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| Title | Sounds in time: effects of a caregiver-led music programme on cognitive ability, mobility and quality of life in residential care settings |
| Authors | Kelly, Fiona |
| Publication date | 2026-06-19 |
| Original Citation | Kelly, F. 2026. Sounds in time: effects of a caregiver-led music programme on cognitive ability, mobility and quality of life in residential care settings. MPhil Thesis, University College Cork. |
| Type of publication | Masters thesis (Research) |
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| Download date | 2026-11-01 10:06:01 |
| Item downloaded from | https://hdl.handle.net/10468/19331 |

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# Sounds in Time: Effects of a Caregiver-led Music Programme on Cognitive Ability, Mobility and Quality of Life in Residential Care Settings.

Thesis presented by

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for the degree of
**Master of Philosophy**

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2026

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## Declaration

This is to certify that the work I am submitting is my own and has not been submitted for another degree, either at University College Cork or elsewhere. All external references and sources are clearly acknowledged and identified within the contents. I have read and understood the regulations of University College Cork concerning plagiarism and intellectual property.

Fiona Kelly

## Acknowledgements

This thesis would not have been possible without the continued guidance and support of several individuals. I would first like to express my sincere gratitude to my supervisor, Dr Eva McMullan Glossop. Her advice, guidance and encouragement throughout the process was unwavering. I would also like to thank my co-supervisor, Dr Alexander Khalil, for his invaluable knowledge and expertise.

I would like to extend my deep appreciation to the management, staff, and residents of the residential care centre who participated in the music programme. The dedication and collaborative spirit of each staff member was pivotal in completing the project. The contribution of the wonderful residents made this programme a memorable experience of which I enjoyed every moment. I am deeply grateful for their enthusiasm in the project.

Finally, I would like to thank my parents for their endless encouragement throughout this journey.

## Abstract

Older adults living in residential care settings require person-centred care that promotes their health and wellbeing and contributes to their quality of life. This is a growing demographic that typically have greater healthcare needs than younger people. Thus, it necessitates initiatives to expand and improve services provided by staff that support the physical, psychological, cognitive and social wellbeing of residents. Staff within residential care settings experience challenges in providing activities that support these objectives, with a lack of time, resources, support and training cited as barriers. Previous studies have suggested that music-based activities could positively impact the cognitive ability, mobility, and quality of life in older adults. Concurrently, an increasing interest in training caregiving staff to use music in their care has been documented in the literature, contributing to both resident health and wellbeing and social relationships in this environment. However, there has not yet been a comparison made between caregiver-led music programme models and those led by external music facilitators. Thus, this study aimed to assess the impact of an eighteen-week music programme on the cognitive ability, mobility, and quality of life of participants. It also compared caregiver-led and external musician-led facilitation and explored the role of session frequency in this context. The study used an experimental, mixed-method design, with three distinct participant groups undergoing varying programme conditions, and one control group. It employed pre-and-post programme cognitive ability, mobility, and quality of life assessments. Participating caregivers and residents completed pre-and-post programme questionnaires exploring their experiences of the programme. Caregivers were also given observation sheets to complete after sessions, and a follow-up focus group with staff members was conducted ten months post-programme. Qualitative data collected indicated that participants perceived the programme as an enjoyable creative activity, contributing to wellbeing and social experiences. Differences within the experiences of participants in caregiver-led and external musician-led sessions were identified, largely within social domains. The study experienced challenges within participant recruitment and retention in this environment. While some positive trends and moderate effect sizes were identified, the results from the cognitive, mobility, and quality of life assessments

did not show significant differences before and after the programme. Twice per week was the preferred frequency of music sessions among resident participants but continued use of the music programme after the study ceased saw caregivers varying the frequency of sessions to suit participant needs and preferences. The programme also resulted in a continued interest and engagement in music activities across the residential care setting, with key considerations identified for implementing sustainable music-based activities. This project contributes to the evidence of the impact of music for older adults in residential care settings, with benefits and challenges for both external musician-led and caregiver-led programme models identified. Further studies with larger sample sizes may determine quantifiable impacts on health and wellbeing domains.

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## Abbreviations

| | |
|---|---|
| BBS | Berg Balancing Scale |
| bpm | Beats Per Minute |
| CASI | Cognitive Abilities Screening Instrument |
| CASP | Control, Autonomy, Self-Realisation, Pleasure |
| CI | Confidence Interval |
| DE | Dalcroze Eurythmics |
| EEG | Electroencephalogram |
| EIU | Economist Intelligence Unit |
| ELSA | English Longitudinal Study of Ageing |
| EMS | Elderly Mobility Scale |
| ESRI | Economic and Social Research Institute |
| FET | Further Education and Training |
| HCA | Health Care Assistant |
| HSE | Health Service Executive |
| HG | Heschl's Gyrus |
| HIQA | Health Information and Quality Authority |
| IPA | Interpretative Phenomenological Analysis |
| MIDDEL | Music Interventions for Depression and Dementia in Elderly Care |
| M&M | Music & Memory Service |
| MMSE | Mini-Mental State Examination |
| MTC | Music Therapeutic Caregiving |
| NFQ | National Framework of Qualifications |

| | |
|---|---|
| NHI | Nursing Homes Ireland |
| PLC | Post Leaving Certificate |
| QOL | Quality of Life |
| QQI | Quality and Qualifications Ireland |
| RAS | Rhythmic Auditory Stimulation |
| RCC | Residential Care Centre |
| RCT | Randomised Controlled Trial |
| REACH | Research Exploring Physical Activity in Care Homes |
| SMMSE | Standardised Mini-Mental State Examination |
| STM | Short-Term Memory |
| TILDA | The Irish Longitudinal Study on Ageing |
| TUG | Timed Up and Go test |

# Chapter 1: Introduction

"Sounds in Time: Effects of a Caregiver-Led Music Programme on Cognitive Ability, Mobility, and Quality of Life in Residential Settings" examines the impact of an eighteen-week music programme for older adults living in a residential care home. Previous research suggests that engaging in music can impact health and wellbeing in several domains, including those that are crucial to healthy ageing, and are susceptible to changes as we age (MacDonald, et al. 2012). Many cognitive functions in healthy older adults may deteriorate as they age. Musical engagement can stimulate memory retrieval (Cuddy, Sikka and Vanstone 2015), improve executive function (Pentikäinen, et al. 2021), and enhance attentional functions (Biasutti and Mangiacotti 2018) with older adults. In the context of mobility, where a decrease in function can predict future health conditions and disability, engaging with music and movement can improve gait velocity (Trombetti, et al. 2011), balance, and reduce risk of falls (Kim, et al. 2015). Participation in music activities also shows promise in promoting quality of life, with emotional, social, and psychological health benefits reported in previous studies (Creech, et al. 2014). Music-based activities for older adults in residential care settings are facilitated by a variety of musicians, practitioners and professionals. An increase in interest from caregivers in facilitating music-based activity in these environments has been noted in recent years (Foster, et al. 2021). When considering the difference between an external music facilitator and an internal caregiver facilitator, outcomes may vary within social experiences, accessibility, and health and wellbeing impacts of the music programme for participants. Factors such as the frequency of music sessions, which have varied in previous studies, may also effect the outcomes of programmes (Frizelle, et al. 2024).

The aim of this study is to evaluate the efficacy of a caregiver-led music programme compared to an external musician led-model for older adults living in residential care settings. To achieve this aim, the following research questions are addressed:

- What is the impact of a music programme on the cognitive ability, mobility, and quality of life of older adults living in residential care settings?
- What differences can be observed between the programme delivery of caregivers and an external musician?

- What effect does caregiver training have on the experiences of caregivers facilitating music sessions?
- What is the optimum frequency of music sessions for participants? .

By examining these research questions, the study aims to determine whether embedded music facilitation in the care environment could create a framework for the long-term use of music-based activities that successfully support the health and wellbeing of older adults in residential care settings.

My motivation for completing this study stems from my work as an undergraduate student, completing a music programme with older adults in 2024 (Kelly 2024). This experience highlighted the potential impact of music for older adults and inspired further exploration of its potential in this study. The programme facilitated positive social interactions between older adults and caregivers, alongside increased confidence and opportunities for reminiscence and sharing memories. Participants expressed a strong interest in continuing their engagement with the music programme after its conclusion, which motivated me to undertake the present study. Furthermore, this research was inspired by the desire to explore ways in which older adults can be best supported as they age, where the population of older adults is growing. The ageing population is a significant demographical shift that necessitates improvement in health and social services. Increased attention has been placed on the promotion of healthy ageing and the provision of adequate care for those who experience age-related changes (Abud, et al. 2022). As life expectancy increases, the population of people living in residential care settings is also projected to increase in forthcoming years (Walsh and Kakoulidou 2025). Older adults living in residential care should be afforded the opportunity of a good quality of life, with supports and services that promote their overall health and wellbeing. While many residents require greater healthcare needs associated with ageing, quality of life is also influenced by modifiable psychosocial factors. Among these, loneliness remains prevalent in residential care settings (Gardiner, et al. 2020), and is associated with poorer health outcomes overall. Addressing these challenges requires the creation of environments that foster meaningful connections with fellow residents, caregivers, and the wider community. Such initiatives are imperative to supporting the social wellbeing of residents. Therefore, there is growing incentive to integrate meaningful activities that

contribute to overall health and wellbeing in residential care. Music-based activities have emerged as a particularly valuable method for older adults to experience enjoyment and social cohesion, while also supporting their health and wellbeing. This thesis is rooted in the belief that access to music activities should be considered an integral component of quality of life promotion in residential care settings, complementary to existing practices and services received for health and wellbeing. By exploring approaches to improving the accessibility of music-based activities, this research seeks to contribute to the literature on developing sustainable initiatives that empower caregivers with practical tools to support person-centred care that prioritises quality of life and healthy ageing.

# Chapter 2: Literature Review

## 2.1 What Does Ageing Look Like? Ageing Conceptualised

Social, economic and health developments have contributed to a global increase in average life expectancy. These developments include improvements in healthcare and less exposure to environmental, biological, and behavioural risk factors (Mathers, et al. 2015). This progress in life expectancy has been slower in some low and middle-income countries, where disease epidemics have remained prevalent (Mathers, et al. 2015). As of 2024, global life expectancy had reached 73.3 years (World Health Organisation 2025). Described in Springer's *Ageing Population* impact analysis as "progressive, dynamic, interlinked and complex" (Lama 2023), age-related changes to health and lifestyle are unique to each individual. Nonetheless, older people generally have greater health and long-term care needs than younger people (Bloom, et al. 2015). Commonly experienced age-related changes within health include neurological (Dementia, Parkinson's disease), cardiovascular, musculoskeletal, and sensory changes (hearing, visual impairment) (Lama 2023). Modifiable risk factors must be considered in lessening the prevalence of such changes and promoting "healthy ageing" (Abud, et al. 2022), while concurrently ensuring adequate care and support are available to older adults affected by such age-related changes.

Along with attaining longer life expectancy, many countries have experienced a decline in family sizes and births, which the World Health Organisation (WHO) attributes to factors such as urbanisation, higher education and access to family planning (World Health Organisation 2025). This, along with longer life expectancy, has resulted in an ageing population, whereby the number of older individuals has begun to outnumber younger demographics. In 2019, the sixty-five and older age group accounted for approximately 696,300 people out of the total population in Ireland. By 2051, this is expected to double to 1.56 million (Sheehan and O'Sullivan 2020). Ireland is in an earlier stage of the population ageing process compared to other high-income countries but is facing similar pressure within health and social care provision (May, et al. 2022). It is imperative that policymakers consider all determinants of health and healthy ageing in order to support the ageing population. As argued in The Lancet, "instead of being portrayed as a problem, increased human

longevity should be a cause for celebration. Moreover, population ageing provides opportunities to rethink health policy for the benefit of all—old and young" (Lloyd-Sherlock, et al. 2012).

## 2.2 Defining Residential Care: Current Trends and Considerations

Older people often move into a residential care setting due to long-term physical or cognitive impairment or social circumstances. People living in residential care settings should enjoy "a good quality of life, live in a place that feels like home, and have the same access to necessary healthcare", according to the Health Information and Quality Authority (HIQA) (Health Information and Quality Authority 2016). Considerations for supporting an ageing population must include long-term residential care, where demand is projected to grow. A 2025 report by The Economic and Social Research Institute (ESRI) provides insight into the reliance on long-term residential care that is likely to occur in forthcoming decades (Walsh and Kakoulidou 2025). The report estimates that services were already short 253 long-stay beds nationally in 2022. They project long-stay requirements will increase by 2.7–3.3% annually between 2022 and 2040, reaching 47,588 beds in 2040. The report shows population age structure (the ageing population) to be the driving factor behind these increases, with the median age of residents expected to rise from eighty to eighty-eight years (Walsh and Kakoulidou 2025).

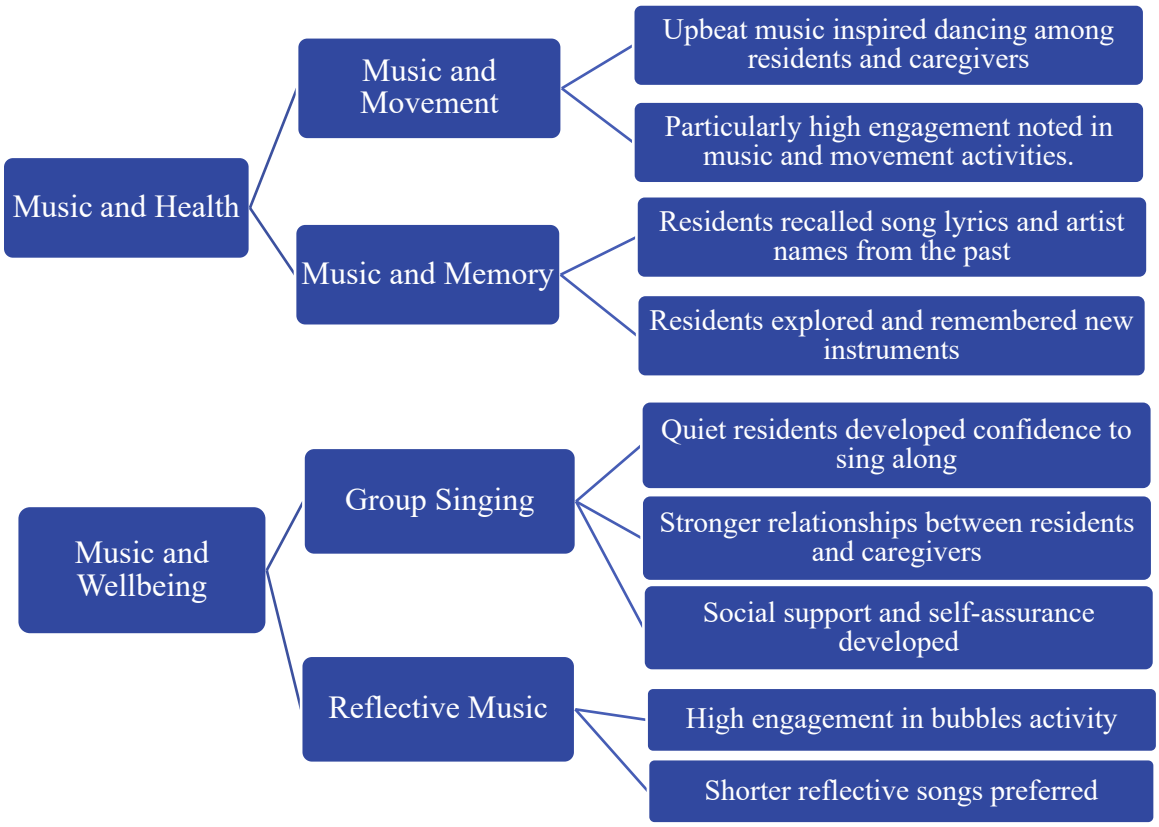
A 2020 study by The Irish Longitudinal Study on Ageing (TILDA) reported that eighty-five of the one hundred participants in residential care settings had a long-term health problem, illness, or disability. Twenty-six of the participants had a diagnosis of dementia or a "cognitive problem" (Kenny, Scarlett and O'Mahoney 2020). It also noted that, among those who were able to self-report, the majority of participants rated their physical and mental health as good to excellent (Kenny, Scarlett and O'Mahoney 2020), indicating a perception of higher quality of life among residents. A good quality of life (QOL) is a primary aim of HIQA for people living in residential care, with national standards requiring person-centred care and the promotion of residents' health and wellbeing (Health Information and Quality Authority 2016). Many factors of daily life experiences influence QOL for residents in care settings in Ireland. Cooney et al. divide these factors into themes such as (i) a

sense of self and identity, (ii) connectedness and social relationships, and (iii) access to activities and therapies (Cooney, Murphy and O'Shea 2009). It is important to note that, due to varying interests, experiences, health status, and expectations for care, residents' requirements for achieving a good QOL will differ. Thus, it is crucial that the autonomy of residents and their choices are respected during their stay in residential care (Cooney, Murphy and O'Shea 2009).

### 2.3 Sounds in Time

This current project, 'Sounds in Time', was inspired by a study completed in early 2024, with an accompanying dissertation entitled 'Timeless: A Caregiver-led Music Intervention in the Context of Residential Care Settings' (Kelly 2024). This study aimed to analyse the effects of a six-week music programme for long-term residents in a residential care setting, with questionnaires completed by caregivers pre- and post-intervention. Additionally, the study explored the role of dosage in music programmes. Intervention dosing may be characterised by duration, frequency, or amount of the intervention (Voils, et al. 2012). Dosage within this context of this study refers to how many music sessions the participants received during the programme (Frizelle, et al. 2024), with distinct groups partaking in a varied quantity of sessions per week. The experiences of residents, as observed by their caregivers, were recorded to determine the optimum frequency of musical activities per week. Responses were divided into themes of (i) music and health, (ii) music and wellbeing and (iii) activity accessibility, as seen in Figure 2.1 (Kelly 2024). Within the first theme, caregivers reported that the most successful element of the intervention was music and movement, particularly the provision of upbeat music that inspired dancing among residents and their caregivers. In addition, upon hearing music from previous decades, residents recalled musician names and song lyrics. Within the theme of music and wellbeing, caregivers reported that participating residents showed heightened confidence while singing songs as part of a group, noting, "a quiet resident sang the full song" in one session. It was reported that these activities fostered relationships between caregivers and residents, as "staff of all countries, cultures and backgrounds" connected with residents. These connections provided social support and self-assurance for typically reserved residents. The theme of activity accessibility highlighted the importance of familiarity

and routine within the sessions, leading to increased participation once established. One caregiver noted that it was "nice to see residents getting to know what we were doing and [thus] engaging". Caregivers began to recognise their ability to facilitate the programme, as they became familiar with the content of the session. Those who initially felt that they lacked adequate skills or confidence in leading a music session soon developed confidence in their ability, noting they were "apprehensive at first, but soon got into it." Caregivers also expressed a desire for further training to "build confidence to carry out the programme" in future interventions. The findings from the 2024 study informed the design and implementation of the programme in this thesis, serving as a feasibility study for the eighteen-week 'Sounds in Time' programme.



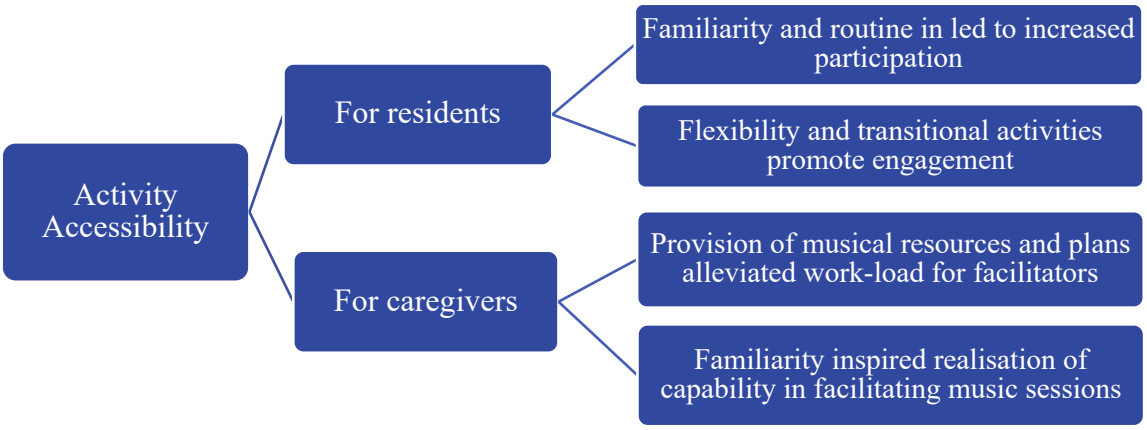



**Figure 2.1.** Diagram of qualitative data collected and categorised from the six-week music programme in the study "Timeless: A Caregiver-led Intervention in the Context of Residential Care Settings" (p. 20), (Kelly 2024).

### 2.4 Mediating the Social and Medical Models in Residential Care

The medical and social models of disability have been a subject of ongoing discussion within disability studies since the 1970s (Hargrave 2015). The medical model of disability typically adopts a biomedical perspective of impairments, which can result in perceiving the individual and their needs as a 'problem'. The social model of disability views the needs of an individual from a multidimensional perspective (Jun 2024). It considers the environmental, interpersonal and organisational structures that could be improved to enable the individual with an impairment to excel (Jun 2024), thereby removing the focus on deficits and expectation of "fixing" the individual's impairment. In their 2015 book on arts and disability, Matt Hargrave establishes that using social or medical models exclusively, or treating them as in opposition to one another, both carry issues in their application (Hargrave 2015). Thus, a level of mediation *between* social and medical models may be considered to acknowledge existing barriers and establish approaches to alleviate them.

