forbes, While and Mathes 2007; Herron and Rosenberg 2017;

Wiersman and Denton 2013). Improvements to the behaviour and mood of participants living with dementia reportedly lasted after the session, sometimes for several days, research has shown that enhancing the wellbeing of a person living with dementia can contribute to a reduction of caregiver burden (Chiao, Wu and Hsiao 2015; Lin, Macmillan and Brown 2011; Lu et al. 2020).

Caregivers reported feeling comfortable leaving the participants living with dementia during the activity session, which is often associated with feelings of guilt (Strang 2000). The caregivers perceived the activity intervention to be beneficial and enjoyable for the participants living with dementia which was likely to have made them feel more comfortable, and trust that the participants were being supported and having a pleasurable experience. Hewitt et al. (2013) also highlighted that a horticultural activity intervention at a community garden benefited caregivers as it allowed them respite from their usual caregiving responsibilities. These findings suggest that a community-based horticultural activity intervention delivered for people living with dementia can also benefit caregivers through providing respite, something which has been found to be lacking, especially for those caring for people living with dementia in the community (Newbronner et al. 2013).

The benefits for caregivers that were reported were partly a result of the way in which this activity intervention was developed and delivered, there were particular aspects, such as the room being laid out and participants welcomed to sit and enjoy a hot drink when they first arrived, which made the caregivers feel more comfortable about leaving. This is discussed further below.

#### **5.4.3. The effectiveness of the horticultural activities**

The benefits of the horticultural activity intervention for both participants living with dementia and their caregivers has been outlined above. Particular features of the activities which were thought to contribute to these benefits, such as being outdoors in a garden environment, sensory stimulation from plants and nature and familiarity of activities, have been highlighted. This section gives further consideration to the overall effectiveness of the horticultural activities and delivery of the activity intervention based on the findings, and particularly the weekly staff and volunteer reflections.

Firstly, participants seemed to enjoy having a range of activities to engage in, including some that were familiar and some that were new. Activities involving flowers and plants seemed to elicit positive behaviours and reminiscence through sensory stimulation and pleasure from the appearance, especially bright flowers. Participants appeared to like activities where they could work on their own things, for example the pressed flower book marks and flower arrangements, but they were still in the group environment so there were people to talk to. The opportunities for social interaction and the conversations and reminiscence that was triggered by the activities was associated with positive behaviour and enjoyment. A successful component of the activities was having a visual end goal through which participants could see what they had achieved and could show others. Also enabling people to take something home was deemed a successful and beneficial aspect of the intervention.

Despite the time of year, and cold weather on several weeks, participants were always willing and interested in going outdoors and walking around different areas of the garden. This was an important activity each week (except one week where it was torrential rain) and the variety of areas within Martineau Gardens likely added to the appeal and enjoyment of being outdoors. Simply walking around the gardens was a good way to increase participant's engagement with nature, and staff and volunteers could point out particular features, such as the pond and the woodland. Although weather has been reported as a challenge to delivering activities (Watts and Hsieh 2015) as highlighted in study 1, with appropriate planning, successful outdoor activities can be done all year round. There were gloves available for participants to wear and they were all encouraged to bring a coat and warm layers. Based on the reflection following the first session, the refreshments were moved to directly after the walk so the participants could have a hot drink and warm up by the log burner which was lit prior to the participants arriving to ensure that the pavilion was cosy and warm. The length of the session was felt to be enough time to do two horticultural activities and a walk without participants losing interest. It was noted that participants did seem tired at the end of the session as they were leaving so 2-hours is likely to be the maximum session length to maintain levels of engagement. Whilst 1:1 support was definitely beneficial as it allowed individual adaptations to take place spontaneously and ongoing throughout the activities, it may not have

been necessary for all participants in this study. The level of support was directly related to the participants cognitive and physical capabilities which has been previously noted (Thelander et al. 2008). A method of assessing needs in order to tailor activities has been mentioned in the literature (Connell, Sanford and Lewis 2007; Gigliotti and Jarrott 2004; Gonzalez and Kirkevold 2013; Thelander et al. 2008), and recommended by Thrive (2016) however, no clear recommendations on how to do this have been presented. Using the GBS Scale at the start of the intervention proved very useful in identifying the needs of each participant. Although not directly related to the activities, one participant could not remember names due to the type of dementia they had. All participants, including staff and volunteers wore name labels so everyone could see each other's names and no one had to ask if they forgot.

Table top activities were useful for participants with physical limitations, and enabled the sharing of resources quite easily. Stools were used during some activities, which were slightly lower than the table height, to balance plant pots on and allow participants to stand as some felt this was easier. In addition, a variety of tools e.g. scissors and secateurs were available to meet the needs of participants. Participants also had the choice of wearing aprons and gloves throughout the intervention. The use of simple step-by-step instructions was beneficial for participants who could understand them and follow them independently whilst visual demonstrations suited those participants who could not.

The intervention was staff and resource intensive, this was attributed to the intervention being held during the autumn and winter months where there was less to do in the garden. The participant's response to the outdoor activities and walks was more positive than anticipated, supported by caregiver feedback. It was thought that a future programme delivered at a similar time of year could include more outdoor activities. Although risk would need to be assessed for every individual, all participants were safe in the gardens and were able to engage with the outdoor environment with support. A positive approach to risk taking enables people living with dementia to spend more time outdoors (Mapes 2017). This would depend on the individual participants, the weather and would require adequate preparations e.g. an indoor space, warm clothes, hot drinks and a fire. Participants seemed to enjoy having the book of photographs and instructions for each activity to



take away. This had been relatively easy to put together and was deemed worth it as a nice memento of the intervention and their time at Martineau Gardens.

Using the principles of CST to guide the development of this intervention was useful. Particular principles were more relevant, for example ensuring activities offered mental stimulation and using triggers to aid recall and reminiscence. The whole intervention and the delivery was underpinned by the CST principles of person-centeredness, respect, involvement, inclusion, choice, fun, maximising potential and building relationships. In the absence of a framework that is specific to the delivery of horticultural activities, outdoor and nature-based activities, or green dementia care (Evans et al. 2019 have presented recommendations but no specific framework for designing effective interventions) applying the principles of CST to such activities may be effective.

Overall, this horticultural activity intervention proved effective by providing benefits for participants living with dementia and caregivers but also staff and volunteers who reported high levels of enjoyment, since they believed the intervention had been worthwhile and fun. Horticultural activities provide multi-sensory stimulation, offer a variety of activities that can link with hobbies and interests and provide enjoyment. In addition, based on the benefits, it was felt that the activities were meaningful (Csikszentimihalyi 1993; Harmer and Orrell 2008; Phinney, Chaudhury and O'Connor 2007) and that the intervention contributed to person-centred dementia care (Brooker 2003; Kitwood 1997) and green dementia care (Barrett et al. 2019). Future activity interventions and sessions could have a similar structure, and depending on the activities and the needs of the individuals taking part, the number of staff and volunteers needed may not be as many.

#### **5.4.4. The community garden environment**

As well as supporting the delivery of horticultural activities for people living with dementia for people living with dementia, this study also highlights the benefits associated with an intervention based at a community garden. The findings support those from Hewitt et al. (2013), Noone and Jenkins (2018) and Smith-Carrier et al. (2019) who also showed the benefits of community garden-based activity interventions. In addition, the findings suggest that the benefits to wellbeing, such as positive behaviour, increased engagement and increased confidence which have been documented for

other people who have taken part in activities within a community garden environment may also be relevant for people living with dementia (Hawkins et al. 2013; Marsh and Spinaze 2016; Milligan, Gatrell and Bingley 2004; Parr 2007; Winterbottom and Wagenfeld 2015). Participants not only benefitted from engaging in the variety of horticultural activities that is available within a community garden, but also from spending time outdoors in a garden environment (Blake and Mitchell 2016; Chalfont 2006; Detweiler et al. 2008; Gonzalez and Kirkevold 2013; Hall et al. 2016; Hawkins et al. 2013; Hewitt et al. 2013; Noone and Jenkins 2018; Watts and Hsieh 2015; Whear et al. 2014).

In particular, Martineau Gardens offered a safe, inclusive and non-judgmental environment that welcomed and supported people living with dementia. These characteristics have been noted in relation to other community gardens which have been linked to the benefits for those spending time in the environment (McKay 2011). Furthermore, the participants living with dementia had positive feelings towards visiting the gardens, despite their cognitive impairment, which for some meant they did forget they had been to the gardens. Research has found that people living with dementia can experience emotional feelings towards a place or person even when the memories associated with those feelings cannot be recalled (Feinstein, Duff and Tranel 2010). Moreover, research suggests they often remember positive emotional feelings towards a person or place when they have had a positive experience (Blessing et al. 2006; Blessing et al. 2012; Evans-Roberts and Turnbull 2011; Guzmán-Vélez, Feinstein and Tranel 2014). It may also be that the familiarity of the garden environment made participants feel safe and comfortable as was suggested by Duggan et al. (2008). They were reminded of their childhood gardens when they were in the gardens at Martineau Gardens which was associated with fond memories. Again, this may have added to the positive experience and associated feelings towards the gardens.

This study supports a collaborative approach to providing opportunities for outdoor and nature-based activities for people living with dementia, which has been advocated by Evans et al. (2019) and Mapes et al. (2016). Working with Martineau Gardens not only provided a setting in which to deliver a broad variety of activities, but the intervention was developed through the expertise and experience of horticultural staff with a wealth of knowledge and skills about horticultural activity delivery and working with people living with dementia. This collaborative working approach

strengthened the development and implementation of the horticultural activity intervention and most likely contributed to the effectiveness and the associated benefits for the participants living with dementia and their caregivers. This study also suggests that a community garden may be able to support people living with dementia in the local community to connect to nature and spend time outdoors, and offer opportunities for meaningful outdoor activities. This may help overcome several of the barriers and challenges currently facing people living with dementia in seeking the benefits that connecting to nature and spending time outdoors can elicit (Clark et al. 2013; Mapes et al. 2016). Additional recommendations to those presented in table 4.6 in Chapter 4 are shown in table 5.8.

Table 5.8. Additional recommendations for designing and delivering outdoor and nature-based activities for people living with dementia

Support	<ul style="list-style-type: none"> <li>• Try and not rely on support from caregivers to encourage independence of those living with dementia and offer respite to caregivers, especially partners and family members.</li> <li>• Draw on experts and those with experience, such as horticultural therapists, about how best to deliver and support specific gardening and horticultural activities.</li> </ul>
Environment	<ul style="list-style-type: none"> <li>• Access to a community garden can provide a good location for offering gardening and horticultural activities and enabling people living with dementia to spend time outdoors amongst nature (providing it meets accessibility and functionality requirements).</li> <li>• Whilst being outdoors is beneficial, a warm and dry indoor space enables activities in adverse weather. It can also help when offering table-top activities, which is useful for people with physical limitations and mobility issues.</li> </ul>
Activities	<ul style="list-style-type: none"> <li>• Try and prompt reminiscence and sharing of childhood memories through engaging people in discussions and using objects, music and videos to trigger memory.</li> <li>• Linking with tailoring activities to hobbies and interests, explore how you can utilise participants experience, expertise, knowledge and skills to encourage self-identity and self-esteem. Establish someone's cognitive deficit in relation to memory and draw on memories they have.</li> <li>• Do not be deterred by poor weather, make sure you have umbrellas and waterproofs, and warm clothing, to encourage people to go outdoors at all times of the year. Weather can offer sensory stimulation and gives people something to talk about. This might link to positive risk-taking.</li> <li>• Activity sessions up to 2 hours allowed for people to take part in several activities without rushing, but was recommended as the maximum time for a session.</li> <li>• In the absence of guiding principles or policies for delivering outdoor and nature-based activities for people living with dementia, the principles of Cognitive Stimulation Therapy (CST) proved useful. In particular, focusing on mental stimulation and providing triggers to aid recall, fostering an inclusive environment where everyone was actively involved in activities and making sessions fun were some of the key principles that translated to outdoor and nature-based activities.</li> </ul>
Adaptation	<ul style="list-style-type: none"> <li>• The process of reflection provided a really useful tool for evaluating how the activities had gone and making suggestions for future adaptations throughout the intervention. It enabled those supporting and delivering the activities to explore what could be done differently in future or what was successful to enhance the experience of people living with dementia.</li> </ul>

## 5.5. Limitations and future research

There are a number of potential limitations within this study. Firstly, the small sample size, due to the logistical constraints and in-depth qualitative focus of this study, reduce the transferability of the findings. The sample of participants whilst small, did demonstrate the heterogeneity between people living with dementia and highlighted great variation in levels of cognitive and functional ability which was directly related to the level of support needed to participate in the activities. The findings may not be applicable to another set of participants in the same setting, who might have different types or severities of dementia. Furthermore, as this study was carried out at a single site, Martineau Gardens, the findings may not be transferable to other community garden settings.

The small sample meant that statistical analysis of the quantitative data was not possible, only descriptive statistics were conducted and the extent to which the findings are generalisable is unclear. Furthermore, there was missing data for the first two activity sessions which represented one third of the overall programme. However, this study sought to guide the design of an extended study (presented in Chapter 6) and test the feasibility of using the GBS Scale, SPPB and hand grip strength tests with participants living with dementia in a community setting. These measures are suitable for using in a community-garden setting. A potential limitation of the GBS Scale was the lack of sensitivity to changes in cognitive impairment over such a short timeframe. Although the 6-week duration of the intervention may have been too short to elicit any notable changes to levels of cognitive impairment, the GBS Scale was useful in identifying specific areas of cognitive impairment that allowed for the appropriate adaptations to the intervention to be made and support to be given.

In this study my role was both as the observer and the person responsible for data analysis. Whilst a systematic and thorough thematic analysis approach was followed, and an intra-coder reliability test performed (Boyatzis 1998) bias may have occurred during the interpretation of the behaviours, facial affect and levels of engagement which may have impacted on the credibility of the findings. To improve the overall trustworthiness and rigour of the research, triangulation of the qualitative data, to include the observations, staff and volunteer reflections and caregiver focus group, was undertaken within the thematic analysis.

The mixed methods were applied within a pragmatic approach to enable flexible data collection to explore wellbeing, which has both objective and subjective components, within the context of dementia research (Robinson et al. 2011). Although all data collection tools were valid and reliable, some were not the gold standard tools recommended by NICE Guidelines (NICE 2006) (see Chapter 3 for full details). An alternative observational tool which is widely used in dementia research is Dementia Care Mapping™ (Bradford Dementia Group 1997). It was not used in this study as the purpose was to explore the benefits associated with the activity intervention rather than conduct a thorough evaluation of the quality of person-centred dementia care.

## **5.5. Conclusion**

This study was designed to develop and test a horticultural activity intervention at a community garden for people living with dementia in the community. Benefits to the wellbeing of participants living with dementia was found that included providing an opportunity to spend time outdoors in a garden environment which led to enjoyment, positive behaviours and facial affect, increased social interaction and reminiscence. The variety of horticultural activities offered participants the chance to engage in both familiar and new activities, and gain multi-sensory stimulation which also triggered memories and resulted in reminiscence and social interaction, and high levels of enjoyment and positive behaviours. Participants living with dementia displayed signs of pride and satisfaction through producing things during the activities they could share with others and take home. They reported that they had enjoyed the activities and visiting the gardens. Benefits to caregiver wellbeing was also found through the support and respite provided by the participants living with dementia being engaged in the activity intervention.

This horticultural activity intervention developed and tested in this study was effective and successful in benefitting the wellbeing of people living with dementia in the community. Moreover, it highlights the potential benefits associated with collaborative working between community organisations, in this case Martineau Gardens, and dementia care services (Rare Dementia Service Birmingham).

## 5.6. Chapter Summary

Chapter five presents a 6-week horticultural activity intervention that was delivered at Martineau Gardens, a community garden in Birmingham, UK, for people living with dementia in the local community. The development of the horticultural activity programme was informed by the existing literature, findings from study 1 and used a collaborative working approach to draw on the expertise and experience of staff from Martineau Gardens and the Rare Dementia Service Birmingham. Full details about how the activity intervention was developed are presented in this chapter. The mixed methods approach to data collection is outlined, and the justification for the selection of data collection tools is presented in Chapter 3. The descriptive statistics of the quantitative data and the thematic analysis of the qualitative data are shown.

Four themes were identified through the thematic analysis: **high levels of enjoyment, reminiscence, active engagement** and **caregiver support and wellbeing**. These themes reflect the benefits of the horticultural activity intervention which included, spending time outdoors in the gardens which prompted reminiscence and enjoyment, participation in a variety of horticultural activities which met different interests and hobbies as well as providing new and interesting experiences, increased social interaction through group working, multi-sensory stimulation which triggered memories and reminiscence, increased positive behaviours and facial affect, and a sense of pride and satisfaction through achieving and making things during each session which they could share with their caregivers and visitors to the gardens. The activity intervention also offered support to caregivers which improved their wellbeing through providing respite from their caregiving role for 2-hours each week which enabled them to do other things.

Key features of the horticultural activities that contributed to the benefits were noted: sensory stimulation, familiarity and having a visual end goal. The activity intervention was deemed effective, and several components were thought to add to the success which included, group-based delivery, activities and props laid out to aid discussion and reminiscence, weekly theme to link activities, 1:1 support available meaning individualised adaptations were done, a mix of individual and group-

based activities, inclusion of outdoor activities despite the weather and provision of step-by-step instructions and visual demonstrations.

The findings from this study were used to guide the development of the outdoor and nature-based activity intervention presented in Chapter 6. The intervention developed in study 3 seeks to offer a greater variety of outdoor and nature-based activities for people living with dementia. The study was based at an extra care retirement village which has potential to provide a setting for community-based activities that are open to the wider community, beyond the residents living there. Following the success of the horticultural activities delivered at Martineau Gardens, fortnightly off-site activities at the gardens were included in study 3. The following chapter presents the outdoor and nature-based activity intervention that was delivered for residents living with dementia and cognitive impairment at an extra care retirement village.

## **Chapter 6:**

### **Study 3 – The development and evaluation of an outdoor and nature-based activity intervention delivered for people living with dementia and cognitive impairment at an ExtraCare village**

#### **6.1. Introduction**

The research outlined in the previous chapter involved the development and testing of an evidence-based horticultural activity intervention that was guided by the current literature and informed by the findings from study 1. The study demonstrated that people living with dementia benefitted from engaging in horticultural activities within a community garden in terms of enjoyment, positive behaviours and facial affect, and increased social interaction, as a result of reminiscence and being part of a group. As well as providing support for community-based activities, and highlighting the role of community gardens, the study identified key components of the intervention that seemed to contribute to the effectiveness. This included, focusing on multi-sensory stimulation, providing enough support so that participants can actively participate and individual adaptations can be made (although 1:1 may not be necessary), using a mix of individual activities within a group setting and group-based activities, providing written and simple step-by-step instructions and visual demonstrations, and making something that participants could take home. In this chapter, these learnings are applied to a 12-week outdoor and nature-based activity intervention that was developed and delivered for people living with dementia and/or cognitive impairment at an ExtraCare retirement village in Birmingham, UK.

People living with dementia in extra care are less likely to have opportunities to engage in structured outdoor and nature-based activities than people living with dementia in care homes and nursing homes (Evans et al. 2019). Whilst people living within ExtraCare retirement villages are considered as independently living, and therefore can come and go from the village freely, it is likely that they will experience the barriers and challenges to connecting to nature and spending time outdoors (Clark et al. 2013 and Duggan et al. 2008). This intervention therefore included facilitating access



to off-site activities delivered within the local community with a number of organisations, and within different outdoor environments, to encourage participants to spend time outdoors and off-site.

ExtraCare retirement village facilities are open to the wider community therefore, outdoor and nature-based activities delivered on-site could potentially include people living with dementia in the local community. Brewin (2018) previously suggested that the inclusion of local communities in nature-based activities within a care setting led to reduced isolation for residents. In future, this could also help address the lack of provision of community-based outdoor and nature-based activities identified by Mapes et al. (2016). Whilst the local community were not brought into the retirement village in this study, the ExtraCare environment was explored with this future direction in mind.

Building on the design and delivery of a horticultural activity intervention outlined in Chapter 5, this study, sought to expand the variety of outdoor and nature-based activities to include other types of activities that have been shown to benefit the wellbeing of people living with dementia such as walking (Hughes et al. 2011; Mapes 2011a; Mapes 2011b) and animal-related activities (Yakimicki et al. 2019). Combining different types of outdoor and nature-based activities hoped to provide more choice and variety, relate to a broader range of interests and hobbies, and offer both familiar and new activities. Using a number of different types of outdoor and nature-based activities related to the benefits seen with green care farming for people living with dementia which include increased social interaction, a sense of purposefulness, more time spent outdoors and increased overall wellbeing (de Bruin et al. 2015). In addition, offering a variety of activities would increase choice for people living with dementia and meet a range of interests and needs which would support a person-centred approach to providing green dementia care (Barrett, Evans and Mapes 2019).

The outdoor and nature-based activity intervention that was developed and tested at Bournville Gardens sought to benefit the wellbeing of participants living with dementia and/or cognitive impairment by providing a variety of activities that would meet participant's interests and hobbies, and increase connection to nature and time spent outdoors.

### **6.1.1. Aims and objectives**

The aim of this study was to develop, test and implement an outdoor and nature-based activity intervention delivered for people living with dementia and/or cognitive impairment at an ExtraCare retirement village and explore the benefits for those taking part.

The objectives of the study were:

- To design, develop and implement an evidence-based programme of outdoor and nature-based activities that could be integrated into The ExtraCare Charitable Trust's Enriched Opportunities Programme to provide opportunities for people living with dementia and/or cognitive impairment to enable them to connect to nature.
- To evaluate the effectiveness of delivering a variety of outdoor and nature-based activities for people living with dementia and/or cognitive impairment both on-site at Bournville Gardens and off-site within the local community.
- To explore the benefits associated with the outdoor and nature-based activities for people living with dementia and/or cognitive impairment.
- To provide evidence-based recommendations of how effective outdoor and nature-based activities could be delivered for people living with dementia and/or cognitive impairment within ExtraCare and within the wider local community.

## **6.2. Methods**

### **6.2.1. Study Design**

A 12-week outdoor and nature-based activity intervention was developed and implemented. Full details about how the activity intervention was developed is presented below in section 6.2.5. The evaluative elements of the study applied mixed methods, including observations, interviews, reflections, a focus group and collection of quantitative measures of symptoms of dementia, physical function, quality of life and depressive symptoms were taken using a pre-test and post-test design.

The ethical considerations of the research are discussed in section 3.5. This study was approved by the NHS Health Research Authority Social Care Research Ethics Committee on 10<sup>th</sup> May 2019 (IRAS ref. 261273) (appendix 21) and Coventry University Ethics Committee on the 4<sup>th</sup> March 2019 (Project ref. P86213) (appendix 22). Gatekeeper approval was given by the manager of Bournville Gardens (appendix 23). A full risk assessment was carried out for participant involvement and risk assessments were carried out for all activities. An incident involving one participant who became unwell during an off-site visit led to a review of the individual risk assessment. A risk assessment was conducted with the Dementia and Mental Wellbeing Enabler to establish whether it was safe to take that participant off-site in future. It was concluded that whilst the participant was awaiting medical investigation, for their own safety they would not be able to attend off-site visits but could continue to attend on-site activities. This decision was supported by the Bournville Gardens manager.

### **6.2.2. Setting**

This study was based at Bournville Gardens, an ExtraCare retirement village in Birmingham UK. Delivery of the intervention activities and data collection occurred on-site and off-site, between June and August 2019. On-site activities were delivered in the activity room and outdoors in the communal gardens. The off-site activity venues are shown in figure 6.1 and described in more detail in section 6.2.5.

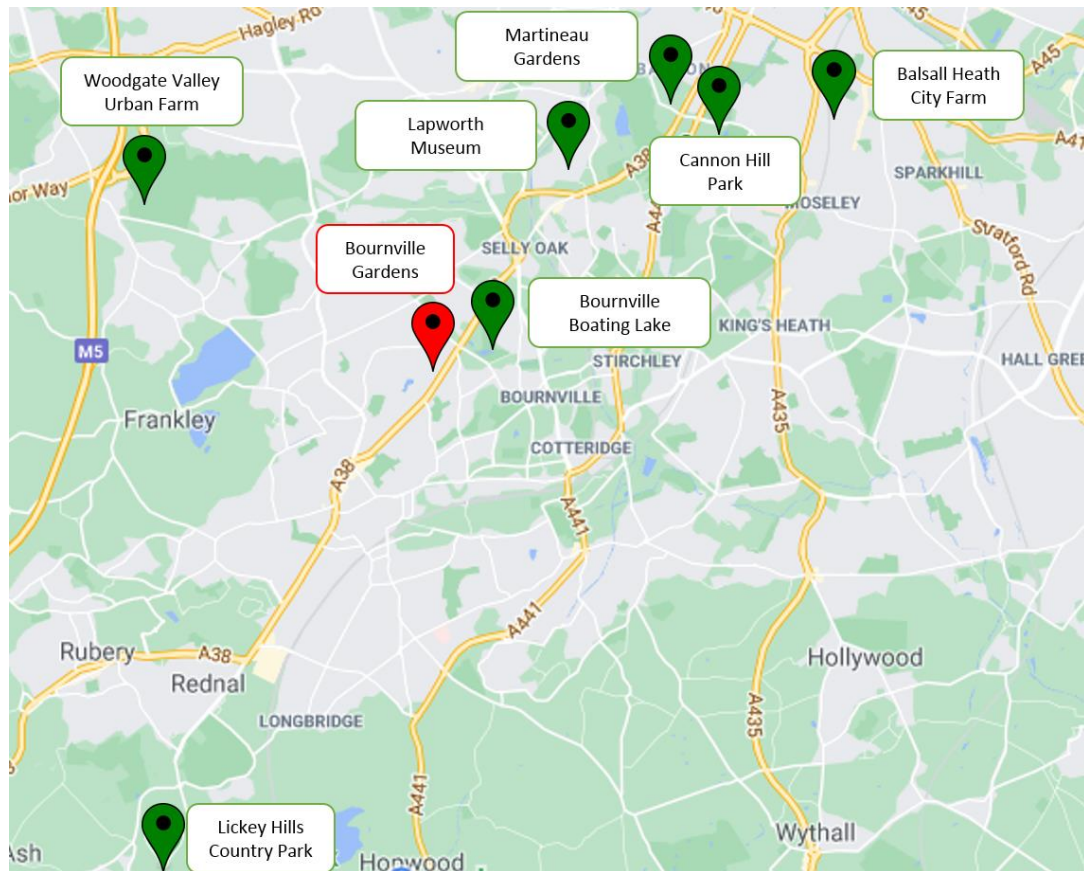


Figure 6.1. Map showing off-site activity venues and Bournville Gardens

### 6.2.3. Participants and sampling

This study included people living with dementia and/or cognitive impairment (diagnosed and suspected) at Bournville Gardens. Eighteen participants were recruited with support from the Dementia and Mental Wellbeing Enabler (2 people dropped out prior to completing baseline assessments but had already been assigned participant numbers and provided consent). Justification for the sample size is presented in Chapter 3. Seven student volunteers studying occupational therapy and physiotherapy at Coventry University were recruited to support the cognitive and physical needs of participants during the activities to ensure they could fully take part and were safe.

Recruitment was carried out between May and June 2019, with support from the Dementia and Mental Wellbeing Enabler. Purposive sampling was used to invite residents to participate who were

identified by the Dementia and Mental Wellbeing Enabler as meeting the inclusion criteria. Participation was voluntary and inclusion criteria was residency at Bournville Gardens, a diagnosis or suspected dementia and/or cognitive impairment (diagnosed as mild cognitive impairment – MCI), and capacity to consent. Exclusion criteria included anyone who had been assessed as a risk to themselves or others, anyone acutely unwell or on a palliative care pathway.

Perspective participants were invited to attend two meetings, the first of which provided an overview of the study and activity programme, all attendees were given an information sheet (Appendix 24). During the second meeting, the activity schedule for the first 4-weeks of the programme was presented. Perspective participants were given the opportunity to ask questions and contribute suggestions for other activities. Following this meeting, those wishing to take part were asked to sign up for their baseline assessment.

The student volunteers were recruited via emails through course programme leads (Occupational Therapy BSc and Physiotherapy BSc and MSc), and an announcement on the intranet asking students, who were interest in taking part in a research study as a volunteer to support people living with dementia, to attend a meeting at Coventry University. The meeting involved an overview of the research project and outlined the role of student volunteers. Those wishing to take part were asked to complete an informed consent form and sign up to the volunteering schedule.

#### **6.2.4. Informed consent**

Following both information meetings, residents wishing to take part in the study were asked to provide informed written consent (Appendix 25). All participants had been assessed as having the capacity to consent to taking part in the study by the Dementia and Mental Wellbeing Enabler. The Dementia and Mental Wellbeing Enabler provided ongoing support with assessing capacity throughout the study if there were concerns that a participant's capacity had changed. No changes to capacity to consent were identified during this study. In addition, informed written consent was gained from student volunteers.

## **6.2.5. Development of the activity intervention**

The following sections describe how the outdoor and nature-based activity intervention was developed and delivered.

### **6.2.5.1. Collaborative working**

The outdoor and nature-based activity intervention was developed through a collaborative approach with staff member from ExtraCare and Bournville Gardens, which included the Dementia and Mental Wellbeing Enabler. A series of meetings were held between December 2018 and April 2019 to develop the activity intervention, the first meeting included ExtraCare's Head of Operations (Health and Social Care) and the manager at Bournville Gardens who gave gatekeeper approval to support the intervention and the research taking place at Bournville Gardens. The activity sought to align with the activities that were currently offered in the Enriched Opportunities Programme (Brooker et al. 2009) at Bournville Gardens, and utilise their expertise and experience of delivering activities at Bournville Gardens for people living with dementia, cognitive impairment and poor mental health. The Dementia and Mental Wellbeing Enabler supported recruitment as outlined above.

Throughout the intervention activities were led by the Dementia and Mental Wellbeing Enabler and myself, who had a more active role in delivering the intervention than in study 2 (which was more focused on design and evaluation). Other people were involved in the delivery of different activities within the intervention. These included horticultural staff and the deputy director at Martineau Gardens, an arts teacher specialising in art for people with a range of cognitive and physical disabilities, farmers at two urban farms (in Birmingham, UK), the regional coordinator for Pets As Therapy charity, a staff member (ecologist) from the Canal and River Trust and the secretary of the local parks association (Manor Farm Park, Birmingham, UK).

During two informal meetings with residents, the prospective participants, were asked to suggest outdoor and nature-based activities which they would like to take part in throughout the programme. They suggested activities related to their interests and hobbies, such as flower arranging and crafts,

which were included in the activities intervention following the initial 4-week activity programme that was shared with participants at the second informal meeting. This ensured that there were activities which met participant's interests and hobbies, which is part of person-centred care.

#### **6.2.5.2. Participants**

The activity intervention was developed for residents at Bournville Gardens who were living with dementia and/or cognitive impairment (diagnoses or suspected by the Dementia and Mental Wellbeing Enabler). All residents lived in their own apartment and had access to all on-site facilities and the freedom to come and go from Bournville Gardens as they wished. Participants were either living alone or with a partner, who in some instances was also their primary caregiver (n=18).

#### **6.2.5.3. Duration and frequency**

Following the success of the 6-week horticultural activity intervention developed and tested in study 2, a longer more varied intervention was developed. This was to offer a broader variety of activities and to see how more nature-based activities might be included into the Enriched Opportunities Programme. Also, in the previous study participants and caregivers wanted the activities to continue for longer. Through discussions with staff at Bournville Gardens, 12-weeks was determined enough time to offer a range of different outdoor and nature-based activities whilst also allowing time to make links with local organisations and to integrate more outdoor and nature-based activities into the Enriched Opportunities Programme that was already delivered. The frequency of the activities was largely pragmatic, the Dementia and Mental Wellbeing Enabler worked 4 days per week at Bournville Gardens so the intervention was delivered on the same days, with the view of increasing the chance of sustainability of the activities once the intervention had finished. The 2-hour session duration that was effective for the horticultural activities delivered at Martineau Gardens was applied in this intervention. Furthermore, a similar session structure for the on-site activities was used as detailed below.

#### **6.2.5.4. Structure of the activity intervention**

The intervention built upon the findings from study 1 and 2. It included a broader variety of outdoor and nature-based activities such as horticultural activities, walking and dog visits, which have been shown to provide benefits for people living with dementia (Bossen 2010; Edwards, McDonnell and Merl 2012; Mapes et al. 2016). On-site and off-site activities were included as shown in table 6.3 and 6.4. The off-site activities were included to help overcome some of the barriers faced by people living with dementia at the extra care village to connecting with nature and spending time outdoors, such as transport and a lack of support (Clark et al. 2013). They also enabled participants the opportunity to benefit from spending time outdoors (Mapes et al. 2016).