When considering debates about the application or relevance of models of disability in aged care, a similar mediation has occurred in the literature (Oldman 2002). Christine Oldman highlights the parallel between the experiences of people with disabilities and those of older adults. Older age can be accompanied by impairment and illness, and discrimination can occur for both groups within health and social care policies, particularly in autonomy and decision making (Oldman

2002). An argument against this association is the diversity of ageing experiences, as although common (Lama 2023), ageing is not always associated with the onset of illness and disability (Oldman 2002). Considering both similarities and differences between the experiences, Oldman thus suggests that some elements of the social model could be particularly relevant to older adults. For example, the promotion of self-advocacy observed in the social model could be applied to service-delivery for those in residential care (Oldman 2002). Proposals relating to self-advocacy and resident-led contribution to psychosocial care in residential care settings are also made in a paper by Theurer et al., entitled 'The Need for a Social Revolution in Residential Care' (Theurer, et al. 2015). Theurer et al. highlight the importance of incorporating resident contributions to social activities within the residential care setting, with the shift from passivity to engagement promoting better quality of life (Theurer, et al. 2015). Furthermore, Theurer et al. cite peer support as another valuable principle for improving the wellbeing of residents, being a social form of productivity that can foster relationships and social identity. The incorporation of such interpretations of the social model within residential care can encounter obstacles from organisational, institutional and administrative standpoints. The medical approach still largely dominates many residential care settings. The focus of the medical model is mainly on task completion and the organisation of physical care of residents (Theurer, et al. 2015). Theurer also notes that apprehension about potential liability associated with autonomy leads to an administrative focus on safety (Theurer, et al. 2015).

A study comparing long-term residential care practices across six countries noted the lack of focus on the social aspects of residential care, describing relational work as "equally important, but often less visible" (Barken and Armstrong 2017). They note that in Sweden, where long-term residential care has been transferred to municipalities and the social care sector, the setting now encompasses diverse relationships and activities for emotional and physical wellbeing (Barken and Armstrong 2017). Barken and Armstrong emphasise the need for an intersectional approach that ensures workers possess the appropriate medical skills to care for residents with complex needs, while not overlooking the importance of the social aspects of care (Barken and Armstrong 2017).

Given the discernible benefits of incorporating the social model of care into traditional residential care for older adults, and its potential for application in both individual and group settings, this thesis aims to support the integration of social

model concepts. However, it also acknowledges the need to recognise specific impairments and health issues in residents for optimum care outcomes. Such recognition allows for implementation of social model practises that are accessible, safe and have the proper supports in place for residents.

### 2.5 Cognitive Health in Older Adults

In most healthy older adults, the executive functions and sub-processes (working memory, inhibition and cognitive flexibility) will deteriorate with age after midlife (Grady 2012). Executive functions support a wide range of cognitive processes. Working memory, for example, is a fundamental component of general cognition, supporting processes such as logical reasoning and problem-solving (Zinke, et al. 2014). Dementia is an umbrella term for several diseases that affect cognitive function (World Health Organisation 2025), and nearly 50% of the global population over eighty-five years old have dementia (Lama 2023). In Ireland, it is estimated that over 64,000 people were living with dementia in 2020, which is expected to rise to over 150,000 by 2045 (Health Service Executive 2020). Thus, dementia is a significant health challenge globally and nationally. As common dementias, such as Alzheimer's disease, begin at least twenty years before their clinical onset (Morovic, et al. 2019), prevention and early intervention are imperative. A 2017 journal article discusses interventions for modifiable risk factors of dementia that may have the potential to delay or prevent cases (Livingston, et al. 2017). A multitude of social factors experienced throughout life can affect cognitive ability or cognitive decline in older age. Less education is an early life modifiable risk factor. Later-age risk factors include physical inactivity, depression and social isolation, which can be addressed through non-pharmacological interventions such as physical exercise and cognitive interventions and maintaining social engagement. The Lancet article maintains that such preventative measures could delay or prevent a third of dementia cases (Livingston, et al. 2017).

The concept of cognitive reserve has also become an increasingly prevalent topic in the study of Alzheimer's disease and other dementias (Livingston, et al. 2017, Morovic, et al. 2019). Cognitive reserve refers to how the brain copes with pathology using its pre-existing cognitive processes (Stern 2002). A 2012 article on this topic

discusses its use to account for differences in the susceptibility of individuals with dementia to brain pathology (Stern, Cognitive Reserve in Ageing and Alzheimer's Disease 2012). Studies by Stern indicate that more educational and occupational experiences can create a reserve against the effects of Alzheimer's disease (Stern 2012). In a study including 593 individuals over sixty years old, those with less than eight years of education had 2.2 times higher risk of developing dementia. Additionally, those with low lifetime occupational attainment were 2.25 times more likely to develop dementia (Stern 2012). Similarly, an Irish study exploring levels of cognition in older age suggests that residing in highly urbanised areas throughout life was associated with higher levels of cognition compared to those who grew up in more rural areas of the country (Cassarino, et al. 2015). Current living situations appear to inform executive and control processes within cognition. Conversely, verbal abilities such as recall and verbal fluency may also be associated with educational circumstances (Cassarino, et al. 2015).

### 2.6 Mobility in Older Adults

Regular physical activity provides substantial health benefits to older people. Considering that independence and autonomy are often at the forefront of the conversation about the quality of life of residents (Cooney, Murphy and O'Shea 2009), physical limitations can negatively impact their contentment. As noted by Shea, Park and Braden in a movement sequence study in 2006, motor skills will also decrease during the ageing process (Shea, Park and Braden 2006). Their study showed that younger adults performed sequential motor tasks significantly quicker than older adults (sixty-five to sixty-eight years old), indicative of the overall slowing of sequential movement production (Shea, Park and Braden 2006). A decrease in mobility function can also predict future health conditions or disability, and thus, activity programmes that incorporate movement and physical activity can play a key role in the prevention of health issues and maintenance of physical functions (Liubicich, et al. 2012). A systematic review found that the risk of physical limitations decreased by an average of 20% when the older person was "somewhat active" (Patterson and Warburton 2010). Interventions focused on physical activity have already proven beneficial in preventing mobility disability among older adults with

physical frailty. A European study completed in 2022 included moderate-intensity physical activity twice weekly for adults aged seventy and older (Bernabei, et al. 2022). This intervention model, supplemented with technological support and nutrition counselling, was associated with a reduction in the incidence of mobility disability. These results were observed in both the twenty-fourth and thirty-sixth month of the intervention (Bernabei, et al. 2022). The 'Act on Ageing' study investigated the effects of a physical activity programme for residents of care facilities (Liubicich, et al. 2012). Liubicich et al. explicitly followed the changes in the participants' mobility function, balance, and gait (Liubicich, et al. 2012). After completing sixteen weeks of intervention, the mobility function, balance and gait of the intervention group remained stable. Within the control group, who did not take part in the activities, participants' ability in these domains significantly decreased (Liubicich, et al. 2012). This result indicates the capability of physical activity to preserve the physical skills of participants while partaking in the intervention. The researchers note that a person's ability to independently move around their environment is a fundamental expression of autonomy. Thus, such initiatives are imperative not only for the promotion of physical health, but also older adults' overall quality of life (Liubicich, et al. 2012). Providing evidence-based physical activities that are designed for older adults can create an opportunity for the preservation of their physical abilities, promoting retention of autonomy and improved quality of life (Liubicich, et al. 2012).

### 2.7 Quality of Life in Older Adults

Understanding the needs of older adults in residential care settings for improved quality of life requires the combined perspective of staff, residents and family, as well as the perspective of residents alone, which is considered crucial in quality of life (QOL) research (Murphy, Cooney and Casey 2014). A review of QOL in residential care settings suggests that studies agree on the importance of several components of QOL, including "autonomy, environment, connectedness, meaningful activity, independence and sense of self" (Murphy, Cooney and Casey 2014). Despite living with other residents and caregivers, older adults in residential care often experience loneliness and social isolation (Freedman and Nicolle 2020), which can be detrimental

to overall quality of life. When discussed, loneliness and social isolation are frequently interchanged (de Jong Gierveld, van Tilburg and Dykstra 2006). However, they may not always be present together. Loneliness is defined as a subjective experience of a person's network of social relations lacking in either a qualitative or quantitative sense. In contrast, social isolation concerns the objective absence of relationships with other people (de Jong Gierveld, van Tilburg and Dykstra 2006). In Ireland, rates of loneliness among older adults rose during the COVID-19 pandemic, before returning to pre-pandemic levels. In 2025, 22.9% of older adults who participated in the TILDA study reported feeling lonely some/a little of the time, or more (Ward 2025). A 2020 systematic review of studies on loneliness in residential and nursing care homes looked at loneliness in residential care globally (Gardiner, et al. 2020). Thirteen articles were included in the final evaluation, measuring loneliness in residential care facilities spanning Europe, Australia and Asia. Their analysis revealed that approximately 61% of care home residents experience moderate loneliness, while a further 35% may be severely lonely (Gardiner, et al. 2020). The researchers hypothesise that although the nature of residential care involves residents being surrounded by staff, visitors, and their fellow residents, the presence of superficial relationships, difficulty connecting with residents of varying cognitive abilities and lack of 'belonging' can all result in a loss of social connectedness and loneliness (Gardiner, et al. 2020). The researchers advocate for initiatives in residential and nursing care homes that improve the provision of group activities which support the relationships between care staff and residents (Gardiner, et al. 2020).

A 2013 review of interventions aiming to improve the QOL of long-term care residents assessed thirty-five articles which utilised a variety of health and wellbeing programmes, daily routines, and leisure activities (Malderen, Mets and Gorus 2013). By analysing the design, quality, and methodology of the studies, Malderen, Mets and Gorus highlight the limitations of the current literature surrounding QOL in long-term care. Particularly noted was the poor methodological quality of many studies, with some lacking control groups or random assignment to groups (Malderen, Mets and Gorus 2013). Many studies have primarily focused on singular determinants of QOL, such as physical ability or psychological factors. The review suggests that further research should include multidimensional intervention studies to provide the best evidence-based practice for improving QOL (Malderen, Mets and Gorus 2013).

## 2.8 The Role of Caregivers in Residential Care Settings

The staff of residential facilities provide twenty-four seven care for their residents. They aim to meet a range of needs, from palliative and end-of-life care to physical, cognitive, and social support (Phelan and McCormack 2013). Residential care facilities employ a variety of staff members to attend to the needs of residents, including nurses, healthcare assistants, and therapists. Brady et al. examined the breakdown of staff roles, shedding light on staffing needs in these settings (Brady, et al. 2021). This information was provided by sixty-four Irish residential care facilities in 2021 (Brady, et al. 2021). Over 50% of staff respondents were health care assistants (HCAs), 19.4% were nurses, and non-clinical staff made up the remaining 30% (Brady, et al. 2021). These figures indicate the significant role which HCAs play in residential care facilities for older adults in Ireland. The 2025 Health Service Executive (HSE) employment report revealed that 9,517 people work as healthcare assistants for older people (Health Service Executive 2025). Beyond these public services, Nursing Home Ireland (of which 90% of private and voluntary nursing homes are members and account for 83% of long-term care beds) reports that over 40,000 staff work within their homes; however, staff roles are not categorised in this report.

In Ireland, several health care assistant or carer education routes are available, which are usually completed through Post Leaving Certificate (PLC) or Further Education (FET) courses. These courses award students a Level Five National Framework of Qualifications (NFQ) certificate, overseen by Quality and Qualifications Ireland (QQI). Two standard courses offered in PLCs and FETs are the Health Service Skills course and the QQI Level Five Healthcare Support course (Conyard, et al. 2020). Components in these courses include ‘Care of the Older Person’ and ‘Activities of Daily Living Patient Care’. In a 2020 report conducted at Dublin City University, 75% of health care assistants and carer respondents have received training in assisting with activities of daily living (e.g. dressing, washing, eating) (Conyard, et al. 2020). The Care of the Older Person module explores “a range of older people’s needs to include … social, emotional, psychological needs” (Quality and Qualifications Ireland 2012), as well as “assist… in the provision of therapeutic interventions that will enhance the social interactions and quality of life of the older person” (Quality and Qualifications Ireland 2012). Both components are optional for students, and so they may not have completed these components before receiving their

qualification. Furthermore, a lack of standardisation and regulation of qualification requirements is noted within this sector (Conyard, et al. 2020). While recommended by the HSE, there is no legal requirement for HCAs to undertake a recognised training programme. Conyard et al.'s report found that 16% of their HCA survey respondents did not have formal qualifications (Conyard, et al. 2020). Considering the courses available, it appears training that is completed by HCAs in Ireland does not prominently feature facilitating social or recreational activities for clients, despite its established importance, particularly within residential care settings. An Australian study examined staff perspectives on facilitating activity programmes in residential care (McAuliffe, et al. 2024). One central theme which emerged from their research was a lack of resources: activity facilitators noted a lack of staff available for activities, difficulty in budgeting for new activities and activities being limited to the skillset of those facilitating (McAuliffe, et al. 2024).

### 2.9 Fostering Relationships in Residential Care Settings

Social relationships are a fundamental component of the psychosocial wellbeing of older adults (Thompson, et al. 2024). As people age, they can experience a loss of social roles, for example, through retirement or the ageing of family members. Friendships can become increasingly important through these shifts in social roles (Song, Kwon and Jeon 2023). Similarly, when going through a significant life transition such as moving into a residential care facility, older adults will often experience a loss of social networks (Dadswell, et al. 2020). Previous research pertaining to relationships in residential care has noted these as small, sparse networks. Reminiscence occurred when considering past relationships, and creating new bonds remained difficult (Casey, et al. 2016).

#### 2.9.1 Identifying the Types of Relationships in Residential Care Settings

A broad range of relationships can develop in the residential care setting, varying across strength or 'closeness' and the person's role. The strength of these relationships can range from close friendships, casual friendships, acquaintanceship, to more functional, utilitarian relationships (Roberts 2018). Relationships also differ when considering who they are between, with residents, staff members, visiting family

members, and the wider community all contributing to the social networks within the setting.

### (a) Resident-Resident Relationships

Cooney et al. saw that a strong sense of collegiality between residents occurred in some Irish facilities, where residents valued the company of others and viewed disagreements as a regular part of life (Cooney, Murphy and O'Shea 2009). A detailed study by Roberts examining the characteristics of relationships reported that some resident-resident relationships remain utilitarian in nature (Roberts 2018). Such a relationship may include helping a peer occasionally with simple tasks. Casual friendships largely emerged after mutual sharing of personal information and time spent together. In comparison, close friendships between residents often began outside the facility and were described in more emotional terms (Roberts 2018). Of course, some relationships remained adversarial, particularly between roommates, where conflicts surrounding routines were more likely to occur (Roberts 2018). In another study that conducted focus groups within residential care, difficulty between roommates was one of the most common causes of resident-to-resident aggression (Rosen, et al. 2008). Conflicts were commonly caused by disagreements on managing the living space, such as the volume of the television, room temperature, or lighting (Rosen, et al. 2008).

### (b) Resident-Staff Relationships

Resident-staff relationships are crucial in the residential care setting, due to both the reliance on care staff for completing activities of daily living (C. Welford, et al. 2010) and for their social connectedness. In a study by Buckley and McCarthy, participating residents often felt they had better interactions, greater connectedness, and more shared interests with staff rather than other residents (Buckley and McCarthy 2009), indicating the importance of care staff in these settings. While functional or utilitarian relationships also occur between staff and residents, most participants in the study by Roberts still described personal connections within their descriptions of relationships (Roberts 2018). From a staff perspective, Phelan and McCormack highlight that bonds formed with residents have been noted as a component of work satisfaction (Phelan

and McCormack 2016). By forming bonds with and learning about residents, staff can use that knowledge to create work satisfaction for themselves and improve care for residents (Phelan and McCormack 2016).

### (c) Family Member Relationships

Family connections are highly valued within residential care settings by both residents and staff members. Visits from family and friends help maintain bonds and assist the resident in staying "connected to the outside world" that is happening at home and in the community (Cooney, Murphy and O'Shea 2009, Buckley and McCarthy 2009). Family members participating in a study by Struthers and Ågnotnes described the significance of developing relationships with staff members, other residents, other residents' families and volunteers (Struthers and Ågotnes 2023). Some participants expressed a deep appreciation for the staff and thus felt it was essential to develop social bonds with them. Others formed relationships with residents who were not their family, taking some time to visit them as well as their own family members. One participant said they hoped others would do the same for their loved ones in their absence (Struthers and Ågotnes 2023). The study participants described these friendships as an unexpected reward for having frequent involvement with the home, contributing to a tight-knit community between staff, residents and family (Struthers and Ågotnes 2023).

### (d) Wider Community Relationships

Similar to family relationships, relationships with community members outside the residential care setting enable residents to feel a sense of social connectedness (Buckley and McCarthy 2009). Relationships with the wider community can occur through engaging volunteers. Participants in Keane, Ryan and Usher's study appreciated the community members who provided music performance, organised a knitting club, and provided painting lessons (Keane, Ryan and Usher 2024). Supporting visitation and contact with family and friends also enabled residents to socially engage with the wider community (Keane, Ryan and Usher 2024). Staff have described such community relationships as crucial for providing opportunities, as staff do not always have the resources to facilitate them (Struthers and Ågotnes 2023).

Intergenerational relationships are also encouraged through community engagement, for example, through collaborations with local schools. In a study by Struthers and Ågnotnes, several participants described these opportunities as pleasurable for residents and staff, with one stating that "the presence of children can transform a unit" (Struthers and Ågotnes 2023). A study of sixteen UK care homes examined further the perspectives of older adults on intergenerational practices and activities (Cook and Bailey 2013). Visits from local primary schools were valued among residents, some participants referring to the genuine interest that children showed in learning about their past. Participants were also pleased to contribute to college students' education, valuing the support they received from those completing work placement (Cook and Bailey 2013). Participants also highlighted concerns that they had when visiting or being visited by younger people. Being unable to interact with young people due to their sensory or mobility problems, thinking that the interactions would bore the young people, or that other residents would not appreciate the intergenerational activities were some main worries for participants. To alleviate such concerns, researchers suggest that activities should be organised with a clear purpose, meaningful activities and structured visits (Cook and Bailey 2013).

### 2.9.2 Key Methods of Relationship Building

As living in residential care for older adults is often a long-term arrangement, staff and caregivers in these settings work to improve social relationships among residents and caregivers. Insights from residents, caregivers, and family members depict the key components of residential care environments that impact the social relationships and wellbeing of residents. These have been documented in studies and overlap in social health priorities is observed across countries. Several key areas proved important for both staff and residents in working to retain or improve the social life of long-term care residents (Phelan and McCormack 2016, Taufik, Wardono and Adhitama 2018, Struthers and Ågotnes 2023, Keane, Ryan and Usher 2024).

### (a) Knowledge of Residents

In an interview study conducted in Ontario, researchers found that caregivers rely heavily on applying their knowledge of past professions, skills and interests of residents in attempting to organise activities in residential care settings (Struthers and Ågotnes 2023). These efforts were described as making "the difference between survival and living" by the wife of one resident in the study (Struthers and Ågotnes 2023). The care home context creates a unique working and learning environment for caregivers (Phelan and McCormack 2016), where complex networks of relationships exist in which knowledge is shared amongst workers. Caregivers develop "careful relationships" with the residents and fellow staff to inform one another of the individual needs of residents, therefore optimising positive care outcomes (Phelan and McCormack 2016). Caregivers also exhibit saliency in their practice, responding to residents' daily cues and ensuring the recognition of precise needs that may go unnoticed when only looking for typical signs of illness progression (Phelan and McCormack 2016). The focus group also highlighted moral agency as a significant influence on their care practices. This was executed by promoting self-determination, individuality, and respect for the values and autonomy of each person through careful communication. An understanding of a resident "from a medical, social and emotional context" allows caregivers to provide care that projects respect and dignity for individual needs (Phelan and McCormack 2013). This comment is reminiscent of the medical and social models of impairment, concurring with the attitude of Hargrave and Oldman in adopting principles from both models when providing care (Oldman 2002, Hargrave 2015). Another Irish study noted the importance of establishing the preferences of residents, thus becoming better equipped to support their choices. One resident stated that "they really do try to spend time working out the differences in people" (Keane, Ryan and Usher 2024).

### (b) Encouraging Friendships

The encouragement of friendships was also cited as a key factor in improving the social lives of residents, among residents and caregivers, as well as with visiting family members. By connecting with staff and other residents, family members felt a shared sense of ownership over the home, with one family member telling interviewers that

it “makes you feel like you are part of a family” (Struthers and Ågotnes 2023).This level of friendship resulted in the participant continuing to visit even when their own family member had passed away (Struthers and Ågotnes 2023). Participants in a study by Keane, Ryan and Usher also highly valued staff efforts to establish friendships, providing more “meaningful social interactions” (Keane, Ryan and Usher 2024). Phelan and McCormack described the relationships between residents and nurses as fundamental to optimal care outcomes (Phelan and McCormack 2013). Displaying friendliness, empathy and “genuine interest” in their lives was said to increase relaxed interactions and create a more “home-like” environment (Phelan and McCormack 2013). From the perspective of residents, specific staff actions can influence the development of relationships (Roberts 2018). Staff who made them feel comfortable when needing assistance and who spent time or provided support beyond care tasks were more likely to be described as friends (Roberts 2018).

### 2.10 Enhancing Caregiver and Resident Relationships through Activities

Overall, social relationships are significant to the wellbeing and quality of life of those within the residential care setting. In particular, strong relationships between staff and caregivers provide a basis for positive care outcomes (Phelan and McCormack 2013, Struthers and Ågotnes 2023). Thus, specific measures must be taken within residential care settings to improve relationships and actively facilitate opportunities for development of positive relationships (Casey, et al. 2016). Such initiatives include the provision of social activities.

#### 2.10.1 General Activities

The associations between proportions of the day spent in solitary activities and life satisfaction have been examined in Lam and García-Román’s 2020 study. They conclude that a higher proportion of the day spent in solitary activities was associated with lower levels of life satisfaction among older adults (Lam and García-Román 2020). The study noted social and productive aspects of activities are conducive with wellbeing, emphasising the necessity of creating activities with social opportunity (Lam and García-Román 2020). Other literature has highlighted specific aspects of

activities content and organisation that facilitate and promote relationship building in residential care settings (Keane, Ryan and Usher 2024, Misiak, et al. 2025).

### (a) Personalisation and Choice

One such aspect, which echoes the sentiments of Phelan and McCormack, is the personalisation of activities. Personalising activities to align with shared interests, experiences, and backgrounds can facilitate social cohesion among participants (Misiak, et al. 2025). The study carried out by Keane, Ryan, and Usher found that residential care settings that emphasised choice and consulted residents about the organisation of activities led to greater satisfaction among residents (Keane, Ryan and Usher 2024). Regarding those who may not be able or willing to express their wishes in this way, Misiak et al. express the value of using the historical context of residents' social life, for which family members are a source of insight (Misiak, et al. 2025). Participants also indicated the importance of residents feeling involved with others emotionally, being able to give and receive support during activities and express their feelings and emotions (Misiak, et al. 2025). Activities that elicit discussions on both personal and general topics of interest created emotional openness amongst the groups, contributing to more meaningful relationships (Misiak, et al. 2025).

### (b) Range of Participants

In creating opportunities for residents and caregivers to develop relationships, the involvement of participants from outside of the care home environment can help staff create meaningful social activities with residents. Activities centred around shared interests and experiences promoted bonding between residents and staff (Misiak, et al. 2025). Bringing family or friends into the residential care setting during activities has also been noted as a means to support the resident in participating (Chapman, et al. 2024), offering encouragement and increasing social contact with others. Where resources for creating, organising or implementing social activities are limited, contributions from volunteers from the community is often used, combined with the professional skills of nurses and care staff to ensure suitability and accessibility for residents participating (Struthers and Ågotnes 2023). This approach may allow

residents to receive a wider range of social activities that incorporate engagement with staff.

### (c) Recognised Barriers

Several studies have recognised barriers that occur when striving for improved social wellbeing within the residential care environment. Struthers and Ågnotnes recognised that enabling residents to move from their rooms to the common areas of care centres to join activities can be challenging. A special programme manager stated that over the last few years of their career, the percentage of residents able to leave their rooms independently has declined, making it increasingly difficult for caregivers to facilitate social activities for residents (Struthers and Ågotnes 2023). These challenges could significantly reduce social wellbeing, as much of their socialisation occurs in common areas of residential care facilities. Furthermore, Taufik et al. noted that even when in communal rooms or during activities, some residents in their study rarely interacted with fellow residents and caregivers, highlighting the proactive approach necessary to strengthen relationships (Taufik, Wardono and Adhitama 2018). Previous studies have also suggested that a high rate of staff turnover makes acquiring knowledge of resident preferences difficult (Krein, et al. 2022). This in turn can inhibit the formation of relationships (Shen, McGarry and Gandhi 2023) and activity organisation. Caregivers shared that it is difficult to support the quality of social life in their care homes without additional support from volunteers and unpaid work. This makes the need for greater support for caregivers, as they cite a lack of time, resources, and support as an inhibitor of creating new social opportunities for residents (Struthers and Ågotnes 2023).

These analyses of stakeholder feedback ultimately recommend a focus on building activities around shared interests, eliciting mutual support, and encouraging resident input in activity programming for activities that appeal to residents with varying preferences (Keane, Ryan and Usher 2024, Misiak, et al. 2025).

## 2.10.2 The Role of Creative Arts

Previous literature has shown the promising effects of creative arts activities in nurturing social relationships within residential care settings (McCormick 2017,

Dadswell, et al. 2020). Creative arts activities are also believed to have the ability to play an integral role in their overall quality of life (McCormick 2017). Creative and participatory arts considered for this purpose range from visual arts, music, dance, crafts, literature and even culinary arts (All-Party Parliamentary Group 2017). As a group activity, they have led to the development of social relationships among residents, increasing both verbal and non-verbal communication and interaction (Dadswell, et al. 2020). They have also been credited as a means to create more equal and open social dynamic between residents and care home staff (Dadswell, et al. 2020). One such example is engaging in visual arts, with activities such as art viewing, discussing or making (Wilson, et al. 2019). A 2019 study of this activity saw changed perspectives of care staff, development of friendships between staff and residents based on co-creation, and opportunities to create and express in ways deemed meaningful by participants (Wilson, et al. 2019). A review of dance activity studies, including therapeutic dance, social dancing, and dance-based exercise, found that these approaches induced social interaction (Guzmán-García, et al. 2013). Communication among residents, staff, and family members involved occurred through dance engagement (Guzmán-García, et al. 2013), which has also been noted as a form of non-verbal communication (All-Party Parliamentary Group 2017).

Residents who have taken part in creative activities such as storytelling have benefited from increased confidence in sharing with their peers (Dadswell, et al. 2020). Storytelling activities have also led to the creation of further opportunities for informal and personal interactions (Dadswell, et al. 2020). A wide range of creative arts activities can enhance social relationships within residential care settings. Researchers describe such activities as facilitating "collective enjoyment, supporting and encouraging others, and developing a sense of camaraderie" (Dadswell, et al. 2020).

### 2.10.3 Music as a Tool for Social Inclusion

Music activities have historically been considered an integral part of community development, social relations, and wellbeing (Shulkin and Raglan 2014). Anthropologists have documented the ability of music to initiate social intimacy, social solidarity and communication beyond language (Turino 2008). Psychological theories have been employed to explain and contextualise these outcomes of music participation (Turino 2008). The theory of *flow* or being in "flow state", developed by

Mihály Csíkszentmihályi, refers to the psychological state of heightened concentration and immersion in a task (Csíkszentmihályi 1990). This has been attributed to or used to characterise the appeal of music and its practice (Csíkszentmihályi 1990, Turino 2008). Performed as a group, it is believed that this *flow* state can illicit interpersonal connections (Keeler, et al. 2015). Research on the ability of music to promote social inclusion has led to its acknowledgment and campaigns for its advancement at a government level (Minguella and Buchanan 2009). The appeal of music engagement appears largely unaffected by age, as reported in a study by Groarke and Hogan (Groarke and Hogan 2015). Their study assessed the adaptive functions of music listening in participants aged eighteen to eighty-five (Groarke and Hogan 2015). Results revealed commonalities across generations within the perceived benefits of music listening, including social engagement (Groarke and Hogan 2015). Music was reported as the most popular creative or cultural arts activity among older adults in Ireland (Hennelly 2023). It was stated that 52% of The Irish Longitudinal Study on Ageing (TILDA) participants reporting playing, listening to, or teaching music (Hennelly 2023). Of the participants who engaged in creative activities, 49% did so with family or friends, and 41% did so as part of an organised group (Hennelly 2023). Similar preference for social music engagement has been noted in other populations (Hong, Kim and Choi 2023). A Korean study indicated preference for interactive music sessions over passive or solitary music activities among older adults in residential care settings (Hong, Kim and Choi 2023). Hong et al. hypothesise that the social element of music engagement will elicit heightened positive effects for individuals participating (Hong, Kim and Choi 2023).

In a 2022 interview study by Paolantonio et al., opportunities to engage with music collectively were considered essential for older adults in residential care settings to interact and access music together (Paolantonio, et al. 2022). One resident speaking on organised music sessions stated that they “need that music”, and “go to chat there” (Paolantonio, et al. 2022). Participants in the Music for Life Project, who took part in group music making, described music as a "vehicle for bringing people together in a meaningful activity" (Creech, et al. 2014). Creech also notes that such social connection through meaningful activities provides opportunity for a sense of purpose and belonging, contributing to active ageing (Creech, et al. 2014). Music was also referred to in a study by Misiak et al. as an activity that could support connection with varying abilities and activity preferences (Misiak, et al. 2025). One participant in this

study reported that “dancing and singing means we do their era of songs” (Misiak, et al. 2025). This aligns with another key factor essential to care staff for promoting social wellbeing: engaging with reminiscence and connecting to the past (Misiak, et al. 2025).

Recent technological developments have led to new techniques for creating music activities that enhance social interactions in residential care settings. A study on the use of a digital music game and its effects on the social interactions of residents was conducted in Indonesia (Taufik, Wardono and Adhitama 2018). The game included the recollection of song titles or musician names after listening to short segments of music or video. The sessions were observed for verbal and non-verbal communication, as well as eye contact, body orientation, gestures, physical contact, proximity, and dialogue. From the analysis of session observations, a significant increase in each social interaction variable was observed compared to before the games (Taufik, Wardono and Adhitama 2018). An increase in residents’ willingness to interact with other residents was also noted, as participants began to invite other residents to join in the next session. This increase was observed as residents became more familiar with the games. Session interaction rose from 50% to 70% between the first and second sessions (Taufik, Wardono and Adhitama 2018). Additional indications of increased social interaction came from questionnaire responses from participating residents and staff. Notably, the digital music game inspired group singing and dancing among participants. It also provided opportunity for discussion about the music, thus encouraging conversation and increasing interaction (Taufik, Wardono and Adhitama 2018). MacRitchie et al. employed a technology-assisted music making workshop in an Australian aged-care facility (MacRitchie, et al. 2024). The workshops involved residents exploring digital music interfaces in a group setting. During sessions, participants made suggestions to each other on how to play instruments, complimented the sound of the instruments, and encouraged each other after playing. (MacRitchie, et al. 2024). Participants reported that the workshops allowed them to become better acquainted, inspiring discussions inside and outside of the workshop setting (MacRitchie, et al. 2024). Akin to Taufik, Wardono and Adhitama’s study, it was also noted that these discussions occurred with groups of residents that did not previously interact often (MacRitchie, et al. 2024). MacRitchie et al. concluded that repeated sessions of such a music activity had built group rapport, trust and inter-participant social connection (MacRitchie, et al. 2024).

## 2.11 Music for Health and Wellbeing

Research on the effects of music activities on health and wellbeing is a multidisciplinary and broad line of study. Research comprises of, but is not limited to, the psychological, physiological, cultural and behavioural effects of music that may have implications for health and wellbeing (MacDonald, et al. 2012). Studies conducted within this subject area occur in both clinical and non-clinical settings (MacDonald, et al. 2012). Contributions from fields such as music, psychology, neuroscience, music therapy, community music, and social sciences have produced a wealth of academic research and evidence of the potential of music to impact various markers of health and wellbeing. As depicted in Figure 2.2, McDonald et al. described the intersection of music education, music therapy, community music and everyday uses of music as the conceptual framework for music, health and wellbeing (MacDonald, et al. 2012). The overlap between these fields can occur within their objectives. For example, a community music intervention may include therapeutic, educational, and social benefits (MacDonald, et al. 2012). The common theme between these intersections is the examining of additional benefits that can incur in music activities beyond that of their primary aim. MacDonald refers to music lessons as a demonstration of this commonality. Where the purpose of a piano lesson is to improve piano skills, research in music, health and wellbeing may consider whether such lessons can enhance cognitive capacities or improve skills in other domains (MacDonald, et al. 2012). The occurrence of skill improvement in domains outside of the music activity is known as the transfer of skills (Biasutti and Concina 2013).

**Figure 2.2:** Conceptual framework for Music, Health and Wellbeing, from Chapter One of the Music, Health and Wellbeing "What is Music, Health and Wellbeing and Why is it Important?" (p. 8), (McDonald, et al. 2012).

### 2.11.1 The Near and Far Transfer of Skills: Musical Training and Beyond

Music ignites a number of regions within the brain and its neural functions and therefore is believed to create changes in the structure, functions, and neural processes in the brain (Miendlarzewska and Trost 2014). This is believed to be particularly evident within music learning and training. Brain plasticity refers to the ability of the nervous system to alter its activity in response to stimuli (Mateos-Aparicio and Rodríguez-Moreno 2019). Music training can create structural differences in the brain, including increased grey matter volume, enlarging neurons and synaptic density (Altenmüller and Shlaug 2012). Given the multi-cognitive functions in musical activities, highly trained musicians appear to show increased brain plasticity in comparison to non-trained musicians (Miendlarzewska and Trost 2014). Considering these effects of music engagement on the brain, music training has been studied for its transfer of skills or transfer of learning. This has been defined as “the event through which a process of learning of specific and contextualised abilities, impact on performance in other domains” (Biasutti and Concina 2013). Near transfer skills, or transfer tasks within the same domain, include listening, motor, and temporal processing skills (Miendlarzewska and Trost 2014). Far transfer skills that are applied

across contexts include executive functions, social skills (Miendlarzewska and Trost 2014), working memory, and attention regulation (Amer, et al. 2013). These skills and their proximity to musical training are presented in Miendlarzewska and Trost's schematic representation, shown in Figure 2.3. In motor abilities, people who have received musical training have performed faster and more precise reproduction of non-musical motor sequence tasks (Landau and D'Esposito 2006), and higher activity in motor and mirror neural areas (Pau, et al. 2013). These outcomes suggest that motor skills acquired in musical training can transfer to unrelated motor tasks (Biasutti and Concina 2013). Frequent training of temporal processing mechanisms through musical education appears to have a beneficial effect on other cognitive functions, such as reading (Miendlarzewska and Trost 2014). An activity such as tapping to a rhythm can revise perceptual predictions (D'Andrea-Penna, et al. 2020), and entrains neural functions (Miendlarzewska and Trost 2014). This is a transfer of skills within cognitive tasks, including those related to attention (Miendlarzewska and Trost 2014). Wanda Wallace described the effects of melody on information recall in 1994 (Wallace 1994). This study indicated that simple melodies could facilitate the recall of text or information more effectively than without a musical stimulus. Furthermore, the inclusion of repetition of the melody provides increased familiarity and, thus, a more effective recall cue, establishing stronger short-term memory and facilitating memory retrieval (Wallace 1994).

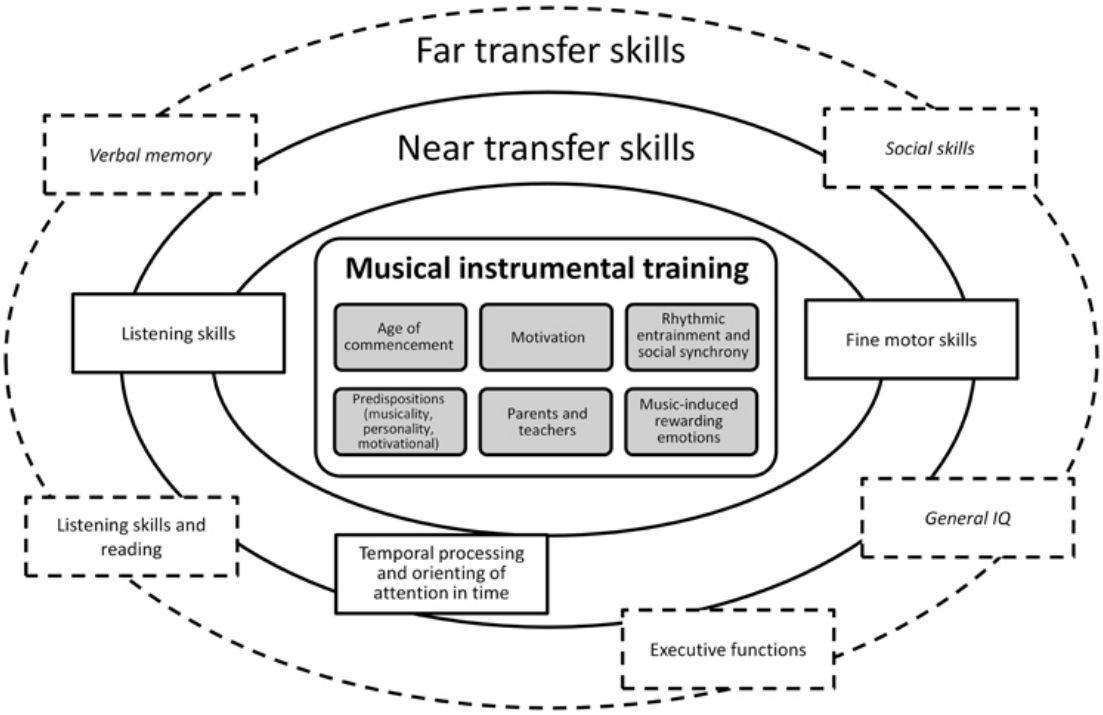



**Figure 2.3:** Schematic representation of near and far transfer skills that benefit from musical instrumental training. (Miendlarzewska & Trost, 2014). How musical training affects cognitive development: rhythm, reward, and other modulating variables [Review]. Frontiers in Neuroscience, 7, Article 279, 1–18. Miendlarzewska, E., & Trost, W. https://doi.org/10.3389/fnins.2013.00279. Reproduced with permission from Frontiers (Creative Commons Attribution 3.0 License).

Near transfer of skills through musical training is well established and largely accepted, and both the transfer of near and far skills through musical training have been subject to much study (Vuurst, et al. 2022). However, some still consider the far transfer effect to be 'controversial' (Vuurst, et al. 2022). Reviews such as Schellenberg's propose commonality of causal inference in this field (Schellenberg 2019). In this context, causal inferences rest on an assumption that the extent of music training is the only variable impacting participants (Schellenberg 2019). The review by Miendlarzewska and Trost acknowledges the potential of external factors to influence results from music training studies (Miendlarzewska and Trost 2014). They specifically identified one study for excluding predisposition differences (ruling out the possibility that prior musical training experience could influence results) (Bugos 2010). The study particularly highlights the potential of music to improve transferable skills and global cognition in older adults. Participants undertook a piano-playing programme that improved working memory, motor skills, and perceptual speed after six months of training, compared with a control group (Bugos 2010).

### 2.11.2 Music and Cognition

The relationship between music and the brain has been extensively studied, leaving many implications for its use in assisting cognitive health. Cognition refers to "all forms of knowing and awareness", as defined by the American Psychological Association (American Psychological Association 2018). It includes tasks such as perception, memory, reasoning, imagining and problem solving. As described in the Oxford Handbook of Music Psychology, music training and practice "are rich sensorimotor and multimodal experiences which can shape the structures and functions of the human brain, and which are associated with cognitive benefits" (Bella 2018). Different types of musical engagement elicit varying brain activity and cognitive stimulation, as depicted in Figure 2.4. This list of brain region activation is not exhaustive and overlaps between engaged regions of the brain occur.

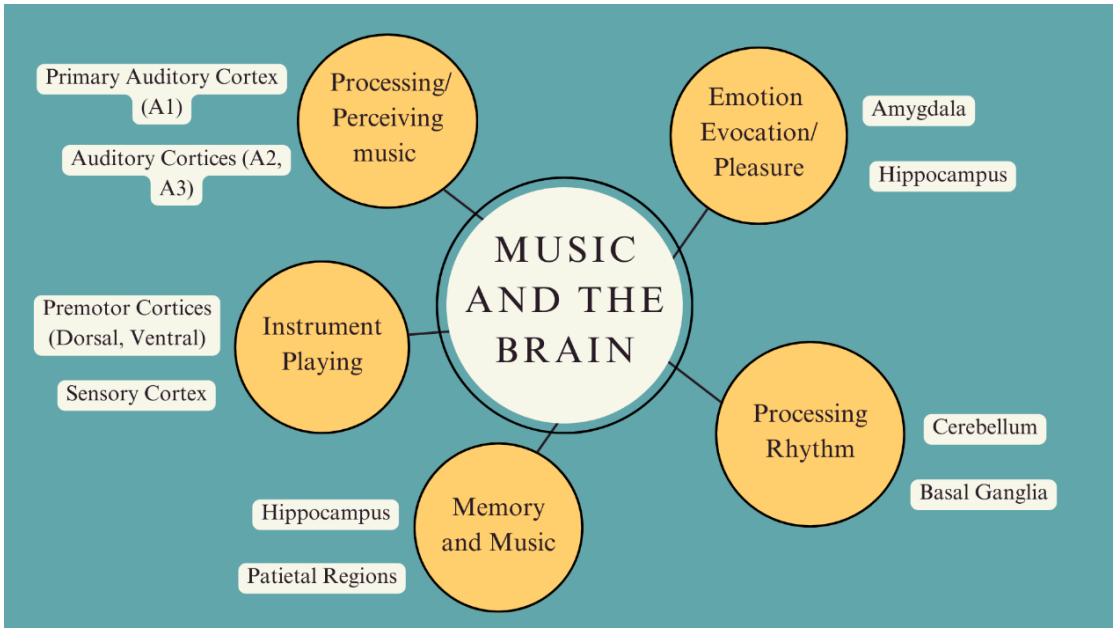



**Figure 2.4:** Activities associated with music engagement and subsequent brain regions that are engaged, as noted by Zatorre 2007, Koelsch 2011, Miendlarzewska and Trost 2014, and Vuurst 2022.

#### (a) Listening

Simply by listening to music, the brain is processing the information in both overlapping and distinct neural networks (Vuurst, et al. 2022). The auditory cortex is central to processing music, and the brain's existing knowledge will map its

predictions onto the auditory experience (Vuurst, et al. 2022). The auditory cortex perceives pitch, rhythm, tempo and timbre of music (Altenmüller and Shlaug 2012). Once received in the auditory cortex, several brain regions are involved in processing this information (Vuurst, et al. 2022). As well as using the cerebral cortex to perceive sensory information, music also influences multisensory areas of frontal, parietal and temporo-occipital brain regions (Altenmüller and Schlaug 2015). The cerebellum is primarily associated with synchronising to the tempo of music (Paquette, et al. 2017). Along with the lateral Heschl's gyrus (HG) in the primary auditory cortex, the primary frontal cortex and tempo-parieto-occipital junction are believed to perceive pitch (Hall and Plack 2008). Studies have suggested that the timbre (tone colour) is perceived in the posterior HG, the superior temporal sulcus, and the insula (Menon, et al. 2002). Within memory domains, functional neuroimaging data have suggested that the left middle temporal gyrus is involved in accessing musical semantic memory (Koelsch 2011). The left anterior temporal areas store parts of a musical lexicon (Koelsch 2011). The inferior frontal gyrus and hippocampal formation operate when retrieving musical information (Koelsch 2011). These regions also subserve language processing (middle temporal gyrus) (Onitsuka, et al. 2004), processing speed and executive function (hippocampal formation) (Hardcastle, et al. 2020). As summarised in Table 2.1, these brain mechanisms are thus involved in an intersection of valuable cognitive functions and music perception.

| Brain Region | Music-related Processing | Other Functions |
|---|---|---|
| **Cerebellum** | **Tempo synchronising** (Paquette, et al. 2017) | **Motor planning, sensory prediction** (Prati, Pontes-Silva and Gianlorenço 2024) |
| **Posterior Heschl's Gyrus**<br><br>**Superior Temporal Sulcus**<br><br>**Insula** | **Timbre perception** (Menon, et al. 2002) | **Early sound processing** (Skipper and Small 2006), (Khalighinejad, et al. 2021)<br>**Social processing** (Beauchamp 2015)<br>**Sensory processing** (Uddin, et al. 2018) |

| | | |
|---|---|---|
| **Lateral Heschl's Gyrus** | **Pitch perception** (Hall and Plack 2008) | **Speech sound processing** (Roll 2024) |
| **Left Anterior Temporal Areas** | **Musical Lexicon Storage** (Koelsch 2011). | **Semantic composition and semantic memory** (Patterson, Nestor and Rogers 2007) |
| **Inferior Frontal Gyrus**<br><br>**Hippocampal Formation** | **Musical Information Retrieval** (Koelsch 2011). | **Working memory, fine movement control, emotional behaviour processing** (Liakakis, Nickel and Seitz 2011)<br>**Executive function, memory** (Hardcastle, et al. 2020) |
| **Left Middle Temporal Gyrus** | **Musical Semantic Memory Retrieval** (Koelsch 2011). | **Conceptual and semantic processing** (Wei, et al. 2012) |

**Table 2.1:** Summary of regions of the brain involved in music-related processing and examples of other functions they support.