The activity intervention was divided into 4-week activity programmes, to not overwhelm participants and allow for activities that had been requested or suggested by participants to be included. These were printed out and given to participants so they knew what activities were available and could decide which to attend (full activity programme, Appendix 26). Offering participants the choice of which activities to attend was supported by the findings from Hewitt et al. (2013) who felt that it led to greater autonomy and wellbeing. Furthermore, this was in line with the Enriched Opportunities Programme and ethos of ExtraCare whereby residents had autonomy to live independently and engage with the facilities and the activities as they wanted. Respecting choice and autonomy is not only an important ethical consideration for delivering person-centred care for people living with dementia but is a fundamental human right (Human Rights Act 1998).

The activity intervention was designed to be delivered in a group environment, as this has been shown to lead to high levels of enjoyment and increased social interaction for people living with dementia (de Bruin et al. 2015; Hall et al. 2016; Hewitt et al. 2013; Mapes et al. 2016 and the findings from study 1 and 2). The facilities at Bournville Gardens allowed for a larger group size (20 participants living with dementia) and due to intervention taking place during the summer, Martineau Gardens (and other off-site activities) could accommodate more participants (Martineau Gardens could only support 4 participants living with dementia during the horticultural activity intervention). Whilst 1:1 support was not necessary, once it was known who would be taking part and based on



the findings from study 2, student volunteers and other staff members did join with activities to provide assistance where needed for example, by holding heavy bowls of compost (Thelander et al. 2008; Watts and Hsieh 2015). The same weekly structure for the delivery of the activity intervention was used for continuity and consistency (based on principles of CST), as shown in table 6.1.

Table 6.1. Overview of weekly activity schedule

<b>Day</b>	<b>Morning (10am-12pm)</b>	<b>Afternoon (2pm-4pm)</b>
<b>Monday</b>	Outdoor activity off-site, with all visits within a 5 mile radius	
<b>Tuesday</b>	Horticultural activity on-site – including planting/growing and nature-based crafts	Nature-based art on-site (part of the Enriched Opportunities Programme adapted for this intervention)
<b>Wednesday</b>	Outdoor activity on-site - including walking and outdoor games OR guest speaker	no activity due to cards group (part of the Enriched Opportunities Programme)
<b>Thursday</b>	Horticultural activity on-site - including planting/growing and nature-based crafts	Nature-based reminiscence on-site (part of the Enriched Opportunities Programme adapted for this intervention)

For each activity session, a similar structure was used to the one in study 2 as it was effective in allowing participants living with dementia time to settle, feel comfortable engage in discussions and reminiscence about the weekly theme/activities and to be introduced to the activities. The on-site activities were split into 30-45 minute sections with refreshments in the middle, in which the person facilitating the activities tried to encourage conversation (Gigliotti, Jarrott and Yorgason 2004; Jarrott and Gigliotti 2010; Watts and Hsieh). The recommendation by Thrive (2016) to lay out equipment was followed in this intervention as it had prompted conversations and generated interest in the activities throughout the intervention in study 2. Simple step-by-step instruction sheets were also created and given to participants (Jarrott and Gigliotti 2010; Thrive 2016). Table 6.2 provides an example of an activity session for making flower arrangements.

Table 6.2. Outdoor and nature-based activity session structure

Time	Activity outline	Sensory stimulus ✓		Resource outline
10.00	<b>Arrival, Settling In &amp; Refreshment</b> <b>Introduction to the activity</b> Music in background Lots of colourful flowers	Hear	✓	Equipment and resources laid out, including instruction sheets Hot drinks and biscuits available
		Vision	✓	
		Smell		
		Taste		
		Touch		
10:15	<b>Group Activity 1</b>  Decorating jam jars with ribbons and buttons etc, participants encouraged to decorate 2 or 3 jars as we are giving some away as gifts	Hear		Jam jars Ribbons, buttons, stickers and sequins to decorate Flowers Scissors and secateurs Labels and pens
		Vision	✓	
		Smell	✓	
		Taste		
		Touch	✓	
	<b>Breakout/Extension Activities</b>  Start selecting and arranging flowers if finished decorating within the first half of the session	Hear		
		Vision	✓	
		Smell	✓	
		Taste		
		Touch	✓	
11.00	<b>Refreshment &amp; Preparing to Leave</b> Hot drink and biscuits Stimulate conversation about favourite flowers	Hear		Hot drinks, biscuits – use of the kitchen
		Vision	✓	
		Smell	✓	
		Taste	✓	
		Touch	✓	
11.15	<b>Group Activity 2</b> Selecting and cutting flowers to be used for arrangements, participants arranging flowers in jars – encouraged to take leaves off, think about height of the flowers and colour combinations, once finished labelling jars for themselves or to give to others	Hear		Jam jars Ribbons, buttons, stickers and sequins to decorate Flowers Scissors and secateurs
		Vision		
		Smell	✓	
		Taste	✓	
		Touch	✓	
12:00	<b>Session Finish</b> Take flowers to be given to other residents to care staff and assist participants taking back their flower arrangements. Reflect & discuss session; what went well, changes to be introduced, individuals' needs & outcomes			

Following the successful use of several of the principles of CST for the development of the intervention in study 2, these were applied in this intervention (example, Appendix 28). The people delivering the activities used stimulating language to encourage discussions and capture interest. The activities sought to provide fun and enjoyable opportunities to engage in a variety of different activities that involved connecting to nature and/or being outdoors and build social relations through group activities. The choice of activities and encouragement of decision making during the activities

was to make sure participants had active involvement. Respect, inclusion and comfort were core components of the way the activity intervention was developed. Further consideration is given to the choice and design of the activities.

#### **6.2.5.5. Activities**

A key focus of the selected activities was connecting people to nature, encouraging them to spend more time outdoors and engaging in multi-sensory stimulation from plants, nature and animals. A variety of activities were selected based on the existing research, guidance from Thrive (Appendix 17) and the inclusion of activities that participants were interested in such as flower arranging, crafts and walking. The off-site activities utilised local organisations and facilities where outdoor and nature-based activities were either provided (Martineau Gardens, Woodgate Valley Urban Farm, Balsall Health City Farm, and Lapworth Museum) or the group went for a walk in a different outdoor environment (Cannon Hill Park, Lickey Hills Country Park, and Bournville Boating Lake). A selection of the off-site activities can be seen in figure 6.2. Each visit had a purpose, to maintain levels of interest and engagement (Hewitt et al. 2013). All off-site activities were within 5 miles of Bournville Gardens, this was to reduce travelling time and to encourage participants to go back and visit themselves as they were nearby.

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Figure 6.2. Off-site activities from top left clockwise: walk around Bournville boating lake, visit to Balsall Heath City Farm, potting plants at Martineau Gardens, and visit to Woodgate Valley Urban Park Farm

Table 6.3 summarises the off-site activities and provides a brief description of where the activities took place and what was involved.

Table 6.3. Overview of the off-site outdoor and nature-based activities

<b>Venue</b>	<b>Activity details</b>
Martineau Gardens	Different activities each session including pond dipping, bird feeders, potting plants, potting succulents, walking around the garden, bug hunting with the forest school
Cannon Hill Park	Group walk (a shorter route and longer route), option to complete a bird survey as part of the Wildlife Trust's 30 Days Wild Campaign, refreshments in café at the end
Woodgate Valley Urban Farm	Walk around the farm, animals included goats, chickens and ponies, farmer answered questions and showed the group smaller animals including rabbits and ferrets
Lickey Hills Country Park	Choice of a woodland walk or outdoor games by the visitor centre
Balsall Heath City Farm	Guided tour of the farm, farmer introduced all of the animals and let participants feed and hold them,
Lapworth Museum	Self-directed tour around the museum, staff available to answer questions
Bournville Boating Lake	A walk from Bournville Gardens around the boating lake, sitting on the bench in the sunshine watching people with model boats

Following the successful delivery of the horticultural activities in study 2, similar activities were included in this intervention such as lavender bags, planting pots and flower arranging. Many of them were table-top activities and they had been delivered indoors at Martineau Gardens making them adaptable for the indoor setting at Bournville Gardens. A key feature was multi-sensory stimulation so a lot of the activities included brightly coloured and scented flowers (flower arrangement, potting plants and window boxes) and plants, including different herbs (planting herb cuttings, making lavender bags, arranging dried herbs). As Watts and Hsieh (2015) recommended, each activity had an end goal, and the activities that enabled participants to take something away for example a pot plant, tray of salad seeds, and flower arrangement (D'Andrea, Batavia and Sasson 2007). Step-by-step instructions were developed for each activity (example, Appendix 28)

Figure 6.3 shows some of the horticultural activities that were delivered during the activity intervention.

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Figure 6.3. Horticultural activities delivered on-site: planting window boxes (left) and decorating plant pots (right)

Gigliotti, Jarrott and Yorgason (2004) showed that other horticultural activities, such as crafts, were as beneficial as planting for people living with dementia. A number of horticultural craft activities, including decorating plant pots and using clay were included in the activity intervention. For the duration of the intervention, the weekly art session that was part of the Enriched Opportunities Programme had a nature focus, activities included painting clay, stained glass painting of birds to hang in participant's windows, and painting/drawing flowers and trees. Art-based interventions have shown to benefit people living with dementia through increasing attention and engagement, stimulating memories and increasing engagement (Young, Camic and Tischler 2016).

The Wildlife Trust are a UK charity which oversees a number of local wildlife charities that help protect and maintain a number of outdoor environments across the country and encourage everyone to spend more time outdoors in nature. Each year they have a 30 Days Wild campaign in which they encourage individuals and organisations, such as care homes, to sign up and receive information and activities about how to connect to nature. Several activities that were included in the activity intervention were adapted from this campaign, specifically making insect houses and butterfly feeders, sowing wild flowers and recording different birds during a walk. Adaptations were made based on the existing literature, recommendations in study 1, and findings from study 2. The instructions provided by The Wildlife Trust were not overly clear and simple, so they were adapted

to break the activity down into small steps and simplified the language, using the DEEP guidelines, to make them appropriate for people living with dementia and/or cognitive impairment. Some of the equipment was prepared in advance, for example when making insect houses the bamboo was cut beforehand to avoid the participants using wood saws where 1:1 support was not available. Other nature-based activities included quizzes and indoor games (wildlife matching pairs) that were designed to add variety and stimulate nature-based discussions.

The two guest speakers were invited based on meeting the interests of participants as a number of participants were interested in the local area and history. The secretary of the Friends Association of the public park which neighbours Bournville Gardens gave a group talk about the history of the park and the site where Bournville Gardens was built. The second guest speaker was an ecologist at the Canal and River Trust who share photographs of the Birmingham canal network. They also spoke to participants about their regeneration scheme which involved replanting native plants along the waterways, the speaker brought in a selection of plants that the participants could touch and smell. Visits from therapy dogs were organised on two occasions as many of the participants had spoken about having dogs during their lifetime and were sad that they no longer had one. Dog visits were highlighted by participants in study 1 as benefitting people living with dementia through increased social interaction. Several participants were interested in animals so other activities such as building insect houses, making wooden birdfeeders and building butterfly feeders were included in the intervention. Figure 6.4 shows participants with the therapy dogs at Bournville Gardens.

Tables 6.4 and 6.5 summarise the on-site activities and provides a brief description of each. The full programme is in the appendices (Appendix 26).

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Figure 6.4. Participants with the therapy dogs that visited Bournville Gardens



Table 6.4. Overview of on-site activities

<b>Type of activity</b>	<b>Activity</b>	<b>Activity details</b>
Horticultural activity	Sowing salad seeds	Sowing quick-growing seeds (spring onions, lettuce, cress, radish) in trays to go in the communal garden and on participant's balcony
	Flower arrangements	Using shop-bought flowers to make flower arrangements in jam jars, which could be taken away and were given as gifts
	Sowing wild flowers	Sowing wild flower seeds in pots for the communal garden and participant's balconies to attract bees and butterflies
	Sowing broad beans	Sowing broad bean seeds in big planters for the communal garden
	Planting herb cuttings	Planting cuttings of rosemary, lavender and thyme in the pots that were decorated by participants in a previous activity
	Dried herb bouquet	Arranging a selection of dried herbs in jars, discussion around the different smells and what herbs can be used for
	Potting plants	Potting flowers and plants for giving as gifts to other residents, family and friends
	Making window boxes	Potting flowers and plants in long containers to be displayed outside the activity room used by the Dementia and Mental Wellbeing Enabler for their activities
	Lavender bags	Pulling off dried lavender, placing in small drawstring bags, participants cutting fabric of their choice and wrapping around the lavender bag, tying with ribbon
	Clay	Using air dry clay, participants could use things that were collected from the gardens – petals, leaves and pinecones, to print into the clay, choice of what to make, these were painted in the art session the following week

Table 6.5. Overview of on-site activities (continued)

<b>Type of activity</b>	<b>Activity</b>	<b>Activity details</b>
Nature-based art	Stained glass	Stained glass birds which were painted using glass paints and could be hung up at the windows
	Clay painting	Painting the clay from the previous activity
	Painting/drawing	Painting/drawing various nature-based pictures including flowers and trees
	Decorating plant pots	Using floral papers, photographs of flowers and gardens from magazines to decoupage onto plant pots which were then used to plant herbs in during a following activity
	Tree rubbing	During a walk around Bournville Gardens taking different tree rubbings, observing different patterns, rubbings used to create a collage of a tree to display in the activity room
	Card making	Nature-based cards using a variety of craft supplies as well as leaves and flowers, for participants to take away and give to people
Outdoor activity	Outdoor games	Outdoor games included giant jenga and quoits which were used to get participants outdoors and engage them in a fun and different activity
	Walk in the gardens	Walking through the gardens, some walks included different activities such as hunt for different plants that had been photographed
Guest speaker	Group talk – Manor Farm Park	The history of Manor Farm Park which is next to Bournville Gardens and information about what the friends association does to manage the part
	Presentation – Birmingham Canals	History of the Birmingham canals, including photographs, information about the regeneration plans for the waterways including replanting native plants
Animal-related activity	Building insect houses	Making insect houses using tin cans and bamboo to hang in the communal garden
	Making wooden birdfeeders	Making wooden birdfeeders from packs, gluing sections of the birdfeeders and later painting them
	Making butterfly feeders	Making trays to attract butterflies, planting flowers and adding sugar water to milk bottle lids
	Dog visit	Pets as Therapy dog visits, participants could play with the animals, take them outdoors for a walk around the gardens
Other	Reminiscence	Weekly reminiscence group had a nature focus, aligned to different themes for example, space as it was the anniversary of the moon landing
	Quiz	Nature-based quiz working in teams
	Indoor games	Nature-based matching pairs game, to stimulate discussion and draw on cognitive stimulation

## **6.2.6. Data collection procedure**

The intervention was implemented over 12 weeks. There was a week either side of the intervention where pre and post-test assessments were carried out. A mixed methods approach to the evaluation was utilised, which included collecting data from participants living with dementia and well as student volunteers during. Justification for the measures used in this study are provided in Chapter 3, General Methods (section 3.3).

### **6.2.6.1. Baseline (pre-test)**

Standardised tests were conducted to assess symptoms of dementia, physical function, quality of life and depressive symptoms as described below.

#### **6.2.6.1.1. Gottfries-Bråne-Steen (GBS) Scale**

An informal discussion was conducted with the participants living with dementia and cognitive impairment, and their caregivers where possible (~20 minutes duration) to complete the revised Gottfries-Bråne-Steen (GBS) Scale (Bråne, Gottfries and Winblad 2001; Gottfries et al. 1982). The responses indicated the severity of symptoms associated with dementia and highlighted where participants may need support in order to take part in the activities which had proved useful in study 2.

#### **6.2.6.1.2. Physical function assessment**

The Short Physical Performance Battery (SPPB) (Guralnik et al. 1994) was conducted, a 4m walking path was marked out within the apartment and a note was made about the chair used for the to ensure the same chair was used at post-test. The participants completed the balance test, followed by the walking test and finished with the sit-to-stand. Hand grip strength was measured using a JAMAR handheld dynamometer (Model J00105, JAMAR Technologies; Philadelphia, USA) following the Southampton Protocol outlined by Roberts et al. (2011) in Chapter 3. Participants performed 3 grip tests on each hand, and their dominant hand was noted. The total scores for the SPPB and the mean and peak hand grip strength for each hand was recorded and included in the analysis.

#### **6.2.6.1.3. DEMQOL**

The questions for the DEMQOL (Smith et al. 2005) were read out to participants who responded and their answer was recorded. On average, this questionnaire took 10-15 minutes to administer. A score was calculated which indicated the level of self-reported quality of life.

#### **6.2.6.1.4. Geriatric Depression Scale (GDS)**

The questions for the Geriatric Depression Scale (GDS) (Yesavage et al. 1983) were read out to participants who gave yes/no responses, their answer was recorded. On average, this questionnaire took 5-10 minutes to administer. A score was calculated which indicated the level of depression.

#### **6.2.6.2. *Observations of and reflections on the outdoor and nature-based activities***

The outdoor and nature-based activities were delivered in 2-hour sessions Monday to Thursday for 12 weeks. At Bournville gardens and various off-site venues. During the intervention, participant observations and reflections were conducted.

Participant observations were conducted for the whole group using a more flexible approach than study 2, and included field notes recorded during the activities as well as reflective notes after the activities. The Greater Cincinnati Chapter Well-being Observational Tool was used to ensure that the observations focused on elements of wellbeing and quality of life (Kinney and Rentz 2005; Lawton 1991). Observational notes were transcribed using Microsoft Word 2016 (Microsoft; Washington, USA) and were included in the thematic analysis (example transcript, Appendix 29).

Gibbs' Reflective Cycle (Gibbs 1988) was used to guide personal reflections following the activities about the successes and challenges, this contributed to the evaluation of the activity intervention.

#### **6.2.6.3. *Post-test***

Following the 12-week intervention, participants living with dementia were invited to repeat the measures for symptoms of dementia, physical function, quality of life and depressive symptoms. A

semi-structured interview was carried out with each participant living with dementia. A focus group was conducted with student volunteers.

### 6.2.6.3.1. Interview with participants living with dementia

The semi-structured interview was used to explore the participant's experience and perspectives of the outdoor and nature-based activity intervention. A set of questions (shown in table 6.6) guided the interview but allowed it to be tailored to the individual. The interview was conducted in participant's own homes, and audio recorded using a Zoom H2n Recorder (Zoom; New York, USA) audio device. A summary of the participant's responses were repeated back to them, for them to add anything else and verify what they had said. The interview recordings were transcribed verbatim using Microsoft Word 2016 (Microsoft; Washington, USA) and used in the thematic analysis. An example interview transcript is in the appendices (Appendix 30).

Table 6.6. Semi-structured interview schedule for participants living with dementia and cognitive impairment

<b>Questions</b>
<ul style="list-style-type: none"> <li>• Overall, how did you find taking part in the outdoor and nature-based activity programme?</li> <li>• What activities did you enjoy most?</li> <li>• Where there any activities you attended which you did not enjoy?</li> <li>• How did you find the off-site activities?</li> <li>• How did you feel about taking things that you had made during the activities home with you afterwards?</li> <li>• How have the activities and being part of the programme made you feel?</li> <li>• Have you done anything during the activities that you had not done before or that you didn't think you would be able to do?</li> <li>• Has taking part in the activities that have made you think or feel differently than you did before?</li> <li>• Do you think it is important to spend time outdoors?</li> </ul>

### 6.2.6.3.2. Focus group with student volunteers

An informal semi-structured focus group was conducted with Student volunteers to explore their experience and thoughts about the activity programme and their involvement. A set of questions (shown in table 6.7) guided the focus group. Two volunteers did not attend and provided written feedback to the same questions. The focus group was audio recorded using a Zoom H2n Recorder (Zoom; New York, USA) and transcribed verbatim using Microsoft Word 2016 (Microsoft; Washington, USA), this was included in the thematic analysis.

Table 6.7. Focus group schedule with student volunteers

Questions
<ul style="list-style-type: none"> <li>• Can you share your overall experience of being involved in this research project?</li> <li>• Has being involved made you think any differently about working with people who are living with dementia and cognitive impairment?</li> <li>• Having taken part in this project, do you think it will have an impact on your practice in future placements or employment?</li> <li>• Do you have any comments or thoughts about the activities you were involved with?</li> <li>• From your perspective, how do you think the activities impacted the participants living with dementia and cognitive impairment?</li> </ul>

## 6.2.7 Data analysis

Data analysis began two weeks after the intervention was completed once all the post-test data was collected. Quantitative data (GBS Scale score, SPPB score, hand grip strength measures, DEMQOL score and GDS score) was analysed used a Paired-T-Test or Wilcoxon test to compare pre-test and post-test data. Qualitative data (observational notes, reflections, interview data, focus group data and questionnaire data) was triangulated and analysed through thematic analysis.

### 6.2.7.1. *Statistical analysis*

Statistical analysis was used to test for changes in symptoms of dementia, physical function, quality of life and depressive symptoms following the intervention. IBM SPSS (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp) was used to conduct the analysis. The Shapiro-Wilk Test was used to check for normal distribution. Data that had a significance value of  $<0.05$  was considered not normally distributed. A Paired-T Test was used to compare the pre-test and post-test measures of data that was normally distributed, this included all measures of hand grip strength, and DEMQOL and GDS scores ( $SD >0.05$ ). The Wilcoxon test was used to compare the pre-test and post-test measures of data that was not normally distributed, this included the GBS Scale and SPPB scores ( $SD <0.05$ ).

### 6.2.7.2. Thematic analysis

Thematic analysis was used to analyse the qualitative data from the observational field notes, reflections, interviews and focus group (and questionnaire) using a triangulation method. This analysis followed the phases presented by Braun and Clarke (2006) as described in Chapter 3. NVivo (Version 12 Pro for Windows, ©QSR International) was used to record the thematic analysis, including the creation of the codebook and coding of the data. The intra-coder reliability coding comparison of a sub-sample of data produced a Kappa co-efficient value of 0.94, which demonstrates excellent levels of agreement and reliability (Altman 1991; Boyatzis 1998; Landis and Koch 1977; Miles and Huberman 1994; Neuendorf 2002). The remaining data was coded, an excerpt of the codebook is shown in table 6.8 and the full codebook is in the appendices (Appendix 31). Throughout phases 3 and 4, a thematic map was produced, the final thematic map is shown in figure 6.5. The themes, subthemes and a brief description are shown in table 6.12 in the following section (page 215). The findings from the thematic analysis are presented below.

Table 6.8. Excerpt from codebook

Parent node	Child node	Short definition	Long definition	When to use	When not to use
Outdoor environments	Benefits	Benefits of engaging with outdoor environments	Benefits associated with spending time outdoors and interacting with outdoor environments, either observed or reported by participants	Use to code data relating to the benefits associated with outdoor environments	Do not use to code data relating to specific outdoor environments, use node "opportunity for activity"
Overcoming barriers	Purpose and usefulness	Participants feeling a sense of purpose and/or usefulness	Participants expressing or displaying signs of feeling a sense of purpose and/or usefulness during the activities and programme	Use to code data relating to a sense of purpose/usefulness	Do not use to code data relating to behaviour indicating satisfaction unless specific to sense of purpose
Social interaction	Group working	Participants engaged in group working	Data relating to group working and working with others during activities	Use to code data relating to group working	Do not use to code data reflecting conversation between participants, use node "conversation"

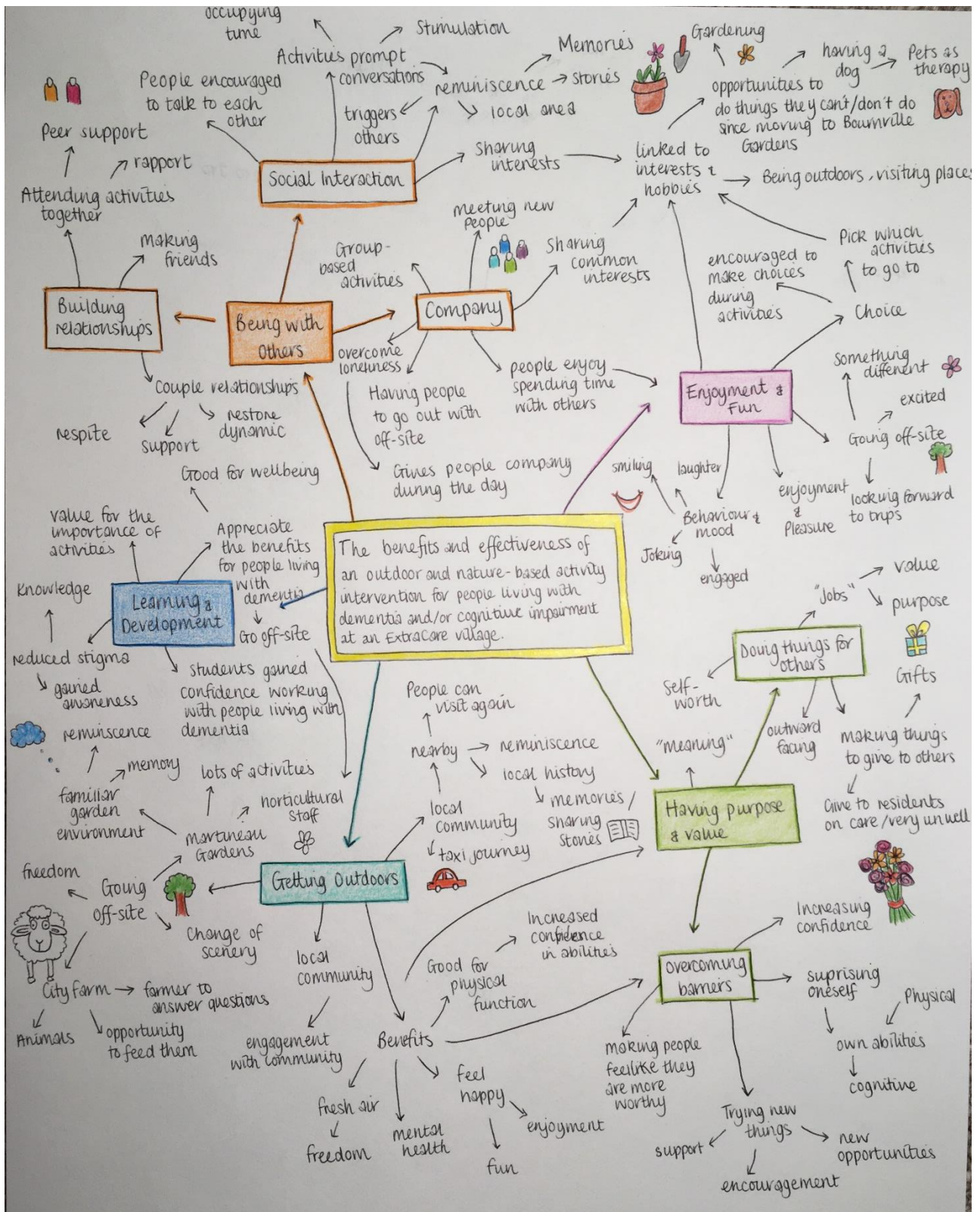


Figure 6.5. Thematic Map



### **6.2.7.3. Missing data**

There was missing quantitative data, 4 participants did not complete both the pre-test and post-test measures (due to physical disabilities, appointments and two people did not want to complete the post-test data on two separate occasions), any data that had been collected was not included in the quantitative analysis. One participant only completed right hand post-test grip strength measures due to an operation, data for their right hand was included in the analysis, which accounts for the difference in total numbers.

## **6.3. Results**

### **6.3.1. Participants**

Eighteen participants living with dementia and/or cognitive impairment were recruited into the study, there were 8 females and 10 males with a mean age of 86 years. Participant demographics are shown in table 6.9.

Table 6.9. Participant demographics

Participant	Gender	Age	Diagnosis
1	Male	87	Suspected mild cognitive impairment (MCI)
2	Female	86	Alzheimer's disease
3	Male	84	Suspected MCI
4	Male	84	Suspected MCI
5	Male	89	Suspected dementia
6	Female	81	Depression and suspected MCI
7	Male	91	Alzheimer's disease
8	Female	80	Alzheimer's disease
9	Male	82	Suspected dementia
10	Female	89	MCI
13	Male	87	Suspected MCI
14	Female	86	Alzheimer's disease
15	Female	85	Suspected MCI
16	Male	87	Parkinson's with dementia
17	Male	91	Suspected MCI and depression, blind
18	Male	91	Suspected MCI
19	Female	86	Suspected MCI
20	Female	76	Cognitive impairment due to childhood brain tumour

Seven student volunteers took part, 6 females of which 2 were masters physiotherapy students and 4 were undergraduate occupational therapy students (2 in final year and 2 in first year) and 1 male who was an occupational therapy student (final year). All were studying at Coventry University.

### **6.3.1.1. Attendance**

As participants could choose which activities to join, the attendance levels varied greatly. Participants attended between 2 and 34 activities in total (of 52 activities) and group sizes ranged from 2 to 13. The most popular activities were the off-site visits to Martineau Gardens and Balsall Heath Farm, the talk from the Canal and River Trust and the therapy dog visits.

### 6.3.2. Symptoms of dementia, physical function, quality of life and depressive symptoms

The data was combined across all participants living with dementia. Four participants did not complete both pre-test and post-test measures therefore the quantitative data represents 14 out of 18 participants (except for the GBS Scores which was completed for 15 participants, pre and post). The qualitative data collected from these 4 participants was included in the data analysis. Comparisons were made between the pre-test and post-test measures for symptoms of dementia, physical function, quality of life and depressive symptoms. Table 6.10 presents the results of the Paired T-Test for DEMQOL scores, GDS Scores and hand grip strength measures (HGS). Table 6.11 presents the results of the Wilcoxon test for SPPB scores and GBS Scale scores.

Table 6.10. Paired T-Test statistical analysis for pre-test and post-test comparison of quality of life, depression and hand grip strength

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
DEMQOL	-5.57	4.40	1.18	-8.11	-3.03	-4.74	13.00	0.000**
GDS	2.21	2.67	0.71	0.68	3.75	3.11	13.00	0.008**
HGS R Mean	0.46	3.01	0.80	-1.28	2.20	0.58	13.00	0.575
HGS R Peak	0.62	2.96	0.79	-1.09	2.33	0.79	13.00	0.447
HGS L Mean	-0.14	2.42	0.67	-1.60	1.32	-0.21	12.00	0.838
HGS L Peak	-0.02	2.95	0.82	-1.81	1.76	-0.03	12.00	0.978

Table 6.11. Wilcoxon Test statistical analysis for pre-test and post-test comparison of SPPB scores and symptoms of dementia

Test Statistics <sup>a</sup>		
	SPPB	GBS Scale
Z	-1.643 <sup>b</sup>	-.420 <sup>b</sup>
Asymp. Sig. (2-tailed)	0.1	0.674
a. Wilcoxon Signed Ranks Test		
b. Based on negative ranks.		

There were two statistically significant differences for DEMQOL scores (quality of life) and GDS scores (depressive symptoms). The data for DEMQOL scores is shown in figure 6.6 and the data for GDS score is shown in figure 6.7. The graphs indicate that as a result of the intervention quality of life has improved, whilst depressive symptoms have reduced across the participant group.

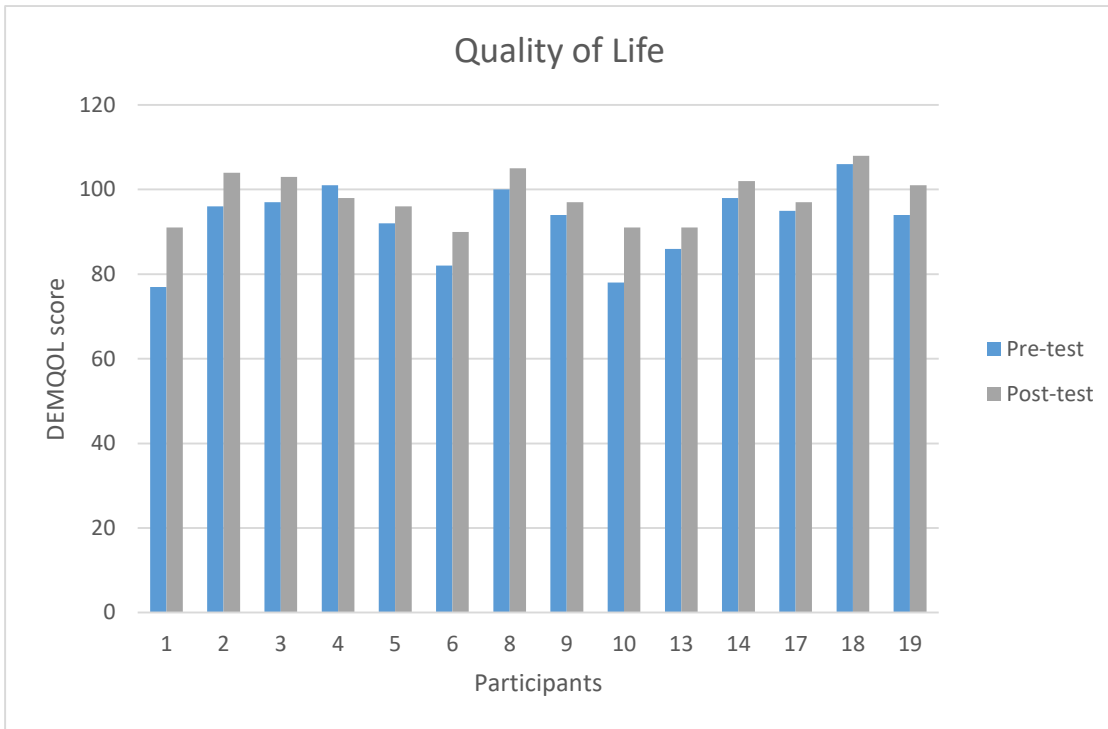


Figure 6.6. Pre-test and post-test DEMQOL scores for participants

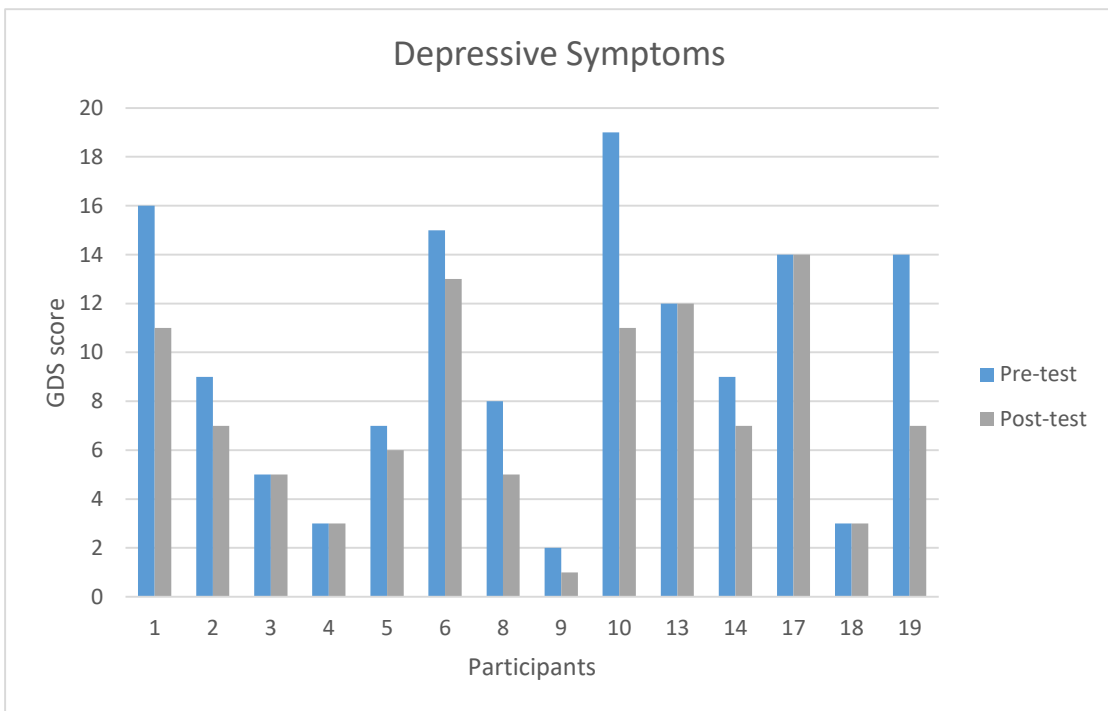


Figure 6.7. Pre-test and post-test GDS scores for participants

#### **6.3.2.1. Gottfries-Bråne-Steen Scale**

Eight participants scored higher on the GBS scale after the intervention (greater impairment), 5 participants scored less (reduced impairment) and 2 participants scored the same (n=15). There was no statistically significant difference in pre-test (m=16.19 SD=13.23) and post-test (m=17.53 SD=13.66) measures of GBS Scale scores ( $Z = -0.420$ ,  $p=0.674$ ).

#### **6.3.2.2. Short Physical Performance Battery**

Ten participants had a higher SPPB score after the intervention, 3 participants scored lower and 1 participant scored the same (n=14). There was no statistically significant difference in pre-test (m=7.20, SD=2.18) and post-test (m=8.21, SD=1.81) measures of SPPB scores ( $Z = -1.643$ ,  $p=0.100$ ).

#### **6.3.2.3. Hand grip strength**

Four participants right hand mean grip strength increased after the intervention, 10 participants right hand mean grip strength decreased (n=14). Five participants right hand peak grip strength increased after the intervention, 9 participants right hand peak grip strength decreased (n=14). Six participants left hand mean grip strength increased after the intervention, 7 participants left hand mean grip strength decreased (n=13). Five participants left hand peak grip strength increased after the intervention, 8 participants left hand peak grip strength decreased (n=13). There was no statistically significant difference in pre-test and post-test measures for HGS.

#### **6.3.2.4. DEMQOL**

Thirteen participants reported higher quality of life (increased DEMQOL scores) after the intervention, 1 participant reported lower quality of life (decreased DEMQOL score) (n=14). Figure 6.6 shows the pre-test and post-test DEMQOL scores for each participant who completed both measures. There was found to be a statistically significant difference in pre-test (m=92.57, SD=8.72) and post-test (m=98.14, SD=5.89) measures of DEMQOL scores ( $t(13) = -4.740$ ) ( $p=0.000$ , 95% CI=-8.111 - -3.032).

### **6.3.2.5. Geriatric Depression Scale**

Nine participants reported lower feelings of depression (decreased GDS scores) after the intervention, no participants reported increased feelings of depression (increased GDS scores), 4 participants reported the same level of depression (equal GDS scores) (n=14). Figure 6.7 shows the pre-test and post-test GDS scores for each participant who completed both measures. The difference in pre- (m=9.71, SD=5.40) and post-measures (m=7.50, SD=4.07) for the GDS scores ( $t(13) = 3.108$ ) ( $p=0.008$ , 95% CI= 0.675 – 3.753) was found to be significant.

### **6.3.3. The effectiveness and benefits associated with outdoor and nature-based activities**

The qualitative data collected from the observations, reflections, participant interviews and student volunteer focus group and interviews was triangulated and analysed using thematic analysis to explore the benefits and effectiveness of an outdoor and nature-based activity intervention for people living with dementia and/or cognitive impairment. Four themes were captured that reflect the benefits to the participants living with dementia and/or cognitive impairment, **being with others**, **enjoyment and fun**, **having purpose and value**, and **getting outdoors**. A fifth theme, **learning and development** captured the benefits for the student volunteers. Table 6.12 provides an overview of the themes, sub-themes and brief description.

Table 6.12. Themes and subthemes with descriptions

Theme	Sub-Theme	Description
Being with others	Social interaction	The opportunities for, and occurrence of, social interaction throughout the activities and programme.
	Company	Participants having company and other people around them during the activities, which meant that they were not alone.
	Building relationships	The friendships and personal relationships that developed between participants throughout the programme.
Enjoyment and fun		Enjoyment experienced by participants associated with the level of interest in the activities and/or nature in general and range of positive behaviours including, smiling, laughing and high levels of engagement.
Having purpose and value	Overcoming barriers	How participants achieved a sense of purpose through overcoming perceived and physical barriers and challenges throughout the programme.
	Feeling useful by doing things for others	The purpose and value participants gained through their contribution, within both specific activities and programme overall.
Getting outdoors		Participants behavioural and emotional response to spending time outdoors throughout the programme
Learning and development		The experiences of the student volunteers in relation to their personal and professional learning and development as a result of their involvement.

### **6.3.3.1. *Being with others***

This theme reflects the positive impact of the participants living with dementia and/or cognitive impairment being in a group and working with others during the activities. Three sub themes: social interaction, company, and building relationships capture the ways in which participants experienced and benefitted from being with others.

#### **6.3.3.1.1. Social interaction**

Spontaneous conversations and discussions were frequently observed between participants living with dementia and/or cognitive impairment throughout all the activities. One student volunteer commented “they [participants] are interacting with each other rather than being in their own rooms” (OT student 1) as a result of attending scheduled activities. Whilst engaging in an activity, participants would discuss what they were doing and would talk about the activities. For example, whilst making insect houses the conversation between participants was about the different insects



that might use it, and how we should be protecting wildlife more. The activities themselves gave participants something different to talk about. Particular activities, such as the therapy dog visits, related to shared interests that participants had, this stimulated conversation between participants who had previously owned dogs. During some activities, participants were encouraged to contribute to the discussion (e.g. reminiscence session) and ask questions (e.g. guest speaker presentations, farm visits) which resulted in increased social interaction.

Reminiscence also contributed to increased social interaction, during familiar activities such as planting vegetable seeds and making lavender bags, participants shared their memories and stories, which triggered other participants to join in. Some participants enjoyed telling stories of their childhood and life history, whilst others engaged by listening and responded with questions. Increased social interaction was observed when participants went off-site. Many participants had lived in Birmingham their whole lives, reminiscence about the local area occurred on the journey to and from the off-site activities and where participants had visited previously.

#### **6.3.3.1.2. Company**

Several participants living with dementia and/or cognitive impairment indicated that taking part in the group activities gave them company, through being with others. One participant shared:

“I have been on my own now for 12 months last May and that takes a bit of getting used to. I don't think I still have really. There is not much fun going out on your own, so if you're in a group it is much more enjoyable” (participant 3).

The participants agreed that doing things in a group, especially going off-site, was more enjoyable as they could share the experience with other people. One participant shared their experience on behalf of themselves and their partner being involved in the programme, stating that “it is good to get out of the apartment and nice for them [participant 16] to mix with a group and meet other people” (participant 15).

Whilst some of the activities involved the group working together (e.g. outdoor games, planting window boxes) a number of participants just appeared to enjoy sitting and being part of a group

rather than engaging in the activities themselves. For example, during flower arranging one participant (who was blind) said they just wanted to sit and chat with the others whilst they did the activity. This was also seen during reminiscence some participants would just sit and listen to the stories of others, and they reported just enjoying being with others and hearing about people's lives.

#### **6.3.3.1.3. Building relationships**

As well as simply having company, participants reported that the intervention had enabled them to meet other residents who they didn't know before. One participant shared:

"It is nice to meet these other people that I have seen about but I haven't actually sat and talked to. I feel like I am more friendly with people I have spoken to. I feel that if I saw them in the corridor I would stop and talk to them more, and I have made a lot more friends. We all ended up happy and laughing, I think it has been a fantastic project, it really has" (participant 19).

Several participants commented they had met new people, including one couple who lived in an isolated apartment.

The activities offered a structured and supportive setting for participants to spend time with each other and positive relationships were observed between participants that regularly attended activities together. Participants were seen supporting each other, for example during building the wooden birdfeeders where some participants found it difficult to follow the instructions and found it easier to copy the person they were sat next to. One participant reflected on their experience of being with others stating, "I can enjoy doing things in a group but I think we all have to be patient because we can't dictate, but we can encourage how much people can do" (participant 10). The positive dynamic between participants evolved over the duration of the intervention.

A change in the relationships between 2 participants who were (marital/life) partners was noted. Although both participants had a level of cognitive impairment, one person took on the primary caregiving role. The activities gave both participants the opportunity to engage in something different and be occupied, and allowed for the person who had caregiving responsibilities to spend time doing something themselves.

### **6.3.3.2. *Enjoyment and fun***

Participants living with dementia and/or cognitive impairment reported they enjoyed taking part in the activity intervention. One participant concluded, “It has been a fantastic project, it really has. There has been something to really look forward to” (participant 19). Another participant stated, “You know if you’ve enjoyed it, you get enjoyment from it” (participant 2), when referring to the different activities. As well as reporting high levels of enjoyment, observations captured frequent positive behaviours and emotions such as laughing, smiling, increased interaction, interest and high levels of engagement in the activities.

High levels of enjoyment and engagement were seen during off-site activities, many participants appeared to find going off-site exciting and interesting. A number of participants reported they had especially enjoyed visiting Martineau Gardens. One participant shared:

“It always turned out to be an exciting day and after the first couple of weeks we really looked forward to Mondays, Martineau Gardens in particular, we enjoyed going there. We have thoroughly enjoyed it” (participant 1).

Student volunteers also reported the increased levels of enjoyment during the off-site activities. One volunteer commented, “I noticed at Martineau Gardens everyone enjoyed doing the hands on activities, particularly doing the planting” (OT student 1). The student volunteers also reflected on their own enjoyment and pleasure from visiting Martineau Gardens, and other off-site activities such as the city farm.

Several participants enjoyed taking part in the activities as they perceived it to be beneficial to their wellbeing. One participant shared,

“I enjoyed coming, and I could see it was benefitting them [participant 16.] I enjoyed the quizzes and the games, and coming out into the garden especially when someone else was pushing [laughing]. That was nice” (participant 15).

Increased enjoyment was associated with other potential benefits, such as social interaction, spending time with others and interest in the activities. Several participants noted that the activities

they enjoyed most related to their interests and hobbies, for example participants who used to do a lot of walking enjoyed going off-site and walking somewhere different, whilst participants who liked animals reported enjoying the therapy dog visits. One participant who shared they were sad they could not have a dog, stated, “It was lovely to see the dogs yesterday, I always enjoy dogs” (participant 7).

Many participants reported they enjoyed the horticultural activities as their hobby was gardening, high levels of positive behaviours indicative of enjoyment were frequently observed during these activities. As well as enjoyment during the activities, several participants shared that they had enjoyed watching the wild flowers bloom and the salad seeds grow over the course of the intervention, and would update on the growth of the plants. Sensory stimulation from brightly coloured flowers and the smell of plants – especially the herbs, led to positive behaviours, greater engagement and enjoyment. One student volunteer reflected on a participant living with dementia who sought great enjoyment from looking at flowers and looking at nature, they shared “She [participant 2] appeared to be excited by seeing many flowers laid out in the garden and in the pots” (OT student 4). They added “she loved sitting down on the bench in front of the pond; she repeated she loved water” (OT student 4).

As well as engaging in activities that linked to their interests, participants reported enjoying new activities they had not done before. One participant commented “I never knew much about birds and insects and I have learnt a lot, and it has made me more aware of the animals and the insects” (participant 6). Participants especially enjoyed pond dipping at Martineau Gardens and continued to recall how much they had enjoyed it for several days afterwards.

#### **6.3.3.3. *Having purpose and value***

Participants living with dementia and/or cognitive impairment reported that the activity intervention had given them a sense of purpose and value. This was related to two subthemes: overcoming barriers and doing things for others.

#### **6.3.3.3.1. Overcoming barriers**

During the activity intervention, participants reported how they had achieved things they did not think they could do. “I have done things I never thought I could do ... a lot of things I didn’t think I was able to, especially with my fingers not being so good. I was very surprised” (participant 19). Whilst another reflected, “Planting flowers, I have never done those since I lost my ability to use my right hand, so it was really good” (participant 20). Such feelings of overcoming barriers was accompanied by positive behaviours and emotions, and a sense of achievement and pride which was reported by participants and observed. The participants who lacked confidence in their abilities, grew in confidence during the intervention. Participants reported how beneficial it had been to try different things even if they may not succeed.

“You know, it is quite obvious. I felt the opportunity was worthwhile 100%. I know that is was good for me to try it. I didn’t always succeed but the main thing was that I was able to try it. You are testing yourself to be able to take part in this, it is beneficial to your confidence, I am still able to try, not wonderfully but I know I can do it to a certain extent” (participant 10).

One participant, who had said at the beginning of the intervention they find it difficult to motivate themselves to do things shared:

“I hadn’t been to Martineau Gardens before. I didn’t want to do it and didn’t want to go really, and didn’t want to play with the flowers, and when I got there you couldn’t stop me. I am like that” (participant 6).

Engaging with the activities helped participants feel a sense of worthiness, “I felt less worthless and I can say, it makes you feel that you can do other stuff and you are capable and able of doing stuff you didn’t think you could do” (participant 6). Whilst others shared “It is really nice to come and achieve something, it feels like you’ve got a purpose” (participant 19) and “If I can produce something I feel is worthwhile, I am always happy” (participant 10).

#### **6.3.3.3.2. Feeling useful by doing things for others**

Several participants reported how the activities made them feel useful as they were doing things for others. “I could please someone else but it also pleased me” (participant 18). A number of activities included making things that participants could give to others, such as flower arranging, lavender bags and potted plants. One participant suggested giving the flowers to residents who are unwell. The group agreed and made a number of flower arrangements that were given to residents by the care staff, who reported that the residents felt “overwhelmed” and “happy” from the kindness of the group.

“I have really enjoyed those and especially where we have made several and we have been able to donate them to people who are in not such a good position. That is what I have really enjoyed doing, knowing we are doing something for other people as well” (participant 19).

During the activities that were focused on doing things for others, through observations a sense of purpose and enjoyment was noted as the participants discussed how other people would benefit from them doing this activity. This was also seen during off-site activities that involved making a perceived contribution such as, making large plant pots to go on display in the new garden area at Martineau Gardens and watering the gardens, also feeding the animals at Balsall Heath City Farm.

#### **6.3.3.4. Getting outdoors**

Participants living with dementia and/or cognitive impairment reported that being outdoors was very important to them, and they had really enjoyed the outdoor activities, particularly the off-site activities. Those who attended the off-site activities appeared to remember these more than the on-site activities during the interviews. The outdoor and off-site activities were associated with the benefits and effects that are represented in the previous themes presented in this chapter. Participants shared how spending time outdoors improved their wellbeing, particularly their mental wellbeing. One participant commented:

“It makes me feel more alive, I can feel, it depends, if I get into the country I can feel the fresh air in my lungs and I will then tend to stride out faster and I move quicker – the quicker

I move the better my balance is. It's when I am going dead slow that my balance is not good, but if I am really stepping out, I am better" (participant 18).

Participants who engaged in the outdoor activities reported increased confidence and high levels of enjoyment. The student volunteers felt that the off-site activities had been particularly beneficial, "I feel like they just improved their wellbeing more and brought more joy and entertainment" (OT student 1), especially Martineau Gardens and Balsall Heath City Farm. The student volunteers discussed how being outdoors acted as a "leveller" for people with cognitive impairment, they said "when you have an open space everyone knows what a tree is or what an animal is, everybody just gets involved" (OT student 3).

Reminiscence was observed when participants were outdoors, with participants sharing their memories that were triggered by the environment, familiar places and particular plants, and the activities. "I think at Martineau Gardens there has been a lot of reminiscence" (OT student 2), the garden environment led to participants talking about their own gardens before they moved to Bournville Gardens, and sharing their knowledge about gardening. One participant shared "I am just having a nostalgic walk, as I no longer garden myself" (participant 5) during a visit to Martineau Gardens.

#### **6.3.3.5. Learning and development**

The student volunteers reflected on the benefits they had gained from being involved in the activity intervention during the focus group and questionnaire responses. It helped the student volunteers build confidence in working with people living with dementia, particularly outside of a clinical setting. One student volunteer shared that their involvement had confirmed that they want to work with people living with dementia when they qualify as an occupational therapist. The student volunteers spoke about how this experience had changed their previous views and preconceptions about people living with dementia. One student volunteer acknowledged how they had assumed that people living with dementia would not be able to live independently, as many participants in this study were. Another expressed how this experience would influence their behaviour when working with people living with dementia in the future.

“I am going to be considerate in my support to maximise respect of their independence physically and mentally, trying to understand their emotion at the time as much as possible” (OT student 4).

They unanimously felt that people living with dementia are often misunderstood and are assumed to not have any cognitive abilities or memories. They highlighted how further training could be given to health care students to change this perception, particularly focusing on how to ensure that good dementia care includes a range of activities.

Regarding the outdoor and nature-based activities themselves, all student volunteers agreed that getting outdoors appeared to benefit people living with dementia and cognitive impairment. “I believe they found it therapeutic and interesting” (OT student 5). They also reflected on the simplicity and familiarity of nature and the outdoors.

“I think the outdoor space has been so good as everyone knows what that is and everyone can use it in a way that they want to use it whereas structured things sometimes are not as accessible. I have just seen so much conversation coming out of people at different points” (OT student 3).

The student volunteers who took part in the focus group (n=3) felt that outdoor and nature-based activities were extremely important for the residents of Bournville Gardens, and that Martineau Gardens was a great place for people to visit as there were so many activities on offer and the staff were welcoming and supportive. All three volunteers were passionate about improving the provision of outdoor and nature-based activities for people living with dementia, having seen the benefits first-hand, they could see the value and opportunities it had given the participants during this programme.

## **6.4. Discussion**

This study has involved the development and testing of an evidence-based outdoor and nature-based activity intervention. The development was informed by the literature, and the findings from study 1 and study 2, as well as the collaboration with the Dementia and Mental Wellbeing Enabler



at Bournville Gardens. The key elements brought to this intervention include a multi-activity intervention, combining a variety of activities including, horticultural activities, walking and outdoor games, and animal-related activities. The study addresses the lack of research exploring the benefits associated with an activity intervention which involves different outdoor and nature-based activities within green dementia care, delivered within an extra care setting. Furthermore, this study sought to present a detailed rationale for the development of the activity intervention and evaluate the overall effectiveness of outdoor and nature-based activities delivered in this context for people living with dementia and/or cognitive impairment.

The activity intervention was analysed using both quantitative and qualitative methods to explore components of wellbeing and the benefits associated with the activities. Quantitative data was collected to measure whether there were changes to symptoms of depression, physical function, self-reported quality of life and self-reported symptoms of depression following the intervention. Qualitative data was collected through participant observations to explore their behaviour, mood, levels of engagement and activities that related to wellbeing, which were conducted during the activities. Personal reflections and feedback from student volunteers provided alternative perspectives about the benefits associated with the activities and the effectiveness of the intervention. Interviews were conducted with participants living with dementia and/or cognitive impairment to explore their experience and perspective of taking part in the activity intervention.

The quantitative data indicated that participants living with dementia and/or cognitive impairment reported improved quality of life and reduced symptoms of depression following the intervention. This was supported by the qualitative findings which highlighted a range of benefits to participant's wellbeing including, increased social interaction and company through being with others, high levels of enjoyment and positive behaviours and mood, increased sense of purpose by overcoming barriers and being able to do things for others, and spending time outdoors which was perceived as beneficial and enjoyable. In addition, the student volunteers benefitted from increased confidence in supporting people living with dementia, greater understanding about the importance of activity for people living with dementia and gained enjoyment from their experience.

#### **6.4.1. The benefits of engaging in outdoor and nature-based activities**

When looking at the benefits of engaging in outdoor and nature-based activities, we can consider a number of factors that are important in person-centred dementia care such as, opportunities for social interaction and connection with others, and engagement in meaningful activities which align to people's interests and hobbies, and draw on their skills and knowledge (Brooker 2003; Marshall and Hutchinson 2001). The current literature exploring the benefits of outdoor and nature-based activities is largely focused on the benefits associated with single types of activities, such as horticultural activities or outdoor walking, and much of the research has been conducted outside of the UK and within care homes and nursing homes. There is a lack of research about the benefits of outdoor and nature-based activities within the community or an extra care setting (where facilities are also open to the wider community). Furthermore, there are few details about the specific activities included, the adaptations made for people living with dementia and information about how the activities were delivered, making it difficult to replicate those activities which have been shown to have potential benefits. Therefore, this study sought to explore the benefits associated with an activity intervention that offered different types of outdoor and nature-based activities, delivered both on-site at an extra care retirement village and off-site within the local community in the UK. This study also captured the direct experiences and perspectives of people living with dementia and/or cognitive impairment where other studies do not.

The benefits indicated in this study were an increase in self-reported quality of life and a decrease in self-reported symptoms of dementia, as well as an increase in social interaction and connection to others, high levels of enjoyment, a sense of purpose and increase in self-worth, opportunities to engage in meaningful activities and spend time outdoors. A statistically significant increase in self-reported quality of life and statistically significant reduction in self-reported symptoms of depression suggest that the outdoor and nature-based activity intervention improved wellbeing and overall quality of life for the participant's living with dementia who completed the pre-test and post-test measures. Quality of life is complex, whilst objective components of health and wellbeing such as illness and disability can impact quality of life, how a person perceives their quality of life is highly

subjective (Diener 2009; Lawton 1991). The qualitative findings demonstrating the benefits to wellbeing, including increased social interaction and connection to others, high levels of enjoyment and spending time outdoors, supported the improvements to objectively measured quality of life.

The significant reduction in self-reported symptoms of depression were also supported by the qualitative findings. Participants felt better connected to others, experienced high levels of enjoyment and a greater sense of purpose through taking part in the activities which have been shown to reduce levels of depression and improve quality of life (Rahman 2017). This is an important finding as the prevalence of depression is rising amongst people living with dementia (Rahman 2017) and it can have a negative impact on wellbeing and quality of life (Barbe et al. 2018). Participants also felt that spending time outdoors benefitted their mental wellbeing, which could have contributed to reduced feelings of depression (Barton and Pretty 2010; Beyer et al. 2014). Whilst no significant changes were found to levels of cognitive impairment or physical function, participants did recall overcoming physical barriers and experiencing increased confidence which again may have contributed to the reduction in depression and increase in quality of life that was shown.

One of the main benefits of the activity intervention was the increased opportunities for social interaction and being with other people, which noted previously in relation to gardening and horticultural activities (Blake and Mitchell 2016), walking (Mapes et al. 2016; Robertson et al. 2020) and through interacting with animals, particularly dogs separately (Yakimicki et al. 2019). Specifically, the variation of activities within the intervention, and autonomy for participants to choose which to attend, led to higher levels of shared interests which prompted conversation and discussion. This supports a person-centred approach in dementia care through enabling people to engage in activities that align with their interests and hobbies, which can increase their sense of self-identity and lead to improved wellbeing (Brooker 2003; Brooker 2006; Kitwood 1997).

Activities that prompted reminiscence through sensory stimulation and familiarity, including horticultural activities using herbs and flowers with bright colours and strong scents, and off-site activities in familiar environments, led to participants sharing memories and stories, which was

associated with increased social interaction and positive behaviours. Whilst the reminiscence as a result of gardening and horticultural activities (Smith-Carrier et al. 2019) and walking (Hughes et al. 2011) has been shown to contribute to the wellbeing of people living with dementia there remains little evidence of the efficacy of reminiscence therapy despite it being widely used in dementia care (O'Philbin et al. 2018). Yet, this was one of the key benefits identified by the participants in study 1 and a key theme captured in study 2, warranting further research.

As well as stimulating conversation, participants benefitted from the company of others, having people to share activities with and go off-site with, and building relationships with people they did not know before the start of the intervention. The importance of social connection for people living with dementia is recognised in a person-centred care approach (Brooker 2003; Brooker 2006; Kitwood 1997) and is reflected in the principles of CST through building relations. Connection to others not only helps maintain an individual's sense of personhood and identity (Kitwood 1997) but can reduce feelings of loneliness and depression (Kane and Cook 2013).

Outdoor and nature-based activities offered people living with dementia opportunities to engage in activities where they could do things for others, whether that was making a gift such as a flower arrangement or card, or watering a community garden and feeding animals on the farm. These activities were associated with a sense of purpose and value, which has also been found as a result of green care farming (de Bruin et al. 2015) and community gardening (Hewitt et al. 2013; Noone and Jenkins 2018; Smith-Carrier et al. 2019) and linked to increased self-esteem. Again, this relates to a person-centred approach to dementia care as self-esteem can impact on quality of life for people living with dementia (Brooker 2003; Brooker 2006). Benefits to self-esteem also relate to participants overcoming to perceived barriers, such as their physical abilities, to take part in the activities. This was due to the effective delivery of the activities which supported participant's abilities but also provided support through clear instructions, accessible equipment, support from staff and volunteers, and encouragement to try new things. These features were all shown to be successful components of the activity intervention in study 2 that were implemented in this study.

A paper was published following the completion of this study which highlights a lack of research about the impact of organising outdoor and nature-based off-site activities for people living with dementia in a residential and extra care setting (Barrett, Evans and Mapes 2019). This study begins to address that gap. The findings suggest that supporting residents to engage in off-site outdoor and nature-based activities can benefit their wellbeing. This was seen through high levels of enjoyment and positive behaviours, the perceived benefit of being outdoors particularly to mental wellbeing, increased social interaction through reminiscence and sharing common interests, and opportunities to do a variety of purposeful and meaningful activities and to be away from Bournville Gardens. It is likely that the structure and group-based element of the activities, and support from student volunteers, as well as the provision of accessible transport, helped the participants overcome potential barriers they face which prevent them from connecting with nature and spending time outdoors off-site (as highlighted by Clark et al. 2013).

#### **6.4.2. Delivering effective outdoor and nature-based activities in an extra care setting**

This study has identified a number of benefits for people living with dementia and/or cognitive impairment in an extra care retirement village through engaging in outdoor and nature-based activities, especially off-site activities in the local community. The student volunteers provided support for participants that help meet individual needs and allow people to take part in the activities. In addition, the opportunity to be involved in this study also led to student volunteers feeling more confident working with people living with dementia and have a greater understanding about the importance of outdoor and nature-based activities, which was reported as a challenge by participants in study 1 to getting the support needed to provide activities.

This activity intervention was effective in offering a variety of opportunities for participants living with dementia and/or cognitive impairment to engage in different outdoor and nature-based activities that supported their interests and hobbies, and were considered as purposeful and meaningful. The horticultural activities were delivered with the same considerations that had been effective in study 2, which included laying out materials to stimulate discussions, having clear step-by-step instructions accompanied by visual demonstrations, accessible equipment, utilised sensory plants

and natural material, and had an achievable end goal which enable participants to either give something to others or take something away themselves. Figure 6.8 shows the activity table for two of the activities. Horticultural activities could be incorporated into the Enriched Opportunities Programme using this method of delivery, the Dementia and Mental Wellbeing Enabler was keen to incorporate more nature-based activities into the weekly art session following this intervention.



Figure 6.8. Activity equipment laid out with step-by-step instruction sheets for insect houses (left) and wild flower seed planting (right)

Walking was done both on-site and off-site activities, as many of the participants reported enjoying walking. A route was planned for each walk, and the appropriate support from student volunteers was ensured so that participants could take part safely. During some of the walks an additional activity was available, such as bird spotting or hunting for different flowers, this was beneficial for some participants who wanted more stimulation and a purpose to the walk. Having an element of flexibility and planning for additional ‘add-on’ activities proved useful for some participants.

Inviting guest speakers and organising therapy dog visits are two ways in which more outdoor and nature-based activities could be included into the Enriched Opportunities Programme without placing too much additional burden on staff. These activities were tailored to participant’s interests during the intervention, which likely contributed to the positive responses and high levels of engagement. This study provides support for therapy dog visits to improve the wellbeing of people

living with dementia and/or cognitive impairment at an extra care retirement village which addresses one of the gaps in the current literature identified in the literature review and later by Barrett, Evans and Mapes (2019).

The inclusion of off-site activities was beneficial for participants for the reasons discussed above. Whilst this requires a greater level of organisation, this study has demonstrated that there are a number of suitable venues and organisations within a 5-mile radius of Bournville Gardens that participants enjoyed visiting. In particular, Martineau Gardens and Balsall Heath City Farm where staff were available to facilitate the activities were enjoyable and memorable for both participants and volunteers. Figure 6.9 shows participants taking part in off-site activities. Based on these findings, it is recommended that off-site outdoor and nature-based activities are included in Enriched Opportunities Programme and collaborative working with local organisations is encouraged, as suggested by Evans et al. (2019) and Mapes et al. (2016).

Content removed on data protection grounds

Figure 6.9. Participants taking part in off-site activities: feeding the fish at Martineau Gardens (left), looking at the animals at Balsall Heath City Farm (middle), pond dipping at Martineau Gardens (right)

Whilst a framework for the delivery of outdoor and nature-based activities does not currently exist, the principles of CST can be used to guide the development of activities and interventions. The application of principles here addresses components of the activities which were associated with benefits to wellbeing and supported a person-centred approach. Furthermore, the

recommendations presented in table 6.13 may contribute to successful delivery of outdoor and nature-based activities.