**(b) Singing**

Insights from neurochemistry demonstrate the connections between singing and the brain (Osaka, et al. 2015, Pan, et al. 2018, Cohen, Levitin and Kleber 2020). An increase in activation of the nucleus accumbens (a key part of the brain's reward system that influences dopamine levels) can occur when engaging in singing (Cohen, Levitin and Kleber 2020). Increased immunoglobulin levels (an antibody that stimulates immune function, and increased oxytocin levels (a social saliency hormone) have also been associated with singing (Cohen, Levitin and Kleber 2020). Some studies have explored the neural mechanisms underlying social connections formed during singing with another person (Osaka, et al. 2015). In a study where pairs of participants sang or hummed together, neural synchronisation occurred in their left and right inferior frontal cortices (Osaka, et al. 2015). The researchers describe this as an example of a collective experience that gave rise to the neural synchronisation, providing the benefits of social cooperation (Osaka, et al. 2015). Interpersonal brain synchronisation has also been observed in the interactions between participants and an

instructor during an interactive song learning session (Pan, et al. 2018). This also appeared bilaterally in interior frontal cortex activity, which researchers suggest track the social interactive learning and interpersonal learning processes that occur during the acquisition of a song (Pan, et al. 2018).

#### (c) Rhythm-Based Engagement

A subfield within music and cognition is the temporal organisation of rhythm (Emmery, et al. 2023). Research in this area has previously assessed the impact of rhythmic auditory cues on motor and cognitive systems (Emmery, et al. 2023). A 2020 study involved participants listening to rhythmic streams of tone bursts and tapping to isochronous beats for one minute (D'Andrea-Penna, et al. 2020). This was followed by passive listening to streams of sounds while wearing an Electroencephalogram (EEG) to analyse their brain responses (D'Andrea-Penna, et al. 2020). After an analysis of tapping accuracy and EEG data, the study revealed that participants with more accurate rhythm synchronisation in the tapping exercise displayed a greater brain response to unexpected beats during the passive listening exercise (D'Andrea-Penna, et al. 2020). This correlation provides insight into attention, learning and brain plasticity in its perception of sounds. Furthermore, the connections between temporal processing and timing ability indicate the influence of rhythmic stimulation on incrementing attention, learning and brain plasticity. The perceptual predictions of participants updated upon processing an unpredictable beat (D'Andrea-Penna, et al. 2020). As sensorimotor function and timing have a significant effect on the ability to perform daily tasks and maintain quality of life, the stimulation of these processes by engaging in rhythmic music could present positive impacts on such functions.

### 2.11.3 Music for Cognitive Health in Older Adults

Research has shown promise in the preservation of musical memories despite cognitive decline and its ability to impact its symptoms in older adults. As characterised by Lola Cuddy, musical long-term memories often appear largely preserved in cognitive decline, in “striking contrast to difficulties with new learning and episodic memories” (Cuddy, Sikka and Vanstone 2015). One study presented by

Cuddy et al. compared the effect of listening to familiar musical stimuli on memory retrieval within younger adults, older adults and adults with mild-to-moderate Alzheimer's disease (Cuddy, Sikka and Vanstone 2015). The music proved effective in evoking memories for all age groups, as 65% and 67% of tunes evoked memories for younger adults, while 64% and 66% did so for older adults (Cuddy, Sikka and Vanstone 2015). For those with mild-to-moderate Alzheimer's disease, 47% of tunes evoked memories, a lower but not significantly different rate (Cuddy, Sikka and Vanstone 2015). Cuddy et al.'s studies present considerable evidence of musical memory retention at various stages of ageing (Cuddy, Sikka and Vanstone 2015). Their findings indicate the ability of music to activate brain functions that have otherwise deteriorated in older age, particularly in regions previously discussed by Koelsch (Koelsch 2011). Cuddy et al. also suggests that evoking positive memories through music may facilitate communication and improve sense of self (Cuddy, Sikka and Vanstone 2015). Cognitive music training programmes could be an effective supplement to typical exercises that are employed for neurocognitive rehabilitation and retention in older people (Biasutti and Mangiacotti 2018), being a multifaceted and engaging concept.

Klimova, Valis, and Kuca reviewed non-pharmacological interventions and their effects on the delay of cognitive decline in ageing (excluding studies involving older people with cognitive impairment or dementia) (Klimova, Valis and Kuca 2017). The review identified twelve studies, two of which explicitly focused on the use of music (Klimova, Valis and Kuca 2017). One of these studies found a significant cognitive decline in their comparison group, which was not observed in the group which received the music intervention (Tai, Wang and Yang 2016). Of all of the studies identified by the review, the most used intervention was physical exercise, accounting for 50% of studies (Klimova, Valis and Kuca 2017). Researchers conclude that overall, the intervention strategies explored appear to affect cognitive function in older people positively (Klimova, Valis and Kuca 2017). They are also considered advantageous in their non-invasive and cost-effective nature. Further research with more longitudinal randomised control trials has been suggested for such non-pharmacological interventions (Kolanowski, et al. 2010). This may be particularly applicable to music interventions, as just two studies were identified in Klimova, Valis and Kuca's review (Klimova, Valis and Kuca 2017). This indicated a gap in research surrounding music interventions for cognitive decline in ageing.

### (a) Listening

In a case study presented by Cuddy, Sikka and Vanstone, one participant with severe Alzheimer's disease was administered a series of music listening tests (Cuddy, Sikka and Vanstone 2015). The participant's stage of Alzheimer's disease made them unable to engage in conversation or recognise family members. The listening tests revealed their ability to recognise familiar tunes, distorted tunes and famous melodies to the same level of ability as a healthy age-matched control (Cuddy, Sikka and Vanstone 2015). The participant also demonstrated their ability to continue singing a song after being prompted with the first phrase of lyrics. The researchers described this as a "dramatic contrast" from the participant's Mini Mental State Examination (MMSE) results (Cuddy, Sikka and Vanstone 2015). The effects of a music listening intervention on cognitive function specifically in care residents was recorded in a study in 2018 (Tang, et al. 2018). Tang et al. looked specifically at its effects on apathy, considered to be a strong predictor of the progression of dementia and early-stage dementia symptoms (Tang, et al. 2018). This can be characterised by a decrease in goal-oriented cognition and motor behaviour (Marin, Biedrzycki and Firinciogullari 1991). With significant improvement in both apathy and communication ability, Tang et al. emphasise that early intervention with active music engagement is an accessible and cost-effective treatment (Tang, et al. 2018). They also note that maintenance of cognitive function was observed in the intervention group, compared to a control group where this declined (Tang, et al. 2018). Improvement in cognitive markers was also noted in the long-term care group music initiative, the 'Java Music Club' (Millett and Fiocco 2021). Participants in this study listened to music collectively and engaged in discussion. Reductions were noted in subjective memory complaints of the participating residents, as well as an improvement noted in set-shifting (Millett and Fiocco 2021). Set-shifting is the ability to move back and forth between tasks and is a component of executive function (Millett and Fiocco 2021). The researchers noted that there is a close connection between social engagement and cognitive functioning (Millett and Fiocco 2021). They thus hypothesise that the social nature of such a music group makes it increasingly cognitively stimulating and promotes executive function (Millett and Fiocco 2021).

**(b) Singing**

The cognitive impacts of group singing for older adults were explored in a 2021 study on choir singing by Pentikäinen (Pentikäinen, et al. 2021). Findings included enhanced verbal flexibility in the participating choristers, a subdomain of executive function assessed with a phonemic fluency test (Pentikäinen, et al. 2021). Researchers attribute this to vocal production of lyrics, focus on musical structure, and auditory perception necessary for group singing (Pentikäinen, et al. 2021). Better general health and social integration markers were also noted in choristers. A unique finding of this study was that better general health was noted in singers who had less than ten years of choir participation, while those with longer than ten years had better social integration (Pentikäinen, et al. 2021). The researchers hypothesise that the integral nature of long-time choir singing in participants' lives had kept them socially connected. Concurrently, the less experienced choristers' participation may be motivated by better health during ageing (Pentikäinen, et al. 2021). However, the study lacks the historical context of participants to confirm this. The varying durations of music participation may also have implications for the limits or sustainability of the ability of music to improve cognitive health. If a plateau in its benefit could be identified, such results could imply the necessary period of music participation to experience the most cognitive benefit derived from music.

**(c) Rhythm**

Rhythm-based activities use anticipatory processes and intentional programming sequences of movement (Biasutti and Mangiacotti 2018). Such activities have led to improvements in attentional functions and visual-spatial location skills (Biasutti and Mangiacotti 2018). In an exploration of the effects of music-based multitask training on cognition, Hars et al. conducted a six-month training programme with 134 older adults in a community setting (Hars, et al. 2013). The programme included specific dual- or multiple-tasks that challenged both motor and cognitive-related abilities. This was done through a combination of music, rhythm, and physical activities (Hars, et al. 2013). The results showed improvement in the executive-related sensitivity to the interference process, as participants portrayed improved behavioural self-regulation to inhibit prepotent stimuli. The programme also reduced anxiety and improved global

cognitive function (Hars, et al. 2013). The improvement in sensitivity to interference was consistent with that of previous data from multitask training using musical stimuli (Hars, et al. 2013). The performance of concurrent attention-demanding tasks (specific movements or manipulation of objects) with stimuli such as music challenges the ability to resist interferences (Hars, et al. 2013). A rhythmic music programme for residents of a Korean nursing home also resulted in significantly higher levels of cognitive function in a music group compared to a control group (Kim and Kang 2021). This intervention was open to participants without severe dementia. Thus, it showed the potential of music programmes to maintain or improve cognitive function in older adults without dementia. The intervention was conducted by visiting music therapists. The researchers suggest that more caregiver involvement in the integration of music in their care may alleviate some of the issues that the programme faced (Kim and Kang 2021).

Combining a rhythm-based intervention with an exercise-focused programme, a 2014 study compared an exercise intervention conducted with and without music stimuli (Satoh, et al. 2014). Satoh et al.'s study suggests an enhancement in the cognitive function of older adults when combining physical exercise with music (Satoh, et al. 2014). Their results showed significant improvement in the visuospatial function of music participants in comparison to their controls. They hypothesise that this improvement occurred due to the perception used to determine the rhythm and tempo of the music and control their movements (Satoh, et al. 2014). Thus, the programme created simultaneous cognitive and physical training (Satoh, et al. 2014).

**(d) Interactive**

Based on the previous data suggesting that musical practice can prevent age-related cognitive decline, James et al. used protocolled and interactive music practice for older adults with neuroimaging and behavioural approaches (James, et al. 2020). In this ongoing study, James et al. hopes to develop a music training programme that could be easily integrated into daily life and stimulate neuroplasticity and delay/reverse symptoms of cognitive and cerebral decline (James, et al. 2020). The participants partook in piano playing, as well as clapping, singing and marching to rhythms as part of the intervention group. A control group completed a music listening and music culture course (James, et al. 2020). Researchers expect a transfer of skills from the

piano training to working memory, executive functions, speed of information processing and auditory selective attention (James, et al. 2020). With neuroimaging, associated functional and structural brain plasticity may show in grey and white matter in the temporal, prefrontal and parietal areas of the brain. They anticipate less decline of grey matter volume and improved functional networking in frontal areas, which are activated during working memory tasks (James, et al. 2020).

Hamiduzzaman et al. examined a multifaceted, interactive music listening intervention in a residential care setting (Hamiduzzaman, et al. 2023). This study included residents with dementia in five rural Australian care facilities (Hamiduzzaman, et al. 2023). These care homes received a six-week music intervention, where residents listened to music, sang along, and played instruments with selected music facilitators (Hamiduzzaman, et al. 2023). Using the Standardised Mini-Mental State Examination (SMMSE), researchers assessed the orientation, memory, attention, calculation, language, and visual construction skills of the residents (Hamiduzzaman, et al. 2023). These assessments were completed before and after the music programme. When retested after the intervention, improvements in attentiveness, response, and initiation were recorded among residents (Hamiduzzaman, et al. 2023). Qualitative data collected from facilitating musicians and care staff recorded a shift in behaviour among residents that indicated increased cognitive stimulation through the programme. Staff also noted residents connecting to the songs with reminiscence, and that songs evoked memories despite the progression of their dementia (Hamiduzzaman, et al. 2023).

### (e) Improvisation

Musical activities that include improvisation have positively impacted skills related to cognitive ability, such as spatial perception, working memory, and selective attention (Biasutti and Mangiacotti 2018). In Biasutti and Mangiacottis's randomised controlled trial, older adults in residential care completed twelve bi-weekly music sessions with improvisation processes (Biasutti and Mangiacotti 2018). Post-programme, significant improvement was observed within the Mini Mental State Examination (MMSE), Verbal Fluency Test, and clock-drawing test (Biasutti and Mangiacotti 2018). This was compared to a control group which showed no significant improvements. The researchers concur that the programme had a positive effect on participants regardless

of their degree of cognitive reserve prior to the trial (Biasutti and Mangiacotti 2018). Improvement in visuospatial function was noted among participants of a musical improvisation programme in a study by Dos Santos et al. (Dos Santos, et al. 2020). Post-intervention assessments of participants showed significant differences in visuospatial and planning abilities (Dos Santos, et al. 2020). These results indicate that a transference effect occurred, where this musical practice improved these cognitive skills outside of a musical context (Dos Santos, et al. 2020).

### 2.11.4 Music and Mobility

The role that music can play within mobility and physical health is closely linked to cognitive processes and psychological experience. Using musical stimuli while engaging in physical movement or exercise has been widely applied. This use has increased rapidly with the widespread accessibility of music due to the progression of portable audio devices (Bigliassi, et al. 2019). The effects of music while engaging in physical activity can be categorised alongside its underpinning neurological mechanisms (Bigliassi, et al. 2019, Park, Williams and Etnier 2023).

#### (a) Pleasure and Reward

Park, Williams and Etnier propose that musical pleasure is integral to responses to music during physical activity (Park, Williams and Etnier 2023). Studies identified increases in perceived arousal, affective valence and improved performance when exercising (Park, Williams and Etnier 2023). Researchers have also explored the effect of music on remembered pleasure after exercise, which refers to the cognitive evaluation of the pleasure of an experience (Hutchinson, et al. 2018). After completing physical activity, participants who listened to self-selected music scored higher within remembered pleasure than those with a no-music condition (Hutchinson, et al. 2018). Remembered pleasure plays a role in decisions to engage in the activity again in the future. Thus, researchers suggest that lasting association of pleasure with music and physical activity may positively influence adherence (Hutchinson, et al. 2018). Pleasure responses to musical stimuli during exercise have also been studied at a neurological level (Bigliassi, et al. 2019). A study by Bigliassi et al. used portable

EEG technology to examine the cerebral mechanisms underlying these effects (Bigliassi, et al. 2019). The study found that exercising with music elicited more positive affective responses and up-regulated perceived activation compared to podcast listening or no auditory stimuli (Bigliassi, et al. 2019). Exercise with music listening also enhanced perceived enjoyment for participants (Bigliassi, et al. 2019). Researchers suggest that the up-regulation of high-frequency waves and frontal-central areas of the brain are associated with the psychological benefits induced by music during physical activity (Bigliassi, et al. 2019).

**(b) Sensory Distraction**

Outside of physical activities, the use of music to increase pain tolerance has been extensively studied and used within the medical setting (Lee 2016). Considering this, the ability of music to shift attention from physical discomfort has been applied to physical activity (Ballman 2021). Using external sources of sensory stimulus, such as music, can distract the exerciser from internal sensory signals (Park, Williams and Etnier 2023). Such signals include sweat, a higher heart rate, and fatigue. Participants in a recent study on music use in physical activity referred to music as a distraction from tiredness and boredom and increased self-efficacy (Hallet and Lamont 2019). A review by Terry et al. considered evidence from fifty-four studies that compared musical stimuli during exercise to no music (Terry, et al. 2020). Objective performance outcomes were used to ascertain its impacts (Terry, et al. 2020). The review confirmed that listening to music before or during physical activity has led to lower perceived exertion, compared to those who did not use music (Terry, et al. 2020). Further examination of music during physical exercise considered the intensity levels of exercise and its impact on the effectiveness of music as a sensory distraction (Chow and Etnier 2017). Chow and Etnier measured heart rate, attentional focus, and ratings of perceived exertion of participants during exercise with musical stimuli (Chow and Etnier 2017). The results of the study indicated that music was less effective at influencing exertion perception at high intensity (Chow and Etnier 2017). Researchers thus suggest that physiological effects of exercise will dominate music during higher intensity activities. However, music can work to compete with the physiological input of discomfort or exertion during low-to-moderate exercise (Chow and Etnier 2017).

### (c) Rhythmic Entrainment Responses

The occurrence of rhythmic entrainment is strongly related to the cognitive and psychological processing of music. As described earlier in relation to music and cognition, the processing of rhythm engages the brain's temporal processing and attention (D'Andrea-Penna, et al. 2020). This causes rhythmic entrainment, a synchronisation of behavioural or physical systems with the external stimuli (Trost, Labbé and Grandjean 2017). This appears in motor behaviours, for example, in moving to the beat of a song (Park, Williams and Etnier 2023). Factors such as the *groove*, tempo, and familiarity of music can affect the motivation to move to the music (Ready, McGarry, et al. 2019, Ready, Holmes and Grahn 2022). The motivation induced by music has led to improved adherence to physical activity (Alter, et al. 2015).

Several studies and reviews demonstrate the benefits of using music during exercise. It can elicit positive emotional states, distract from uncomfortable sensory experiences, and even intrinsically motivates movement in the body (Alter, et al. 2015, Bigliassi, et al. 2019, Terry, et al. 2020, Emmery, et al. 2023, Park, Williams and Etnier, 2023). This literature describes the affective, motoric and sensory engagement that music can facilitate, indicating its ability to promote physical health and mobility. Research suggests further examination of this impact to assess its long-term capabilities in improving physical health and mobility.

## 2.11.5 Music for Mobility in Older Adults

The merging of music and physical movement within activities for older adults has previously elicited positive results in the retention or improvement of their mobility (Trombetti, et al. 2011). A weekly exercise programme involving the use of percussion instruments, walking in time with music, and responding to changes in rhythmic patterns was completed as part of a Swiss study (Trombetti, et al. 2011). Participants displayed an increase in gait velocity, stride time variability and experienced fewer falls during the first six months than participants in the control group (Trombetti, et al. 2011).

A 2015 study specifically examined the effect of music on balancing ability throughout a six-week training programme (Kim, et al. 2015). The study included a group that partook in balance training alone, while another group listened to musical stimuli while they completed their balance training. Participants chose to use slower-tempo popular music to ensure consistency (Kim, et al. 2015). The Timed Up and Go (TUG) test was used to measure basic mobility and balance, as well as the Berg Balancing Scale (BBS) for an in-depth assessment of balance ability. After the training programme had finished, changes in the TUG and BBS were significant in both the balance training group and the music balance training group, as well as the changes in the limit of stability (Kim, et al. 2015). The study recommends a longer training period for a more comprehensive understanding of the role of music in the use of balance training for older individuals (Kim, et al. 2015).

Music education methodologies have also been utilised as a multi-task exercise intervention for physical the health of older adults, namely the Dalcroze 'Eurythmics' method (DE) (Hars, et al. 2024). A 2024 study assessed the effects of DE on the physical and cognitive function and fall occurrences in older adults, compared to a multicomponent exercise intervention (Hars, et al. 2024). Participants engaged with a DE programme for twelve months. After the twelve-month period, these participants had "significant improvements in physical function" (Hars, et al. 2024), in comparison to the group that took part in the alternative multicomponent exercise programme. This was particularly evident within gait under balance and dual-task actions (Hars, et al. 2024). Beyond the effects on physical function, the DE programme also exhibited significant improvements in the executive function-related tests (Hars, et al. 2024). As the DE programme combines the performance of body movement with adaptation to a musical stimulus, the exercises engage cognitive inhibition, flexibility and working memory (Hars, et al. 2024). This study strengthens the evidence for interventions incorporating both physical and cognitive stimulation for older individuals in comparison to traditional exercise programmes (Hars, et al. 2024).

Auditory stimulation has been implemented in gait training, often utilised for older adults and for people living with Parkinson's disease (Thaut and Hoemberg 2014). Rhythmic Auditory Stimulation (RAS) refers to the use of music cues or metronomes to provide temporal events, allowing a person to entrain their gait function (Thaut and Hoemberg 2014). A study by Emily Ready on music-based auditory cues and their influence on gait showed the stark difference in effects between

low groove and high groove music (Ready, McGarry, et al. 2019). In this study, high groove stimulus led to more stable gait, even for those with poor beat perception (Ready, McGarry, et al. 2019). Thus, it can be argued that the type of music chosen during RAS or music with movement greatly affects its ability to alter gait within participating individuals (Ready, McGarry, et al. 2019). An assessment of older adults completing RAS assessed the participants by asking them to walk in sync with the music and at a self-selected, comfortable pace (Ready, Holmes and Grahn 2022). It demonstrated increased gait speed with auditory cues faster than the natural walking rate. Additionally, it was found that older adults who had poor beat perception demonstrated a cautious approach to walking with unfamiliar musical cues, hindering their ability to benefit from RAS within gait speed or cadence. Older adults may benefit more from familiar stimuli during this activity (Ready, Holmes and Grahn 2022).

### 2.11.6 Music and Quality of Life

Quality of life (QOL) is a multi-faceted concept, which is subjective to the perceptions of an individual of their position in life (Barcaccia, et al. 2013). Quality of life is also a dynamic condition, which can be modified by developments, changes, and experiences that occur throughout life (Barcaccia, et al. 2013). Akin to the effect of music on cognition, varying types of musical engagement can impact several components of QOL.