Table 6.13. Additional recommendations for the design and delivery of outdoor and nature-based activities

Support	<ul style="list-style-type: none"> <li>If there is an opportunity to involve students training to be health care professionals or horticultural therapists, this might provide some valuable support for participants and the activities, but also offer learning opportunities and personal, and professional development for these students.</li> </ul>
Environment	<ul style="list-style-type: none"> <li>Explore what outdoor activities are already offered within the local area. See whether visits could be arranged or partnership working to offer activities in a variety of settings, that get people out of their homes or residence.</li> </ul>
Activities	<ul style="list-style-type: none"> <li>Be creative with the activities that enable people living with dementia to engage with nature, these can be so varied and go beyond gardening, walking and animal visits. Activities including outdoor games, nature-based quizzes, arts and crafts, and farm visits were popular and appeared to benefit people living with dementia.</li> <li>See how activities might focus on doing things for others, whether this is doing a perceived 'job' or making something to give to someone else. This might enable people living with dementia to feel purposeful and valued, as they are able to make a contribution.</li> </ul>
Adaptation	<ul style="list-style-type: none"> <li>Be willing to abandon your plans and follow the wishes of individuals or a group. Don't be offended if those taking part would rather sit outside with a cup of tea and chat, than do your well planned gardening activity. Be willing to compromise, be flexible and don't be precious about how things are done.</li> </ul>

## 6.5. Limitations and future research

This study has extended the research presented in Chapter 5 by offering a longer intervention, with more participants and a wider variety of outdoor and nature-based activities. Overall, the intervention was seen to benefit the emotional and physical wellbeing of the participants living with dementia and/or cognitive impairment who took part evidenced by both quantitative and qualitative data. This study was conducted at a single extra care retirement village in Birmingham that included the delivery of specific activities, including local off-site activities. As a result the findings may not be directly transferrable to other settings. Future research could explore the generalisability of the approach and the practicality of delivery in other extra care settings, and the support mechanisms that would need to be put in place.

Due to ethical considerations, and the IRAS approval timeframe, this study only included people living with mild dementia who had capacity to consent. The findings may not reflect the potential benefits for people living with moderate or severe dementia, or identify potential issues relating to the planning and delivery of the activities. Future work could expand the development and testing



of this outdoor and nature-based activity intervention to meet more advanced needs of people living with moderate and severe dementia. This may require further adaptations to the activities as well as increased staff support, which was not feasible in the current study.

This study had multiple elements so it is hard to determine which activities and components of the intervention had the most impact on the participants. It is difficult to determine whether the benefits were derived from the outdoor and nature-based activities specifically, as it may have been the social interaction which was a key finding of the intervention. In order to explore this further, a controlled trial comparing different types of activities could be conducted, although the heterogeneity amongst people living with dementia in relation to their interests, capabilities and symptoms may prove challenging. Participants were also able to choose which activities to attend and therefore some participants only attended a few activities over the duration of the intervention. Whilst this makes it difficult to determine whether the changes in quality of life and depression were due to the intervention, the qualitative findings from those participants who attended fewer activities supported the overall findings.

This study sought to gain rich feedback about how a variety of outdoor and nature-based activities impacted on participant's wellbeing rather than determine the most effective activities. The findings support the delivery of outdoor and nature-based activities as a way of providing meaningful and purposeful activities, which appear to benefit the wellbeing of people living with dementia and increase social connectedness which are key considerations for person-centred care.

This study did not explore in depth the impact of the outdoor and nature-based activity intervention on cognitive function, rather the GBS Scale was used to identify changes to symptoms of dementia and cognitive impairment. It would be of value to investigate how a similar intervention may affect different aspects of cognitive function, such as memory and language.

Whilst my own interpretations of the qualitative data could be considered a potential limitation of the findings, a thorough approach to conducting the thematic analysis was taken. The self-reported data for quality of life and depression, and the interview data with participants living with dementia and/or cognitive impairment is a potential source of bias. However, the use of multiple measures

pre-test and post-test, and throughout the activity programme, as well as the triangulation approach to the thematic analysis, sought to overcome some of this bias by exploring the impact of the activities from different perspectives. Whilst self-reported data can hold bias, it is also vital for exploring and understanding individual experiences and perspectives, and therefore was an essential and important component of this research.

## **6.6. Conclusion**

This study presents a comprehensive intervention of outdoor and nature-based activities that was delivered for 18 residents living with dementia and/or cognitive impairment in an extra care retirement village. The intervention was shown to offer a number of benefits to wellbeing and quality of life including, increased social interaction and connection to others, high levels of enjoyment and positive behaviours, a sense of purpose and value, and greater time spent outdoors. Overall, the increase in perceived quality of life and reduced depression suggest that outdoor and nature-based activities do have an important role within an extra care setting to contribute to people living with dementia and/or cognitive impairment living well. Furthermore, this intervention supported a person-centred care approach as activities reflected individual's interests in connecting to nature as well as enabling them to engage in meaningful and purposeful activities that promoted self-identity and self-esteem.

This study highlights that supporting people living with dementia and/or cognitive impairment to engage in off-site activities, by providing volunteers and transport, can contribute to wellbeing. Utilising local organisations and outdoor environments in which to provide a variety of outdoor and nature-based activities is recommended in order to introduce variety and address the barriers facing people living with dementia when spending time outdoors in their local community. Whilst this study demonstrates the benefits to people living with dementia and/or cognitive impairment at the extra care retirement village, there is potential for future activities to be opened to the wider community. This may result in greater opportunities for people living with dementia in the community to engage in outdoor and nature-based activities, and seek the benefits seen in this study.

## 6.7. Chapter Summary

This chapter has outlined research that has involved the development, implementation and evaluation of a 12-week outdoor and nature-based activity for people living with dementia and/or cognitive impairment at an extra care retirement village. The development of this study was informed by existing research and the findings from study 1 and 2 and benefited from a collaborative working approach with the ExtraCare Charitable Trust and a number of local organisations.

A statistically significant increase in self-reported quality of life and a statistically significant decrease in self-reported symptoms of depression were found following the intervention. This was supported by four themes identified through the thematic analysis: **being with others, enjoyment, having purpose and value** and **getting outside** which captured the emotional, psychological, social and physical benefits of the activities for participants. The benefits included: increased social interaction and connection to others through shared interests and group activities, high levels of enjoyment and positive behaviours, a sense of purpose through overcoming barriers and feeling useful by doing things for others, and opportunities to spend time outdoors. The variety of activities met different individual's interests and hobbies, and enabled people living with dementia and/or cognitive impairment opportunities to engage in purposeful and meaningful activities, which are components of person-centred care.

The theme **learning and development** reflected the benefits for student volunteers as a result of increased confidence working with people living with dementia and greater understanding about the benefits associated with outdoor and nature-based activities. Including volunteers and working collaboratively with local organisations, enabled people living with dementia and/or cognitive impairment to spend time outdoors away from Bournville Gardens, in the wider community.

The findings have provided support for the delivery of an effective outdoor and nature-based activity intervention within an extra care setting, that could be adapted for other extra care settings in future or opened up to people living with dementia in the wider community. This study has provided support for benefits that have been found in the existing literature are relevant for people living with dementia and cognitive impairment. This research has demonstrated that the benefits may be

transferrable to people living in extra care settings which has been under researched. Furthermore, this study combined a variety of activities rather than a single type of activities and suggests that a range of activities offers choice and can meet difference needs and interests, contributing to person-centred care.

The final chapter pulls together the research findings from the 3 studies. The potential implications for practice in green dementia care and future research is discussed. The following chapter discusses the overall findings and learnings from the research, relating them to the existing evidence-base for green dementia care and outlines potential implications for practice and directions for future research.

## **Chapter 7: Overall discussion, future work and conclusion**

### **7.1. Introduction**

This research sought to explore and develop person-centred green dementia care in order to provide people living with dementia opportunities to benefit from connecting to nature through engagement in a variety of outdoor and nature-based activities. Although the benefits have been reported in the existing literature, there is limited detail about how to develop and implement effective activities and interventions. More recently, Evans et al. (2019) has suggested ways to achieve effective green dementia care in care homes and extra care settings by considering staff training, the design of the environment and sourcing funding. However, this does not offer guidance about how to design specific activities or deliver community-based activities. There continues to be a lack of research supporting the benefits of outdoor and nature-based activities within a community and extra care setting, therefore this was the focus here.

The research sought to explore the benefits specifically for people living with dementia in the community and in an ExtraCare village in the UK. This has been achieved by developing and evaluating the effectiveness of a horticultural activity intervention within a community garden; and an outdoor and nature-based intervention delivered at an extra care retirement village. A pragmatic research approach has driven the use of mixed methods within an applied and practical setting. A holistic perspective has considered the physical, cognitive and emotional health and wellbeing benefits for people living with dementia.

The review of the literature (presented in Chapter 2) explored the existing evidence. Benefits included improved physical, psychological and social wellbeing (Blake and Mitchell 2016; Bossen 2010; Brooker 2001; Chalfont 2006; Clark et al. 2013; Duggan et al. 2008; Gonzalez and Kirkevold 2013; Mapes 2011b; Mapes et al. 2016; Whear et al., 2013). The benefits associated with three types of outdoor and nature-based activities: gardening and horticultural activities; walking - a form green exercise; and animal-related activities, for people living with dementia were discussed (Blake and Mitchell 2016; Mapes 2011a; Mapes 2011b; Whear et al. 2013; Yakimicki et al. 2019). The

literature highlighted the positive impact on behaviour and mood, increase in social interaction, greater feelings of self-esteem and self-identity and reduction in symptoms of dementia that engaging in such activities had led to (Blake and Mitchell 2016; Hewitt et al. 2013; Lui and Chu 2018; Smith-Carrier et al. 2019). Gaps in the current evidence emerged, in particular the lack of UK-based and community-based research and the extent to which the existing research is transferable to these contexts (Mapes et al. 2016). Furthermore, there has been a lack of consistent evaluation of the activities and interventions, and poor detail about how the activities and interventions were developed and implemented. This research therefore sought to address these gaps by developing and implementing outdoor and nature-based activities for people living with dementia within the UK, in a community garden and extra care settings. The interventions were evaluated and the benefits and effectiveness determined to inform recommendations for future practical delivery of green dementia care.

The interview findings in study 1 (Chapter 4) highlight the wide variety of outdoor and nature-based activities taking place with people living with dementia across different health and social care settings, and in the community, within the UK. Based on the experiences of the participants, gardening and horticultural activities were most commonly used within a hospital and residential care setting, and were delivered by horticultural therapists, occupational therapists and physiotherapists. The findings identified several benefits to quality of life and wellbeing for people living with dementia which included, increased positive behaviours and emotions, and increased social interaction. A set of recommendations to guide the planning and delivery of such activities was presented in Chapter 4, these were later added to in Chapter 5 and Chapter 6.

To address the lack of attention to the development and implementation of outdoor and nature-based activities within a community setting, a horticultural activity intervention delivered within a community garden was developed and tested (Chapter 5). The mixed methods evaluation suggested that people living with dementia in the community benefitted from engaging in gardening and horticultural activities in this setting. In addition, the study highlighted that a community-based

activity, in a welcoming and supportive environment, may also provide support to caregivers through respite from their caregiving role and responsibility.

The identified benefits included high levels of enjoyment as a result of engaging in the activities and being in a garden environment. This was reported by participants, caregivers, and staff and volunteers, as well as being observed in a range of positive behaviours and emotions. Activities that involved making things for others or contributing to the work in the gardens were associated with a sense of pride and satisfaction. Reminiscence was identified as a key outcome as a result of multi-sensory stimulation during activities, particularly related to scents, the familiarity of a garden environment, and facilitation of discussion about life histories and memories by staff and volunteers. This study demonstrated that giving consideration to how the activities were tailored and adapted for participants living with dementia led to high levels of active engagement and participation. In turn, this was associated with increased positive behaviours such as enjoyment and social interaction.

Overall the research suggested that horticultural activities delivered in a community garden can enhance the wellbeing of both people living with dementia in the community and their caregivers. This is providing that consideration is given to the interests and capabilities of those taking part, appropriate support is available, activities stimulate the senses, and have visual and tangible end goals, and group-based activities are offered. Building on these findings a larger more varied outdoor and nature-based activity intervention was developed, delivered and tested in an ExtraCare village.

The second activity intervention (Chapter 6), included gardening and horticultural activities, walking, outdoor games and animal-related activities. The research was focused on this environment as the literature highlighted that people living within extra care retirement villages have less opportunities for structured outdoor and nature-based activities and face specific barriers to connecting to nature and spending time outdoors in the local community (Clark et al. 2013; Evans et al. 2019; Mapes et al. 2016). The ExtraCare retirement village in which the intervention was developed and delivered is open to members of the wider community, offering potential for activities provided on-site to be

open to people living with dementia in the community. Again, the Model of Development Considerations for Green Dementia Care and principles of CST were used to underpin the activity intervention. This study was unique in offering a broad variety of outdoor and nature-based activities. This is lacking in existing research, and specifically within an extra care setting (as opposed to a care home or nursing home).

The results indicated a significant increase in self-reported quality of life and a significant decrease in self-reported depression following the intervention. These findings were further supported by qualitative data which highlighted a range of perceived benefits including, being with others and increased social interaction through group-based activities and shared interests. Also, high levels of enjoyment and fun due to the variety of activities and opportunity to be engaged in something different and try new things. Participants living with dementia and cognitive impairment reported an increased sense of purpose and value through engaging in activities in which they overcame perceived barriers and they were able to do things for others, through making something to give to other residents (e.g. flower arrangements and potted plants), and contributing through doing a job (e.g. watering the plants at Martineau Gardens).

The testing of the outdoor and nature-based activity intervention indicated benefits from spending time outdoors and getting 'off-site'. The inclusion of off-site activities for people living with dementia in an extra care setting was identified as an area worthy of future research (Clark et al. 2013; Evans et al. 2019). The findings suggest a wide range of benefits of including off-site activities, such as positive behaviours and emotions, high levels of enjoyment and reminiscence. In addition, participants valued being outdoors as they perceived benefits to their wellbeing and it enabled them to continue their hobbies, interests and activities. Utilising local organisations supported the delivery of activities, offering variety, opportunities to spend time outdoors, a change of scenery and it enabled people to engage in activities such as pond dipping and feeding farm animals, which they could not do on-site.

The contribution of this study lies in the clear development and implementation of the intervention that can be followed by others. The findings suggest benefits of delivering outdoor and nature-



based activities at an ExtraCare village, including off-site activities with local organisation and within a number of outdoor environments. The approach has the potential to include people living with dementia in the wider community, so that ExtraCare residents benefit from greater community involvement. The reported benefits extend existing evidence by demonstrating similar benefits to those reported in the literature in care home settings (Blake and Mitchell 2016; Gonzalez and Kirkevold 2013; Whear et al. 2013) for people living with dementia and/or cognitive impairment at an Extra Care village. A summary of the benefits of outdoor and nature-based activities found in each study, and the contributing factors relating to the activities and delivery, are presented in table 7.1.

Table 7.1. Summary of the benefits associated with outdoor and nature-based activities found in each study

Study	Benefits	Contributing factors
Expert views and experiences	Positive impacts on behaviour and emotion	<ul style="list-style-type: none"> <li>- Multi-sensory stimulation from plants and nature</li> <li>- Activities relating to people's interests and hobbies</li> </ul>
	Opportunities for social interaction	<ul style="list-style-type: none"> <li>- Facilitation and prompting of discussion that relates to the activities</li> <li>- Sensory stimulation and familiarity of activities prompting reminiscence</li> <li>- Group-based delivery and working with others</li> </ul>
Gardening and horticultural activities	Enjoyment, and positive behaviour and emotion	<ul style="list-style-type: none"> <li>- Being in a familiar environment – a garden</li> <li>- Opportunity to engage in structured gardening and horticultural activities</li> <li>- Multi-sensory stimulation from plants and nature</li> <li>- Working with others and social interaction</li> </ul>
	A sense of pride and satisfaction	<ul style="list-style-type: none"> <li>- A tangible and visible end goal, can see what has been achieved at the end of the activity</li> <li>- Making something that could be given as a gift to their caregivers</li> <li>- Doing a 'job' within the gardens such as raking leaves</li> </ul>
	Reminiscence	<ul style="list-style-type: none"> <li>- Sensory stimulation during activities and from within the garden environment itself</li> <li>- Familiarity of a garden environment</li> <li>- Facilitation and prompting of discussions and sharing memories</li> <li>- Use of props to aid reminiscence and discussion relating to a theme</li> </ul>
	Active engagement during activities	<ul style="list-style-type: none"> <li>- 1:1 support available to maintain focus</li> <li>- 1:1 support allowed for individualised adaptations during activities</li> <li>- Focus on doing the activity and enjoyment, not just on the end goal</li> <li>- Group activities and group working</li> <li>- Written instructions enabled people to be more independent</li> </ul>
	Support for caregivers	<ul style="list-style-type: none"> <li>- Community-based activity offered respite from caregiving role/responsibilities</li> <li>- Welcoming and supporting environment made people feel more comfortable</li> </ul>
Outdoor and nature-based activities	Being with other people and increased social interaction	<ul style="list-style-type: none"> <li>- Group-based activities encouraged group working and gave people company</li> <li>- Activities gave people something to talk about</li> <li>- Shared interests through choosing which activities to attend</li> <li>- Peer support during activities</li> </ul>
	Enjoyable and fun experience	<ul style="list-style-type: none"> <li>- New activities that people had not done before</li> <li>- Off-site activities caused excitement and interest</li> <li>- Something different from usual routine</li> <li>- Variety of different activities to meet different interests</li> </ul>
	A sense of purpose by overcoming barriers and doing things for others	<ul style="list-style-type: none"> <li>- Adapted activities – use of equipment, step-by-step instructions, support from volunteers</li> <li>- Encouragement to try things in a non-judgemental environment</li> <li>- Opportunities to try new things</li> <li>- Activities with an outward focus that involved making things for other people or doing a job</li> </ul>
	Spending time outdoors	<ul style="list-style-type: none"> <li>- Outdoor activities providing purpose and structure to being outdoors</li> <li>- Getting off-site into wider community and variety of outdoor environments</li> <li>- Perceived benefits associated with being outdoors in the fresh air</li> <li>- Continuation of interests, hobbies and activities relating to being out outdoors and connecting to nature</li> </ul>

## **7.2. Effective outdoor and nature-based activities**

The findings of this research sought to address a lack of UK research about the benefits of outdoor and nature-based activities for people living with dementia in the community and in extra care settings. In addition, the effectiveness of two activity interventions was evaluated, in order to provide practical recommendations about designing and delivering such activities. The research highlights three key features of outdoor and nature-based activities that were associated with the benefits to wellbeing found for people living with dementia and cognitive impairment, which include multi-sensory stimulation, meaningful activities and being outdoors.

### **7.2.1. Multi-sensory stimulation**

This research recommends that effective outdoor and nature-based activities are designed to provide multi-sensory stimulation and engage the senses. Multi-sensory stimulation was a consistent theme within the research as a result of engagement with plants and nature, especially through smell, touch and sight, which led to reminiscence, increased social interaction and a wide range of positive behaviours and emotions. This supports the existing evidence relating to the benefits of multi-sensory stimulation through gardening and horticultural activities (Hall et al. 2016; Rappe and Topo 2007; Smith-Carrier et al. 2019; Watts and Hsieh 2015) and walking (Mapes et al. 2016). Successful activities included the use of strongly scented herbs, such as making lavender bags and planting rosemary cuttings, and brightly coloured and familiar scented flowers, that were used for flower arrangements and pots. The findings also highlighted that a community garden can provide a multi-sensory experience for people living with dementia through engaging with different areas of the gardens and walking through the environment, corroborating the previous research (Cox et al. 2004; Gonzalez and Kirkevold 2013; Hernandez 2007) and providing support for delivering activities within this environment to encourage reminiscence and positive behaviours and emotions.

### **7.2.2. Meaningful activity**

A broad variety of outdoor and nature-based activities were shown to offer people living with dementia opportunities to engage in meaningful activity that aligned with their interests and hobbies, promoted a sense of purpose and value, and enabled them to connect to others. Meaningful activity has been associated with improved wellbeing and quality of life for people living with dementia (Bradshaw, Playford and Riazi 2012; Marshall and Hutchinson 2001; Menne et al. 2002; Perrin and May 2000; Perrin, May and Milwain 2008; Rahman 2017) and recognised in the provision of person-centred care (Brooker 2003; Brooker 2006). However, specific guidance on how to develop and implement meaningful activities is limited.

The findings highlight the role of outdoor and nature-based activities in providing opportunities for meaningful activity, as well as providing practical guidance on how to ensure that activities are delivered in a meaningful way. This research recommends asking people living with dementia and cognitive impairment about their interests and hobbies, so that activities can be tailored. For example, organising flower arranging for people who enjoy flowers and plants, or inviting a guest speaker to talk about the history of the canal network for people with an interest in local history. It is also important to assess both cognitive and physical abilities in order to make appropriate adaptations and provide sufficient support during activities so that people are able to actively engage and participate in the activities. Whilst the importance of tailoring and activities has been highlighted within the existing literature, specific details on how activities were selected and adapted is limited (Blake and Mitchell 2016; Hewitt et al. 2013; Noone and Jenkins 2018; Smith-Carrier et al. 2019).

Outdoor and nature-based activities can offer an increased sense of purpose for people living with dementia and cognitive impairment, particularly when the activities involve doing something for others (D'Andrea, Batavia and Sasson 2007). Activities which included making things to give to others, such as flower arrangements, cards and pressed flower bookmarks, gave people living with dementia a sense of purpose and value which is often lost as the disease progresses (Alzheimer's Society n.d.) which in turn can contribute to depression (Kane and Cook 2013; Rahman 2017). As

well as making things for others, this research suggests that an increased sense of purpose can be gained from engaging in activities which are perceived as doing a job or contributing to work, for example through raking leaves and watering plants. This supports the existing research that has shown that engagement in gardening activities and activities at a green care farm can lead to a greater sense of purpose and subsequently improve self-esteem for people living with dementia (de Bruin et al. 2015; Hewitt et al. 2013; Smith-Carrier et al. 2019). Here it is recommended that the inclusion of activities enable people living with dementia and cognitive impairment to make things for others, and contribute to perceived work within the environment to increase a sense of purpose and improve self-esteem.

Connecting to others and engaging in social interaction was not only perceived as beneficial, but was reported by people living with dementia and cognitive impairment as an aspect of taking part in outdoor and nature-based activities which was enjoyable. Social connections and interactions are a key component of person-centred care that can have a positive impact on wellbeing and quality of life (Brooker 2003; Brooker 2006; Kitwood 1997). The activities stimulated social interaction through reminiscence and providing prompts for conversation as highlighted above, which is also reflected in the literature (Mapes et al. 2016; Smith-Carrier et al. 2019; Rappe and Topo 2007). Moreover, many activities could be delivered in a group and therefore encouraging social interaction and shared working (Hall et al. 2016; Hewitt et al. 2013; Noone and Jenkins 2018; Smith-Carrier et al. 2019). Interestingly, opportunities to work in a group and to be with other people was more evident amongst the participants living with dementia and cognitive impairment at the ExtraCare retirement village. This may be related to high levels of loneliness and isolation reported amongst people living with dementia, especially within an institutional setting (Kane and Cook 2013). Therefore, this research recommends including group-based activities within green dementia care, especially in an extra care setting.

### **7.2.3. Being outdoors**

Outdoor activities, especially those conducted in the community, were shown to benefit people living with dementia and cognitive impairment as a result of the perceived benefits of spending time

outdoors, increased positive behaviour, emotions and levels of engagement, reminiscence triggered by multi-sensory stimulation and familiar outdoor environments, and enabling people to connect to nature within the wider community. This further supports the existing research (Clark et al. 2013; Gonzalez and Kirkevold 2013; Mapes 2011a; Mapes 2011b; Mapes et al. 2016; Whear et al. 2014) and addresses a gap in the literature by highlighting the benefits of engaging in off-site outdoor activities that were reported by people living with dementia in ExtraCare villages (Barrett, Evans and Mapes 2019).

The value of spending time outdoors has been previously demonstrated (Bossen 2010; Brooker 2001; Duggan et al. 2008; Mapes 2011b; Mapes et al. 2016). This research highlights the broad range of activities that can take place outdoors which include, walking, outdoor games, gardening, visiting urban farms and pond dipping. Structured outdoor activities may have helped people overcome the barriers to connecting to nature and spending time outdoors which have been identified (Clark et al. 2013). Table 7.2 outlines criteria for effective outdoor and nature-based activities for people living with dementia.

Table 7.2. Criteria for effective outdoor and nature-based activities

<p><b>Effective outdoor and nature-based activities should:</b></p> <ul style="list-style-type: none"><li>• Offer multi-sensory stimulation to trigger memory and reminiscence which can lead to increased social interaction and positive behaviours.</li><li>• Offer opportunity for meaningful activity which relies on tailoring activities to meet interests and hobbies and capabilities and making appropriate adaptations to meet capabilities and provide the necessary support.</li><li>• Provide those taking part with a sense of purpose through doing things to give to others or contributing to perceived work/jobs in the environment.</li><li>• Encourage connection to others and increase social interaction by prompting conversation and enabling group working.</li><li>• Include engagement with outdoor environments to enable people living with dementia to spend time outdoors.</li><li>• Include activities delivered off-site for people living with dementia in an extra care setting.</li></ul>
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### **7.3. Delivering effective green dementia care**

The research was driven by a lack of information and detail within the existing literature, and a lack of practical guidelines for the development and implementation of outdoor and nature-based activities as part of effective green dementia care delivery in the UK. Since this research started, awareness of green dementia care has grown (Barrett, Evans and Mapes 2019; Evans et al. 2019), further highlighting the need for more research to explore how effective green dementia care can be delivered in practice. Whilst Evans et al. (2019) have recently published recommendations on how to deliver effective green dementia care, they focus on high-level considerations such as management support, environmental design and funding. In contrast, this research has sought to evaluate the effectiveness of two activity interventions which were developed and tested, in order to inform practical recommendations to guide the design and development of outdoor and nature-based activities which is otherwise lacking.

The literature review highlighted that lack of evidence and theory driven interventions. The development of a 6-week horticultural activity delivered at a community gardens for people living with dementia in the community, and a 12-week outdoor and nature-based activity intervention for people living with dementia and cognitive impairment in an ExtraCare retirement village have been guided by expert views and experiences alongside the literature and theoretical models. The development has drawn on person-centred approaches and the principles of CST to offer an evidence-based, and theoretically driven and evaluated approach.

#### **7.3.1. Practice framework**

The recommendations developed throughout this research (in chapters 4, 5 and 6) are presented within a practice framework, that has been created to aid the planning and delivery of outdoor and nature-based activities for people living with dementia. Practice frameworks have been widely developed to enhance adult (and child) social care (Connolly 2007; Stanley 2016; 2017), to reinforce ideas of current practice, co-produced knowledge and research (Stanley 2016; 2017). Connolly and Healy (2009, pp.32) state that a practice framework combines empirical research, practice theories, ethical principles and experiential knowledge in a format that enables

practitioners to utilise these principles and knowledge in their work. The practice framework presented here seeks to enable practitioners to utilise an evidence-based approach to planning and delivering activities for people living with dementia.

There are five components to the practice framework: the core considerations of delivering person-centred outdoor and nature-based activities, a table of practical recommendations, a summary of useful principles of CST, practice tools (checklists and an activity planning template), and guidance on engaging in reflection (additional practice tools: checklist and reflection template). Each of these components is presented in table 7.3 and explained in more detail below.



Table 7.3. Outline of the components of the practice framework

<b>Component of framework</b>	<b>Aim of component</b>	<b>Informed by...</b>
Core considerations (Figure 7.1, 7.2)	To guide the initial planning and development of person-centred outdoor and nature-based activities for people living with dementia.	<ul style="list-style-type: none"> <li>- Themes relating to the delivery of activities for people living with dementia identified through the literature review.</li> <li>- Themes relating to recommendations made by participants delivering and supporting activities, interviewed in study 1.</li> </ul>
Recommendations (figure 7.3)	To provide evidence-based recommendations to assist with the planning, development and design of effective person-centred outdoor and nature-based activities for people living with dementia.	<ul style="list-style-type: none"> <li>- Findings from the existing literature.</li> <li>- Recommendations made by participants delivering and supporting activities, interviewed in study 1.</li> <li>- Findings and learnings from both intervention studies.</li> </ul>
Principles (Table 7.5)	In the absence of established principles of green dementia care, to support the planning, development and design of effective person-centred outdoor and nature-based activities for people living with dementia by utilising principles of existing and beneficial CST.	<ul style="list-style-type: none"> <li>- Findings from the existing literature on the effectiveness of CST.</li> <li>- Findings and learnings from both intervention studies.</li> </ul>
Checklists	To provide evidence-based practice tools that can be used by practitioners to plan and deliver effective person-centred outdoor and nature-based activities for people living with dementia.	<ul style="list-style-type: none"> <li>- Findings from the existing literature.</li> <li>- Recommendations made by participants delivering and supporting activities, interviewed in study 1.</li> <li>- Findings and learnings from both intervention studies.</li> </ul>
Activity Planner	To guide practitioners to apply the considerations and recommendations in planning outdoor and nature-based activities for people living with dementia across different settings.	<ul style="list-style-type: none"> <li>- Findings from the existing literature.</li> <li>- Recommendations made by participants delivering and supporting activities, interviewed in study 1.</li> <li>- Findings and learnings from both intervention studies.</li> </ul>
Reflection Guide	To enable practitioners to engage in reflective practice to evaluate the effectiveness of outdoor and nature-based activities for people living with dementia that they deliver and support.	<ul style="list-style-type: none"> <li>- Wide use of reflective practice in health and social care.</li> <li>- Utilising Gibbs' (1999) reflective cycle.</li> <li>- Findings and learnings from both intervention studies.</li> </ul>

The core considerations (figure 7.1) were established following key themes relating to the delivery of activities for people living with dementia identified through the literature review, as well as the findings from the interviews conducted in study 1 (Chapter 4). They provided focus for the recommendations presented in each study chapter (Chapters 4, 5 and 6), and informed the design and delivery of both interventions. As part of the practice framework, they are presented in figures 7.1 and 7.2, and relate to the full list of recommendations collated from each study and presented in tables 7.4 and 7.5.

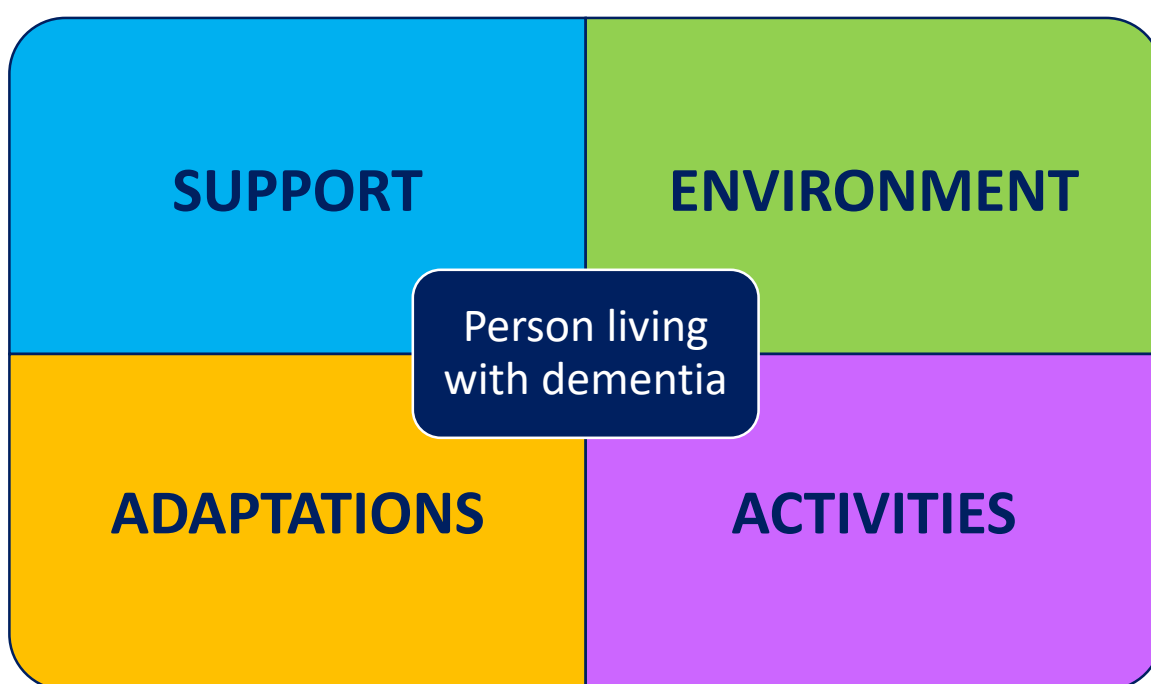


Figure 7.1. Core considerations for planning and delivering person-centred outdoor and nature-based activities for people living with dementia.