#### (a) Listening

Studies have positioned individual listening to music as a resource that people can select, access, and use with intention (Rolvsjord 2010). Such elements of music listening are associated with autonomy and a sense of self, which are key components of QOL. In times of difficulty, listening to music has been described as offering hope and support for emotional processing (McFerran and Lotter 2024). During life transitions, music can provide people with both comfort and inspiration throughout their experience (McFerran and Lotter 2024). Participants in a study by Groarke and Hogan highlighted other functions of music listening, including mood improvement,

engaging in reminiscence, and aesthetic appreciation (Groarke and Hogan 2015). Regarding stress relief, a meditation study found stable stress levels among workers who listened to 'relaxing music', while a control group reported an increase in stress (Carissoli, Villani and Riva 2015). Considering the association between poor sleep quality and poorer wellbeing, research has also assessed the ability of music to affect subjective sleep quality and next-morning wellbeing (Majeed, et al. 2021). Compared to pink noise listening, bedtime music listening was found to significantly improve subjective sleep quality in a group of young adults (Majeed, et al. 2021). A reduction in next-morning stress and an increase in next-morning life satisfaction was also observed (Majeed, et al. 2021). A similar study assessed the impact of bedtime music listening for participants with insomnia disorder (Jespersen, et al. 2019). While no apparent effect on objective measures of sleep was found, participants showed significant improvement in the severity of insomnia, perception of sleep, and QOL (Jespersen, et al. 2019). Both studies indicate that using music before bedtime may have positive effects on their perceived quality of sleep and thus, their QOL.

**(b) Group Activities**

Group music engagement has been credited for its ability to contribute to successful socialisation across the lifespan (MacDonald, et al. 2012). It has long been associated with the development of personal and cultural identity, social integration, collaboration, and socioemotional regulation (MacDonald, et al. 2012). Group music activities can impact several facets of QOL. The practice of community music includes a particular emphasis on these characteristics (MacDonald, et al. 2012). An example of this is evident in a recent case study of an Australian community music group, which explored the effects of collective music-making on the wellbeing of participants (Heard and Bartleet 2025). Almost all members of the group from across the community noted that happiness was a fundamental experience in their participation. For some group members, the opportunity to create joy with others was rare and thus valued (Heard and Bartleet 2025). A sense of purpose, confidence building, and an opportunity to express themselves creatively were also key outcomes (Heard and Bartleet 2025). Through the medium of music, participants reported that they could share stories with each other, creating strong bonds and connections among members (Heard and Bartleet 2025). The facilitator described the group as a "safe space" in this

way. This inclusive and supportive avenue makes an essential contribution to the overall wellbeing of the group members (Heard and Bartleet 2025).

Within group singing, benefits for wellbeing and overall QOL have been observed among members of choirs (Judd and Pooley 2013). The benefits of choir singing participation reported in Judd and Pooley's study share similarities with those reported by community music group members (Judd and Pooley 2013, Heard and Bartleet 2025). On a psychological level, respondents expressed that participation provided them joy and was a means to cope with stressful life situations (Judd and Pooley 2013). For some participants, their choir participation was helpful during times of depression or during recovery from illness (Judd and Pooley 2013). Within interpersonal experiences, participants valued the specific ethos of the choirs. They were described as a welcoming, fun community, where members felt safe to be vulnerable (Judd and Pooley 2013). Additionally, they spoke of the social aspects of singing within a choir, learning from the diverse range of fellow members, and developing strong bonds within the choir community (Judd and Pooley 2013).

### 2.11.7 Music for Quality of Life in Older Adults

The universal nature of music engagement may enable it to influence multiple aspects of quality of life (QOL), many of which are strongly associated with active ageing (Creech, et al. 2014). The impact of music activities for the wellbeing and QOL of older adults has been studied for many decades. Vanderark, Newman and Bell examined the impact of a music participation programme for residents of a care home in 1983 (Vanderark, Newman and Bell 1983). After completing the five-week programme, satisfaction, music attitude and music self-concept were found to have significantly improved among the residents. This indicates the positive impact of music activities in residential care settings on their QOL. The study recommended music as an integral part of daily activities among residents (Vanderark, Newman and Bell 1983). In recent years, research has explored the impact of music listening (Wattanasoei, et al. 2017), music making (Yap, et al. 2017), singing (Batt-Rawden and Stedje 2020) and music and movement (Verrusio, et al. 2014) on QOL for older adults.

**(a) Listening**

A 2017 study on the experiences of older adults engaging with music examined its implications for their QOL (Wattanasoei, et al. 2017). Researchers compared the results of a QOL index with the music habits of participants. The lowest scoring domain in this cohort was a sensory ability facet, likely due to their reported health problems that affected their vision, movement, and memory (Wattanasoei, et al. 2017). Participants with an increased total QOL score, particularly within the autonomy and intimacy domains, reported listening to a popular Thai song (Wattanasoei, et al. 2017). The song included lyrics describing community and a tempo likened to the rhythm of a heartbeat. The researchers in this study speculate that the song instilled feelings of comfort and nostalgia in the listeners and allowed them to connect with the music emotionally (Wattanasoei, et al. 2017).

Common age-related changes such as dementia can include non-cognitive symptoms such as irritability, depression, anxiety and psychosis (Masters, Morris and Roe 2015). Such symptoms can have a significant effect on a person's QOL. Several studies have been conducted to assess the effects of music programmes on these symptoms, including the Music and Memory service (M&M) (Music & Memory 2025). A study within the University of California assessed the impact of the intervention specifically in residents with dementia and/or behavioural problems in residential care (Bakerjian, et al. 2020). The M&M programme was evaluated for effects on "psychotropic medication use, cognitive impairment, aggressive behaviour, mood and depressive symptoms, presence of pain, and occurrence of a fall" (Bakerjian, et al. 2020). The study included 4107 residents across 265 facilities (Bakerjian, et al. 2020). Over six months, the requirement of medication use for psychosis, anxiety and depression declined significantly, by 11%, 17% and 9% respectively. A decline was also noted in the exhibition of aggressive behaviours, depressive symptoms, and pain (Bakerjian, et al. 2020). While the study found both clinically and statistically significant benefits to the implementation of M&M, it did not include a control group to compare with participating residents. The study also excluded residents who were not diagnosed with dementia or exhibited behavioural problems (Bakerjian, et al. 2020).

The results of Bakerjian et al.'s study on the M&M programme reassert the findings of Thomas et al.'s study completed in 2017 (Thomas, et al. 2017). Thomas et

al. assessed the outcomes of the programme on behavioural and psychological symptoms associated with dementia through an experimental design (Thomas, et al. 2017). Long-stay residents with Alzheimer's disease and related dementias from ninety-eight nursing homes took part in the M&M programme for approximately six months. Upon reassessment, a decrease in the use of antipsychotic and anxiolytic medicines and a reduction in behavioural problems were observed (Thomas, et al. 2017). Unlike Bakerjian et al.'s study, Thomas et al. implemented a matched comparison group to compare participant outcomes, and thus these results were compared to similar facilities that were not using the M&M service (Thomas, et al. 2017). The researchers assert M&M as a low-cost and efficient non-pharmacological intervention for use in residential care. The study excludes care facility residents who have not been diagnosed with Alzheimer's disease or dementia (Thomas, et al. 2017). Further research may assess whether residents with milder cognitive decline or have not yet exhibited dementia symptoms could benefit from individualised music programmes such as M&M.

**(b) Singing**

The 'Singing Norway' Programme involved caregivers singing to residents on a one-to-one basis (Batt-Rawden and Stedje 2020). Caregivers recorded changes that they observed within the moods and wellbeing of residents in twenty-six residential care facilities (Batt-Rawden and Stedje 2020). During the programme, participating caregivers observed an increase in vitality, energy and good mood within residents (Batt-Rawden and Stedje 2020). They noted that lullabies and sing-along songs reduced uneasiness and discomfort, as well as produced strong memories and emotions for some residents (Batt-Rawden and Stedje 2020). At one facility, staff believed that frequent singing practice reduced the need for the "minor use of medication for anxiety, depression or disorderly behaviour" (Batt-Rawden and Stedje 2020). Batt-Rawden and Stedje stress that singing to residents as a strategy in care should be included as a "vital component for the enhancement of health, wellbeing and quality of life" (Batt-Rawden and Stedje 2020). A 2021 study examined the impacts of a singing group program on the subjective and social wellbeing of older adults attending a day centre (Galinha, Garcia-Martin and Lima 2022). The researchers also considered the mediating roles of self-esteem and social identification

within the group (Galinha, Garcia-Martin and Lima 2022). Qualitative results from this study show that nearly a third of the participants highlighted social wellbeing as a benefit of the singing group. The programme helped them to form new relationships, socialise and communicate with their peers (Galinha, Garcia-Martin and Lima 2022). The study also contributes to the quantitative evidence of the benefits of a singing group programme on the social wellbeing of older adults. The programme had a significant effect on the positive affect, social wellbeing and self-esteem of participants (Galinha, Garcia-Martin and Lima 2022). These effects sustained for six months after the singing group programme had been completed (Galinha, Garcia-Martin and Lima 2022), indicating the long-term impact that participation in singing can have for older adults.

**(c) Music Making**

The Music for Life project assessed the impact of three music programmes for older adults that incorporated music making (Hallam and Creech 2016). One programme included singing, instrument playing and performing, another used singing and instruments alongside sound engineering, and the third incorporated music and storytelling (Hallam and Creech 2016). Participants in these programmes created and performed music together and provided an opportunity for skill development (Hallam and Creech 2016). Hallam and Creech utilised the CASP-12 quality of life scale and Basic Psychology Needs Scale to measure effects on QOL that focused on cognitive, social and emotional wellbeing (Hallam and Creech 2016). Groups who participated in the music activities displayed higher levels of measured wellbeing than those in control group activities (Hallam and Creech 2016). The researchers suggest that music appears to have greater impact on health and wellbeing than other group activities, as participation in music can provide cognitive stimulation, creativity, and social support, all contributing to QOL (Hallam and Creech 2016).

A rhythm-centred music making programme was trialled for its effect on the quality of life, depressive mood, sleep quality and social isolation in the older adults (Yap, et al. 2017). Ten sessions took place over a period of eleven weeks. Participation involved playing drums and other handheld percussion instruments in a group setting, accompanied by three experienced instructors. Participants completed the Geriatric Depression Scale, European Quality of Life Dimensions, Lubben Social Network

Scale, and the Pittsburgh Sleep Quality Index, before and after the intervention (Yap, et al. 2017). Compared to a control group, the participants of the rhythm-centred music making showed possible improvements in depressive mood, sleep quality and social isolation. Due to the small sample sizes used in this pilot study, the statistical power was limited and thus was not deemed statistically significant (Yap, et al. 2017). The researchers thus suggests that a cross over study design with a larger sample size should be considered in future studies. The rhythm-centred music making programme was well received by participants and perceived as a promising recreational activity to engage older participants with potential health benefits (Yap, et al. 2017). The indicative results of Yap et al.'s study, as well as Ready's studies on the effect of RAS (Ready, Holmes and Grahn 2022), reiterate the significant connection between rhythmic stimuli and brain functions. This stimulation allows the performance of both cognitive and physical tasks, as explored by D'Andrea-Penna et al. (D'Andrea-Penna, et al. 2020).

**(d) Movement**

Music and movement have also been studied for their effects on the mental health of older adults, namely evaluating its impact on depression and anxiety (Verrusio, et al. 2014). A six-month music and exercise intervention resulted in a reduction in the depression and anxiety symptoms of the participants (Verrusio, et al. 2014). These impacts were sustained for four weeks after the cessation of the programme, indicating lasting benefits of music and exercise (Verrusio, et al. 2014). The study also links the increase in the number of sessions completed to progressive improvement in the mood of the participants, suggesting a dose-dependent effect (Verrusio, et al. 2014). Ofosu et al.'s study assessed the effects of an online music and movement intervention (Ofosu, et al. 2023). Researchers analysed survey data on residents' anxiety, loneliness, perceived stress, fear of falling, sleep quality and general health and appetite domains (Ofosu, et al. 2023). Activity coordinators were invited to share their observations during the programme. Positive effects were noted in the levels of anxiety, depression, loneliness, perceived stress, and sleep satisfaction of participants. However, researchers emphasised that the small sample size meant other markers were not deemed significant (Ofosu, et al. 2023).

Dance programmes have also been previously employed for their benefits for QOL of older adults (Podolski, et al. 2023). A systematic review on dance movement interventions identified fourteen studies examining programmes with varying dancing styles, all completed in a group setting with older adults (Podolski, et al. 2023). Many of the dancing styles utilised for these interventions appear to be selected based on the popularity of the style within the population. The analysis revealed a small positive effect of dance movement interventions on psychological health compared to control groups (Podolski, et al. 2023). Podolski et al. recommends further research to expand on evidence of the impact of dance within specific psychological domains. The identification of underlying neurophysiological mechanisms involved in these positive psychological effects could also lead to a better understanding of these outcomes (Podolski, et al. 2023). Researchers expected that such activities incorporated into everyday life may retain the positive mental health outcomes associated with dance movement (Podolski, et al. 2023). Thus, longer intervention periods to observe sustained benefits are also recommended (Podolski, et al. 2023).

A 2022 study assessed the impact of square dancing in China, a popular traditional dance within the older population that is rhythmic, accessible, and of moderate intensity (Zhao, et al. 2022). Compared to other sports and activities, older adults who took part in square dancing reported a higher level of confidence in their body self-worth and physical ability (Zhao, et al. 2022). Significant differences were observed within domains of perceived health concern, and life satisfaction. Additionally, square dancers benefitted within emotional and behavioural control domains of wellbeing compared to those who participated in other sports and activities (Zhao, et al. 2022). Zhao et al. also conducted an experimental study, selecting forty participants who had never participated in dancing activities to partake in a two-month square dance programme (Zhao, et al. 2022). After the programme, the factors for body self-esteem and happiness were significantly higher within the experimental group in comparison to the control group (Zhao, et al. 2022). In particular, post-programme satisfaction and interest in life and the control of emotion and behaviour domains were higher within dancing group (Zhao, et al. 2022). No significant changes in these domains were observed within in the control group (Zhao, et al. 2022). The researchers thus conclude that the combination of folk music with physical activity in the form of dance greatly influenced by the quality of life among older participants (Zhao, et al. 2022).

## 2.12 A Question of Facilitation: The Use of Music in Residential Care Settings for Older Adults

As described in previous sections, the use of music for the health and wellbeing of older adults can vary across styles of engagement, music used, and intended effects. The environment in which music is used can also differ, across community, home, and healthcare settings. For older adults living in residential care settings in particular, music use for health and wellbeing can also differ in facilitators. These include music therapists, healthcare musicians, community musicians, and health care professionals who already work directly with the participants (Foster, Pearson, et al. 2021).

## 2.13 Facilitating Music Programmes

Music has served as a part of health care or as medicine in various cultures over the past two and a half millennia (Horden 2017). Distinctions can be made within music in healthcare depending on the facilitators, their roles, and methods of practice. Music therapists undergo training at the higher education level and work independently or as part of interprofessional teams to achieve specific goals with their clients (Foster, et al. 2021). Despite advocacy efforts from music therapists and associated organisations, music therapy has not yet been recognised as an allied health profession in Ireland (Boyle 2019). In other countries, such as Switzerland and the UK, music therapy is a state-registered health profession; legally recognised, regulated and certified (European Music Therapy Confederation 2022). Irish music therapists can, however, register with the Irish Association of Creative Arts Therapists (IACAT) (Boyle 2019). IACAT aims to ensure a code of conduct within members, represent them to health and government departments, and steer the profession towards statutory recognition (Boyle 2019). The scope of music in healthcare settings has expanded exponentially in recent years. This includes professional and volunteer musicians bringing live musical practice to healthcare settings, including Irish projects such as Musicians on Call (Limerick City and County Council 2022). Community musicians, in creating spaces for inclusive and participatory music, also engage with healthcare settings (Higgins and Willingham 2017). Community music practise prioritises personal and social wellbeing benefits over the mastering of musical skills. They will

often create musical groups with marginalised or vulnerable communities (Higgins and Willingham 2017), including older adults or those living in residential care settings. Facilitation of music activities in care settings can also occur with internal facilitators (Foster, Pearson, et al. 2021). Activity coordinators, nurses and caregiving staff have used music in their care across individual and group settings, and varying types of participation. An increasing number of music-based programmes with care staff involvement are also being developed for healthcare settings (Foster, et al. 2021).

Specific qualities, strategies and skills of music facilitators may be particularly relevant when leading music-based activities for older adults, particularly when aiming to support the health and wellbeing of participants. In the context of their Music for Life project, Andrea Creech outlines methods of facilitation that play a role in the development of an effective, collaborative music environment for participants (Creech, et al. 2014). In recognising and incorporating the prior knowledge, skills and life experience of participants, facilitators can use repertoire deemed meaningful to capture the interest of participants. This can help to build relationships within the group through commonalities before introducing new material (Creech, et al. 2014). Facilitators can also support the autonomy of participants through collaborative organisation of group goals, and foster interdependence through shared learning and peer support (Creech, et al. 2014). Creech also notes that for facilitating music activities for older adults, a wide range of enabling strategies are required to account for the diverse needs and preferences that are encountered in their participants (Creech, et al. 2014).

### 2.13.1 Training Caregivers in the Use of Music in Care Settings

With an increase in healthcare professionals interested in incorporating music into their care (Foster, et al. 2021), approaches to enabling the use of music have differed across past literature. Care staff already largely have ownership and responsibility for social activities within the residential care setting, including those that are music-based. However, a lack of resources and support can hinder their ability to provide activities (Struthers and Ågotnes 2023). Looking specifically at music use, Garrido et al. explored the challenges and potential solutions for implementation in residential care (Garrido, et al. 2021). Beyond issues relating to a lack of time and resources, the study identified difficulties that are more unique to music facilitation (Garrido, et al.

2021). One such challenge is effectively communicating the benefits of music to care staff, emphasising the importance of the wellbeing and emotional needs of residents alongside physical care (Garrido, et al. 2021). Furthering this point, it was reported that some staff saw music as "an entertainment device that would enable them to go and do other things rather than an opportunity for interaction" (Garrido, et al. 2021). Participants do note that these perceptions are not the fault of care staff but appear systematically within facilities (Garrido, et al. 2021). The study ultimately recommends an increase in education and knowledge for caregivers relating to music and its ability to strengthen relationships and enhance care (Garrido, et al. 2021).

Some studies have trained formal caregivers to facilitate music interventions for individuals with dementia during one-on-one sessions. A systematic mixed-methods review of such research identified nine papers for inclusion in a systematic analysis (Stuart-Röhm, Baker and Clark 2023). Upon their analysis, Stuart-Röhm, Baker and Clark conclude that training in live music intervention for formal caregivers should be incorporated into staff training (Stuart-Röhm, Baker and Clark 2023). The researchers consider skills such as confidence, flexibility, and adaptability as necessary for caregivers to integrate music into their care (Stuart-Röhm, Baker and Clark 2023).

A number of methods and approaches to training caregivers in music have been documented in previous studies. Hsu et al.'s approach to providing education to caregivers on using music in their practice involved caregivers watching videos of the residents working with a music therapist (Hsu, et al. 2015). Caregivers were then encouraged to use the ideas they were presented by the music therapist in their own interactions with the residents. After the video presentations, caregivers reported that using music in their care had increased their insight into the personal backgrounds of the residents (Hsu, et al. 2015). The experience also enhanced their ability to communicate and improved their relationships with residents (Hsu, et al. 2015). Caregivers expressed interest in further learning specific musical skills to use in their care. Researchers believe that this showed the importance of providing staff with education and practice opportunities to embed psychosocial support in their care (Hsu, et al. 2015).

Caregivers in Hammar et al.'s study were given training in what was called 'Music Therapeutic Caregiving' (MTC), a course provided at a Swedish university (Hammar, et al. 2011). The course content included theories relating to music and

health, using body movements and singing in care, and using songs from childhood and young adulthood with their residents (Hammar, et al. 2011). Caregivers were seen as more interested in communicating and engaging with the residents while singing (Hammar, et al. 2011). The act of singing together also evoked heightened cooperation in completing activities of daily living, such as dressing in the morning (Hammar, et al. 2011). In further reporting on MTC, Engström et al. noted that residents were able to respond to questions and communicate coherently with caregivers when using music in care situations (Engström, et al. 2011). These findings indicate an enhanced sociable communication between residents and caregivers when using MTC (Engström, et al. 2011). Since MTC requires no specialised equipment and is cost-effective, the researchers recommend implementing it as an alternative psychosocial intervention. They suggest that a music therapist, music instructor, or singing caregiver could instruct others on how to use music as a tool to enhance communication between caregivers and residents (Engström, et al. 2011).

In a 2020 study on caregiver singing, a four-hour lecture was conducted for caregivers (Swall, Hammar and Craftman 2020). This included information on the use of music and caregiver singing, and instructions on how to choose songs based on the personal preferences or interests of residents. After using the information that they learned in their care, caregivers reported that singing or using music with residents "promoted togetherness" and facilitated socialisation (Swall, Hammar and Craftman 2020). This was particularly noted with residents where due to the progression of dementia, speaking was no longer useful in communication (Swall, Hammar and Craftman 2020). Some caregivers also discovered mutual musical interests with residents, which allowed for discussion and the development of the relationship between caregivers and residents (Swall, Hammar and Craftman 2020). Swall, Hammar and Craftman describe these results as "valuable knowledge" when considering the future development of education programmes for caregivers (Swall, Hammar and Craftman 2020).

A study conducted in Japan recorded the changes in attitude among nurses after an educational workshop on the use of music in their practice (Lai 2011). The workshop included analytical music appreciation, applications of musical instruments, and listening to music from a variety of cultures (Lai 2011). After completing the three-session workshop, nurses improved in musical aesthetic appreciation scores and gained knowledge and positive attitudes towards the use of music in their practice (Lai

2011). A sustained effect on these scores was observed at a three-month post-workshop follow-up (Lai 2011). Notably, even nurses who had reported that they did not have a musical background benefited from improvement in musical aesthetic experiences (Lai 2011). Researchers suggest that the lesson in music appreciation resulted in a keen awareness of musical content, thus creating a positive difference in aesthetic responses (Lai 2011). The study calls for the implementation of educational workshops to improve the professional literacy of nurses in the use of music in their practices (Lai 2011). This study did not monitor potential implementation of music by nurses in their care after the educational workshops.

One facility that participated in a 2010 study included caregivers who were trained as both nursing assistants and activity personnel (Kolanowski, et al. 2010). This allowed caregivers to use their activity skills while providing care to the residents (Kolanowski, et al. 2010). Staff reported that they often used these skills when working with residents who posed challenges in direct care situations (Kolanowski, et al. 2010). Such methods of cross-training may reduce the reliance of residential care settings on external activity facilitators and provide staff the skills to promote wellbeing through activity (Kolanowski, et al. 2010).