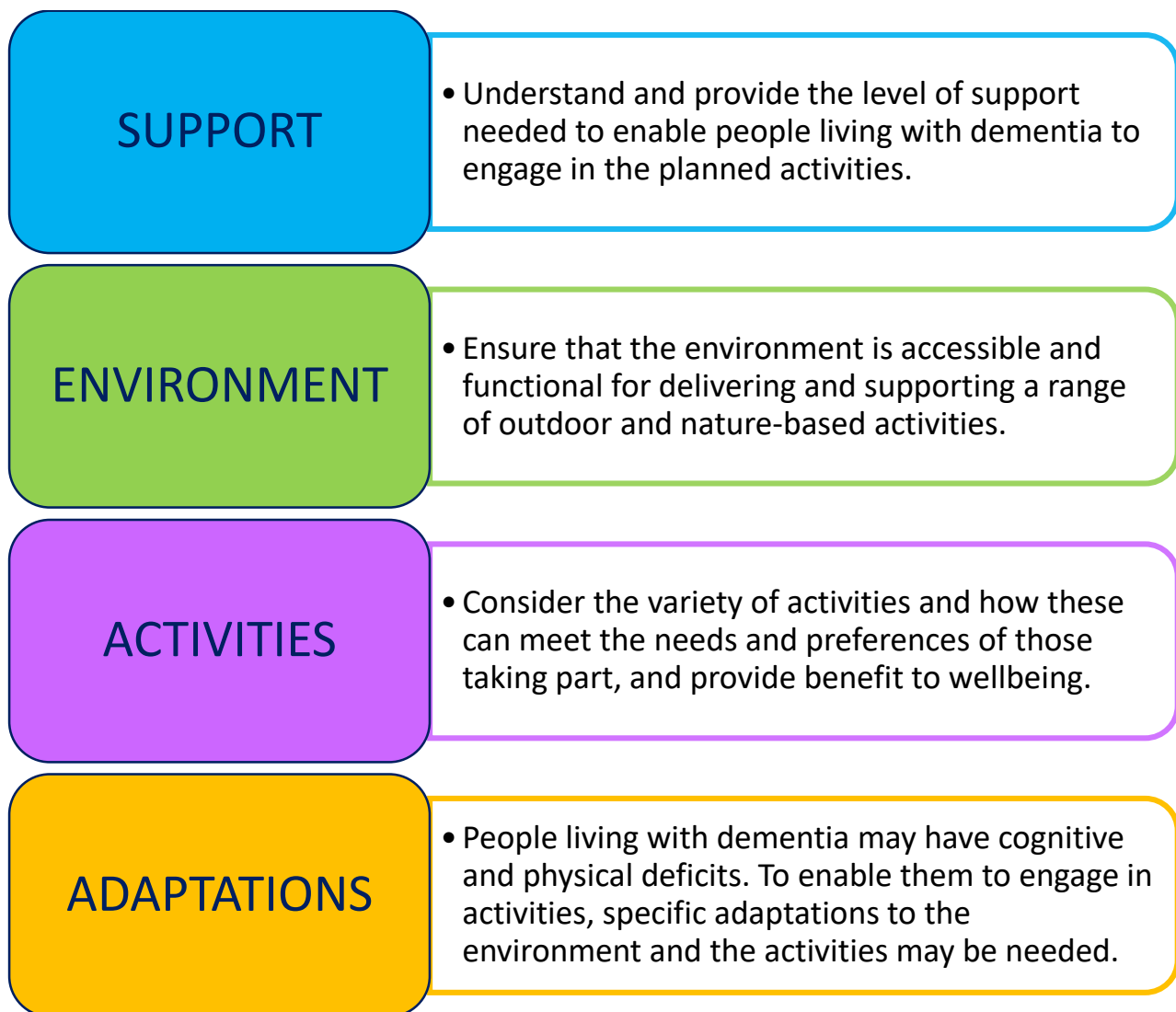


Figure 7.2. Summary of the core components of planning and delivering outdoor and nature-based activities for people living with dementia

### 7.3.1.1. Recommendations for planning and delivering person-centred outdoor and nature-based activities

The recommendations in table 7.4 consolidate the recommendations informed by the findings of each study. They aim to guide practitioners with the planning and delivery of outdoor and nature-based activities, and focus on the four core considerations to ensure activities are person-centred.

Table 7.4. Recommendations for planning and delivering person-centred outdoor and nature-based activities for people living with dementia – Support and Environment Considerations.

Support	<ul style="list-style-type: none"> <li>• Adequate support is needed during activities to enable people living with dementia to take part. Assess the needs and abilities of individuals to establish the level of support needed. Make use of staff and volunteers.</li> <li>• Find out the level of experience and confidence that staff and volunteers have, and whether additional training in either dementia care or specific to outdoor and nature-based activities might be useful.</li> <li>• Encourage a positive-risk taking approach to outdoor and nature-based activities, particularly when going outdoors with people living with dementia. In addition to assessing risk, try and assess the potential benefits of spending time outdoors for individuals. Explore how risks can be managed to enable people to spend time outdoors and engage in activities.</li> <li>• Try and not rely on support from caregivers to encourage independence of those living with dementia and offer respite to caregivers, especially partners and family members.</li> <li>• Draw on experts and those with experience, such as horticultural therapists, about how best to deliver and support specific gardening and horticultural activities.</li> <li>• If there is an opportunity to involve students training to be health care professionals or horticultural therapists, this might provide some valuable support for participants and the activities, but also offer learning opportunities and personal, and professional development for these students.</li> </ul>
Environment	<ul style="list-style-type: none"> <li>• Explore whether there is a suitable environment which is accessible for people living with dementia to spend time outdoors.</li> <li>• Consider the ease of access: can someone go outside independently? how close is it? are walkways clear and level? is there seating available? where are the nearest toilets? how can someone be made comfortable?</li> <li>• Where possible, try and support people living with dementia to spend time in an outdoor environment such as a garden or park.</li> <li>• Ensure that the environment is functional and encourages people to engage with the outdoor space and have the opportunity to take part in a variety of activities.</li> <li>• Think about how the environment could support activities of daily living such as hanging out washing, feeding the birds or gardening.</li> <li>• Try and enable people to interact with safe, non-toxic plants – raised beds can make them more accessible and use plants with strong familiar scents.</li> <li>• Access to a community garden can provide a good location for offering gardening and horticultural activities and enabling people living with dementia to spend time outdoors amongst nature (providing it meets accessibility and functionality requirements).</li> <li>• Whilst being outdoors is beneficial, a warm and dry indoor space enables activities in adverse weather. It can also help when offering table-top activities, which is useful for people with physical limitations and mobility issues.</li> <li>• Explore what outdoor activities are already offered within the local area. See whether visits could be arranged or partnership working to offer activities in a variety of settings, that get people out of their homes or residence.</li> <li>• Make sure people can travel to the activities, look at accessibility on public transport and availability of parking.</li> </ul>

Table 7.5. Recommendations for planning and delivering person-centred outdoor and nature-based activities for people living with dementia – Activities and Adaptations Considerations.

<p>Activities</p>	<ul style="list-style-type: none"> <li>• Try and prompt reminiscence and sharing of childhood memories through engaging people in discussions and using objects, music and videos to trigger memory.</li> <li>• Linking with tailoring activities to hobbies and interests, explore how you can utilise participants experience, expertise, knowledge and skills to encourage self-identity and self-esteem. Establish someone's cognitive deficit in relation to memory and draw on memories they have.</li> <li>• Do not be deterred by poor weather, make sure you have umbrellas and waterproofs, and warm clothing, to encourage people to go outdoors at all times of the year. Weather can offer sensory stimulation and gives people something to talk about. This might link to positive risk-taking.</li> <li>• Activity sessions up to 2 hours allowed for people to take part in several activities without rushing, but was recommended as the maximum time for a session.</li> <li>• In the absence of guiding principles or policies for delivering outdoor and nature-based activities for people living with dementia, the principles of Cognitive Stimulation Therapy (CST) proved useful. In particular, focusing on mental stimulation and providing triggers to aid recall, fostering an inclusive environment where everyone was actively involved in activities and making sessions fun were some of the key principles that translated to outdoor and nature-based activities.</li> <li>• Be creative with the activities that enable people living with dementia to engage with nature, these can be so varied and go beyond gardening, walking and animal visits. Activities including outdoor games, nature-based quizzes, arts and crafts, and farm visits were popular and appeared to benefit people living with dementia.</li> <li>• See how activities might focus on doing things for others, whether this is doing a perceived 'job' or making something to give to someone else. This might enable people living with dementia to feel purposeful and valued, as they are able to make a contribution.</li> </ul>
<p>Adaptation</p>	<ul style="list-style-type: none"> <li>• Consider the resources, equipment and tools you will need. You might need to decide where specialised equipment that has been adapted for physical impairments are required, or whether more traditional and familiar equipment would enable someone to use it effectively. This will rely on you knowing who you are working with.</li> <li>• Using step-by-step instructions with pictures, and visual demonstrations can help people to do the activity at a manageable pace and does not rely on memory. It can also help some people to be more independent if they are able to follow the instructions.</li> <li>• Be prepared to adapt activities as you go, work with those supporting you, to recognise the changing needs of those taking part.</li> <li>• Be mindful to only adapt activities if someone is not able to do things, or to enable them to do things, don't assume people living with dementia won't be able to do things – especially physically.</li> <li>• Symptoms of dementia fluctuate, and you do need to be able to react to this by having a flexible approach to delivering activities. It is always good to have a back-up plan, and someone to quickly offer support 1:1 if needed.</li> <li>• The process of reflection provided a really useful tool for evaluating how the activities had gone and making suggestions for future adaptations throughout the intervention. It enabled those supporting and delivering the activities to explore what could be done differently in future or what was successful to enhance the experience of people living with dementia.</li> <li>• Be willing to abandon your plans and follow the wishes of individuals or a group. Don't be offended if those taking part would rather sit outside with a cup of tea and chat, than do your well planned gardening activity. Be willing to compromise, be flexible and don't be precious about how things are done.</li> </ul>

A number of the principles of CST were also used to guide the development of the activities. Those that were seen as most useful and applicable to outdoor and nature-based activities are recommended and summarised in table 7.6 for practitioners to adopt.

Table 7.6. The principles of CST that can be useful to apply when developing and implementing outdoor and nature-based activities for people living with dementia

<b>Principles of cognitive stimulation therapy</b>	<b>Application to outdoor and nature-based activities</b>
Mental stimulation	Stimulation from outdoor environments as well as through different activities that include multi-sensory stimulation, conversations and interactions with others, use different skills and knowledge
Using reminiscence as an aid to the here-and-now	Encouraging reminiscence through asking questions about life histories and previous interests and hobbies, draw on familiar environments e.g. gardens and particular activities and plants that might stimulate reminiscence
Providing triggers to aid recall	Use of props linking to activities, involve multi-sensory stimulation e.g. tasting herbs, when delivering activities have instructions to remind people what they are doing – include photographs
Continuity and consistency between sessions	Use the life cycle of plants to continue activities e.g. sowing seeds, watering, harvesting produce, include weekly themes to link activities together, return to outdoor environments
Person-centeredness	Finding out individual interests, assessing cognitive and physical needs, provide social opportunities
Respect	Deliver activities in a respectful and ethical way, respect participants, be empathetic and patient
Involvement	Involve people in decision making and choice making, active involvement in the activities, gain feedback from those taking part to reflect on and aid learning and development
Inclusion	Include people living with dementia both actively and passively, facilitate group so everyone is included, think about the environment and atmosphere, welcoming everyone
Choice	Offer choices during activities, use a variety of activities to meet varying needs and interests
Fun	Make activities fun and exciting, combination of new and familiar activities, focus on enjoyment, stimulate discussions and conversation
Maximising potential	Support people to be as independent as possible, tailor activities to interests and adapt activities for capabilities, encourage people to have a go and try new things, help overcome barriers
Building/strengthening relationships	Supporting social interactions, use group-based activities, encourage discussion and working together

### **7.3.1.2. Checklists for practitioners**

To enhance the application and usability of this practice framework, a number of practice tools are presented below to support practitioners. The checklists (figures 7.3 and 7.4) and activity planner (table 7.7) are evidence-based and informed by the intervention studies that took place in a real-world context.

# Checklist for Planning

- Understand who you are working with and what their individual and/or group needs are.
- Establish what support you need from staff/volunteers/caregivers and ensure you have enough.
- If any specific training or knowledge might benefit staff/volunteers/caregivers, try and organise this.
- Take a positive approach to risk-taking and consider the benefits as well as potential risks.

**SUPPORT**

- Where appropriate, plan for people to be outdoors as much as possible.
- Find a suitable environment with outdoor space that is both accessible and functional.
- If you can use different places, try and select a range of different and varied outdoor environments.
- Look what environments and outdoor settings are in the local area, see if a visit is possible.
- It is useful to have shelter and indoor space in case of poor weather.
- Make the environment welcoming for when people first arrive or join the activity.
- Make sure people will be comfortable – toilets, refreshments, seating.

**ENVIRONMENT**

- Consider how all of the senses can be incorporated into activities, utilise stimulation from nature.
- Consider using plants with strong familiar scents such as lavender and rose.
- Include a variety of activities: gardening, horticulture, walking, animal-related activities.
- Tailor activities to meet interests and hobbies of those taking part, ask them what they want to do.
- Use objects/music/discussions relating to the activities to trigger and prompt reminiscence.
- A theme for each activity session can help with continuity and focusing discussions.
- Sometimes it is helpful to have a purpose or end-goal for the activities, consider what this would be.
- Group-based activities can encourage social interaction and shared working.
- Consider focusing activities around doing something for others e.g. a perceived 'job' or making a gift.

**ACTIVITIES**

- Consider both the familiarity of tools and equipment as well as ease of use and adapted tools.
- Step-by-step instructions and visual demonstrations might benefit different people.
- Encourage staff/volunteers/caregivers to only provide support where needed.
- Make ongoing adaptations to enable people to fully participate but also make their own decisions.
- Be flexible and reactive to changing needs and symptoms of those taking part.

**ADAPTATIONS**

Figure 7.3. Checklist for planning outdoor and nature-based activities for people living with dementia.



# Checklist for Delivering

- Assess the level of need during different activities and adjust the level of support accordingly.
- Encourage independence wherever possible, support should not be 'doing for'.
- Continue to assess risk throughout the activities and mitigate risk and harm.

**SUPPORT**

- Use different parts of the environment for different activities.
- Encourage people to interact with outdoor environments by touching plants and listening to birds.
- Don't be put off by poor weather, have layers and waterproofs for people to use during activities.
- Use the environment to stimulate discussions amongst those taking part.

**ENVIRONMENT**

- Recognise who might benefit from engaging particular senses and draw on these during activities.
- Be flexible and allow people to continue with activities they enjoy or wanting to do something else.
- Draw on people's hobbies, interests, knowledge and skills throughout activities.
- The purpose of the activities will be different for individuals e.g. just taking part or completing it.
- Actively encourage social interaction and shared working for people who it could benefit.
- Encourage people to share their memories by asking questions and drawing on past experiences.
- Use the objects/music/discussions to relate to the activities and prompt group discussions.

**ACTIVITIES**

- Be reactive to changing needs and symptoms and recognise when people need more support.
- Adapt activities as you go, someone might need support with something specific.
- Be prepared to change the activity or allow someone to do something different to what was planned.
- Provide practical demonstrates, walk/talk through steps together and go at the pace of the group.

**ADAPTATIONS**

Figure 7.4. Checklist for delivering outdoor and nature-based activities for people living with dementia.

### **7.3.1.3. Activity planning and reflection templates**

Careful planning is an important part of delivering effective activities, as highlighted in the recommendations and checklists. The activity planning template shown in table 7.7 was developed for practitioners to use in practice.

Table 7.7. Activity planning template.

<b>Activity Planning Sheet</b>	
What is the activity?	
Who is taking part?	
Who is involved in delivering and supporting? What are their specific roles?	
Is any specific training/knowledge required?	
Risk assessment completed (using a positive risk-benefit approach) <input type="checkbox"/>	
Where is the activity taking place?	
The environment is accessible and functional for the group and the activity <input type="checkbox"/>	

Activity outline	Resources & equipment	Sensory stimulation		Intended purpose/outcome
		Sound		
		Vision		
		Smell		
		Taste		
		Touch		
<b>What adaptations might be needed?</b>				

As well as careful consideration to planning and delivering activities. One of the key learnings and recommendations from this research is the value of engaging in reflective practice to deliver effective person-centred outdoor and nature-based activities (McCormack and McCance 2010; McCormack et al. 2015). To support practitioners to engage in reflective practice a checklist for reflection has been developed (Figure 7.5) and the adapted Gibbs (1988) reflective cycle that was applied in this research (Table 7.8).

# Checklist for Reflecting

<ul style="list-style-type: none"><li><input type="checkbox"/> Reflect on how well individual's needs were met, was there anything more that could be done?</li><li><input type="checkbox"/> Review whether the level of support was appropriate and beneficial, rather than overpowering.</li><li><input type="checkbox"/> Ask staff/volunteers their experience and perspective of how the activities went.</li><li><input type="checkbox"/> Review whether any training was effective or if training would be beneficial in future.</li><li><input type="checkbox"/> Reflect whether the risk assessment was appropriate and didn't restrict those taking part.</li></ul>	<b>SUPPORT</b>
<ul style="list-style-type: none"><li><input type="checkbox"/> Think about how effective the environment was for the group you were working with.</li><li><input type="checkbox"/> Reflect if there was anything that would have made the environment better and more effective.</li><li><input type="checkbox"/> Review how the environment enabled people living with dementia to connect with nature.</li><li><input type="checkbox"/> Ask those taking part how they found the environment, and what they did/didn't enjoy.</li><li><input type="checkbox"/> Reflect on how easy it was to access the environment, including travelling to/from.</li></ul>	<b>ENVIRONMENT</b>
<ul style="list-style-type: none"><li><input type="checkbox"/> Reflect on whether the level of sensory stimulation benefitted all those taking part.</li><li><input type="checkbox"/> Think about which activities worked well and which didn't, and why that might be.</li><li><input type="checkbox"/> Ask those who took part about their experience and what they did/didn't enjoy.</li><li><input type="checkbox"/> Reflect on how well the activities met the interests and hobbies of the group.</li><li><input type="checkbox"/> Decide if there are any changes that would make the delivery of the activities smoother.</li><li><input type="checkbox"/> Share your reflections with staff, volunteers, caregivers and those living with dementia.</li><li><input type="checkbox"/> Review the use of objects/music/discussions during activities, was it beneficial?</li><li><input type="checkbox"/> Reflect on how people responded to activities that involved doing things for others.</li></ul>	<b>ACTIVITIES</b>
<ul style="list-style-type: none"><li><input type="checkbox"/> Ask yourself whether you were able to react to individual's needs and symptoms well.</li><li><input type="checkbox"/> Reflect on whether it was possible/easy to adapt activities during the delivery.</li><li><input type="checkbox"/> Review how suitable the tools and equipment was for those taking part, was anything missing?</li><li><input type="checkbox"/> Decide how useful instructions and demonstrations were, and whether these could be improved.</li><li><input type="checkbox"/> Reflect on how activities might be adapted in future to make them more successful/beneficial.</li></ul>	<b>ADAPTATIONS</b>

Figure 7.5. Checklist for reflecting on planning and delivering outdoor and nature-based activities for people living with dementia.

Table 7.8. Adapted Gibbs (1988) reflective cycle template

<b>Activity reflective diary</b>
<b>Date:</b> <b>Activity (and setting):</b> <b>Who was involved:</b>
<b>What was the intended activity and purpose/outcomes?</b> <i>What did you plan to do? What was the intended purpose and/or outcome of the activity?</i>
<b>What actually happened during the activity?</b> <i>Did the activity happen as planned? Were there any changes to what activity/activities were done?</i>
<b>What went well?</b>
<b>What went less well?</b>

**Was the support in place appropriate for those taking part?**

**Were you able to adapt activities to suit individual's needs, capabilities and wishes?**

**Were the tools, equipment and resources suitable and sufficient?**

**What were the experiences/views/thoughts of those taking part?**

**What did you learn?**

**Plans/Actions for next time**

This practice framework and practice tools have been developed to support those looking to develop similar outdoor and nature-based activities for people living with dementia. This includes:

- Core considerations
- Recommendations
- Guiding principles
- Checklists
- Activity planner
- Reflection guide

Through future work, this framework should be developed, and tested with practitioners, and people living with dementia, and iterated. Within the scope of the research presented in this thesis, the framework and tools have been informed by expert views, experiences and opinions. To enhance the delivery of outdoor and nature-based activities for people living with dementia it would be beneficial to test this framework and tools across a range of dementia care settings to determine if it supports and guides the design, planning and delivery of successful activities. The ease of use and application should be assessed, as well as the effectiveness and potential barriers and challenges to application. This may contribute to the development of an evidence-based framework that is central to policy promoting green dementia care as a key method of person-centred dementia care in the UK.

## **7.4. Strengths and limitations of the research**

### **7.4.1. Strengths**

A strength of this research is the successful development and implementation of two activity interventions within a community setting and extra care setting. Through evaluation these were found to benefit the wellbeing of people living with dementia and cognitive impairment. This research contributes practical considerations for delivering outdoor and nature-based activities in practice, based on the experiences and perspectives of individuals delivering activities with a broad scope of practice and settings in the UK, which is currently lacking in the literature.



This research used a mixed methods approach to explore the benefits associated with outdoor and nature-based activities from different perspectives as well as acknowledging both objective and subjective components of wellbeing. The pragmatic approach to study design and data collection has allowed for the involvement of people living with dementia and their caregivers directly in the research. It has been possible to adapt and apply those methods in a community garden and Extra Care setting.

Crucially, the experiences and views of people living with dementia and cognitive impairment were included in the research. This is not only lacking in other studies of outdoor and nature-based activities, but is essential in understanding the impact on people's wellbeing and enabling person-centred delivery of green dementia care. Awareness of user-centred design encouraged the involvement of participants as users and informants which contributed to the overall recommendations and learnings that are presented.

The combination of the interview study and the testing of 2 interventions provides a holistic overview of the benefits associated with a variety of outdoor and nature-based activities delivered in two under-researched settings, the community and extra care. Moreover, evidenced-based practical guidance on developing and implementing effective outdoor and nature-based activities in these settings is provided to inform future development of effective green dementia care.

#### **7.4.2. Limitations**

There are limitations to the research that may be addressed through future studies. The interventions were delivered in a single setting with relatively small sample sizes. This was due to limited resources and the need to provide adequate support to participants. This reduces the transferability and generalisability of the findings to other settings and other populations however, similar interventions could be tested with other participants and in other settings.

Due to the ethical approval requirements, the participants living with dementia had mild to moderate dementia and all had capacity to consent. Therefore, the results may not be relevant for people living with more advanced dementia. It is also difficult to know the extent to which the results are

specific to the organisations and people involved in delivering the activities, and those taking part, in this research.

A pragmatic mixed methods approach was used to combine objective measures of function, wellbeing and quality of life, and qualitative accounts of individual's experiences and perspectives, in order to explore the benefits associated with outdoor and nature-based activities. In relation to the data collection methods used, neither the GBS Scale or physical function tests (SPPB and hand grip strength) provided notable results. Given the heterogeneity of people living with dementia and variability in symptoms and physical function, the relevance and significance of such measures is questionable.

The study design for testing both interventions did not include a control group. This was an ethical decision based on denying people living with dementia an opportunity to engage in an activity programme that had the potential to benefit their wellbeing. Therefore, although the findings from study 3 show significant improvements to self-reported quality of life and depressive symptoms, causality cannot be directly attributed to the activities.

The current evidence-base for outdoor and nature-based activities appears to favour quantitative measures to assess factors such as cognitive ability, wellbeing and engagement. There is pressure within health and social care research to show tangible outcomes and improvements in order to obtain funding, justify further research and challenge existing practice. In the research design, it seemed sensible to consider this approach. On reflection, the value and ethics of including measures of physical function and symptoms of dementia in future research on this topic is questionable. The degenerative and fluctuating nature of dementia is likely to impact on any measures taken, and therefore more nuanced methods of assessing the impact of dementia on function and symptoms, and consequently on quality of life, might be more useful in future studies.

The qualitative findings capture the experiences and perspectives of people living with dementia, which is argued as a strength of this research. However, the qualitative data, along with self-reported quantitative responses to the GDS and DEMQOL questionnaires, may have been subject to bias. Although the participants living with dementia had mild to moderate dementia, their level of

cognitive impairment may have impacted on their ability to accurately complete the questionnaires and provide feedback informally and through semi-structured interviews upon completion of the intervention (study 3). Whilst the feelings, views and opinions of participant's living with dementia and/or cognitive impairment concerning the activities and their involvement in the sessions were also captured through observations (study 2 and 3), future research might include more regular structured qualitative data collection, for example group reflections or group discussions. It is important that future research captures the voice of people living with dementia and their caregivers, and the risk of bias and interpretation from caregivers and researchers is managed where direct feedback may not be possible.

## **7.5. Implications for practices**

The research has important implications for green dementia care practice, by providing evidence of the benefits for people living with dementia in the community and within an extra care setting. The account of two evidence-driven activity interventions (delivered in a community garden and ExtraCare retirement village) provides information about how the activities and the interventions were developed and what they comprised of, something which is lacking in the existing literature. The research offers recommendations and a model to guide the development of outdoor and nature-based activities for people living with dementia that can contribute to effective person-centred green dementia care within a community and extra care setting.

The benefits associated with the interventions conducted in this research enabled a successful funding application by Martineau Gardens to continue supporting people living with dementia to engage in horticultural and gardening activities over 3-years (2019-2022). The funding will enable Martineau Gardens to establish and extend links with existing dementia services in the local community such as Alzheimer's Society and the Rare Dementia Service Birmingham. This is hoped to provide more people living with dementia in the community opportunities to engage in horticultural and gardening activities within a community garden environment, and seek the benefits to health and wellbeing that have been found in this research. A decision was made to use the funding to support people living with dementia joining existing volunteering groups within the

gardens to focus on their interests and hobbies rather than their diagnosis of dementia. This supports the recommendation from Mapes (2017) who suggested involving people living with dementia in groups of people without dementia to remove the focus from their diagnosis and simply focus on getting outdoors. Support from staff and volunteers would be provided as people required to enable them to take part in the activities. Since the funding was awarded, two participants who took part in the activity intervention within this research have continued to attend weekly activities at Martineau Gardens as part of the women's group.

This research has implications for social prescribing, which involves referring people into community and non-clinical services in order to improve their health and wellbeing, offering people an alternative to medical and pharmacological treatments. Social prescribing was highlighted in the NHS Long Term Plan (2019) with aims of 900,000 people being referred via social prescribing schemes by 2023/24. Research has shown that social prescribing initiatives can reduce the need to access NHS services as well as improved health and wellbeing (Public Health England 2019). Furthermore, as a result of the COVID-19 pandemic, the UK Government announced £5million of funding for the National Academy for social Prescribing to address loneliness and to improve health and wellbeing, as well as supporting recovery from COVID-19 within the community. The funding is aimed at local community partnerships to encourage a variety of projects, including arts for people living with dementia and gardening which relates directly to the present research.

The collaborative working throughout this research may support social prescribing involving local organisations who could provide outdoor and nature-based activities for people living with dementia within the community. Social prescribing initiatives involving gardening and horticultural activities have increased in the UK in recent years. Organisations such as the Royal Horticultural Society and Thrive are committed to supporting social prescribing gardening and horticultural activity schemes to enhance health and wellbeing. However specific social prescribing initiatives for people living with dementia are not widely available. Since this research was completed, Martineau Gardens planned to hold discussions with local dementia charities and GP services to identify people living with dementia in the community who may benefit from taking part in horticultural activities at the gardens. Although due to the COVID-19 pandemic this project has been delayed,

there is potential for it to link into existing social prescribing initiatives to support people living with dementia in Birmingham.

At the time of writing, the ongoing COVID-19 pandemic has significantly disrupted health and social care provision. Whilst the pandemic did not impact directly on the research presented here, it has impacted the potential implications for practice. The Alzheimer's Society released a report that highlighted the impact of COVID-19 on people living with dementia and their caregivers (2020). This report shone a light on the negative impact of lockdown and the pandemic, showing increasing severity of symptoms, worsening mental health, reduced confidence going out and carrying out activities of daily living, and fewer social interactions (Alzheimer's Society 2020). Moreover, the report suggests that despite the easing of lockdown people living with dementia, particularly those living alone, had not socialised with others outdoors and did not feel confident going outdoors. Whilst the findings are concerning, one of the findings relates to the present research. The Alzheimer's Society state that many caregivers and people living with dementia reported engaging in outdoor activities, including gardening and visiting allotments during lockdown. A recent episode of *Gardeners' World* suggested that many people had taken to gardening during lockdown, this has been more widely reported in the news. Research conducted at the University of Cumbria suggested that despite the national lockdown, people spent more time in nature through their daily exercise and noticed nature more through birdsong and watching wildlife (Lemmey 2020). A promising finding was that 72% of women and 60% of men surveyed (n=704) reported they were more likely to spend greater time in nature in the future. There is an opportunity to draw on this increased engagement, particularly with nature and green spaces in the local community, and identify ways to maintain this connection to nature and also ensure that access is available for everyone living in the community, including people living with dementia.

Prior to the COVID-19 pandemic there was growing evidence to demonstrate the benefits of engaging with nature, accessing green space and taking part in outdoor activities, in relation to improving physical, mental and social health and wellbeing (Federation of City Farms and Community Gardens website). However, we are more aware now of the potential benefits of

connecting to nature and spending time outdoors and engaged in a range of activities, so this research is particularly timely.

## **7.6. Implications for policy**

This research was influenced by policies relating to dementia care, highlighting the need for non-pharmacological approaches to enhancing the health and wellbeing, and overall quality of life, of people living with dementia. However, there remains a lack of clear direction on which non-pharmacological approaches and interventions are recommended and outlined in policy. This research may guide future policy relating to the provision of meaningful activities and community-based activities for people living with dementia. The sharing of best practice is essential for developing high-quality and person-centred dementia care.

The findings highlight the importance of access to nature and outdoor environments for people living with dementia. This includes people living with dementia within communities and neighbourhoods that do not currently support the needs of people living with dementia. There is growing awareness of the relationship between health inequalities and access to safe outdoor green space. In July 2020 the UK Government promised £4 million towards green social prescribing projects that sought to improve mental health and reduce health inequalities, whilst reducing overall demand on existing health and social care services.

COVID-19 has further exposed the ongoing social care crisis - a result of the sector being underfunded and under-resourced for many years. The UK government were due to publish a green paper in 2018 outlining a social care reform, this has yet to happen. Important issues such as the cost of social care and housing are likely to be the key focus of the reform. However, there is an opportunity to highlight how quality can be added to long-term social care through the provision of meaningful activities and support to enable people to maintain connections to their community. A priority of the reform should address support for people living in the community and identify how to support people living independently in their own homes for longer. The present research provides evidence to support the use of outdoor and nature-based activities for people living with dementia and cognitive impairment in the community.

## 7.7. Future research

This research has demonstrated a wide range of benefits associated with outdoor and nature-based activities for people living with dementia in the community and in an extra care village, and provided guidance on delivering effective interventions to contribute to green dementia care. However, the evidence-base is still limited and further research is needed in this area. Future research could implement similar activity interventions to those presented in this research within different settings and with other participants to compare see if the findings are transferable. Research including people living with moderate to severe dementia would be useful to explore the impact of outdoor and nature-based activities for people living in more advanced stages of dementia.

The present research, and the funding awarded to Martineau Gardens, could lead to a future research project that investigates and evaluates the impact of horticultural activities for people living with dementia in the community over a longer period of time than the 6-week Intervention in this research. This could help to explore whether the benefits associated with gardening and horticultural activities change during disease progression, as the participants in the present research had mild to moderate dementia. It is likely that people living with severe dementia may need additional support and therefore, the recommendations for planning, preparing and delivering activities may differ from the ones presented in this research. Moreover, future research based on the project at Martineau Gardens may highlight a more sustainable approach to offering people living with dementia opportunities to engage in gardening and horticultural activities through existing groups within the gardens. In addition, sustainability might be enhanced if the project aligns with social prescribing initiatives and is supported by local health and social care services and dementia charities, which is another avenue for future research

The importance of tailored and person-centred activities that align to a person's interests and hobbies has been highlighted. Future case study research could provide in-depth exploration and evaluation of person-centred green dementia care through the provision of tailored outdoor and nature-based activities for individuals. This research would contribute to sharing best practice, and

might offer recommendations and guidance for adapting activities for people living with dementia as well as responding to changes in their symptoms as the disease progresses.

There is little research on the impact of outdoor and nature-based activities on cognitive function in people living with dementia. A future development of the research in the present study would be to deliver similar activity interventions and focus on the impact on cognitive function, rather than symptoms of dementia and/or cognitive impairment which was assessed in this research. Investigation into the impact on cognitive function may be useful for securing funding for delivering activities and supporting further research. Exploration of the effects of different types of outdoor and nature-based activities in a more controlled environment to draw more reliable conclusions about causality would also be of value. However, careful ethical considerations would be needed to conduct controlled trials involving people living with dementia.

Ultimately, future research that supports the benefits associated with outdoor and nature-based activities for the wellbeing of people living with dementia will provide evidence needed to drive dementia care policy, guidelines and practice and ensure that people living with dementia have opportunities to spend time outdoors and connect to nature.