### 2.13.2 Music Programmes with Caregiver Involvement: In Practise

Beyond the provision of music education and training for caregivers, previous studies have documented the use of caregiver-led and caregiver-supported music initiatives in residential care environments. Direct caregiver involvement in the facilitation of music activities has seen increased social wellbeing and relationship building within both participants and staff (Batt-Rawden and Stedje 2020). The ‘Singing Norway’ programme was implemented by care staff, who were given material, guidance, and courses to help them implement songs (Batt-Rawden and Stedje 2020). This support was developed in collaboration with the researchers and caregivers, based on their individual needs (Batt-Rawden and Stedje 2020). A recurring theme in this feedback from staff was the greater self-confidence and ‘finding of one’s voice’ that was felt after singing together. Some respondents who felt they ‘would not be able to sing’ did report that it had been more difficult for them to participate (Batt-Rawden and Stedje 2020). Staff also emphasised how the programme had created a positive working environment, with a deeper sense of community and belonging among the participants

(Batt-Rawden and Stedje 2020). Overall, the perception of singing with residents facilitated by staff was positive. Researchers conclude that when caregivers learn how to incorporate singing into their practice, it can become a vital component for the enhancement of health, wellbeing and quality of life for residents (Batt-Rawden and Stedje 2020). The study by Batt-Rawden and Stedje could be compared to Galihna, Garcia-Martin and Lima's singing programme, which was implemented by external music facilitators (Galinha, Garcia-Martin and Lima 2022). Their study noted little positive effects in self-esteem domains after the programme (Galinha, Garcia-Martin and Lima 2022). The researchers hypothesised that a lack of individualised support, such as the involvement of caregivers, may have hindered the ability of the programme to promote self-esteem (Galinha, Garcia-Martin and Lima 2022). Participants found tasks difficult without support and thus, the programme's overall positive social wellbeing effect may have been limited (Galinha, Garcia-Martin and Lima 2022).

A music programme which largely relies on caregiver-resident relationships for its results is Music & Memory (M&M), a service of the Institute for Music and Neurologic Function (Music & Memory 2025). This programme offers training and support to residential care facilities in America to implement personalised music playlists for their residents (Music & Memory 2025). They work directly with caregivers to create personalised music playlists for residents and manage audio equipment (Music & Memory 2025). Similarly to the M&M programmes, Hamiduzzaman et al. incorporated MP3 players to provide personalised music listening experiences for residents (Hamiduzzaman, et al. 2023). This study saw residents expressing themselves with staff and creating staff-resident interactions beyond those typical of their care plan (Hamiduzzaman, et al. 2023) Caregivers becoming knowledgeable about music preferences and past experiences allowed them to utilise this information to create closer connections with the residents (Hamiduzzaman, et al. 2023). Simultaneously, residents could experience some of the health and wellbeing benefits associated with reminiscing with music (Hamiduzzaman, et al. 2023).

The challenges associated with residential care staff facilitating and implementing music activities were explored in a study carried out in 2023 (Ofosu, et al. 2023). Ofoso et al.'s study involved activity coordinators delivering a digital music and movement programme in ten residential care homes (Ofosu, et al. 2023). The difficulties that activity coordinators faced while completing the programme included

technical difficulties, a lack of resources, and adhering to session frequency (Ofosu, et al. 2023). As the activity resources were digital and online, some care facilities with poor internet or inadequate technical equipment found accessing the resources difficult (Ofosu, et al. 2023). Smaller and short-staffed care facilities struggled to transfer residents into a suitable room for the activity coordinator to implement the programme (Ofosu, et al. 2023). While some activity coordinators were able to adhere to the recommended three to four sessions per week, others found it difficult to complete these many sessions during a typical week (Ofosu, et al. 2023). Activity coordinators did note that despite these challenges, facilitating the programme gave them a renewed sense of job satisfaction and fulfilment (Ofosu, et al. 2023). Participation also increased their knowledge of incorporating music and movement into their care. Activity coordinators were able to build rapport and friendship with the residents through their participation, thus creating an environment of social support (Ofosu, et al. 2023).

### 2.14 Setting the Stage: Sounds in Time

When developing a music programme for health and wellbeing promotion for older adults in a residential care setting, several key considerations must be taken. Within the context of a study, session frequency, duration, and dosage must be established to ensure the accurate documentation of the effect of the music programme. Music activities that have shown positive health and wellbeing effects can be utilised, with a focus on accessibility and routine to increase engagement with participants. Finally, with the incorporation of caregiver facilitation, adequate training and resource provision is required. Figure 2.5 depicts these considerations for implementing a successful caregiver-led music programme, followed by detailed descriptions of each of these programme elements in practice.

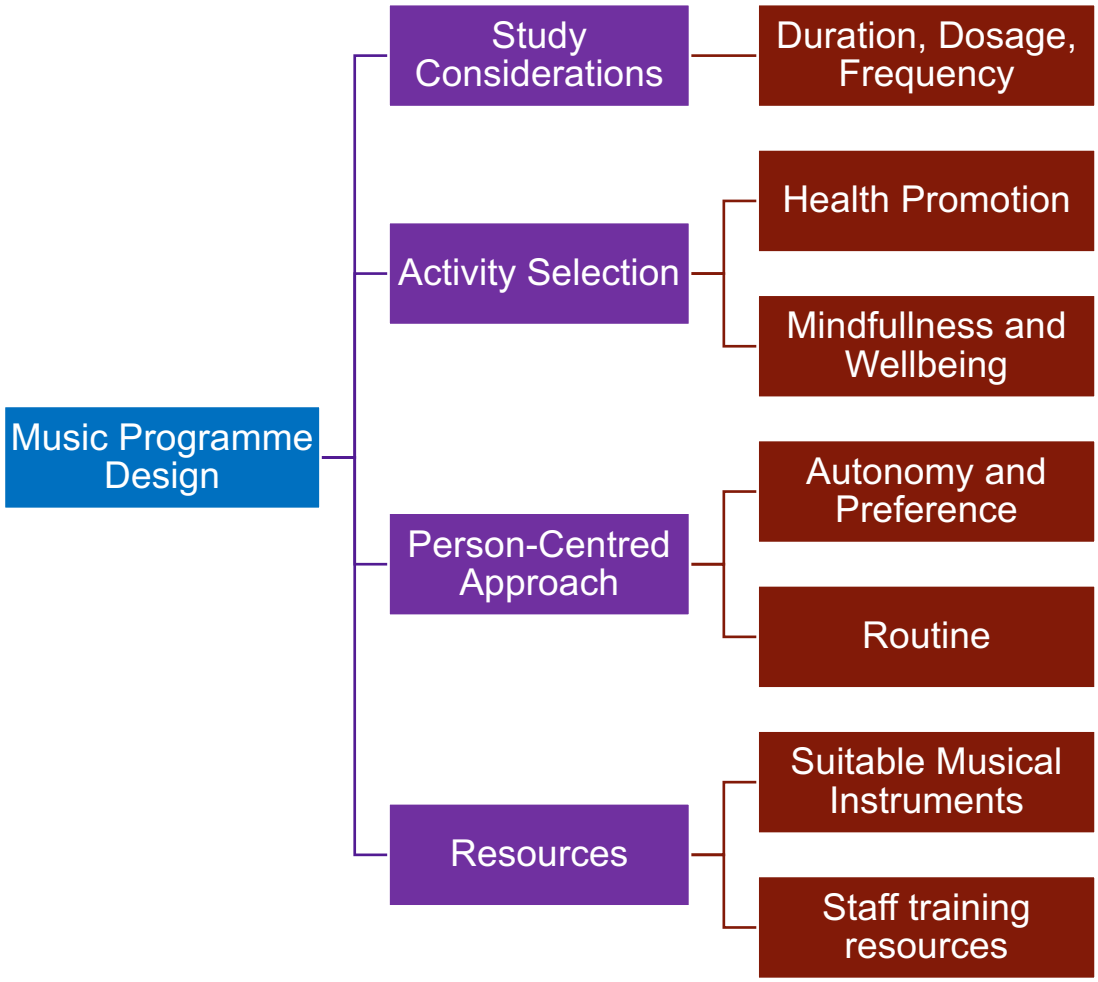



**Figure 2.5:** Visual representation of considerations for music programme implementation.

### 2.14.1 Duration, Dosage and Frequency

Previous studies on music-based programmes and interventions for older adults have varied greatly in both duration and frequency of occurrence during the week, or 'dosage'. Table 2.2 depicts the range of duration, frequency, and session lengths of recent programmes in the literature. Regarding duration, shorter studies discovered through previous meta-analyses range from two to six weeks. This included a singing intervention for cognitive function which lasted two weeks (Brotons and Susan 2000, Li, et al. 2015), a four-week music and physical activity intervention (Bauldoff, et al. 2002, Clark, Taylor and Baker 2012) and a preferred music listening intervention that was implemented for six weeks (Sung, Chang and Lee 2010). Longer studies have included a nine-month music reminiscence activity (Mahendran, et al. 2018), a twelve-month Dalcroze Eurythmics programme (Hars, et al. 2024) and twelve months of music and exercise for cognitive function (Satoh, et al. 2014). A 2013 meta-analysis

of music therapy on behavioural and psychological symptoms of dementia identified and reviewed twenty-three articles (Ueda, et al. 2013). The researchers found that interventions that lasted longer than three months had larger effects on domains such as anxiety (Ueda, et al. 2013). While this review was restricted to specific symptoms within participants diagnosed with dementia, it suggests an advantage that may come from a longer intervention period in recognising effects.

The dosage of sessions during music programmes and interventions also varies considerably throughout previous studies. Less frequent sessions were employed in a music reminiscence study, where participants completed weekly sessions for three months before switching to fortnightly sessions (Mahendran, et al. 2018). Mahendran et el. note that in domains such as anxiety, results were similar at the third and ninth month, while cognitive domains continued to improve (Mahendran, et al. 2018). Several studies used weekly or twice weekly sessions for their programme period (Yap, et al. 2017, Biasutti and Mangiacotti 2018, Dos Santos, et al. 2020, Galinha, Garcia-Martin and Lima 2022). Among the higher rates of dosage completed was an Indian dance intervention, with five sessions per week for six weeks (Mishra and Shukla 2022). A music-based multicomponent exercise training programme employed an average of 4.6 sessions per week for their twenty-week study (Park, et al. 2023).

| **Study** | **Programme Duration (weeks)** | **Session Frequency (per week)** | **Session Length (minutes)** |
|---|---|---|---|
| Bauldoff, et al. 2002 "Exercise Maintenance Following Pulmonary Rehabilitation: Effect of Distractive Stimuli" | 4 | 2–5 | 20–45 |
| Biasutti, M, and A Mangiacotti. 2018. "Assessing a Cognitive Music Training for Older Participants: A Randomised Controlled Trial." | 12 | 2 | 70 |
| Brotons, Koger. 2000. "The Impact of Music Therapy on Language Functioning in Dementia." | 2 | 2 | 20–30 |
| Dos Santos, M, M Krug, M Brandao, V de Leon, J Martinotto, J da Fonseca, A Brasil, A Machado, and A de Oliveira. 2020. "Effects of Musical Improvisation as a Cognitive and Motor Intervention for the Elderly." | 8 | 1 | 60 |

| | | | |
|---|---|---|---|
| Galinha, I, M Garcia-Martin, and M Lima. 2022. "Sing4Health: Randomised Controlled Trial of the Effects of a Singing Group Program on the Subjective and Social Wellbeing of Older Adults." | 17 | 2 | 120 |
| Hars, Melany, Francois Herrmann, Gabriel Gold, Rene Rizzoli, and Andrea Trombetti. 2013. "Effect of Music-Based Multitask Training on Cognition and Mood in Older Adults." Trombetti, A, M Hars, F Herrmann, R Kressig, S Ferrari, and R Rizzoli. 2011. "Effect of Music-Based Multitask Training on Gait, Balance and Fall Rise in Elderly People: A Randomised Controlled Trial." | 25 | 1 | 60 |
| Hsu, M, H, R Flowerdew, M Parker, J Fachner, and H Odell-Miller. 2015. "Individual Music Therapy for Managing Neuropsychiatric Symptoms for People with Dementia and their Carers: A Cluster Randomised Controlled Feasibility Study." | 22 | 1 | 30 |
| James, Clara, Eckart Altenmüller, Matthias Kliegel, Tillmann Krüger, Dimitri Van De Ville, Florian Worschech, Laura Abdili, et al. 2020. "Train the Brain with Music (TBM): Brain Plasticity and Cognitive Benefits Induced by Musical Training in Elderly People in Germany and Switzerland, A Study Protocol for an RCT Comparing Musical Instrument Practise to Sensitisation to Music." | 52 | 2 | 90 |
| Kim, Nyeon Jun, Jung Hyun Choi, Ho Jung An, Ji Sung Kim, Yoo Rim Choi, Jung San Wang, Sang Bin Lee, Kyung Tae Yoo, Hyun Sook Hwang, and Soon Hee Kim. 2015. "The Effects of Music During Balance Training for Six Weeks on Elderly Persons' Balancing Ability." | 6 | 3 | 30 |
| Lyu, J, J Zhang, H Mu, W Li, M Champ, Q Xiong, T Gao, et al. 2018. "The Effects of Music Therapy on Cognition, Psychiatric Symptoms, and Activities of Daily Living in Patients with Alzheimer's Disease." | 13 | 14 | 30 |
| Mahendran, R, M Gandhi, R Moorakonda, J Wong, M Kanchi, J Fam, I Rawtaer, A Kumar, L Feng, and E Kua. 2018. "Art Therapy is Associated with Sustained Improvements in Cognitive Function in the Elderly with Mild Neurocognitive Disorder: Findings from a Pilot | 39 | 0.5 | 60 |

| | | | |
|---|---|---|---|
| Randomised Controlled Trial for Art Therapy and Music Reminiscence Activity Versus Usual Care.” | | | |
| Matziorinis, A. M., B. K. Flo, S Skouras, K Dahle, A Henriksen, F Hausmann, T. T. Sudmann, C Gold, and S Koelsch. 2023. "A 12-Month Randomised Pilot Trial of the Alzheimer's and Music Therapy Study: A Feasibility Assessment of Music Therapy and Physical Activity in Patients with Mild-to-Moderate Alzheimer's Disease." | 52 | 1 (40 total) | 90 |
| Millett, Geneva, and Alexandra J Fiocco. 2021. "A Pilot Study Implementing the JAVA Music Club in Residential Care: Impact on Cognition and Psychosocial Health." | 12 | 1 | 60 |
| Ofosu, E, L De Nys, J Connelly, G Ryde, and A Whittaker. 2023. "A Realist Evaluation of the Feasibility of a Randomised Controlled Trial of a Digital Music and Movement Intervention for Older People Living in Care Homes.” | 12 | 4 | 20 |
| Park, K, L Buseth, J Hong, and J Etnier. 2023. "Music-Based Multicomponent Exercise Training for Community-dwelling Older Adults with Mild-to-Moderate Cognitive Decline: A Feasibility Study." | 20 | 4.6 | 35 |
| Satoh, M, J Ogawa, T Tokita, N Nakaguchi, K Nakao, H Kida, and H Tomimoto. 2014. "The Effects of Physical Exercise with Music on Cognitive Function of Elderly People: Mihama-Kiho Project." | 52 | 1 (40 total) | 60 |
| Siddharth, Mishra and Shukla, Shivani. 2022. "Effect of Indian Folk Dance Therapy on Physical Performances and Quality of Life in the Elderly." | 6 | 5 | 30 |
| Sung, Huei-Chuan, Anne Chang, and Wen-Li Lee. 2010. "A Preferred Listening Intervention to Reduce Anxiety In Older Adults With Dementia in Nursing Homes." | 6 | 2 | 30 |
| Tai, S-Y, L-C Wang, and L-H Yang. 2016. "Effect of Music Intervention on the Cognitive and Depression Status of Senior Apartment Residents in Taiwan." | 17 | 5 | 30 |
| Tang, Quibi, Ying Zhou, Shuixian Yang, Wong Kwok Thomas, Graeme Smith, B Feans, Zhi Yang, Lexin Yuan, and Joanne | 12 | 3 | 50 |

| | | | |
|---|---|---|---|
| Wai-yee Chung. 2018. "Effect of Music Intervention on Apathy in Nursing Home Residents with Dementia." | | | |
| Verrusio, W, P Andreozzi, B Marigliano, A Renzi, V Gianturco, M Pecci, E Ettorre, M Cacciafesta, and N Gueli. 2014. "Exercise Training and Music Therapy in Elderly with Depressive Syndrome: A Pilot Study." | 24 | 2 | 60 |
| Yap, Angela, Yu Heng Kwan, Cheun Seng Tan, Syed Ibrahim, and Seng Bin Ang. 2017. "Rhythm-centered Music Making in Community Living Elderly: A Randomised Pilot Study." | 11 | 1 | 60 |
| Zhao, Xiaona, Na Qi, Huizhen Long, and Sen Yang. 2022. "The Impact of National Music Activities on Improving Long-Term Care for Happiness of Elderly People." | 8 | 3 | 60 |

**Table 2.2:** Duration, session frequency and session length of previous music-based programmes.

### 2.14.2 Activity Selection

To target specific health and wellbeing domains within music activities, previous research has considered both psychological and physical tasks that stimulate cognitive processes, promote movement, and improve wellbeing. These health and wellbeing domains have been explored across a range of musical engagement styles with older adults and in the residential care context.

Using familiar or favourite songs can significantly stimulate memory in group music activities (Mahendran, et al. 2018, Lyu, et al. 2018, Ito, et al. 2022). Two studies included in a recent meta-analysis (Ito, et al. 2022), showed familiar music prompting reminiscence (Mahendran, et al. 2018) and improving word recall (Lyu, et al. 2018). The use of familiar music can also encourage discussion among participants (Millett and Fiocco 2021). Repetition within music is an important and widely used component, with repeating verses or motifs often creating interpersonal cohesion (Margulis 2013). It is noted that episodic memory can be improved when songs or melodies repeat throughout a music intervention (Ito, et al. 2022). This allows participants to explicitly and implicitly recall memories from past music sessions (Ito, et al. 2022). To incorporate improvisation in music activities for older adults, approaches such as the Kratus improvisatory method (Kratus 1991), have been

employed (Dos Santos, et al. 2020). This programme included participants engaging with percussion instruments to explore the sound potentialities of the instruments, then established relationships between the sound and their movement and manipulation (Dos Santos, et al. 2020).

Relating to word list memory, short-term memory (STM) has been explored by presenting distinctions between serial STM and non-serial STM (Usher and Cohen 1999). Serial STM is defined by recalling ordered lists of items, while non-serial STM focuses on remembering information without a specific order (Usher and Cohen 1999). Serial STM tasks were used to examine the effects of long and short duration tasks and the differences that may occur when using repetitive or non-repetitive items in memory retention (Cohan and Bryant 1991). Their research found that subjects who performed tasks for longer durations exhibited higher recall ratings, regardless of their non-repetitive contents (Cohan and Bryant 1991). It is thus assumed that multi-operational tasks leave multi-operational representations in memory, leading to stronger levels of short-term memory recall (Usher and Cohen 1999). The effect of cognitive training on word list memory has been examined with non-music-based interventions. However, few significant relationships were found between the memory training used and the functional outcomes of participants (Rasmusson, et al. 1999, Gross, et al. 2011), warranting further research.

When incorporating movement into musical activities, choice of musical stimuli and accessibility are imperative to ensure engagement and attainability of activity benefits for participants (Park, et al. 2023). Previous studies, such as Park et al.'s study on music-based multicomponent exercise training in the US, have chosen music considering the music preferences of participants (Park, et al. 2023). They also incorporated music with unchanging tempos and clear, discernible rhythm (Park, et al. 2023). Chair-assisted exercises could be adaptable across mobility levels and allow safe implementation of activities for participants who may be susceptible to falling (Park, et al. 2023). Such accommodations allow more participants to engage in the exercise programme (Park, et al. 2023).

Various kinds of music have long been considered for their effect on relaxation, anxiety and stress responses (Rider 1985, Scheufele 2000, Nater, et al. 2006, Thoma, et al. 2013). Early studies have examined musical stimuli that varied in structure and rhythm (Rider 1985). Rider concluded music that shifted in mood from tension to relaxation was most effective in perceived pain reduction and electromyography

levels, indicating muscle relaxation (Rider 1985). With this in mind, Scheufele employed Mozart's 'Sonata in D major for Two Pianos', including its first movement (allegro con spirito) and its second movement (andante) (Scheufele 2000). This study resulted in physiological benefits after listening to the music including lower heart rates and served as a distraction from the experimental stressor that was deployed (Scheufele 2000). These findings support the idea that tense to relaxed moods in classical music support relaxation and stress relief (Scheufele 2000). In a study by Nater et al., the emotional and psychophysiological responses to musical stimuli were examined (Nater, et al. 2006). 'Miserere Mei' by Allegri was chosen as a slow and comforting stimulus, and elicited emotions such as relaxation and drowsiness (Nater, et al. 2006). The Allegri piece was also used in a study on relaxing music by Thoma et al. (Thoma, et al. 2013). The impact of 'Miserere Mei' on the stress hormone cortisol, heart rate, and respiratory sinus arrhythmia was compared to rippling water sounds and rest without stimulation. The group exposed to the relaxing music had higher cortisol concentrations than the other groups (Thoma, et al. 2013). However, after the stressor, salivary alpha-amylase baseline levels were reached quickly in the relaxing music group in comparison to the group that was not exposed to any stimulus (Thoma, et al. 2013).

### 2.14.3 Person-Centred Approach

Person-centred care is one of the key themes of the national standards for residential care settings for older people in Ireland (Health Information and Quality Authority 2016). Person-centred care standards span across numerous services in this setting. They must be incorporated in resource use, management, health and wellbeing promotion, and safeguarding. Within the context of music programmes, autonomy and preference and supporting routine are relevant considerations for developing music activities that prioritises person-centred care.

#### (a) Autonomy and Preference

An increase in resident autonomy with residential care homes leads to an enhanced quality of life, satisfaction in daily routine, and higher participation in social activities

(Welford, et al. 2010). Analyses conducted on the perception of autonomy of residents suggests that the use of open negotiations of care plans and routines are valued by participants (Welford, et al. 2010). Additionally, gaining an insight into residents' interests, activities and lifestyles from before they moved into the care setting allows for the development of person-centred care (Welford, et al. 2010). When considering music for long-term care residents, 'participant-selected music' or 'preferred music' has been incorporated in previous studies (Sung, Chang and Lee 2010, Costa, Ockelford and Hargreaves 2018). A UK music listening study tested 113 care residents for their levels of pain, anxiety, and depression after three weeks of listening to their preferred music (Costa, Ockelford and Hargreaves 2018). The analysis of the pre and post-test scores showed a significant decrease in pain in the music group, compared to no changes and small, non-significant decreases in the control group (Costa, Ockelford and Hargreaves 2018). Decreases in depression were found after just two weeks of the intervention, with a similar result found in the decrease of anxiety (Costa, Ockelford and Hargreaves 2018). Participants who provided more detailed information regarding their music preferences experienced the most significant decrease in pain (Costa, Ockelford and Hargreaves 2018). The researchers suggest that the close level of attention and emotional arousal with this familiar music was essential for their pain relief (Costa, Ockelford and Hargreaves 2018). A similar study was completed in 2009, where preferred music listening was evaluated for its effects specifically on reducing anxiety in residents with dementia in care homes (Sung, Chang and Lee 2010). Participants in the study were classified as having moderate to severe cognitive decline and displayed symptoms of anxiety. After six weeks of the preferred music listening intervention, the mean anxiety score decreased significantly (Sung, Chang and Lee 2010). Sung, Chang and Lee hypothesise that music reduced anxiety by enhancing a sense of familiarity in the care space for residents (Sung, Chang and Lee 2010). The study notes the significance of a careful assessment of the importance of music to the individuals, as well as their preferences before implementing a music listening intervention. This ensures the intervention is tailored to the participants needs and is accessible for care staff to promote alleviation of anxiety among residents (Sung, Chang and Lee 2010).

Previous studies have shown songs from childhood and young adulthood have increased attention and facilitated reminiscence of memories associated with the music (Götell, Brown and Ekman 2000). Group singing has also long been associated with

the promotion of social wellbeing (Galinha, Garcia-Martin and Lima 2022). A previous randomised controlled trial revealed that group singing created higher senses of purpose, feelings of control, and validation, in comparison to alternative activities (Galinha, Garcia-Martin and Lima 2022).

**(b) Routine**

Routine is a key factor in realising identity, self-esteem, activity levels and continuity, and coping with major life changes (Zisberg, et al. 2007). A concept pertaining to strategically designed patterns, the maintenance of a personal routine offers conceptual and therapeutic direction for the preservation of the functional state (Zisberg, et al. 2007). This is particularly pertinent when facing major situational or life changes (Zisberg, et al. 2007), which often occurs when adjusting to residential care. Research has suggested that routines can play a crucial role in the preservation of function and health while in care settings (Borell, et al. 1994, Zisberg, et al. 2006). In contrast, as noted in an Irish study, fixed routines that lack autonomy and control could also negatively impact the quality of life of residents living in residential care settings (Cooney, Murphy and O'Shea 2009). This highlights the importance of recognising preferences and individuality (Cooney, Murphy and O'Shea 2009), while adhering to routines that could help preserve or improve function and health (Zisberg, et al. 2007).

The beginning of a group music activity can often establish the atmosphere of the entire session, and thus, the first song should be chosen with intent (Moss, et al. 2022). Music practitioners and researchers have expressed the importance of making each participant feel comfortable and welcome within the group (Moss, et al. 2022). Songs to initiate activities have been used across many settings, including within school and childcare (Register and Humpal 2007), individual and group music therapy sessions (Strongwater 2018), and music interventions for older adults (Moss, et al. 2022). ‘Hello’ or greeting songs are commonly used to facilitate this. ‘Hello’ songs allow participants to feel welcomed regardless of their level of understanding, being accessible and inviting in nature. These songs may also be altered to include each participant’s name during the song (Moss, et al. 2022). Perspectives from the field of music therapy and community music propose a mediation between structure and spontaneity within the overall planning of music programming (Strongwater 2018,

Moss, et al. 2022). Rather than rigid adherence to structure, subtle guiding from facilitators of music groups is recommended to allow for peer support and mutual learning to occur (Moss, et al. 2022). Predicable routine is recommended to create familiarity and ease, but flexibility is required to prepare for changes that may occur session to session (Strongwater 2018).

The balance between familiarity and flexibility in facilitation is identified as a key feature of Creech and Enright's model for later-life music learning and participation (Creech and Enright 2025). Within this model, these features can be grounded within principle values of a group, such as community, reflection, and curiosity (Creech and Enright 2025). The authors highlight the leadership required in the music facilitator to respond to the outcomes of the group's experiences, guiding participants through the creative moments influenced by the core values that are established (Creech and Enright 2025). By incorporating such pedagogy in developing music-based activities for older adults, the facilitator can provide a musical environment that is person-centred and supportive towards the individual and collective goals of participants (Creech and Enright 2025).

### 2.14.4 Resources

Hong, Kim and Choi's study exploring the music activity preferences of older adults in residential care settings revealed that engaging with musical instruments was the most popular activity amongst participants (Hong, Kim and Choi 2023). In preparing a music programme for older adults, physical resources such as musical instruments must be thoughtfully selected (Boonrod 2024). Their suitability must be ensured for optimum accessibility, engagement and enjoyability. The use of resources that could promote the health and wellbeing of participants can also be employed (Puspitosari and Nurhidayah 2023). With the incorporation of music programmes led by caregivers, the suitability of training and implementation resources to aid these facilitators is an additional consideration (Hammar, et al. 2011, Lai 2011, Swall, Hammar and Craftman 2020).

### (a) Suitable Musical and Multisensory Instruments

There are several factors to consider when choosing suitable musical instruments for programmes with older adults (Boonrod 2024). A 2024 study on the needs of older adults in the use of musical instruments highlighted the following four main categories of importance:

- User-friendly: Instruments should be intuitive to facilitate effortless engagement.
- Aesthetics, safety and ergonomics: Visually stimulating instruments with no sharp edges and minimal physical strain upon use are preferred.
- Accessibility and playability: Instruments should not rely on intricate or physically demanding manoeuvres and should be designed to accommodate physical limitations associated with ageing.
- Musical selection and cultural relevance: Culturally sensitive selections of instruments may enhance enjoyment when participating (Boonrod 2024).

Similar sentiment has been held in previous interventions (Martin, et al. 2004). Martin et al.'s vibrotactile rhythm playing study highlighted their choice of lightweight instruments to accommodate varying ranges of motion and muscle strength (Martin, et al. 2004). With these recommendations in mind, hand-held and accessible percussion instruments deployed during activities may encourage participants to move to the tempo of the musical stimuli (Martin, et al. 2004, Boonrod 2024). Such synchronisation in instrument playing can encourage social cohesion within the group (Martin, et al. 2004).

Providing sensory stimulation to auditory, visual, tactile, olfactory, vestibular, and proprioceptive senses promotes maintenance of the functions of the sensory system of older adults (Puspitosari and Nurhidayah 2023). This stimulation can also have positive effects on the physical and psychological health of older people (Puspitosari and Nurhidayah 2023). Writing on group modalities for geriatric skill enhancement, psychologist Kathie Erwin cites bubble blowing as a carefree activity that initiates a sensory experience visually and tacitly (Erwin 2012). This can occur by the directing the attention of participants to the form, size, and colours reflecting from the bubbles,

and popping them (Erwin 2012). A 2023 experimental study explored the effects of sensory stimulation activities on the quality of life of forty-four older adults (Puspitosari and Nurhidayah 2023). Using activities such as balloon dancing, music listening, guessing games, and marbles, the study showed a significant positive influence on the quality of life of participants after an eight-week intervention (Puspitosari and Nurhidayah 2023). The inclusion of such activities in residential care settings could be an inexpensive and accessible medium for sensory stimulation and contribution to the quality of life of residents (Puspitosari and Nurhidayah 2023).

**(b) Staff Training Resources**

Providing care staff with training and resources for facilitating music engagement has enhanced the care experience for both staff and residents (Hammar, et al. 2011, Lai 2011, Swall, Hammar and Craftman 2020). Participating caregivers in Hammar et al.'s study were offered information on music therapeutic caregiving theory and music and health (Hammar, et al. 2011). They were also provided instructions on how to use songs and body movements during care interactions (Hammar, et al. 2011). Similarly, Swall, Hammar and Craftman's study reported providing a four-hour lecture on the use of music and caregiver singing, focusing on choosing songs based on person-centredness (Swall, Hammar and Craftman 2020). Hui-Ling Lai provided an educational workshop to nurse participants in their study (Lai 2011). The workshop content was guided by the theory of experiential education, with "learning by doing" being at the forefront of the design (Lai 2011). The workshops included pictures, handouts, and a variety of musical instruments for participants to engage with throughout. The workshops included analytical music appreciation, where participants listened to a variety of musical pieces to consider and discuss the emotional experience that they evoked. The theory and practise of therapeutic music was also discussed in the workshop, where learners were active participants in interactive learning strategies (Lai 2011). Overall, a mediation between practical and theoretical learning appears to provide both an understanding of music's potential in care, and the practical knowledge and skills to implement it (Hammar, et al. 2011, Lai 2011, Swall, Hammar and Craftman 2020).

### 2.14.5 Sounds in Time in Summary

This chapter has explored the scope of music use within the context of older adults living in residential care settings. This knowledge base can inform the development of a rational for devising a music-based programme in this environment. This includes the relationships between music engagement with cognitive, physical, emotional and social health and wellbeing, and their various forms of implementation for this purpose. Additionally, strategies for supporting healthy ageing and key principles for improving quality of life for those living in residential care settings must be considered. A summary of this rationale can be seen in Figure 2.6.

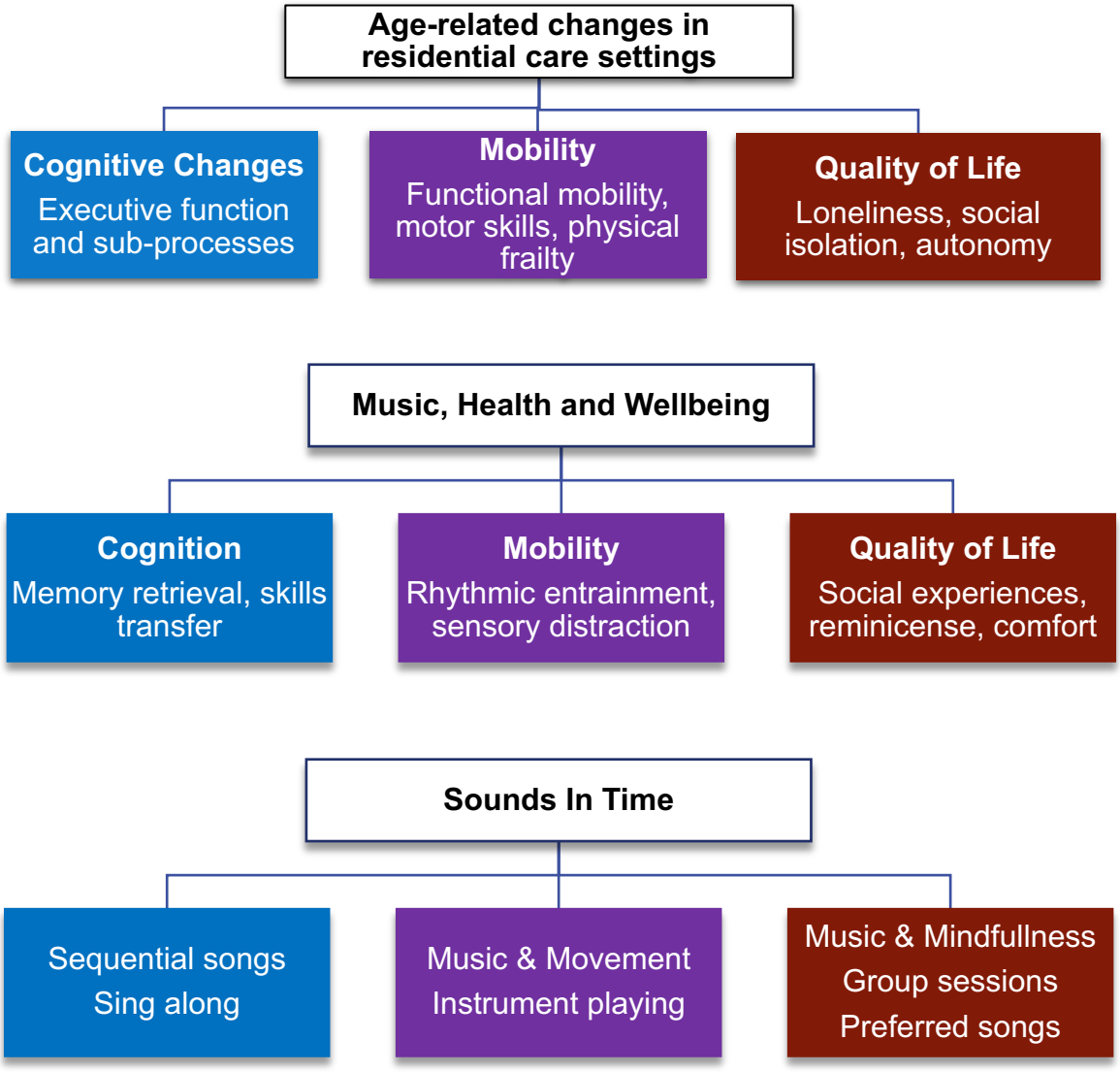



**Figure 2.6:** Summary of the rationale for the design and implementation of a music programme for older adults in residential care settings.

## 2.15 Literature Review: Conclusions

This literature review describes the potential of music to impact several health and wellbeing domains, including cognitive, physical, social and emotional health. In the context of residential care settings, initiatives for the promotion and maintenance of health and wellbeing is a key objective of care providers. In addition, creating opportunities to foster relationships between residents, caregivers, and the wider community is particularly important for both the quality of life of residents and work satisfaction for caregivers. Several types of facilitators have been identified in this environment, varying in roles and methods of practise. Studies have also considered the training of caregivers to facilitate these music-based activities. The characteristics of previously adopted music initiative were analysed for their duration, selected activities and resources, and methods of adopting person-centred practises. Finally, the key insights from the literature review developed a rationale for creating a successful music programme to promote the health and wellbeing of older adults in a residential care setting. Details of these insights contributing to the objectives and research questions explored in this study are presented in the following section.

## 2.16 Aims

Previous research indicates the positive effects of music-based activities for older adults, namely within their cognitive ability, mobility, and quality of life, as well as providing an outlet to improve social relationships with those around them. There is, however, a lack of research which compares the effects of caregiver-led music programmes to external musician-led programmes. The contrasting facilitation models may affect the experiences of participating residents, within relationship building, level of engagement and health and wellbeing outcomes. This study intends to address this by assessing the impact of both facilitation models in a residential care setting. Additionally, the study will assess the differences between varying amounts of music sessions per week in order to determine the optimum amount of sessions to elicit the health benefits associated with music engagement.

The aim of this study is to observe and analyse the effects of an eighteen-week music programme in a residential care centre. To achieve this, the following questions will be addressed.

- What is the impact of a music programme on the cognitive ability, mobility, and quality of life of older adults living in residential care settings?
- What differences can be observed between the programme delivery of the caregivers and an external musician?
- What effect does caregiver training have on the experiences of caregivers facilitating music sessions?
- What is the optimum frequency of music sessions for participants?

# Chapter 3: Methodology

## 3.1 Ethical Approval

This study initially received ethical approval on January 6th, 2025, by the Social Research Ethics Committee (SREC) at University College Cork. An amendment request to include an additional measurement of observations from participating caregivers was approved on March 21st, 2025. Due to unforeseen circumstances, the music programme started later than initially proposed, on February 5th, 2025. A further amendment was requested to lengthen the duration of the data collection process, which SREC approved on June 27th, 2025. To aid data analysis, an amendment request to add a quantitative data exclusion criterion was approved on September 18th, 2025. An amendment request to include the follow-up focus group with caregivers was approved on April 9th, 2026.

**Figure 3.1:** Timeline showing the key dates of the ethics approval process for this study.

## 3.2 Study Design

The study was designed to measure the effects of an eighteen-week music programme on the cognitive ability, mobility and quality of life of older adults in a residential care setting. These measures were assessed within both an external music facilitator-led and caregiver-led programme model. The study incorporated qualitative and quantitative data in an experimental, mixed-method study design. Mixed-method studies are commonly used across social sciences, including health, nursing and education research (Cresswell and Piano Clark 2007). Collecting both qualitative and quantitative data allows for a better understanding of a research question than if either dataset is used alone — merging and analysing the data together forms "a more complete picture" of the investigation (Cresswell and Piano Clark 2007). This research method was chosen to give an insight into the quantifiable health and wellbeing effects of the programme, while providing the participants with an opportunity to share their experience of the programme. Open-ended questions provide context on the perception of the programme and its feasibility.

The study participants were divided into four groups, group A, B, C, and D. This was to examine the role of session frequency, differences between caregiver-led and external musician-led models, and the effects compared to non-musical activities. Group A received two music sessions per week, led by the external music facilitator. Group B also received two music sessions per week, but these were led by the participating caregivers. Group C received the caregiver-led music session once a week, and group D participated in alternative activities already provided in the residential care centre. Details of these groups are depicted in Figure 3.2.

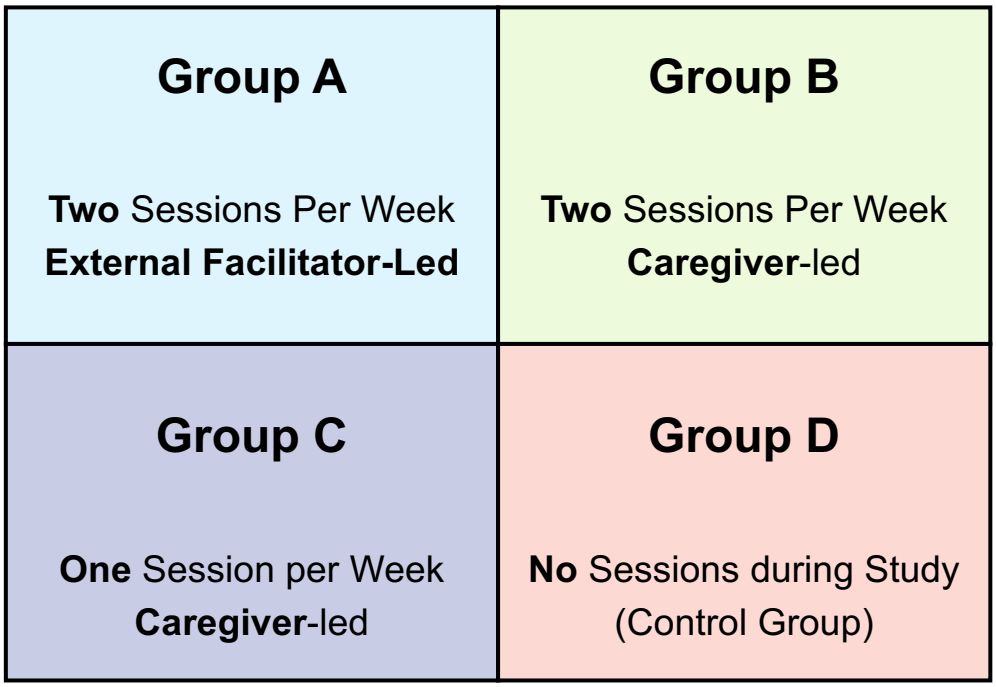



**Figure 3.2:** Participant group divisions and their conditions for the duration of the programme.

### 3.3 Recruitment Process

Participants were recruited from a residential care centre located in County Cork, Ireland. The care centre has a maximum occupancy of 127 people and offers short and long-term care, as well as independent living apartments. The operations manager at the facility granted permission to recruit participants. Garda Vetting was obtained by both the researcher and supervisor before any contact with residents. The care centre was then visited before the study commenced to explain the programme and ask for volunteers. As this study mainly involved a cohort of older adults living in a residential care centre, all relevant considerations were taken to ensure that participants were fully informed. During the initial visit, participants were provided with information on the purpose of the research and its details. It was emphasised that there was no obligation to participate and that they had the right to decline participation, using clear and straightforward language. It was stated that the information would be kept confidential, and time was allocated for any questions or queries from potential participants. Participants were informed of their right to withdraw from the study, even after initial consent was given. They could do this by disclosing their wishes to withdraw to the researcher directly, or to their caregiver/the operations manager, who would then notify the researcher. Participants did not have to give a reason for

withdrawing. Participants were provided with information sheets containing this information, which are available alongside the consent forms in Appendix A. To accommodate any learning or communication difficulties, the information sheets were written with a large, easy-to-read font (Calibri 14) and clear language. It also included images to help convey the message of the information sheet. Participants were encouraged to discuss any further questions they may have had with their caregiver or with the researcher directly, if any clarifications were needed. Consent forms signed by participants were stored in the locked cabinet in the supervisor's office, with only the researcher and supervisor having access. Once transferred to an electronic file stored on Microsoft OneDrive with UCC credentials, these physical copies were destroyed. Participants were identifiable in the study through the use of subject codes.