## **7.8. Conclusions**

In conclusion, this research supports the provision of outdoor and nature-based activities for people living with dementia and cognitive impairment in the community and within extra care. Recommendations and a Model of Development Considerations of Green Dementia Care to guide the development and implementation of outdoor and nature-based activities which can contribute to good green dementia care is presented. Furthermore, it is encouraged that collaborative working between dementia care organisations, charities and organisations delivering outdoor and nature-based activities could offer opportunities for community-based activities that could benefit the wellbeing and quality of life of people living with dementia and cognitive impairment, and their caregivers.



### 7.8.1. Key contributions of the research

This research offers:

- The development and evaluation of a novel horticultural activity intervention which benefited people living with dementia and their caregivers. Whilst also supporting the positive impact that a community garden could have through delivering horticultural activities for people living with dementia in the community.
- The development and evaluation of a novel, person-centred multi-activity outdoor and nature-based activity intervention that not only highlighted a variety of benefits for people living with dementia and cognitive impairment but suggested benefits associated with a broad range of outdoor and nature-based activities. The findings from this study also identified the added value that off-site and outdoor activities had for people living with dementia and cognitive impairment within an extra care retirement village.
- This research was influenced by policies relating to dementia care, highlighting the need for non-pharmacological approaches to enhancing the health and wellbeing, and overall quality of life, of people living with dementia. However, there remains a lack of clear direction on which non-pharmacological approaches and interventions are recommended and outlined in policy. This research may guide future policy relating to the provision of meaningful activities and community-based activities for people living with dementia. The sharing of best practice is essential for developing high-quality and person-centred dementia care.
- The findings highlight the importance of access to nature and outdoor environments for people living with dementia. This includes people living with dementia within communities and neighbourhoods that do not currently support the needs of people living with dementia. There is growing awareness of the relationship between health inequalities and access to safe outdoor green space. In July 2020 the UK Government promised £4 million towards green social prescribing projects that sought to improve mental health and reduce health inequalities, whilst reducing overall demand on existing health and social care services.
- A set of practical recommendations and a Model of Development Considerations for Green Dementia Care to guide researchers and practitioners in the development and

implementation of a person-centred and meaningful outdoor and nature-based activities for people living with dementia and cognitive impairment in the community and extra care in the UK.

Further research is required to influence and shape both dementia care practice and policy, and to highlight the benefits of providing outdoor and nature-based activities for people living with dementia. In the current COVID-19 pandemic, the dementia care and charity sector faces an uncertain and challenging future. However, it is hoped that this research can contribute to the growing evidence-base to support the provision of outdoor and nature-based activities for people living with dementia in the community and extra care to enhance wellbeing and quality

## Personal reflection

This thesis represents not only a body of progressive research that was conducted in order to meet the aims and objectives, but a journey relating to my own personal development as an independent researcher. Although working with people living with dementia at times was challenging, it has certainly been the most rewarding and enjoyable part of this journey. It was during the two activity interventions where I began to fully appreciate both the rationale and purpose of my research, and the importance within a real-life context. Despite the challenges of conducting research with people living with dementia, and the complex practical and ethical considerations, I would choose to continue working with this population, and particularly sharing the voices of people living with dementia which is under-represented within the existing literature.

I started this PhD journey with a critical realist epistemological approach (Bhaskar 1975) however, I have progressed to a pragmatic approach (Maxcy 2003). I have developed a greater understanding and appreciation of the value of qualitative approaches in seeking direct views and opinions from participants and gaining deeper insight into their experiences. Something which I feel is extremely important to consider within both person-centred dementia care and research. I believe I have gained a lot of new skills and knowledge of using mixed methods and thematic analysis within the context of dementia research, and this is something that I shall continue to explore and develop further. On reflection, I am proud of the research that is presented in this thesis and my own development throughout the PhD journey.

***“There is an enormous value of living and enjoying things in the moment. Even though people may not remember doing an activity afterwards, so much happiness and enjoyment can be achieved in that moment of doing it. We should never assume people who won’t remember, won’t benefit”***

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## **Appendices**

### **Appendix 1. GBS Scale recording sheet**

#### **Intellectual impairment**

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#### **Emotional impairment**

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#### **Impairment of ADL performance**

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## Appendix 2. SPPB form

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### Appendix 3. McCann Instrument

<b>Participant:</b>				
<b>Date:</b>				
<b>Time of observation(s)</b>				
<b>Onset Time</b>				
<b>Location</b>				
Dining Room				
Communal Lounge				
Corridor				
Recreation Room				
Outdoors				
<b>Directed Activity</b>				
Solitary				
Care Related				
Family Visit				
Large Group (6+) Structured				
Small Group (2-5) Structured				
Small Group (2-5) Unstructured				
Large Group (6+) Unstructured				
<b>Level of Alertness</b>				
Eyes Open				
Eyes Closed (5+s)				
Eyes follow object				
Intent fixation on object or person				
Visual scanning				
Eye contact maintained				

<b>Facial Affect Expression</b>				
Pleasure				
Interest				
Null/Content				
Angry				
Anxious				
Sad				
<b>Behavioural Ratings</b>				
No Behaviour				
Self-Care*				
Complying with Nursing Care				
Resisting Nursing Care				
Talking to another*				
Non-verbal engagement with another*				
Loud talking/screaming				
Swearing or cursing				
Helping another*				
Positive physical expression				
Solitary enjoyment				
Participation in family activity*				
Participation in group activity*				
Walking				
Repetitive behaviours*				
Physical Aggression				
Destroying property				
Sleeping				
Other*				
* = Additional Field Note required				

## Appendix 4. Gibbs Reflective Cycle

<b>Reflective Diary for STH session based on Gibbs' Reflective Cycle</b>
<b>Date:</b> <b>Session:</b> <b>STH practitioner:</b>
<b>Goals/tasks</b> <i>What do you plan to do?</i> <i>Goals for session</i> <i>Goals for individuals, where applicable</i>
<b>Resources</b> <i>What do you need to buy/source/prepare before the session?</i>

**Reflection**

*Who attended?*

*What actually happened?*

**What went well?**

**What went less well?**

**What did you learn?**

**Plans/Actions for next time**

## Appendix 5. DEMQOL form

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## **Geriatric Depression Scale (Long Form)**

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## Appendix 7. Greater Cincinnati Tool

Date	Time	Activity

Well-Being Domain	Observation Field Notes
Interest	
Sustained attention	
Pleasure	
Negative affect	



Sadness	
Self-esteem	
Normalcy	
Other	

## Appendix 8. Coventry University Full Ethics Approval Study 1



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### **Participant Information Sheet**

You are being invited to take part in a research project by Coventry University. This is part of a wider project looking at the benefits of outdoor environments, outdoor physical activity and other outdoor activities for older adults with dementia living in residential care. Please read through the information sheet, and let us know if you have any questions.

**1. Information about the project/Purpose of the project**

This project aims to explore the experiences, opinions and perspectives of a number of individuals who are involved in activity provision and care support for older adults living with dementia. We are particularly interested in outdoor environments and activities.

**2. Why have I been chosen?**

We have identified a number of 'experts' within care and/or activity provision for older adults, especially those living with dementia.

**3. Do I have to take part?**

No, you do not have to take part if you do not wish. You may also withdraw at any point up until the data analysis begins.

**4. What do I have to do?**

You will need to attend a single interview that will last approximately 1-1.5 hours. The location of the interview will be at your convenience, researchers are willing to travel. The interview will involve a number of pre-set questions however, informal discussion and further questioning is likely to take place.

**5. What are the risks associated with this project?**

No hazards have been identified with carrying out interviews. We appreciate that discussing care for older adults for dementia may be difficult at times, should you become distressed or upset at any point then we are able to pause or end interviews.

**6. What are the benefits of taking part?**

This project is part of a wider project which investigating the benefits of outdoor environments, outdoor physical activity and other outdoor activities in UK care homes. The information and insight from this project will be used to enhance care provision, to enable people living in care homes with dementia to take part in enjoyable activities which benefit their physical and mental health, leading to an overall better quality of life.

**7. Withdrawal options**

You may withdraw at any point prior to and during the interview without giving reason. If you do not wish to continue then please contact one of the supervisors as soon as possible. You will be able to withdraw up until the point of data analysis which is expected to commence in May 2018.

**8. Data protection & confidentiality**

Data will be stored anonymously. Digital data will be stored in password protected files, and other paper data will be stored in a locked cabinet at Coventry University. Only the direct research team will have access to data. All data must be kept for 5 years under university regulations before it is destroyed.

**9. What if things go wrong? Who to complain to.**

Content removed on data protection grounds

**10. What will happen with the results of the study?**

The results of the study will be used to inform the wider project, and enable us to make decisions about interventions or activities we may wish to carry out or evaluate. We may publish the anonymised results in an exploratory paper, and the results from this study will form part of the PhD thesis.

**11. Who has reviewed this study?**

Coventry University Ethics Committee have approved the ethics application and all of the additional material for this project. The project will adhere to the university's Principles and Standards of Conduct on the Governance of Research.

**12. Further information/Key contact details**

Content removed on data protection grounds

**Informed Consent Form Template**

This project aims to explore the impact of an 8-week programme involving horticultural and garden-based activities delivered at Martineau Gardens for people living with dementia and their caregivers/family/friends.

**Please initial**

1. I confirm that I have read and understood the participant information sheet for the above study and have had the opportunity to ask questions.

2. I understand that my participation is voluntary and that I am free to withdraw without giving a reason up to the point of data analysis.

3. I understand that all the information I provide will be treated in confidence.

4. I understand that I also have the right to change my mind about participating in the study until week 8 of the study, after which data analysis will take place.

5. I agree to be recorded as part of the research project.

6. I agree to take part in the research project.

Name of participant: .....

Signature of participant: .....

Date: .....

Name of Researcher:.....

Signature of researcher: .....

Date: .....

## Appendix 11. Example Interview Transcript Study 1

**Participant 1 Interview, place of work**

**Monday 19<sup>th</sup> February 2018, 10:15am**

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## Appendix 12. Full Codebook Study 1

Parent Node	Child Node	Short definition	Full definition	When to use	When not to use
Understanding (level of)	Verbalising oneself	Participant verbalising, not in response to a direct question	An instance of a participant verbalising oneself by making a statement, sharing a story or contributing to a discussion.	Use this code to capture participants verbalising oneself either spontaneously or within a discussion.  Likely double coding with verbal engagement.	Do not use this code if a participant is responding to a question or directly asking a question, use other codes within 'understanding'.
	Responding to questions	Participant responding to a question	Participant responding to a question asked to them or to the group.	Use this code to capture participants responding to questions asked to them.  May double code with verbal engagement and 1:1/unstructured or structured group working.	Do not use this code if a participant is sharing a story or verbalising not in response to a specific question. Use verbalising oneself as an alternative code.
	Awareness	Participants level of awareness	Participant behaviour that indicates their level of awareness during the activities or discussions that are taking place.	Use this code to identify examples of behaviour that suggest the level of awareness a participant has during the activity or discussions within the group. More general	Do not use this code where participants are actively enquiring, use alternative codes, or for behaviours relating to following specific instructions.

				<p>behaviours rather than specific ability to engage and follow instruction.</p> <p>May also double code with active/passive participation and codes within facial affect and behaviour.</p>	
	Actively enquiring	Participant asking questions or seeking answers or instruction	Incidence of participants actively asking questions and seeking to find answers or advice from others.	<p>Use this code for any verbalisation that represents the participant asking questions or seeking a response.</p> <p>Likely double code with verbal engagement. Could also be coded with requires assistance.</p>	Do not use this code unless a specific question has been asked by the participant, use alternative codes in 'understanding'.
	Ability to follow instructions	Participant ability to follow instructions during activities	Incidence of participants demonstrating their ability to follow instructions in order to engage with activities.	Use this code for behaviours relating to the ability to follow (or not) instructions during activities.	Do not use this code for direct questions, this code is more related to physical behaviours than verbalisation.

				May code with either passive or active engagement.	
Sensory Stimulation	Seeking SS	Participants seeking out sensory stimulation	Participant behaviour and engagement that demonstrates them seeking some form of sensory stimulation from the activity or environment.	Use this code for behaviours relating to the seeking of sensory stimulation and actions of engaging different senses.  May code with active or passive engagement and other behaviours.	Do not use this code to record a response to sensory stimulation, use the response code specifically to distinguish between seeking and responding/resulting behaviours.
	Response to SS	Participants response to sensory stimulation	Participant response and reactions to sensory stimulation demonstrated through their behaviours or actions.	Use this node to record the response to/reaction to/result of sensory stimulation.  Likely double coding with reminiscence and a behaviour.	Do not use this code to record the seeking of sensory feedback, use the seeking code specifically.
Support	Requires assistance	Participant requires assistance to participate in activity	Participant behaviour indicating they require assistance to participate in a particular activity.	Use this code for behaviours that suggest a participant requires assistance to be able to engage within the activity.	Do not use this code in isolation if reasons for requiring assistance are also given, expecting most data to be multiple-coded.

				Likely to be coded with one from directed activity and engagement.	
	Independent	Participant able to independently participate in activity	Participant behaviour indicating they are able to engage with the activity independently and do not require assistance to engage.	Use this code for behaviours that suggest the participant is able to independently engage successfully with the activity.  Likely to be coded with one from directed activity and engagement.	Do not use this code in isolation if further reasoning to suggest why a participant is able to be independent, use with other codes.
	Caregiver	Participant required caregiver support	Participant behaviour indicating they required caregiver support to engage with the activities	Use this to code incidences where the caregivers provide support for participants.	Do not use this code in isolation if reasons for requiring assistance are also given, expecting most data to be multiple-coded.
Group dynamic		Data relating to the group dynamic	Data that relates to elements and changes to the group dynamic during the activity sessions	Use this code where data relates to the overall group dynamic. Might also be coded to support and directed activity.	Do not use to code individual relationships and communications , use alternative codes in support, engagement and directed activity.
Facial Affect	Tiredness	Participant showing signs of tiredness	Participant behaviour that suggests tiredness	Use for behaviours suggesting tiredness.	Do not use to code for other facial affect.

			during activities.	Might be also coded to behavioural codes and level of engagement.	
	Sadness	Participant showing signs of sadness	Participant behaviour that suggests sadness during activities.	Use for behaviours suggesting sadness. Might be also coded to behavioural codes and level of engagement.	Do not use to code for other facial affect.
	Interest	Participant showing signs of interest	Participant behaviour that suggests the participant is interested during activities.	Use for behaviours suggesting a level of interest in activities. Might be also coded to behavioural codes and level of engagement.	Do not use to code for other facial affects.
	Happiness/pleasure	Participant showing signs of happiness/pleasure	Participant behaviour that suggests happiness or pleasure during activities.	Use for behaviours suggesting happiness and/or pleasure during activities. Might be also coded to behavioural codes and level of engagement.	Do not use to code for other facial affects.
	Content/null	Participant showing no obvious behaviours	Participant behaviour that suggests being content during activities or displaying no obvious behaviours indicative of their feelings.	Use for to record behaviours or actions which suggest the participant is content, or if no specific emotive behaviours are observed. Might be also coded to	Do not use to code for other facial affects.

				behavioural codes and level of engagement.	
	Anxious/worried	Participant showing signs of anxiousness/worry	Participant behaviour that suggests anxiousness/worry during activities.	Use for behaviours suggesting the participant is anxious or worried. Might be also coded to behavioural codes and level of engagement.	Do not use to code for other facial affects.
Environment	Trust	Data relating to feelings or experiences of trust	Data relating to participants including caregivers and staff reporting or indicating feelings and experiences of trust during activities.	Use this code for data that implies feelings or experiences of trust, if further feelings are given/indicated this may be coded in additional codes.	Do not code generic behaviours assuming a level of trust.
	Comfort	Data relating to feelings or experiences of comfort	Data relating to participants including caregivers and staff reporting or indicating feelings and experiences of comfort during activities.	Use this code for data that implies feelings or experiences of comfort, if further feelings are given/indicated this may be coded in additional codes.	Do not code generic behaviours assuming a level of comfort.
Enjoyment		Data suggesting or indicating enjoyment	Data relating to participants including caregivers and staff suggesting or indicating enjoyment.	Use to code for any data relating to levels of and incidence of enjoyment displayed by any participants.	Do not use to repeat code positive behaviours, ensure that a level of enjoyment is suggested.



				Data relating to participant behaviour is likely to be coded under positive behaviours such as happiness/pleasure.	
Engagement	Passive participation	Participant passively participating in an activity	Participant behaviour and observed actions that indicate the participant is engaged in the activities passively.	Use to code for behaviours and incidences where the participant is passively participating, and is not playing an active role in the activity itself. Likely to be coded with directed activity and physical ability.	Do not code incidence where a participant requires help which then enables them to take an active role in an activity, this should be coded as requiring assistance in physical ability.
	Active participation	Participant actively participating in an activity	Participant behaviour and observed actions that indicate and demonstrate the participant is actively participating in the activity.	Use to code for behaviours where the participant is actively participating. Likely to be coded with directed activity and physical ability.	Do not code general observations about participant's physical ability to be independent and engage with activities unless specifically demonstrated.
	Other hobbies	Data relating to other outdoor and nature-based hobbies or activities	Data relating to other outdoor and nature-based hobbies and activities that participants currently engage in or	Use to code for data about participants wider hobbies and interests, relating to outdoor and	Do not code other activities participants might engage in during the sessions.

			have done so throughout their lifetime.	nature-based activities.	
	Beyond Martineau Gardens	Data relating to activities continued beyond the sessions	Data relating to continuation of the activities done during the sessions once the participants are home.	Use to code for data about participants and caregivers continuing or reflecting on activities that were done during the sessions once they have returned home.	Do not code for other hobbies and activities that were not initiated by this activity programme, this should be coded under 'Other hobbies'.
Directed activity	Unstructured group	Working as a group that has not been pre-planned	Participants are working within a group setting for no specific purpose or common group aim.	Use this code for observations where participants are working within a group environment that is either spontaneous or has no clear objective or aim but involves participants working together.	Do not code data which involves 1:1 or solitary work even if sitting in what appears to be a group, use specific codes.
	Structured group	Working as a group that is planned and structured	Participants are working within a planned and specific group setting to achieve a collective goal as a group.	Use this code for observations where participants are working within a group environment that has been pre-planned and the group are working together to achieve a common goal or aim, either	Do not use this code for 1:1 or solitary work if it can be specifically identified, use specific codes.

				as a group or simultaneously.	
	Solitary	Working on their own	Participants are working on their own, they may be sitting within a group but they are not engaged with anyone else.	Use this code to record when participants are working entirely on their own, this may be coded with independent physical ability.	Do not use this code to document level of physical ability, some codes may be double coded but a participant may be working solitary but require assistance to engage fully with the activity.
	1:1	Working 1:1 with another person	Participants are working solely with one other during an activity.	Use this code where participants are working directly with one other, usually a volunteer/staff member. Likely to be coded with requires assistance and active engagement.	Do not use this code to only document the level of assistance required, likely to double code but not exclusive.
Change in behaviour		Data relating to a change in behaviour	Data relating to an observed or reported change in participant behaviour, either negative or positive.	Use this code when a change in behaviour is observed or reported, it is likely that this data will be coded to a particular prevalent behaviour.	Do not use this code to document a change in behaviour from a previous observation.
Behaviour	Verbal engagement	Participant displaying verbal engagement	Participant displaying verbal engagement with another participant,	Use this code when a participant exhibits verbal engagement, will likely code	Do not use this code if there is no engagement within the verbalising, not directed to

			volunteer or staff member in any capacity.	within understanding either in verbalising oneself, responding to questions or actively enquiring.	another person. An exclusion for this code is specific verbal engagement which involves reminiscence, code directly to the specific reminiscence code.
	Satisfaction	Participant showing signs of being satisfied	Participants display behaviours that indicate feelings of satisfaction.	Use this code for behaviours and observations that demonstrate satisfaction of participant. May include verbalisation to confirm satisfaction or facial affect.	Do not code incidence of happiness and pleasure without argument for feelings of satisfaction.
	Reminiscence	Participant engaging in reminiscence behaviour	Participants engage in reminiscence behaviour or activity.	Use this code for observations of reminiscence in behaviour and activity of participants. Likely to be coded with verbalising oneself, and expected link to sensory stimulation.	Do not code in isolation if possible to suggest causation of reminiscence (questioning, sensory stimulation) and affect of reminiscence.
	Symptoms of dementia (other)	Any display of symptoms associated with dementia except cognitive deficit	Participants display behaviours that are associated with symptoms of dementia, and specifically	Use this code for any behaviours that are related to symptoms of dementia, or that can be explained by	Do not code behaviours relating to cognitive deficit, use the specific code.

			their type of dementia.	particular symptoms.	
	Non-verbal engagement	Non-verbal engagement demonstrated	Participants display non-verbal engagement behaviours during activities towards or with others.	Use this code for any non-verbal engagement, this could also be coded with understanding and facial affect.	Do not code any non-verbal behaviours which do not suggest an attempt to engage in either an activity or with another person.
	Display of character	Any activity suggesting participants character	Participants demonstrating behaviours that indicate their character or personal qualities that are not associated to dementia.	Use this code to document any behaviours which relate to individual displays of character and personality that are not associated with dementia symptoms. These may be coded to other codes depending on what they are.	Do not use to code any behaviours which are a result of dementia symptoms.
	Cognitive deficit	Participant showing signs of cognitive deficit	Participant's specific behaviours that indicate their level of cognitive deficit relating to dementia.	Use to code for behaviours relating to cognitive deficit level, if this is linked to level of physical ability or engagement double-code as appropriate.	Do not code other dementia symptoms, use specific code.
Alertness	Visual scanning	Participant engaging in visual scanning	Participant engaged in repeated visual scanning as the primary behaviour.	Use this code where a participant is primarily engaging in visual scanning	Do not use this code unless participant is explicitly visually scanning and it is their

				during activity or engagement. May be linked to facial affect.	predominant behaviour.
	Maintaining eye contact	Participant maintaining eye contact	Participant engaged in repeated maintenance of eye contact as the primary behaviour.	Use this code where a participant is primarily engaging in maintaining eye contact during activity or engagement. May be linked to facial affect and understanding.	Do not use this code unless the participant is maintaining eye contact for a prolonged period and it is their predominant behaviour.
	Fixation on object/person	Participant engaged in fixation on an object or person	Participant engaged in repeated fixation on a person or object as the primary behaviour.	Use this code where a participant is primarily engaging in fixation of an object or person during activity or engagement. May be linked to facial affect and understanding.	Do not use this code unless the participant is fixated for a prolonged period and it is their predominant behaviour.
Activity feedback		Data relating to participant feedback about the activities	Data relating to participant feedback about the successful or unsuccessful elements of activities and recommendations for any changes	Use to code participant feedback about activities and any suggestions.	Do not use to code negative participant responses in behaviour or engagement observed, code to behaviour and engagement codes.

Appendix 13. Coventry University Full Ethics Approval Study 1



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## Appendix 14. Participant Information Sheet Study 2

**A pilot study to investigate the impact of a horticultural-based activity programme for people living with dementia in the community in Birmingham.**

### **PARTICIPANT INFORMATION SHEET**

You are being invited to take part in research to explore the impact of an 8-week horticultural activity programme delivered by staff at Martineau Gardens for people living with dementia and their caregivers. Molly Browne (PhD Student) at Coventry University is leading this research. Before you decide to take part it is important you understand why the research is being conducted and what it will involve. Please take time to read the following information carefully.

#### **What is the purpose of the study?**

People living with dementia in Birmingham are invited to take part in an 8-week programme at Martineau Gardens along with a caregiver, family member or friend who is responsible for offering care and support. Both participants will be involved in the study, and able to take part in a range of horticultural based activities.

#### **Why have I been chosen to take part?**

You are invited to participate in this study because you are living with dementia, or supporting your family member or friend living with dementia in the community in Birmingham.

#### **What are the benefits of taking part?**

By sharing your experiences with us, you will be helping Martineau Gardens and Coventry University to better understand the benefits that horticultural activities can offer those living with dementia and their family/friends or caregivers.

#### **Are there any risks associated with taking part?**

This study has been reviewed and approved through Coventry University's formal research ethics procedure. There are no significant risks associated with participation. A full risk assessment has been carried out by Martineau Garden's as they have responsibility for delivery of the programme. Staff are trained to work in the garden, and within horticultural activities and have experience of working with people living with dementia.

#### **Do I have to take part?**

No – it is entirely up to you. If you do decide to take part, please keep this Information Sheet and complete the Informed Consent Form to show that you understand your rights in relation to the research, and that you are happy to participate. Please note down your participant number (which is on the Consent Form) and provide this to the lead researcher if you seek to withdraw from the study at a later date. You are free to withdraw your information from the project data set until the data analysis commences on the final week of the programme. You should note that your data may be used in the production of formal research outputs (e.g. journal articles, conference papers, theses and reports) prior to this date and so you are advised to contact the university at the earliest opportunity should you wish to withdraw from the study. To withdraw, please contact the lead researcher (contact details are provided below). Please also contact the Director of Studies so that your request can be dealt with promptly in the event of the lead researcher's absence. You do not need to give a reason. A decision to withdraw, or not to take part, will not affect you in any way.

### **What will happen if I decide to take part?**

You will be asked a number of questions regarding your (or your family members) current condition including type of dementia if known, dementia onset, age/DOB and overall health. Once consent has been provided (either self-consent or via a personal consultee) you will be invited to the first week of the programme. Week one will involve a familiarisation visit to Martineau Gardens where you will meet staff and get a tour of the gardens. During this visit the researcher from Coventry University will carry out two physical function tests with the participants living with dementia. These will involve a short walk, sit-to-stand and balance exercise, and hand grip strength measures. Caregivers will take part in an informal discussion about the programme and advised how they can take part throughout the activity weeks. Each pair of participants will then have a short informal interview with the researcher and a member of staff to explore dementia symptoms, and their current daily activities and lifestyle. Weeks 2-7 will be activity-based. All sessions will be led by a member of staff from Martineau Gardens, and a variety of horticultural activities, crafts and cooking activities will be offered. During the activities the researcher will carry out observation of participant's behaviour, mood and engagement but will not be directly involved in the sessions. The final week will be a repeat of the measures taken in the first week, and the short interview.

### **Data Protection and Confidentiality**

Your data will be processed in accordance with the General Data Protection Regulation 2016 (GDPR) and the Data Protection Act 2018. All information collected about you will be kept strictly confidential. Unless they are fully anonymised in our records, your data will be referred to by a unique participant number rather than by name. If you consent to being audio recorded, all recordings will be destroyed once they have been transcribed. Your data will only be viewed by the researcher/research team. All electronic data will be stored on a password-protected computer file on a secure server at Coventry University. All paper records will be stored in a locked filing cabinet in MF121. Your consent information will be kept separately from your responses in order to minimise risk in the event of a data breach. The lead researcher will take responsibility for data destruction and all collected data will be destroyed on or before September 2021 (upon PhD completion).

### **Data Protection Rights**

Coventry University is a Data Controller for the information you provide. You have the right to access information held about you. Your right of access can be exercised in accordance with the General Data Protection Regulation and the Data Protection Act 2018. You also have other rights including rights of correction, erasure, objection, and data portability. For more details, including the right to lodge a complaint with the Information Commissioner's Office, please visit [www.ico.org.uk](http://www.ico.org.uk). Questions, comments and requests about your personal data can also be sent to the University Data Protection Officer - [enquiry.ipu@coventry.ac.uk](mailto:enquiry.ipu@coventry.ac.uk)

### **What will happen with the results of this study?**

The results of this study may be summarised in published articles, reports and presentations. Quotes or key findings will always be made anonymous in any formal outputs unless we have your prior and explicit written permission to attribute them to you by name.

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**Informed Consent Form**

This project aims to explore the impact of an 8-week programme involving horticultural and garden-based activities delivered at Martineau Gardens for people living with dementia and their caregivers/family/friends.

**Please initial**

- 1. I confirm that I have read and understood the participant information sheet for the above study and have had the opportunity to ask questions.
- 2. I understand that my participation is voluntary and that I am free to withdraw without giving a reason up to the point of data analysis.
- 3. I understand that all the information I provide will be treated in confidence.
- 4. I understand that I also have the right to change my mind about participating in the study until week 8 of the study, after which data analysis will take place.
- 5. I agree to be recorded as part of the research project.
- 6. I agree to take part in the research project.

Name of participant: .....

Signature of participant: .....

Date: .....

Name of Researcher: .....

Signature of researcher: .....

Date: .....

## Appendix 16. Gatekeeper Letter Martineau Gardens

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## Appendix 17. Thrive instruction Sheet (Example)

### 6 Some step-by-step gardening jobs

The following examples are approaches to various common gardening jobs.

#### Sowing seeds

##### You will need...

Seed tray and compost, seeds, watering can, label and pen



- 1 Overfill a seed tray with seed compost.



- 2 Level the compost using a sawing action. Place a levelling board over the seed tray and press firmly.



- 3 In a standard tray, space the seed out evenly, starting from one long and one short side of the tray.



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6 Some step-by-step gardening jobs

gardening jobs

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#### Sowing seeds (continued)

- 4 Put two handfuls of seed compost into the sieve and sprinkle a thin layer of compost over the seeds.



- 5 Label the seed tray. Water the tray with a watering can with a fine rose.



## Appendix 18. Observation Transcript Study 2

### Session Three: 23<sup>rd</sup> October 2018

10:30 - P1 Observation – in lounge of pavilion

- Sitting with cup of tea, talking about what a potato is. (Due to type of dementia P1 cannot recall what some things are if told the name, they are not able to associate objects with their names.) “I must eat them at home”, kept repeating potato, potato, potato.
- Listening to a staff member talk about smash, and then introducing the session and what we would be doing.
- P1 offered to pass the potato peeler and potato they had been holding (props for introducing the session) to another participant so they could have a look. (P1 very thoughtful towards the other members of the group).
- P1 was drinking their tea and chatting the one of the volunteers.

10:35 – All – in lounge of pavilion

- One of the staff got an old smash advert onto YouTube and showed the group. P2 was smiling as if they remembered it. P4 “that was interesting”. Staff were talking about how it used to be made by Cadburys and wondering if it was made in Bournville.
- Staff suggested we start the activities and led everyone over to the activity table.

10:40 – P2 Observation – around the activity tables in the pavilion

- Watching a staff member tip out the buckets ready for the group to search for any potatoes. Each participant given a bucket and a bowl to put any potatoes they find in. P2 looking at soil pile, the staff member asked “can you see this?” pointing to a potato.
- P2 “Yes”, Staff “can you reach for it”, P2 was able to pick up to potato and follow the verbal instruction to place it in the bowl that was on their left.
- They were able to find another potato and asked “are we putting it in the bowl?”
- P2 seemed to enjoy picking up a handful of the soil and sifting it through their fingers, and rubbing the soil on the table. The staff member asked “does the soil smell”, P2 “it shouldn’t do”.
- When placing the potatoes in the bowl, and finding the potatoes their movements are very slow and sometimes they needed prompting to remain on the task.
- The staff member said to P3 “if you put the small one back, they’ll grow again” referring to a very small potato they had found, and saying they could replant it. P2 said “yes, they grow again” as they were feeling the soil with their hand.

10:45 – All

- The group were finding potatoes in the soil.
- P4 had found a worm and was talking about this with the volunteer.
- P4, P3 and P1 were chatting to the staff and volunteers who were working with them.
- P2 was feeling the soil, and when prompted was helping push soil on the table into a bucket for it to be taken outside.
- P2 was watching the other participants, and laughing at P3.
- P4 kept checking “what is supposed to be going in here” pointing at the bowl for the potatoes.

- P1 said to P4, "I'll search this side of yours for you and give you them" (P1 very conscious about not taking other people's soil or potatoes).
- Rhyme about wiggly worms, P2 laughing and P4 joining in.

10:50 – P4 observation — around the activity tables in the pavilion

- Pushing the soil into the bucket off the table whilst chatting to the volunteer. They were asking the volunteer about shoes.
- Watching the others because they had finished finding the potatoes and swept the soil away "we've beaten them".
- Volunteer brought another bucket of potatoes in, when they started pouring it P4 could see the table cloth was caught "I'll hold the table cloth".
- P4 asked again was the bowl at the side of them for potatoes.
- Volunteer said this is a good bucket as you could see a lot of potatoes, P4 "yes, it is because it's ours". They found another worm and began asking "shouldn't they be asleep because it's winter?" the volunteer was talking about how the warmer temperatures could have confused them.
- The participant seemed happy picking the potatoes and cleaning them ready to put in the bowl.

10:55 – All - around the activity tables in the pavilion

- P2 mentioned potato cakes, and the staff started talking about eating and making potato cakes. P2 was smiling and trying to join in the conversation.
- P3 and P1 were both very independent with their searching for potatoes.
- The group began chatting about taking a photo of their hands that was suggested by one of the staff.
- P2 was sat rubbing the soil on the edge of the pot. When everyone was showing their hands for the photo it was commented that P2 only had their right hand covered in dirt – they had only been using their right hand throughout the activity.

11:00 – P3 observation - around the activity tables in the pavilion

- P3 had been standing for the activity, and was waiting for the photo. They seemed quite quiet this week compared to previous weeks (they had said they had a cold when they arrived and had just got their voice back).
- They were watching and listening to the others.
- They did make a comment about the colour of everyone's hands, but no one commented on that, and staff moved the conversation on and got everyone ready for the photo.
- P3 got actively involved in cleaning the table, wiping the soil into a bucket and sweeping the table. As they were doing it they said "don't sit in this chair" pointing at the chair covered in mud. One of the volunteers joked about sitting in it, and P3 replied "I'm saving it for me" and laughed.
- P3 was using their hands to sweep the soil, and kept clapping them to get them clean even though they were wearing gloves. They kept joking with P4 who had asked to use the dustpan brush and was banging it on the table to get rid of the soil in the bristles "I'm trying to sleep over here" – commenting on the loud noise.

11:05 – All - around the activity tables in the pavilion

- P2 helping to sweep table with a dustpan brush, slowly and quietly but appeared to feel involved.



- P4 was sweeping the table and joining with P3 who took their gloves off and saw they had soil on their hands and said “I’ve got hands all over my potato” – appeared to have said it the wrong way round on purpose, and it is in line with some of their humour they have previously shown.

11:10 – P1 observation – in pavilion and then walking to vegetable patch

- P1 was washing their hands and asking about why the floor is uneven, the volunteer was explaining about a leak in the kitchen.
- P1 is very independent, drying their hands and then getting their coat on ready to go outside.
- We were walking up the garden to the vegetable patch and chatting about what a nice day it was, we passed one of the other participant’s partners who was helping out with the garden, and we were chatting about what they were doing. P1 couldn’t remember who the participant was by their name but could do so when they were pointed out.
- Sometimes when walking and chatting P1 doesn’t pay attention to things around them and had to be guided to walk back on the path.
- P1 stopped and pointed to two trees, “they’re beautiful” and said their partner and them had been previously admiring them. “Are they the same type?” The volunteer explained that they’re both eucalyptus trees, and that the bark on the trees peels off, one has already happened which is why it is white and the other one is starting to peel. P1 appeared really interested in the trees.

11:15 – All – vegetable patch outdoors

- P3 – was offered a chance to dig the potatoes after saying they wanted to do the digging with a garden fork when the staff member first introduced the activities. P1 then had a go at digging too and was very able to do it.
- P2 and P4 were being passed the potatoes by P1 and P3 and placing them in buckets – it was really nice to see the two pairs of people working together, and people were chatting about the shapes of the potatoes.
- P1 was kneeling down to get the potatoes, and was looking out for worms, making sure they didn’t get caught up in the digging.

11:20 – P2 Observation – vegetable patch outdoors

- P2 was feeling a very small potato that a staff member passed to them to have a look at. They were being supported by two of the staff members, one to hold their arm whilst they were standing and one to help them place the potatoes they were being passed by P3 into the bucket.
- The staff were chatting to P2 and they were smiling. When they were asked to put another large potato into the bucket, P2 was still holding onto the smaller one. When they were dropping the potatoes into the bucket they were watching them fall in.
- P2 said “it’s a charlotte I think”, the staff said yes, that is a variety of potato very similar to this one but these are pink fir potatoes, they’re really nice. P2 “yes they are”, and the staff showed a potato and explained why it was called pink fir potato.
- P2 was smiling and watching the others, they needed help from two of the staff members to walk out of the vegetable garden and stay on the path. When P4 got their walking stick stuck, P2 was laughing. The staff member pointed out the coloured rainbow chard P2 “yes”, and acknowledged the colours. They were guided to the pumpkin patch where P1 and 3 were picking the pumpkins.

11:25 – All – vegetable patch outdoors

- P1 and P3 were sent to pick two of the large pumpkins.
- P1 was able to use the secateurs to cut the stalk of the pumpkin and lift the pumpkin up. They were holding it, waiting to place it in the wheelbarrow. They also spotted that there was something on P3's pumpkin that was moving, and said we needed to get it off.
- P3 placed the pumpkin in the wheelbarrow and was ready to take hold of the wheelbarrow.

11:30 – P4 observation – vegetable patch outdoors and through gardens back to the pavilion

- P4 was walking with one staff member and was stopped by the Jo Malone garden admiring the flowers, and talking about the colours. They were talking with the staff and P3. They chatted all the way back to the pavilion and the staff member had to keep encouraging them to continue walking as they were stopping to look at things.
- They were able to get into the pavilion and were wiping their feet on the mat.
- We then went to sit at the table, and they did so independently but asked whether there was a chair behind them as they went to sit down.

11:35 – All

- At table sorting potatoes into bags.

11:40 – P3 observation - around the activity tables in the pavilion

- P3 was bagging the potatoes and twisting the bag closed. They wanted to wash their hands "I am very fussy with my hands". P3 took themselves off into the kitchen to wash hands and said to the staff member in there "it reminded me of building trains". The staff member asked how does digging potatoes remind you of building trains. P3: "We used to have a garden". They then finished drying their hands and walked back into the activity room. They sat down in a low chair, and said they didn't realise how low it was and laughed to themselves.
- They settled with their coffee and watched other participants coming to join.

11:45 – All

The group sat around with tea and biscuits, people finishing washing their hands.

11:50 – P1 Observation – in lounge in pavilion

- P1 asked could they have a biscuit, told of course you can and they appeared very happy.
- A staff member brought up the rhyme about potatoes ... "1 potato, 2 potato, 3 potato, 4..." P4 was singing along. We played the game as a group, with the staff member saying whoever is last can do the tidying up.
- P1 was joining in the game, and held their hand behind their back when one hand was out. They were content just watching the staff member go round and play the game.
- The staff then showed a video from the British library of children in 1957 playing the game, and P1 was watching the video.

11:55 – All – in lounge in pavilion

- Staff said the P4, you remembered that well, and P4 was laughing.
- The group passed the laptop around so they could watch the video.

- One of the volunteers at the gardens had written the group a poem which one of the staff read out, the poem rhymed and P4 guessed what the end line was (correctly) and joined it.
- The group were passing around the potatoes and were shown a potato peeler that was from Aldi.
- P1 kept repeating the word "Potato" trying to make sure they didn't forget what one was.

12:00 – P2 observation – in lounge in pavilion

- Staff were talking about the onions we were using for the next activity, when they said the onions were small but perfect for a cheese and onion sandwich, P2 said "yes", the volunteer asked "do you like them?" P2 "yes I do".
- The group were talking about a car garage that used to be in Birmingham called Mr Onion's, a staff member said it's near Kings Norton, P2 said "yes it is" and was nodding. We then talked about manufacturing cars in Longbridge, P2 said "yes" and knew that MG rover were there. They were nodding along and aware of what everyone was talking about.
- The group then moved onto talking about Woolworths and how it used to sell everything – P2 was joining in saying "yes" and knew they sold marbles when someone mentioned it. P4 said, "I think it started as x shop" P2 replied "yes it did", and they were watching P3 talking about it with the volunteers.

12:05 – All – in lounge in pavilion

- Participants were finishing cups of tea and P4 was talking about the garden. P3 was talking about them being an electrical engineer with one of the volunteers.
- The group were introduced to the next activity which was onion plaiting and shown one that the staff member had done. P2 was smiling and said their mother did this.

12:10 – P4 observation – around activity table in pavilion

- They were choosing which onion set to pick, and asked for the one on the opposite side of the table. They were spreading the ribbons out when the volunteer passed it to them.
- P4 was able to help with the plaiting and follow instructions with a lot of help verbally and the volunteer pointing to the next ribbon to plait.
- They understood plaiting when the volunteer talked about them plaiting hair and P2 joined in by saying "yes Heidi plaits".
- P4 was chatting about getting in trouble at school and the teacher constantly saying "what are you doing", and the volunteer was laughing along with the participant.
- The volunteer asked what do we do when we get to the bottom – P4 was able to wrap the string around, and was joking and laughing when they wrapped the volunteer's finger up.
- P4 said to the volunteer "I'm so glad I sat by you" and held their hand as they said it.

12:15 – All – around activity table in pavilion

- P1 was cutting their ribbons, and P2 talking about Heidi books about a girl with plaits and replying "yes".
- P3 helping with plaiting.
- P4 laughing with volunteers.

12:20 – P3 observation – around activity table in pavilion

- Helping with plaiting – staff pointing to the ribbon each time, but P3 was able to fold over very carefully and neatly done.
- They were plaiting very tightly and making it all neat and even.
- They were listening and watching the instructions from the staff about tying the string around but said to the staff “you better do this bit”.
- Staff holding the onions whilst P3 cut the string, they were watching the others with what they were doing.
- When the staff said do you want to cut the ribbons “no, I daren’t touch it”.

12:25 – all – around activity table in pavilion

The group were asked did they want to do the onion set planting, P4 said they didn’t and P3 nodded in agreement but P1 expressed an interest. It was suggested we do it as a group, and we moved to the activity table.

P3 was very neat with their arranging and followed verbal instructions of how to place the onions in the pot. P1 was able to do it themselves and partner came to join, and did do the activity assisting them more than we had been doing. P2 needed quite a lot of support to do the activity, and their partner also joined but let the staff take the lead. P4 seemed quite tired but joined in.

## Appendix 19. Group Reflection Transcript

<b>Reflective diary for STH session</b>
<b>Date:</b> 9 <sup>th</sup> October <b>Session:</b> First activity session, flowers and plants <b>Group:</b>
<b>Goals/tasks</b> <i>What do you plan to do? Goals for session. Goals for individuals, where applicable.</i> <ul style="list-style-type: none"><li>- 3 activities revolving around flowers and planting.</li><li>- Meet and introduce activities, play music 'English Country Garden'</li><li>- Activity 1: using plants and tulip bulbs get the participants to plant up a winter pot for the pavilion patio.</li><li>- Activity 2: a walk around the garden to select and cut flowers to use for a flower arrangement. Making the flower arrangement for a small decorated jam jar. These can then be taken home.</li><li>- Activity 3: sowing sweet pea seeds into small pots ready to put in the green house over winter.</li></ul> Main aim: time for people to do something nice in a relaxed environment.
<b>Resources</b> <i>What do you need to buy/source/prepare before the session?</i> <ul style="list-style-type: none"><li>- Plants for potting – winter pansies, golden cypress, eucalyptus, ivy, ornamental cabbages, cyclamen.</li><li>- Bagged compost.</li><li>- Tulip bulbs and sweet pea seeds.</li><li>- Gather small pots for seeds and big pots for plants.</li><li>- Scissors, labels, pens, secateurs, jam jars, aprons, and gloves.</li><li>- Sort table trays out, and tables and chairs.</li><li>- Prepare drinks and snacks.</li></ul>
<b>Reflection</b> <i>Who attended? What actually happened?</i> <ul style="list-style-type: none"><li>- Two participants did not attend the session, so we just had 2 participants.</li><li>- Two volunteers, one researcher and three members of staff.</li><li>- Introduction to session over a cup of tea in the lounge area, we listened to English Country Garden and Tulips of Amsterdam, and talked about what we would be doing this session. The participants were shown a pack of bulbs and some scented roses that had been picked from the gardens were passed around.</li><li>- The first session involved putting soil into a big plant pot, and choosing which plants to plant along with some tulip bulbs. We then watered the plants on the patio.</li><li>- The second activity involved a walk around the Joan Malone garden to select and cut flowers to then make a flower arrangement with. Participants were able to select which flowers they wanted, and cut them themselves if able to. We then went back inside the pavilion to create a flower arrangement for a small jam jar.</li><li>- We then had a coffee and biscuits and listened to some more music.</li><li>- The final activity involved sowing sweet pea seeds into small plant pots and labelling them up ready for the green house.</li><li>- The session ended, and we invited the partners of both participants to see what we had done during the session.</li></ul>
<b>What went well?</b> <ul style="list-style-type: none"><li>- One participant (P1) was able to follow the task, and took the lead with arrangement and grew in confidence and said 'I often go with what other people like' but seemed to enjoy doing what she liked. Both participants seemed settled and happy.</li><li>- It was quite good that the two who didn't meet got a chance to meet before the whole group met (as the other two participants know each other).</li><li>- Enough volunteers, 1:1 was important and it was good that people switched who they were working with. Feel like there would be enough for the other two participants as well.</li></ul>

- The music was really successful – evoking memory, P1 was animated and singing and P2 who is a keen musician knew the artist. The music resulted in an instant reaction off people. It was nice at the beginning and during the coffee break – less formal.
- Doing an indoor task then going outdoors was good, also good to be able to open the doors and be connected to nature.
- Using the pavilion, it is a good practical space.
- The participants visibly grew in confidence during the session.
- There was evident enjoyment and laughter. Overall a lovely session and they left happy. P1 was hugging everyone goodbye and seemed very happy.
- Being able to take something home, it would be good to try and do this every week.

#### **What went less well?**

- It didn't not go well, but we could have made the sweet pea instructions simpler although P1 actively engaged with the instructions and read them. They read to tamper gently and was told to 'go gently' but decided 'I want to do it hard', they hadn't misunderstood the instructions they just wanted to do it their way.
- Table layout although it looked very visual, it was a bit cluttered so maybe in future we could add stuff as we go.

#### **What did you learn?**

##### **Plans/Actions for next time**

- Positioning of participants when planting the winter container and filling with soil, working out whether it was best to have people in sitting or standing. Agreed that if possible it was easier to keep people in standing.
- Even in poor weather try and do a walk outside.
- P2 has previously shown distress and we've been advised to not ask them open questions or ask them to make decisions. Today they were able to selected flowers they wished to plant, and choose their own drink.
- The pansies and other plants had been pre-prepped so that they easily came out of the plant pots so the participants were more able to do this independently.
- Plants for these activities were quite cost intensive, although we didn't have to buy pots. We are trying to keep the overall cost under £500. Some things are one-off costs.
- The sweet pea seeds were small, we could begin a future programme with big seeds and progress to smaller seeds. P2 found it more difficult handling the seeds, the staff member working with them tried different methods of handling them and the equipment and worked out the best way of doing it was to place single seeds in their hands and help them to pick it up and place in the soil. Sometimes they got tired of doing the activity.
- Think about what part of the activities could result in something for each participant to take home with them. This could tie into the arts/crafts activities planned.
- The set up beforehand is crucial, the dry weather helped.
- Preparing enabled the staff to go through the activity in their head and check they had everything, and the time to go and fetch things they needed. Useful having a spare set of hands during the session to pass and fetch things.

Appendix 20. Full Codebook Study 2

Parent Node	Child Node	Short definition	Full definition	When to use	When not to use
Understanding (level of)	Verbalising oneself	Participant verbalising, not in response to a direct question	An instance of a participant verbalising oneself by making a statement, sharing a story or contributing to a discussion.	Use this code to capture participants verbalising oneself either spontaneously or within a discussion.  Likely double coding with verbal engagement.	Do not use this code if a participant is responding to a question or directly asking a question, use other codes within 'understanding'.
	Responding to questions	Participant responding to a question	Participant responding to a question asked to them or to the group.	Use this code to capture participants responding to questions asked to them.  May double code with verbal engagement and 1:1/unstructured or structured group working.	Do not use this code if a participant is sharing a story or verbalising not in response to a specific question. Use verbalising oneself as an alternative code.
	Awareness	Participants level of awareness	Participant behaviour that indicates their level of awareness during the activities or discussions that are taking place.	Use this code to identify examples of behaviour that suggest the level of awareness a participant has during the activity or discussions within the group. More general behaviours rather than specific ability to engage and	Do not use this code where participants are actively enquiring, use alternative codes, or for behaviours relating to following specific instructions.

				<p>follow instruction.</p> <p>May also double code with active/passive participation and codes within facial affect and behaviour.</p>	
	Actively enquiring	Participant asking questions or seeking answers or instruction	Incidence of participants actively asking questions and seeking to find answers or advice from others.	<p>Use this code for any verbalisation that represents the participant asking questions or seeking a response.</p> <p>Likely double code with verbal engagement. Could also be coded with requires assistance.</p>	Do not use this code unless a specific question has been asked by the participant, use alternative codes in 'understanding'.
	Ability to follow instructions	Participant ability to follow instructions during activities	Incidence of participants demonstrating their ability to follow instructions in order to engage with activities.	<p>Use this code for behaviours relating to the ability to follow (or not) instructions during activities.</p> <p>May code with either passive or active engagement.</p>	Do not use this code for direct questions, this code is more related to physical behaviours than verbalisation.
Sensory Stimulation	Seeking SS	Participants seeking out sensory stimulation	Participant behaviour and engagement that demonstrates them seeking some form of sensory stimulation from the	Use this code for behaviours relating to the seeking of sensory stimulation and actions of engaging different senses.	Do not use this code to record a response to sensory stimulation, use the response code specifically to distinguish between seeking and



			activity or environment.	May code with active or passive engagement and other behaviours.	responding/resulting behaviours.
	Response to SS	Participants response to sensory stimulation	Participant response and reactions to sensory stimulation demonstrated through their behaviours or actions.	Use this node to record the response to/reaction to/result of sensory stimulation.  Likely double coding with reminiscence and a behaviour.	Do not use this code to record the seeking of sensory feedback, use the seeking code specifically.
Support	Requires assistance	Participant requires assistance to participate in activity	Participant behaviour indicating they require assistance to participate in a particular activity.	Use this code for behaviours that suggest a participant requires assistance to be able to engage within the activity.  Likely to be coded with one from directed activity and engagement.	Do not use this code in isolation if reasons for requiring assistance are also given, expecting most data to be multiple-coded.
	Independent	Participant able to independently participate in activity	Participant behaviour indicating they are able to engage with the activity independently and do not require assistance to engage.	Use this code for behaviours that suggest the participant is able to independently engage successfully with the activity.  Likely to be coded with one from directed activity and engagement.	Do not use this code in isolation if further reasoning to suggest why a participant is able to be independent, use with other codes.

	Caregiver	Participant required caregiver support	Participant behaviour indicating they required caregiver support to engage with the activities	Use this to code incidences where the caregivers provide support for participants.	Do not use this code in isolation if reasons for requiring assistance are also given, expecting most data to be multiple-coded.
Group dynamic		Data relating to the group dynamic	Data that relates to elements and changes to the group dynamic during the activity sessions	Use this code where data relates to the overall group dynamic. Might also be coded to support and directed activity.	Do not use to code individual relationships and communications, use alternative codes in support, engagement and directed activity.
Facial Affect	Tiredness	Participant showing signs of tiredness	Participant behaviour that suggests tiredness during activities.	Use for behaviours suggesting tiredness. Might be also coded to behavioural codes and level of engagement.	Do not use to code for other facial affect.
	Sadness	Participant showing signs of sadness	Participant behaviour that suggests sadness during activities.	Use for behaviours suggesting sadness. Might be also coded to behavioural codes and level of engagement.	Do not use to code for other facial affect.
	Interest	Participant showing signs of interest	Participant behaviour that suggests the participant is interested during activities.	Use for behaviours suggesting a level of interest in activities. Might be also coded to behavioural codes and level of engagement.	Do not use to code for other facial affects.
	Happiness/pleasure	Participant showing signs of happiness/pleasure	Participant behaviour that suggests happiness or	Use for behaviours suggesting happiness and/or pleasure	Do not use to code for other facial affects.

			pleasure during activities.	during activities. Might be also coded to behavioural codes and level of engagement.	
	Content/null	Participant showing no obvious behaviours	Participant behaviour that suggests being content during activities or displaying no obvious behaviours indicative of their feelings.	Use for to record behaviours or actions which suggest the participant is content, or if no specific emotive behaviours are observed. Might be also coded to behavioural codes and level of engagement.	Do not use to code for other facial affects.
	Anxious/worried	Participant showing signs of anxiousness/worry	Participant behaviour that suggests anxiousness/worry during activities.	Use for behaviours suggesting the participant is anxious or worried. Might be also coded to behavioural codes and level of engagement.	Do not use to code for other facial affects.
Environment	Trust	Data relating to feelings or experiences of trust	Data relating to participants including caregivers and staff reporting or indicating feelings and experiences of trust during activities.	Use this code for data that implies feelings or experiences of trust, if further feelings are given/indicated this may be coded in additional codes.	Do not code generic behaviours assuming a level of trust.
	Comfort	Data relating to feelings or experiences of comfort	Data relating to participants including caregivers and staff reporting or indicating feelings and experiences of	Use this code for data that implies feelings or experiences of comfort, if further feelings are given/indicated this may be	Do not code generic behaviours assuming a level of comfort.

			comfort during activities.	coded in additional codes.	
Enjoyment		Data suggesting or indicating enjoyment	Data relating to participants including caregivers and staff suggesting or indicating enjoyment.	Use to code for any data relating to levels of and incidence of enjoyment displayed by any participants. Data relating to participant behaviour is likely to be coded under positive behaviours such as happiness/pleasure.	Do not use to repeat code positive behaviours, ensure that a level of enjoyment is suggested.
Engagement	Passive participation	Participant passively participating in an activity	Participant behaviour and observed actions that indicate the participant is engaged in the activities passively.	Use to code for behaviours and incidences where the participant is passively participating, and is not playing an active role in the activity itself. Likely to be coded with directed activity and physical ability.	Do not code incidence where a participant requires help which then enables them to take an active role in an activity, this should be coded as requiring assistance in physical ability.
	Active participation	Participant actively participating in an activity	Participant behaviour and observed actions that indicate and demonstrate the participant is actively participating in the activity.	Use to code for behaviours where the participant is actively participating. Likely to be coded with directed activity and physical ability.	Do not code general observations about participant's physical ability to be independent and engage with activities unless specifically demonstrated.
	Other hobbies	Data relating to other outdoor	Data relating to other outdoor	Use to code for data about	Do not code other activities

		and nature-based hobbies or activities	and nature-based hobbies and activities that participants currently engage in or have done so throughout their lifetime.	participants wider hobbies and interests, relating to outdoor and nature-based activities.	participants might engage in during the sessions.
	Beyond Martineau Gardens	Data relating to activities continued beyond the sessions	Data relating to continuation of the activities done during the sessions once the participants are home.	Use to code for data about participants and caregivers continuing or reflecting on activities that were done during the sessions once they have returned home.	Do not code for other hobbies and activities that were not initiated by this activity programme, this should be coded under 'Other hobbies'.
Directed activity	Unstructured group	Working as a group that has not been pre-planned	Participants are working within a group setting for no specific purpose or common group aim.	Use this code for observations where participants are working within a group environment that is either spontaneous or has no clear objective or aim but involves participants working together.	Do not code data which involves 1:1 or solitary work even if sitting in what appears to be a group, use specific codes.
	Structured group	Working as a group that is planned and structured	Participants are working within a planned and specific group setting to achieve a collective goal as a group.	Use this code for observations where participants are working within a group environment that has been pre-planned and the group are working	Do not use this code for 1:1 or solitary work if it can be specifically identified, use specific codes.

				together to achieve a common goal or aim, either as a group or simultaneously.	
	Solitary	Working on their own	Participants are working on their own, they may be sitting within a group but they are not engaged with anyone else.	Use this code to record when participants are working entirely on their own, this may be coded with independent physical ability.	Do not use this code to document level of physical ability, some codes may be double coded but a participant may be working solitary but require assistance to engage fully with the activity.
	1:1	Working 1:1 with another person	Participants are working solely with one other during an activity.	Use this code where participants are working directly with one other, usually a volunteer/staff member. Likely to be coded with requires assistance and active engagement.	Do not use this code to only document the level of assistance required, likely to double code but not exclusive.
Change in behaviour		Data relating to a change in behaviour	Data relating to an observed or reported change in participant behaviour, either negative or positive.	Use this code when a change in behaviour is observed or reported, it is likely that this data will be coded to a particular prevalent behaviour.	Do not use this code to document a change in behaviour from a previous observation.
Behaviour	Verbal engagement	Participant displaying verbal engagement	Participant displaying verbal engagement	Use this code when a participant exhibits verbal	Do not use this code if there is no engagement within the

			with another participant, volunteer or staff member in any capacity.	engagement, will likely code within understanding either in verbalising oneself, responding to questions or actively enquiring.	verbalising, not directed to another person. An exclusion for this code is specific verbal engagement which involves reminiscence, code directly to the specific reminiscence code.
Satisfaction	Participant showing signs of being satisfied	Participants display behaviours that indicate feelings of satisfaction.	Use this code for behaviours and observations that demonstrate satisfaction of participant. May include verbalisation to confirm satisfaction or facial affect.	Do not code incidence of happiness and pleasure without argument for feelings of satisfaction.	
Reminiscence	Participant engaging in reminiscence behaviour	Participants engage in reminiscence behaviour or activity.	Use this code for observations of reminiscence in behaviour and activity of participants. Likely to be coded with verbalising oneself, and expected link to sensory stimulation.	Do not code in isolation if possible to suggest causation of reminiscence (questioning, sensory stimulation) and affect of reminiscence.	
Symptoms of dementia (other)	Any display of symptoms associated with dementia except cognitive deficit	Participants display behaviours that are associated with symptoms of dementia, and specifically their type of dementia.	Use this code for any behaviours that are related to symptoms of dementia, or that can be explained by particular symptoms.	Do not code behaviours relating to cognitive deficit, use the specific code.	

	Non-verbal engagement	Non-verbal engagement demonstrated	Participants display non-verbal engagement behaviours during activities towards or with others.	Use this code for any non-verbal engagement, this could also be coded with understanding and facial affect.	Do not code any non-verbal behaviours which do not suggest an attempt to engage in either an activity or with another person.
	Display of character	Any activity suggesting participants character	Participants demonstrating behaviours that indicate their character or personal qualities that are not associated to dementia.	Use this code to document any behaviours which relate to individual displays of character and personality that are not associated with dementia symptoms. These may be coded to other codes depending on what they are.	Do not use to code any behaviours which are a result of dementia symptoms.
	Cognitive deficit	Participant showing signs of cognitive deficit	Participant's specific behaviours that indicate their level of cognitive deficit relating to dementia.	Use to code for behaviours relating to cognitive deficit level, if this is linked to level of physical ability or engagement double-code as appropriate.	Do not code other dementia symptoms, use specific code.
Alertness	Visual scanning	Participant engaging in visual scanning	Participant engaged in repeated visual scanning as the primary behaviour.	Use this code where a participant is primarily engaging in visual scanning during activity or engagement. May be linked to facial affect.	Do not use this code unless participant is explicitly visually scanning and it is their predominant behaviour.



	Maintaining eye contact	Participant maintaining eye contact	Participant engaged in repeated maintenance of eye contact as the primary behaviour.	Use this code where a participant is primarily engaging in maintaining eye contact during activity or engagement. May be linked to facial affect and understanding.	Do not use this code unless the participant is maintaining eye contact for a prolonged period and it is their predominant behaviour.
	Fixation on object/person	Participant engaged in fixation on an object or person	Participant engaged in repeated fixation on a person or object as the primary behaviour.	Use this code where a participant is primarily engaging in fixation of an object or person during activity or engagement. May be linked to facial affect and understanding.	Do not use this code unless the participant is fixated for a prolonged period and it is their predominant behaviour.
Activity feedback		Data relating to participant feedback about the activities	Data relating to participant feedback about the successful or unsuccessful elements of activities and recommendations for any changes	Use to code participant feedback about activities and any suggestions.	Do not use to code negative participant responses in behaviour or engagement observed, code to behaviour and engagement codes.

## Appendix 21. IRAS Ethics Approval Study 3

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Appendix 22. Coventry University Full Ethics Approval Study 3



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## Appendix 23. Gatekeeper Letter Bournville Gardens

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## **A pilot programme of outdoor activities for people living in a retirement village.**

### **PARTICIPANT INFORMATION SHEET**

You are invited to take part in a research project, this sheet will explain what the research is about and what will happen if you choose to take part.

#### **What is the purpose of the study?**

To offer you the chance to take part in a number of outdoor activities and nature-based activities and to see if taking part has any impact on your physical and mental well-being.

#### **Why have I been chosen to take part?**

You are invited because you are living at Bournville Gardens, and we think you will enjoy the activities we are offering as part of the project.

#### **What are the benefits of taking part?**

We hope firstly that you enjoy taking part in the different activities we have to offer both at Bournville Gardens and at local places in Birmingham. By taking part you will be helping us to better understand the impacts that outdoor and nature-based activities can have on physical and mental well-being, and how we could offer more outdoor activities in the residential village.

#### **Are there any risks associated with taking part?**

There are no significant risks associated with participation in this research. This study has been reviewed and approved by ethics committees at Coventry University and the national Health Research Authority. All activities and off-site visits have been fully risk assessed.

#### **Do I have to take part?**

No – it is entirely up to you. You can decide whether you would like to take part or not.

#### **What will happen if I decide to take part?**

You will be given a timetable of activities that will be offered during the 12-week programme and can choose which you would like to take part in. We will ask for your commitment to off-site visits at in advance so we can arrange transport. At the start of the project you will be asked to complete a number of tasks to explore your physical function and mental well-being, including wearing an activity monitor (similar to a wrist watch) for 5-days. You will then be invited to take part in a wide variety of outdoor and nature-based activities over 12-weeks. During the activities the researcher will be carrying out observations to explore whether the activities are suitable for the group and whether people are enjoying them. You will also be asked to share with us why you chose to attend each activity, and how you have felt during and after the activities. Once the 12-week programme is completed we will repeat the tasks you did in the first week to re-measure physical function and mental-wellbeing.

### **Withdrawing**

You are free to withdraw your information from the project data set until the data analysis begins in August 2019. Your fully anonymised data may be used in the production of formal research outputs (e.g. journal articles, conference papers, theses and reports). If you do want to withdraw then you can tell the Locksmith or Molly who will make sure this is possible. You do not need to give a reason. A decision to withdraw, or not to take part, will not affect you in any way.

### **Data Protection and Confidentiality**

Your data will be processed in accordance with the General Data Protection Regulation 2016 (GDPR) and the Data Protection Act 2018. All information collected about you will be kept strictly confidential. All data will be referred to by a unique participant number rather than by your name. Your data will only be viewed by the researcher/research team. All electronic data will be stored on a password-protected computer file on the Coventry University secure server. All paper records will be stored in a locked filing cabinet in the Centre for Arts, Memory and Communities at Coventry University.

### **Data Protection Rights**

Coventry University is a Data Controller for the information you provide. For more details, including the right to lodge a complaint with the Information Commissioner's Office, please visit [www.ico.org.uk](http://www.ico.org.uk). Questions, comments and requests about your personal data can also be sent to the University Data Protection Officer - [enquiry.ipu@coventry.ac.uk](mailto:enquiry.ipu@coventry.ac.uk)

### **What will happen with the results of this study?**

The results of this study may be summarised in published articles, reports and presentations. Quotes or key findings will always be made anonymous in any formal outputs unless we have your prior and explicit written permission to attribute them to you by name. You will also be invited to attend a presentation given by the PhD researcher at Bournville Gardens which will share the findings of the research with everyone who took part.

### **Disclosure**

Whilst we seek to maintain your anonymity throughout this project, should you disclose anything which we believe puts yourself or others at harm then we have a duty to report this to an appropriate person either through Coventry University or to a staff member at Bournville Gardens. Where safe and appropriate to do so, we will let you know if we are going to have to follow a disclosure procedure.

### **Making a Complaint**

Content removed on data protection grounds

**INFORMED CONSENT FORM:**

**A pilot programme of outdoor activities for people living in a retirement village.**

You are invited to take part in a research project, this sheet asks you to state that you are willing to take part and that you understand what is involved. You will have discussed, and been given, the information sheet which tells you all about the project and the research.

Please ask any questions you have about the research or if anything is unclear. If you are happy to take part, please circle YES against each of the statements and sign your name.

1	I confirm that I have read and understood the <u>Participant Information Sheet</u> for the above study and have had the opportunity to ask questions	YES	NO
2	I understand my participation is voluntary and that I am free to withdraw my data, without giving a reason, by contacting the lead researcher and the Research Support Office <u>at any time</u> until the date specified in the Participant Information Sheet	YES	NO
3	I have noted down my participant number (top left of this Consent Form) which may be required by the lead researcher if I wish to withdraw from the study	YES	NO
4	I understand that all the information I provide will be held securely and treated confidentially	YES	NO
5	I am happy for the information I provide to be used (anonymously) in academic papers and other formal research outputs	YES	NO
6	I agree to take part in the above study	YES	NO
7	I agree for staff at Bournville Gardens to give the researcher medical information about cognitive health, falls and hospital admissions, and frailty.	YES	NO

**Thank you for your participation in this study. Your help is very much appreciated.**

<b>Participant's Name</b>	<b>Date</b>	<b>Signature</b>
<b>Researcher</b>	<b>Date</b>	<b>Signature</b>

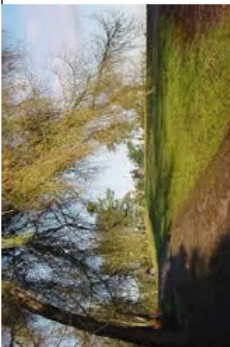
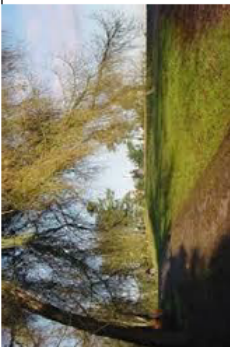
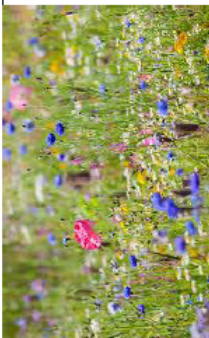
## JUNE PROGRAMME

Week	Monday	Tuesday	Wednesday	Thursday
10th June MORNING	<p>Cannon Hill Park and pond walk, visit to the café 10:30am-12:30pm Meet at 10am in the entrance to Bournville Gardens</p> 	<p>Quick growing vegetables 10:30am-12:30pm Activity room/garden area at Bournville Gardens</p>	<p>Building Insect Houses 10:30am-12:30pm Activity room/garden area at Bournville Gardens</p>	<p>Outdoor games 10:30am-12:30pm Activity room/garden area at Bournville Gardens</p>
10th June AFTERNOON	<p>Art Group 2-4pm Craft Room at Bournville Gardens</p> 	<p>Art Group 2-4pm Craft Room at Bournville Gardens</p>	<p>Friends of Manor Farm Park Talk 1-3pm Activity room at Bournville Gardens</p>	<p>Reminiscence 2-4pm Activity room at Bournville Gardens</p>
17th June MORNING	<p>Martineau Gardens visit and activity 10:30am-12:30pm Meet at 10am in the entrance to Bournville Gardens</p>	<p>Making Bird Feeders 10:30am-12:30pm Activity room/garden area at Bournville Gardens</p>	<p>Walking Club – Tree Mapping of site 10:30am-12:30pm Activity room/garden area at Bournville Gardens</p> 	<p>Outdoor Games 10:30am-12:30pm Activity room/garden area at Bournville Gardens</p>
17 <sup>th</sup> June AFTERNOON		<p>Art Group 2-4pm Craft Room at Bournville Gardens</p>		<p>Reminiscence 2-4pm Activity room at Bournville Gardens</p>

## JUNE PROGRAMME

Week	Monday	Tuesday	Wednesday	Thursday
24th June MORNING	<b>Woodgate Valley Farm Visit</b> 10:30am-12:30pm Meet at 10am in the entrance to Bournville Gardens 	<b>Jam jar flowers</b> 10:30am-12:30pm Activity room/garden area at Bournville Gardens	<b>Outdoor Games</b> 10:30am-12:30pm Activity room/garden area at Bournville Gardens	<b>Morning Walking Club – flower mapping on site</b> 10:30am-12:30pm Activity room/garden area at Bournville Gardens
24 <sup>th</sup> June AFTERNOON		<b>Art Group</b> 2-4pm Craft Room at Bournville Gardens		<b>Reminiscence</b> 2-4pm Activity room at Bournville Gardens
1 <sup>st</sup> July MORNING 	<b>Martineau Gardens - Visit</b> 10:30am-12:30pm Meet at 10am in the entrance to Bournville Gardens	<b>Sowing Sunflower Seeds and wild flowers</b> 10:30am-12:30pm Activity room/garden area at Bournville Gardens	<b>Outdoor Games</b> 10:30am-12:30pm Activity room/garden area at Bournville Gardens 	<b>Planting broad beans</b> 10:30am-12:30pm Activity room/garden area at Bournville Gardens
1 <sup>st</sup> July AFTERNOON		<b>Art Group</b> 2-4pm Craft Room at Bournville Gardens		<b>Reminiscence</b> 2-4pm Activity room at Bournville Gardens



<b>Date/Time</b>	<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>
<b>8<sup>th</sup> July Morning</b>	<b>Lickey Hills Woodland Walk</b> 10:15am meeting in the reception of Bournville Gardens. Taxi transport, back at 12:15. 	<b>Nature Clay Coasters</b> 10:30-12:30 in Activity Room	No Activity	No Activity
<b>8<sup>th</sup> July Afternoon</b>		<b>Art</b> 2-4pm Craft Room	No Activity	<b>Reminiscence</b> 2-4pm in Activity Room This will go ahead as usual.
<b>15<sup>th</sup> July Morning</b> <b>Anni will be off this week!</b>	<b>Martineau Gardens</b> 10:15am meeting in the reception of Bournville Gardens. Taxi transport, back at 12:15.	<b>Surprise Craft Activity with a special visitor</b> 10:30-12:30 Activity Room	<b>Raft Building</b> 10:30-12:30 Activity Room	<b>Walk to boating lake to sail rafts</b> 10:30-12:30 Meeting in Activity Room
<b>15<sup>th</sup> July Afternoon</b>		<b>Art</b> 2-4pm Craft Room – with Molly	<b>Guest Speaker or a Quiz</b> 2-3pm Activity Room	<b>Reminiscence</b> 2-4pm in Activity Room – with Molly

## Appendix 27. Activity Planning with CST Principles

<b>CST Principle</b>	<b>Cannon Hill Park</b>	<b>Sowing quick growing vegetable seeds</b>	<b>Insect Houses</b>	<b>Manor Farm Park Talk</b>	<b>Games Session</b>
<b>Mental stimulation (including multi-sensory stimulation)</b>	<p>Stimulation of being in a different and potentially new outdoor environment. Walking activity requiring physical activity and encouraging wayfinding.</p> <p>Participants engaging with the environment, looking for different birds.</p>	<p>Stimulation through following instructions and visual demonstration to compete activity. Multi-sensory stimulation from touching the compost. Fine motor skills and coordination when sowing the seeds. Engaging participants in discussions about growing fruit and vegetables.</p>	<p>Stimulation through following instructions and visual demonstration to compete activity. Doing something new which participants probably haven't ever done before. Using fine motor skills and coordination.</p>	<p>Listening to a talk about the local history of the area and about Manor Farm Park, encouraged to ask questions about the local area and share their own memories.</p>	<p>Outdoor games involving coordination and indoor games (wet weather plan) involving thinking and coordination – outdoor activities – dealing with many unpredictable stimuli. Word search testing ability to recognise letters and put them together.</p>
<b>New ideas, thoughts and associations</b>	<p>Participants looking out for different birds and completing the activity sheet to record them. Participants encouraged to discuss different types of birds in the UK that live near water whilst walking around the pond.</p>	<p>Talking about what the seeds would grow into and what we could then use the vegetables for. Getting participants to look at the photographs on the seed packets.</p>	<p>Talking about different insects and what we could do to protect insects that are dying out.</p>	<p>Many participants may not know about the park, those who do would be actively encouraged to take part in sharing their memories of it.</p>	<p>Introducing potentially new games and getting participants to do something they don't usually do.</p>
<b>Orientation both sensitively and implicitly</b>	<p>Orientating to a new environment by walking around the park using the footpaths, encouraging participants to decide where to walk and guiding them back to the start.</p>	<p>Spatial awareness in the trays, getting participants to arrange seeds as you would in an allotment.</p>	<p>Spatial awareness – putting the things into the tin can. Hanging the insect houses outside, thinking about where the insects might come from</p>	<p>Talking about the site that Bournville Gardens is on, in relation to the surrounding area, getting participants to think.</p>	<p>Being outdoors in the gardens, included the walk to/from as part of the activity, getting participants to decide where the best place to</p>

			and where the best places are.		do the activity is.
<b>Opinions rather than facts</b>	Asking questions to participants about what they think plants/animals are – and allowing participants to share their knowledge rather than just telling them facts.	Asking questions about what types of fruit and vegetables participants have grown, talking about what we can use them for and which we like and don't like and why.	What they want to put into and onto their tin can – how they are going to welcome the insects.	Encouraging participants to share their own memories about how the local area used to look. Whilst also sharing some factual information.	Just having fun, asking participants how they want to play. For the indoor games – a quiz/word searchers - some of the questions were specifically designed to be guessing ones – so it would provoke discussions between the teams and enabling people to guess.
<b>Using reminiscence to aid here and now</b>	Asking participants if they have visited before, encouraging them to share memories and stories.	Talking about growing vegetables and having an allotment. Encouraging participants to share their memories.	Talking about creepy crawlies and whether anyone used to go insect hunting.	Talking about history of the area, sharing stories and memories.	Encouraging discussions about the outdoor games people have played in their lives.
<b>Providing triggers to aid recall</b>	Spotting sheets had photos and the names of different birds, participants had to tick which ones they had seen.	Instruction sheets and seed packets with photographs to show the participants what the seeds should grow into	Instruction sheets, and a tin insect house that was made earlier to help participants see what we are trying to make.	Guest speaker bringing in photographs of the local area and park to help encourage memories and also talking about the area.	Gave out some clues in the quiz for answers that people might know but need help remembering
<b>Continuity and consistency</b>	This is the first off-site activity on a Monday, continuing these trips each	Using a session structure that will be used	Continuing the same session structure.	Continuing the same session structure.	Continuing the same session structure.

	week at the same time for continuity.	throughout, getting participants used to how activities will be delivered and seeing if it is effective. Discussing about the growing cycle for the vegetables and how we need to water them and wait for the seedlings to appear.	Making the insect houses and then going into the gardens to hang them up at the end of the session. Will go and check on them during one of the outdoor activities next week.		Outdoors at Bournville Gardens.
<b>Implicit learning</b>	Encouraging group to start walking and introducing the activity as we start, just by getting them to point out birds they have seen and talking about whether they know the types of birds before looking on the activity sheets.	Offer written instructions and visual demonstrations but encourage participants to begin activity and learn through doing, offering support and guidance where needed.	Offer written instructions and visual demonstrations but encourage participants to begin activity and learn through doing, offering support and guidance where needed.	Asking questions, engaging in conversations.	Rather than giving lots of instructions, basic instructions and start participants playing the game and learn and improve skills through doing it.
<b>Stimulating language</b>	Consider the way activities are introduced, make them sound exciting and interesting by drawing on the interests of the participants who are attending.	Consider the way activities are introduced, make them sound exciting and interesting by drawing on the interests of the participants who are attending.	Consider the way activities are introduced, make them sound exciting and interesting by drawing on the interests of the participants who are attending.	Consider the way activities are introduced, make them sound exciting and interesting by drawing on the interests of the participants who are attending.	Consider the way activities are introduced, make them sound exciting and interesting by drawing on the interests of the participants who are attending.
<b>Stimulating executive functioning</b>	Engaging participants in activities which require focus and attention, encouraging active participation and asking questions	Engaging participants in activities which require focus and attention, encouraging active participation	Engaging participants in activities which require focus and attention, encouraging active	Engaging participants in activities which require focus and attention, encouraging active	Engaging participants in activities which require focus and attention, encouraging active

	about interests and life history to prompt memory	and asking questions about interests and life history to prompt memory	participation and asking questions about interests and life history to prompt memory	participation and asking questions about interests and life history to prompt memory	participation and asking questions about interests and life history to prompt memory
<b>Person-centeredness</b>	Knowing who is coming and what level of support they need, making sure there are sufficient volunteers. Make sure volunteers have an understanding of the interests of participants and encourage them to engage by pointing out things which individuals might enjoy. Ask participants what they would like to do in the activity with different walk options.	Knowing who is coming and what level of support they need, making sure there are sufficient volunteers. Make sure volunteers have an understanding of the interests of participants.	Knowing who is coming and what level of support they need, making sure there are sufficient volunteers. Make sure volunteers have an understanding of the interests of participants	Knowing who is coming and what level of support they need, making sure there are sufficient volunteers. Make sure volunteers have an understanding of the interests of participants	Knowing who is coming and what level of support they need, making sure there are sufficient volunteers. Make sure volunteers have an understanding of the interests of participants
<b>Respect</b>	Activity delivered in a respectful and ethical way, respect participants, be empathetic and patient.	Activity delivered in a respectful and ethical way, respect participants, be empathetic and patient.	Activity delivered in a respectful and ethical way, respect participants, be empathetic and patient.	Activity delivered in a respectful and ethical way, respect participants, be empathetic and patient.	Activity delivered in a respectful and ethical way, respect participants, be empathetic and patient.
<b>Involvement</b>	Encourage participants to engage in wayfinding and spotting different birds. Engage all participants in conversation and ask them questions.	Each person had their own tray to work on. Support was provided when people asked for it, but participants encouraged to have a go themselves.	Each person had their own insect house to work on. Support was provided when people asked for it, but participants encouraged to have a go themselves.	Activity available for everyone to attend. Asking questions about whether participants know the park.	Activity available for everyone to attend. Games can be played seated or standing.
<b>Inclusion</b>	Making sure that all participants can attend, accessible transport and	Making sure all participants are included in discussions	Making sure all participants are included in discussions	Inclusive to anyone, not off-site so people in	Encouraging group games and working together.

	enough volunteers to support those with mobility needs.	and the activity, accommodate any needs so everyone can take part.	and the activity, accommodate any needs so everyone can take part.	W/C and with less confidence were able to join. Encouraging everyone to engage in discussions whether they know the park or not.	
<b>Choice</b>	Choice of short or long walk, getting people to pick which they would like to do and giving them an option of routes.	Participants choosing which seeds to plant based on what vegetables they like and can arrange in their trays however they like (patches or rows)	Participants able to choose how to make their insect house and what to include in it. Also encouraged to decorate them. Participants can choose if they want to put them on their own balcony or in the garden and encouraged to choose the best place.	Participants are able to choose whether to come to activities or not, and whether to just sit and listen or engage in conversation.	Participants have a choice of outdoor and indoor games.
<b>Fun</b>	Taking them to a new environment, lots to look at and talk about. Encouraging discussions and sharing memories of visiting parks.	Doing something they may not have done before. Encouraging discussions and sharing memories about growing vegetables, asking participants who used to garden or have allotments about what they grew.	Doing something they may not have done before. Encouraging discussions about insects and animals.	Hearing from someone different about the local area and linking with interests in local history.	Outdoor and indoor games designed to be fun and interesting not about winning. Made quiz questions fun and will try to encourage lots of group/team discussions
<b>Maximising potential</b>	Supporting participants to be able to walk around the park and engage	Supporting participants where needed and adapting	Supporting participants where needed and adapting	Asking the guest speaker to ask	Selection of outdoor games that don't require

	in the activities, whilst also maintaining independence where possible.	activities for example lifting the bowl of compost and enabling someone to just pull it out instead of using the trowel. Trying to allow people to be as independent as possible.	activities for example the bamboo was cut beforehand so the activity was focused on making the houses with the resources so people of all abilities could be involved.	questions to the participants and speak clearly and use simple language so everyone can understand.	complex skills or abilities and can be done seated or standing. Indoor games not too difficult.
<b>Building/strengthening relationships</b>	First time the group has been together as a group, encourage conversation.	Encouraging group working sharing equipment and encouraging discussion amongst the group.	Encouraging group working sharing equipment and encouraging discussion amongst the group.	Encouraging group discussions.	Working in teams and group-based games.
<b>Adaptations made prior</b>	Offer of a shorter and longer walk – followed by meeting in the café to discuss the bird spotting sheets and have a hot drink.	Seeds separated so participants could see the different seeds – some bigger than others and easier to see. Also putting compost into washing up bowls onto tables so people do not need to lift the bags of compost onto the tables.	Cut the bamboo which was originally going to be for the participants to do but it was very difficult.	Changing the layout of the activity room so everyone can be sat in a circle.	Due to weather we moved to indoor games and did a nature based quiz and word searches.
<b>Adaptations made during (reflection)</b>	Due to the weather we stuck to the main paths, and did a walk around the lake beginning together and then those who wanted to continue a bit further could do so.	Using the pale coloured seeds with some participants rather than the black lettuce and spring onion seeds.	Some participants needed help threading the string through the hole at the bottom of the tin can but most participants were very independent.	Asking the guest speaker to talk a bit louder as some participants not able to hear.	Adding more option questions in the quiz so adding A/B/C options as participants found this easier to join in with

# Quick Growing Vegetables

## What do we need?

- Seeds
- Trays
- Compost
- Gloves (if you want to wear them)
- Trowel
- Labels

We have: radish, little gem lettuce, mixed salad leaves & spring onions.



1. Put a layer of soil into the trays, fill them about  $\frac{3}{4}$  full.
2. Use the trowel to pat down the soil so that it is level.
3. Decide which seeds you would like to plant, and tip out the number of seeds you would like.
4. Sow your seeds in rows, leaving enough space between each one so they have space to grow – this will need to be at least 3 inches for radish and spring onion seeds.
5. Once you have placed your seeds into the soil, sprinkle a thin layer of soil on top and water.
6. Keep the soil moist, seedlings usually appear in 7-14 days. Keep watering your vegetables.
7. Your salad leaves can be cut in the morning and evening when they are ready to eat.
8. The radish and spring onions will be ready to harvest in 6-8 weeks.



## Appendix 29. Observation Transcript Study 3

Date	Time	Activity
17 <sup>th</sup> June 2019	10:30-12:30	Martineau Gardens, walk to the pavilion, intro about the gardens, walk around the woods to little leaf, cup of tea and walk back through the gardens – pond area

Well-Being Domain	Observation Field Notes
Interest	<p>P1 asking questions about the history of Martineau Gardens and what it was before it was an education college. They seemed interested in the history. P2 although they had been before, didn't remember what the gardens used to be. They did remember that they had been before, and remembered JB the staff member.</p> <p>P1+2 were happy wandering around the gardens and they asked to go and look at the pond and went off on their own to do so. MB checked they were okay, and they were fine, just making their way down the woodland path. P3 was quite quiet but chatting when asked questions. They were walking around the gardens near to P17 and the volunteer OT student.</p> <p>P5 interested in the bee keeping as they were involved at Martineau for a number of years as a member of the bee keeping team, attended many events that were bee related.</p> <p>P8 + P9 didn't seem overly interested in the gardens, P8 did recount when they used to play tennis there and spoke about it being an old grass court. P10 was quite anxious about coming due to their walking and as soon as we were out of the taxi they were asking how far they would have to walk – reassured there was plenty of places to sit down. They asked again half-way down the pathway to the pavilion but when walking around the woodland path they didn't mention it. They were so interested in the little leaf group (they really enjoy working with children), they were asking the children what they were doing and watching one of the children tell them and show them about a woodlouse they had captured.</p> <p>P2+1 were also chatting to some of the children and speaking to one of them about their dinosaur and digger.</p> <p>*Other participants did not seem overly bothered about the children.</p> <p>P14 quite happy to sit and listen to JB telling the group about the gardens, and wandering around. They were very complimentary in the taxi on the way home and said they had really enjoyed it.</p> <p>P17 walking with the OT student as they are blind, chatting to them about going on their residential trips.</p> <p>P18 helping P10, very kind to them and looking out for them. They were interested in how the gardens is funded and asking about whether they'd thought about opening a café. When JB explained why they hadn't and about the fact that Martineau is a bit like a well-kept secret, P10 said "I think it's nice like this" – and P18 later said it is so nice for something to not be about making money. P18 was also asking about the bee keeping and asking wasn't it a bit early for selling honey and vegetables.</p>

Sustained attention	<p>P1 walking with P2, helping them around the gardens. Commenting on how nice it is, “there’s all that traffic just there (pointing) but you can’t hear it here”.</p> <p>P2 very interested in stopping and looking at things, pointing to trees and plants and asking what they are. Pointed to one plant and said “is this a thistle?” MB said “it’s holly like you get at Christmas”. P2 also said “this is real nature” and P1 said “yes, not like artificial places”. P2 and P10 needed a sit down on the walk back, P18 and P1 were there – the group were listening to the wind in the trees and all seemed to be enjoying watching the leaves. P2 joked “look at that giant Christmas tree above me”.</p> <p>P3 – walked back to the pavilion, didn’t seem too interested in little leaf.</p> <p>P5 – walked back to the pavilion, wasn’t too interested in little leaf, was speaking with P8 and P9 along the walk back.</p> <p>P8 was chatting to P5 (since found out they were not happy about what they had done to the gardens, they used to play tennis there).</p> <p>P9 walking with P8.</p> <p>P10 enjoyed seeing the children, and was commenting on how nice it was that they were outside. Enjoyed stopping to listen to the trees.</p> <p>P14 quite happy just walking along and looking at the different things.</p> <p>P17 help from OT student volunteer.</p> <p>P18 walking with P10 and P1 and 2 and joining in the conversations.</p>
Pleasure	<p>P1, 2, 10, 18 seemed to enjoy just being in the woods and listening to the wind and trees and birds and being in the gardens.</p> <p>The group enjoyed looking at the pond and seeing the fish.</p> <p>P10 was commenting on how beautiful a flower was as we walked back, and feeling the petals. They said “it’s like going back in time, bringing memories because my husband used to help somewhere like this”.</p> <p>P3 said “I don’t like gardening but it has been nice”</p> <p>P14 said they had really enjoyed getting out and it was a nice place.</p>
Negative affect	<p>P3 quite quiet, the OT volunteer was working with P17 and conscious to not leave P3 on their own so was trying to encourage them to chat and walk together.</p> <p>P8 + P9 didn’t really engage with the group or the gardens. P8 did not seem happy about the gardens as they remember it being a tennis court.</p> <p>P18 smelt a flower but said they had lost their sense of smell. When we were later talking about honey they were saying they can’t really smell or taste anymore.</p> <p>P17 did say they felt it was a bit claustrophobic – the woodland path was quite narrow and their sight is not very good.</p>
Sadness	<p>No sadness, P18 was a bit down that their smell and taste seems to be affected.</p>

Self-esteem	<p>P10 was able to walk around the gardens, and seemed much less anxious once we had arrived. They were able to sit down walking back through the woods, and sat when asked would they like to rather than requesting to. P10 was very chatty with the nursery children and bending down to look at things.</p> <p>P17 doesn't get outside very often due to their deteriorating sight and hearing, but enjoyed going outside and somewhere different today.</p>
Normalcy	<p>P10 much more confident and less anxious than usual.</p> <p>P1 and 2 very chatty and cheery.</p> <p>P3 seemed quiet, not really showing displays of enjoyment but when asked said they did enjoy it.</p> <p>P5 is interested but not very talkative, although was talking with P8 and 9 trying to explain about the gardens when P8 wasn't very happy.</p> <p>P8 and 9 keep to themselves and do not engage much with others.</p> <p>P18 very chatty and kind to P10</p> <p>P14 quite quiet and happy to just walk and look at things.</p>
Other	<p>P5 came and found MB after the session back at Bournville Gardens to say that one participant (P8) did not seem to enjoy the trip, and kept saying that they had made such a mess of the gardens (they used to play tennis there as a young adult).</p>

## Appendix 30. Interview Transcript Study 3

Content removed on data protection grounds

Content removed on data protection grounds

## Appendix 31. Full Codebook Study 3

Parent Node	Child Node	Short Definition	Full definition	When to Use	When not to use
Benefit to wellbeing		Additional benefits to wellbeing	Additional benefits to levels of wellbeing for participants or caregivers.	Use to code for data about the additional benefits to levels of wellbeing for participants or caregivers.	Do not use to code unless there is evidence of an additional benefit to wellbeing
Enjoyment	Interest	Participants' expressing interest towards the activities.	Incidences of, or self-reported, interest towards the activities, outdoor environment or programme.	Use to code for data reflecting levels of interest	Do not use to code data that is self-reported
	Positive behaviours	Displays of positive behaviours	The display or occurrence of positive behaviours and facial affect that indicate enjoyment and pleasure.	Use to code for data reflecting positive displays of behaviour	Do not use to code data that is self-reported
	Self-reported enjoyment	Participants self-reporting level of enjoyment	Participants self-reporting enjoyment during the programme relating to the activities or environment.	Use to code for data about self-reported enjoyment	Do not use to code data that is not self-reported
Other behaviours	Attention	Participant level of attention	Level of attention displayed during the activities.	Use to code for data reflecting levels of attention	Do not use to code for other behaviours
	Considering and doing things for others	Participants showing consideration to others	Participants considering other people and doing things for other people during activities.	Use to code for data reflecting participants doing things for others	Do not use to code for other behaviours
	Expression of character	Participant expression of character	Any displays of behaviour specially associated with the expression of character	Use to code for data reflecting expressions of character	Do not use to code for other behaviours

	Loneliness	Displays or experiences of loneliness	Participants displaying signs of, or expressing, loneliness and/or feeling isolated.	Use to code for data reflecting loneliness or isolation	Do not use to code for other behaviours
	Negative behaviours	Incidence of negative behaviour	Participants displaying negative behaviours or facial affect during activities or relating to the programme.	Use to code for data reflecting negative behaviours	Do not use to code for other behaviours
	Satisfaction	Displays or experiences of satisfaction	Participants displaying behaviours or reporting levels of satisfaction during activities or relating to the programme.	Use to code for data reflecting levels of satisfaction	Do not use to code for other behaviours
Outdoor Environments	Behavioural response	Behavioural response to being outdoors	Participants displaying or expressing particular behaviours relating to being in an outdoor environment	Use to code for data reflecting participants behaviour specifically outdoors	Do not use to code secondary benefits, code in the moment behavioural responses
	Benefits	Benefits of engaging with outdoor environments	Benefits associated with spending time outdoors and interacting with outdoor environments, either observed or reported by participants	Use to code for data reflecting the benefits of being specifically outdoors	Do not use to code for other aspects of the environment
	Engagement with the environments themselves	Participant engagement with the outdoor environment	Participants actively or passively engaging with the outdoor environment, and nature within it, not necessarily being outdoors themselves.	Use to code for data reflecting the benefits of engaging with the outdoor environments themselves	Do not use to code for opportunities to engage in activities
	Familiarity	Participants displaying or expressing familiarity with	Signs that a participant is familiar with an outdoor	Use to code for data reflecting the familiarity of	Do not use to code for other aspects of the environment

		outdoor environments	environment, or mentions having been there before.	outdoor environments	
	Getting off-site	Participants going on off-site trips	Participants spending time off-site and visiting different outdoor environments.	Use to code for data reflecting participants going off-site	Do not use to code for general outdoor activities unless specifically off-site
	Opportunity for activity	Activities within the outdoor environment	Participants having opportunities to engage in outdoor and nature-based activities within the outdoor environment.	Use to code for data reflecting the opportunities for activity when outdoors	Do not use to code for other aspects of the environment
Overcoming barriers	Active participation	Participants actively participating in activities	Participants actively participating in activities and the programme.	Use to code for data reflecting participants overcoming barriers and actively participating	Do not use to code with other codes in overcoming barriers
	Attempting something new	Participants trying something they had not done before	Participants trying an activity that they had not done before, attempting something new.	Use to code for data reflecting participants overcoming barriers and attempting something new	Do not use to code with other codes in overcoming barriers
	Purpose and usefulness	Participants feeling a sense of purpose and/or usefulness.	Participants expressing or displaying signs of feeling a sense of purpose and/or usefulness during the activities and programme.	Use to code for data reflecting participants feeling a sense of purpose or usefulness	Do not use to code with other codes in overcoming barriers
	Surprising oneself	Participants surprising themselves	Participants surprising themselves by achieving something and/or overcoming barriers and challenges.	Use to code for data reflecting participants surprising themselves	Do not use to code with other codes in overcoming barriers
Person-centred	Adapting for ability	Activities being adapted for people	Anything reflecting when and how activities had	Use to code for data reflecting	Do not code data relating to meeting interests



			been adapted to enable people to participate, as actively and independently as possible.	adaptions for abilities	
	Autonomy	Participants offered or displaying autonomy	Participants having opportunities for autonomy by having choices and making decisions.	Use to code for data reflecting autonomy	Do not code data relating to meeting interests
	Meeting interest	Activities meeting participant's interests	Any signs that activities met the interests of participants throughout the programme.	Use to code for data reflecting meeting participants interests	Do not code data relating to adapting for abilities
	Recognising symptoms	Recognising symptoms of dementia/cognitive impairment	Anything relating to the recognition of participant's symptoms associated with dementia or cognitive impairment that effected their ability to engage or take part in the activities and programme.	Use to code for data relating to recognising symptoms	Do not code with other person-centred codes
	Support	Support given to participants	Anything relating to the support that was given to participants that enabled them to take part in the activities and engage with them.	Use to code for data relating to levels of support for participants	Do not code with other person-centred codes
Preference for activity		Participant preference for activity	Any examples of participants expressing a preference for a particular activity or requestion activities.	Use to code for data relating to preferences for activities	Do not code unless data relates to participant feedback
Reminiscence	Previous activities	Participants talking about their previous hobbies and activities	Participants reminiscing, sharing stories and memories, about their hobbies,	Use to code for data relating to reminiscence of previous activities	Do not include data relating to structured reminiscence sessions

			interests and activities they have enjoyed throughout their lifetime.		
	Provoked through sensory stimulation	Reminiscence linked to sensory stimulation	Any incidence of reminiscence that appears to be associated with sensory stimulation.	Use to code for data relating to reminiscence linked to sensory stimulation	Do not include data relating to structured reminiscence sessions
	Sharing stories and memories	Participants sharing stories and memories	Any examples where participants shared stories and memories during the programme, that were not associated with a sensory stimulation.	Use to code for data relating to reminiscence which leads to sharing stories and memories	Do not include data relating to structured reminiscence sessions
	Structured activity	Structured reminiscence	Participant engagement with the structured activity of reminiscence.	Use to code for data relating to reminiscence as a structured activity	Do not include data relating to unstructured reminiscence occurring during other activities
Social interaction	Asking questions	Participants asking questions	Participants asking questions and engaging actively in social interaction.	Use to code for data relating to participants asking questions	Do not use to code general conversation
	Company	Participants seeking company	Participants seeking and experiencing company from others and as a result of being in the group during activities and the programme overall.	Use to code for data relating to participants having company	Do not use to code data reflecting the group dynamic or group working
	Conversation	Participants engaging in verbal interactions	Participants engaging in verbal interactions with others and /or within the group.	Use to code for data relating to participants in conversation	Do not use to code where participants ask questions, use specific code
	Group dynamic	Dynamic and atmosphere of the group	Anything relating to the general group dynamic and atmosphere.	Use to code for data relating to the group dynamic	Do not use to code for general company – be

					specific to group dynamic
	Group working	Group working	Incidences of group working, and anything relating to working in a group.	Use to code for data relating to group working	Do not use to code for general company – be specific to group working
Stimulation	Involved in an activity	Participant stimulated from being involved in an activity	Anything relating to participants being involved and engaged in the activity and gaining some sort of stimulation from doing so.	Use to code for data relating to participants being involved in an activity	Do not code with other stimulation codes
	Mental stimulation	Participants gaining mental stimulation from an activity	Anything relating to participants being involved and engaged in the activity that provides mental stimulation.	Use to code for data relating to participants engaging in mental stimulation	Do not code with other stimulation codes
	Music	Participants stimulated by music	Participants gaining stimulation from music and singing.	Use to code for data relating to participants stimulated by music	Do not code with other stimulation codes
	Occupying time	Participants being occupied by the activities	Anything relating to participants being occupied by their involvement in the activities.	Use to code for data relating to participants occupying time	Do not code with other stimulation codes
	Sensory stimulation		Any examples of participants seeking or responding to sensory stimulation during activities.	Use to code for data relating to participants stimulated through the senses	Do not use to code data relating specifically to music stimulation
Support for caregiver		Support offered for caregivers	Any data which reflects that the activities have offered those providing care for participants living with dementia and cognitive impairment are supported, or	Use to code for data relating to support for caregivers	Do not use to code where caregivers have supported people living with dementia

			provided with respite.		
Volunteer Experience	Feedback about project	Feedback from volunteers about the activities and programme	Any feedback from student volunteers that reflected their experiences or perspectives of activities and the overall programme.	Use to code for data relating to volunteer experience of the activities and programme	Do not code with other volunteer experience codes
	Impact on wellbeing	Impact on volunteer wellbeing	Anything relating to the impact on the wellbeing of volunteers as a result of taking part in the programme.	Use to code for data relating to volunteer wellbeing	Do not code with other volunteer experience codes
	Participant enjoyment	Feedback relating to perceived enjoyment of participants	Volunteer perspective about participant enjoyment and pleasure as a result of their involvement in the programme.	Use to code for data relating to volunteer's perceived level of enjoyment amongst participants	Do not code with other volunteer experience codes
	Personal enjoyment	Volunteer enjoyment	Enjoyment and pleasure as a result of volunteering on this project.	Use to code for data relating to volunteer's enjoyment	Do not code with other volunteer experience codes
	Professional and personal development	Development and learning	Any feedback about how their involvement in the programme has supported their professional and personal development, and learning about working with people living with dementia and cognitive impairment and/or outdoor and nature-based activities.	Use to code for data relating to volunteer's own learning and development	Do not code with other volunteer experience codes