Scheduling of music sessions and participant group division was also discussed with the operations manager and activity coordinator during the initial visit. The following criteria were verified through a review of the previous feasibility study and comprehensive discussions with caregivers and management of the care centre. As described in Table 3.1, participants included were long-term residents of the care centre, and exclusion criteria were short-term residents and those who had dementia beyond a mild stage. Caregiver participants included were staff who were available to facilitate music sessions, and those who could not commit to facilitating the music sessions were excluded.

| Inclusion Criteria | Exclusion Criteria |
|---|---|
| - **Long-term residents of the care centre**<br>- **Caregivers available to facilitate weekly music sessions.** | - **Residents with dementia that is moderate to severe**<br>- **Caregivers who cannot commit to facilitating weekly music sessions**. |

**Table 3.1:** Inclusion and Exclusion Criteria for study participants.

Due to the nature of the research setting, randomisation of group allocation was not feasible. Participants had to be grouped according to their living arrangement within the care centre, as moving residents from the floor or day room where they resided would be impractical for care staff. After the initial volunteer request, seventy-nine people agreed to participate. This figure was made up of sixty-five residents and

fourteen caregivers. Forty-seven of the resident participants were women, and eighteen were men. Group A comprised of twenty-three participants (m=5; f=18), eighteen participants were in Group B (m=6; f=12), ten in Group C (m=1; f=9), and fourteen in Group D (m=6; f=8). During the study, ten participants dropped out, four participants passed away, and one participant moved to a different residential care centre. Of the participants that did not complete the study, five of these were from Group A (m=2; f=3), three from Group B (m=2; f=1), six from Group C (m=0; f=6) and one from Group D (m=1; f=0). Fifty resident participants were still in the study at the time of post-programme assessments and questionnaires. Along with the caregivers, this brings the total to sixty-four participants. A summary of participant engagement can be found in Table 3.2.

| | **Total No. of Resident Participants** | **Group A** ***n*** | **Group B** ***N*** | **Group C** ***N*** | **Group D** ***n*** |
|---|---|---|---|---|---|
| **No. of Resident Participants at Recruitment** | 65<br>M=18; F=47 | 23<br>M=5; F=18 | 18<br>M=6; F=12 | 10<br>M=1; F=9 | 14<br>M=6; F=8 |
| **Participants who discontinued** | 15<br>M=5; F=10 | 5<br>M=2; F=3 | 3<br>M=2; F=1 | 6<br>M=0; F=6 | 1<br>M=1; F=0 |
| **Total Residents who completed the study** | 50<br>M=13; F=37 | 18<br>M=3; F=15 | 15<br>M=4; F=11 | 4<br>M=1; F=3 | 13<br>M=5; F=8 |

**Table 3.2:** Visual representation of sample size and group allocation.

### 3.4 Caregiver Training

Participating caregivers completed a training day at the care centre prior to the study. The researcher and supervisor facilitated the training sessions. Both a morning and an afternoon training session were conducted, minimising the impact of the sessions on the work schedule of the staff. Approximately eighteen caregivers in total participated in the training. The sessions were forty minutes long. First, an explanation of the study was provided. The supervisor presented an introduction to the impact of music on

health and wellbeing, the potential benefits of incorporating music into their care, and the purpose of conducting research such as this study. The researcher then presented the content of a typical music session. Caregivers were fully briefed on the types of activities in the programme, how to implement them when they are facilitating sessions, and an introduction to the musical instruments and equipment. They were also shown how to access the music recordings and materials necessary for facilitation. This included a live demonstration, where the researcher acted as the music facilitator and caregivers as the participants. The practical training allowed caregivers to engage in the session material before volunteering. Caregivers then had an opportunity to pose any questions, queries, or concerns that they had before the start of the programme.

### 3.5 Materials

Caregivers were provided with a physical folder, which served as a guide for implementing the programme. The first page included photographs of each musical instrument along with their names. This was provided to allow caregivers to become familiar with any instruments or resources they may not have seen before (see Figure 3.3). It also included a guide on how to connect the programme laptop to the television with the HDMI cable, where they could find the songs for each session on the laptop, and general tips for implementing the sessions safely. The second page listed songs and musicians that would appear throughout the programme, so that those facilitating the sessions could familiarise themselves with some of the material before the sessions. The remainder of the folder was made up of session plans for each week, ensuring a consistency in structure and delivery of the music programme. The plans explained each activity, the resources needed, and included instructions on how to implement them, as seen in Figure 3.4. Musical instruments provided included tambourines, hand drums, egg shakers, sticks, maracas, a triangle, an agogo bell, and chime bells. Each instrument was easy to use and adaptable to varying levels of mobility. Bubble mixture and bubble wands were provided for use during the music and mindfulness activity. For safety, a distinct “dry” bubble solution, as part of the Tobar blizzard bubble blower set, was purchased for the programme, to avoid slippery residue that is associated with traditional bubble solutions. A designated laptop provided by the care centre was used to store the music recordings and lyric videos,

which was plugged into a large wall-mounted television in the activity room. Music recordings were available offline to avoid any difficulty in the event of a lack of internet coverage. The full list of materials provided for the music programme is available in Table 3.3. All session plans are available in Appendix F.

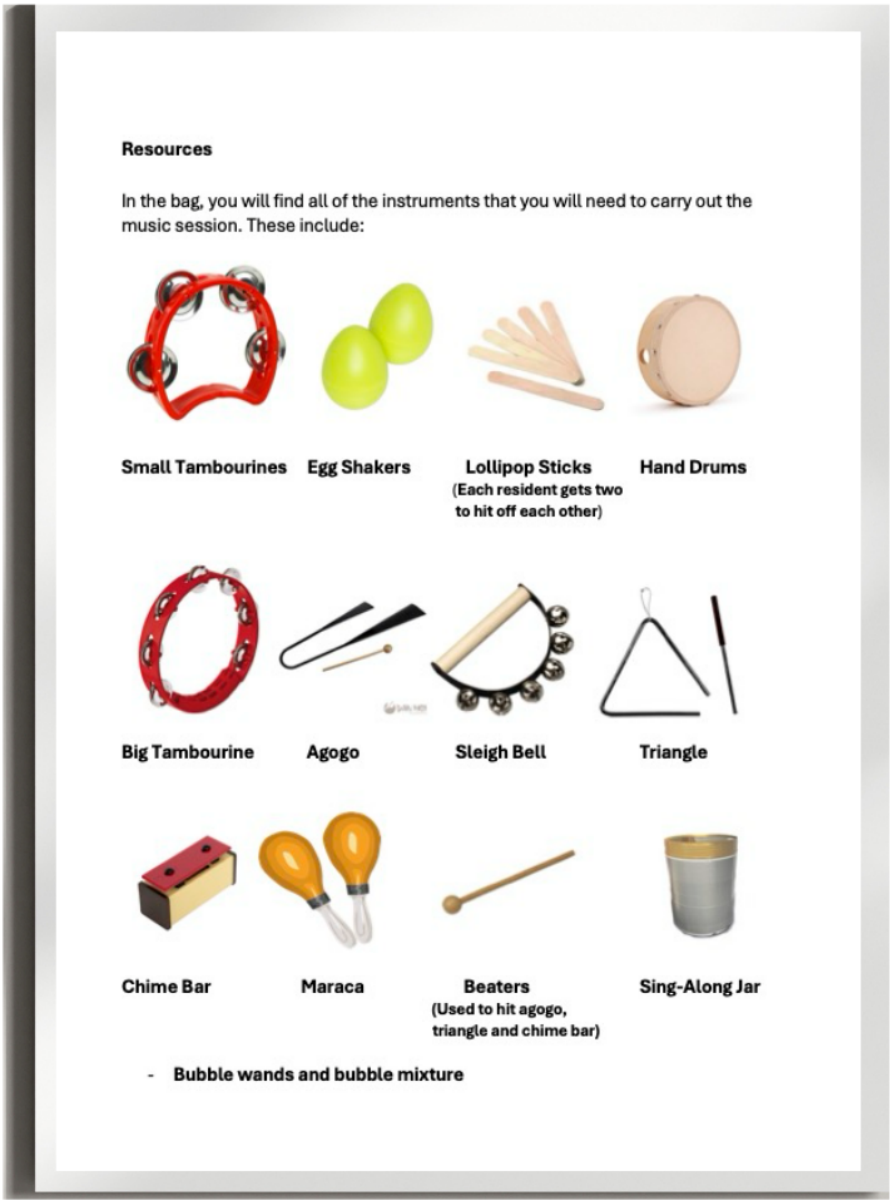
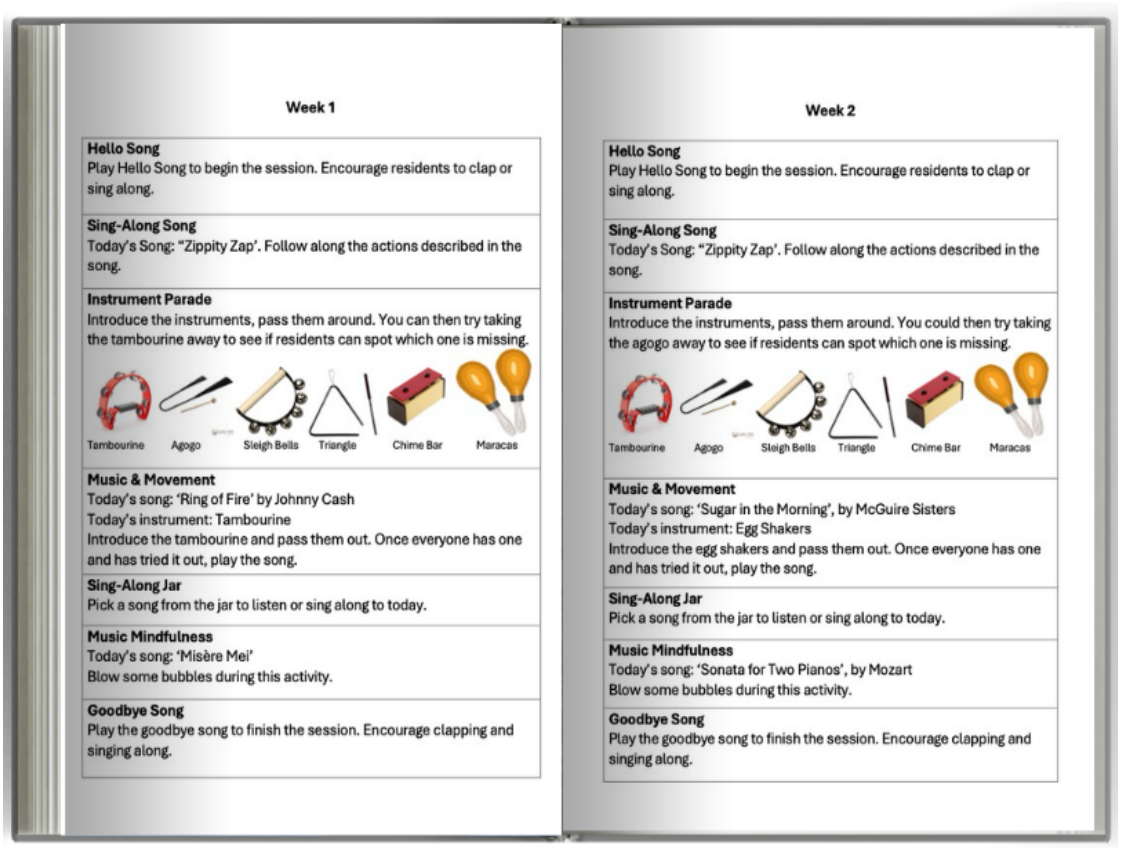



**Figure 3.3:** Opening page of guidelines folder with instrument images and descriptions.



Week 1

**Hello Song**
Play Hello Song to begin the session. Encourage residents to clap or sing along.

**Sing-Along Song**
Today's Song: "Zippity Zap'. Follow along the actions described in the song.

**Instrument Parade**
Introduce the instruments, pass them around. You can then try taking the tambourine away to see if residents can spot which one is missing.

Tambourine Agogo Sleigh Bells Triangle Chime Bar Maracas

**Music & Movement**
Today's song: 'Ring of Fire' by Johnny Cash
Today's instrument: Tambourine
Introduce the tambourine and pass them out. Once everyone has one and has tried it out, play the song.

**Sing-Along Jar**
Pick a song from the jar to listen or sing along to today.

**Music Mindfulness**
Today's song: 'Misère Mei'
Blow some bubbles during this activity.

**Goodbye Song**
Play the goodbye song to finish the session. Encourage clapping and singing along.

Week 2

**Hello Song**
Play Hello Song to begin the session. Encourage residents to clap or sing along.

**Sing-Along Song**
Today's Song: "Zippity Zap'. Follow along the actions described in the song.

**Instrument Parade**
Introduce the instruments, pass them around. You could then try taking the agogo away to see if residents can spot which one is missing.

Tambourine Agogo Sleigh Bells Triangle Chime Bar Maracas

**Music & Movement**
Today's song: 'Sugar in the Morning', by McGuire Sisters
Today's instrument: Egg Shakers
Introduce the egg shakers and pass them out. Once everyone has one and has tried it out, play the song.

**Sing-Along Jar**
Pick a song from the jar to listen or sing along to today.

**Music Mindfulness**
Today's song: 'Sonata for Two Pianos', by Mozart
Blow some bubbles during this activity.

**Goodbye Song**
Play the goodbye song to finish the session. Encourage clapping and singing along.

**Figure 3.4:** Example of music session plans from guidelines folder.

| Materials | Quantity |
|---|---|
| Folder | 1 |
| Laptop | 1 |
| HDMI Cable | 1 |
| Small Tambourine | 42 |
| Egg Shaker | 40 |
| Lollipop Stick | 100 |
| Maracas | 2 |
| Hand Drum | 10 |
| Large Tambourine | 1 |
| Agogo Bells | 1 |
| Sleigh Bells | 1 |
| Triangle | 1 |
| Chime Bar | 1 |
| Bubble Wand & Mixture | 6 |

**Table 3.3:** Full list of materials provided.

### 3.6 Measures

Undertaking a mixed-method, pre-test/post-test design, this study collected both qualitative and quantitative data from participants. Before and after taking part in the programme, participants completed the CASP-12 Quality of Life index, the Elderly Mobility Scale (EMS), and the Mini-Cog cognitive impairment screening test. Participants also completed questionnaires before and after the programme. Caregivers who took part in the study completed a questionnaire before and after the programme and were given observation sheets to document additional insights on the programme throughout its duration. A ten-month post-programme follow-up focus group was also completed by members of staff involved in the programme.

#### 3.6.1 Qualitative Data Collection

As part of the qualitative data collection, questionnaires, observation sheets, and a focus group were employed. Four questionnaires were distributed to participants. Prior to the commencement of the music programme, each participant completed the Resident's Pre-Programme Questionnaire. This questionnaire asked for their music experiences and preferences, their attitude towards the frequency of music sessions, the anticipated benefits they seek from engaging in the activities, and their relationship with their caregivers. Resident participants were reminded before completing the questionnaire that they had the option to omit any questions they did not want to answer. The questions were asked by the researcher, who was assisted by caregivers. Their presence and assistance gave support to residents who may have difficulty communicating, from staff whom they were familiar and comfortable with. Before their training or facilitation of music sessions, caregivers completed the Caregiver's Pre-Programme Questionnaire. This questionnaire asked caregivers to express their opinions on the training, skills, and knowledge they considered essential for their ability to provide music sessions, as well as their perceived confidence in facilitating these sessions. Caregivers were given the observation sheets to document key observations from the music sessions that they facilitated. The observation sheets provided three prompt questions. It asked which elements were enjoyed the most in

the session, if any engagement, enjoyment or ability changes were observed, and whether any particular moment stood out to them (a 'magic moment') in the session.

Once the music programme has ceased, participants completed the Resident's Post-Programme Questionnaire. This asked residents for their opinions on the programme, if it made an impact in their day, if the activities were accessible, and whether the frequency of sessions they received was adequate. An additional question was added for participants in Group B and C, where they were asked about their experience completing the music programme facilitated by their caregivers. Caregivers completed the Caregiver's Post-Programme Questionnaire, asking caregivers for their opinions on the training methods, their confidence after completing the programme, and the caregiver-resident experiences that occurred during the programme. Approximately ten months after the cessation of the programme, the researcher returned to complete a follow-up focus group with members of staff who were involved in the study. Prompt questions for the focus group included whether there were lasting impacts within the residential care home after the study, if its resources were still in use, differences in staff facilitation and external musician facilitation, and what changes they would make if completing the programme again. All questionnaire responses were collected through Qualtrics, a university-approved survey tool. The information was later uploaded to Microsoft OneDrive. Caregiver observations were documented on paper, which was later destroyed after transferring to storage on Microsoft OneDrive. Focus group responses were audio-recorded and transcribed verbatim, with the recordings then being deleted. This data will be kept for ten years as per university policy. Caregiver and resident pre-and-post-programme questionnaires, as well as the observation sheets and focus group prompts, are available in Appendix C, D and E.

### 3.6.2 Quantitative Data Collection

Quantitative data was collected through assessments of cognitive ability, mobility, and quality of life. The assessments completed were the Mini-Cog, the EMS, and the CASP-12 quality of life index. Each assessment tool has been validated for its use in residential care and are considered easy to administer (Smith 1994, S. Borson, J. Scanlan and M. Brush, et al. 2000, Yu, Chan and Tsim 2007, Wiggins, et al. 2008, Sexton, et al. 2013, Forster, Airlie, et al. 2017). The Mini-Cog, EMS, and CASP-12

assessments were completed on physical assessment forms, which were stored in a locked filing cabinet in the supervisor's office, located in the department of music building, which only the researcher and supervisor had access to. Once the data from the physical copies had been fully transferred to an electronic file stored on Microsoft OneDrive with UCC credentials, the physical copies were destroyed.

The Mini-Cog is used to screen for cognitive impairment. It is an evidence-based and easy-to-administer instrument that assesses the ability to plan, manage time, organise activities, and manage working memory, which is impaired in mild cognitive impairment or dementia (Carolan Doerflinger 2007). It involves the drawing of a clock and the recalling of three unrelated words to the examiner (Carolan Doerflinger 2007). A normal clock drawing scores two points, while an abnormal clock drawing scores zero points. One point is scored for each word that is recalled correctly after the clock exercise (S. Borson, et al. 2005). Figure 3.5 depicts the clock drawing question in the Mini-Cog assessment.

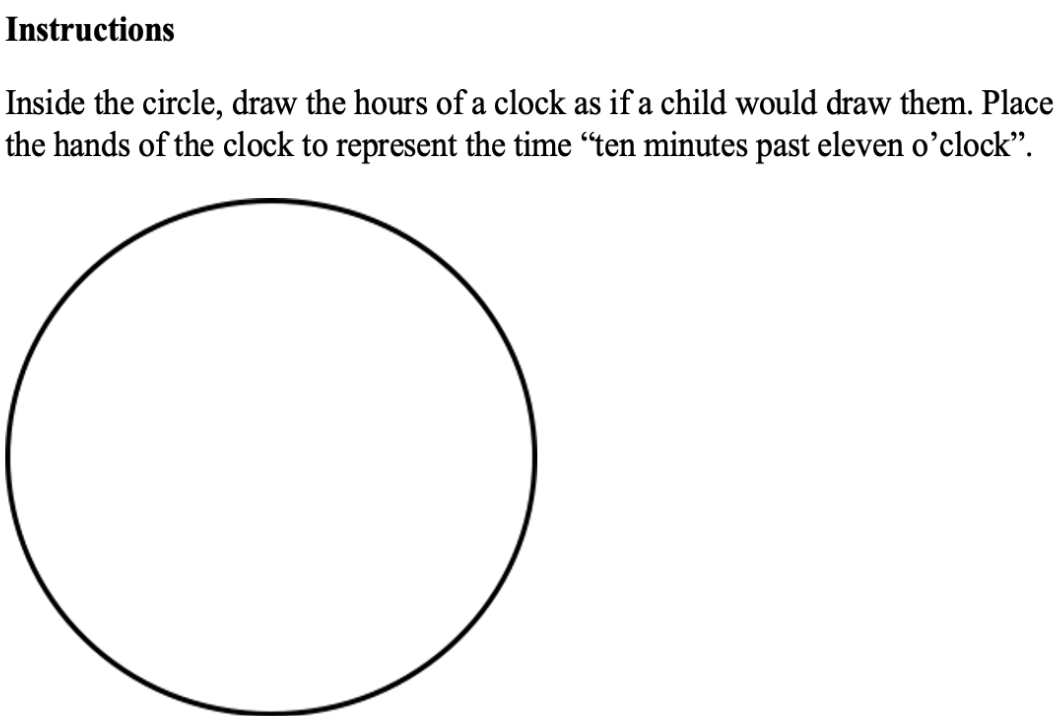



**Figure 3.5:** Section of the Mini-Cog cognitive impairment screening tool.

The EMS questionnaire was developed in 1994 and assesses the functional mobility of elderly people (Rajendran and Jeevanantham 2016). It includes the assessment of the ability of the participant to go from a lying to sitting position, sitting to lying,

sitting to standing, gait, a short, timed walk (six meters) and functional reach. These are scored based on their ability to complete the task and their level of independence in its completion (Rajendran and Jeevanantham 2016). An appropriate staff member, who knows the participants and their abilities well, can also complete the EMS questionnaire by proxy. This has been protocolled in a previous randomised controlled trial (RCT) (Forster, Airlie, et al. 2017, Forster, Airle, et al. 2021). For the purpose of this study, the proxy method of EMS completion was employed.

The CASP-12 quality of life scale was developed for use in assessing the quality of life of older adults (Wiggins, et al. 2008). The theoretically grounded measure consists of twelve scaled agreement statements, addressing four life domains: Control, Autonomy, Self-Realisation, and Pleasure. The CASP-12 is scored with a four-point scale, where zero indicates "never", one is "not often", two is "sometimes", and three is "often". It includes questions with negative wording, whereby scores in these questions are the reverse of the above scale (three indicating "never", two indicating "not often", etc). A higher score indicates a higher quality of life. The highest possible score in the CASP-12 is thirty-six (Wiggins, et al. 2008, Alattas, et al. 2024). Residents completed the assessments before the programme commenced and repeated them when the programme had finished. If a participant became upset during the assessments, they were offered a break from the assessments or allowed to suspend their participation. Caregivers were present during the assessments and activities, with whom participants are familiar and comfortable, for support. In addition, participants had the option to leave and be accommodated in separate day rooms. The results of the assessment were documented on paper, which was later destroyed after data was transferred and stored on Microsoft OneDrive. Copies of the Mini-Cog, the EMS, and the CASP-12 quality of life index assessments are available in Appendix B.

### 3.7 Music Programme Design

The programme activities and format were chosen based on existing evidence of their effects on cognitive ability, mobility, and indicators of quality of life, explored in the literature review. Feedback from the previous feasibility study and the caregiver training demonstration also informed the design of the music programme. The chosen

assessments aim to review the impacts of the programme on these aspects of health and wellbeing. The questionnaires, observations, and focus group aim to review the perceived effects and experiences of both caregivers and residents who participated. Table 3.4 outlines the musical methods employed within the programme, the functions and effects they intend to elicit, and the measures that aim to quantify these effects.

| Quality | Musical Method | Intended Effect | Measure |
|---|---|---|---|
| Cognitive Ability | Sequential Songs<br>Instruments Parade<br>Group Sing-Along | Semantic Memory<br>Working Memory<br>Episodic Memory<br>Executive Function<br>Overall Cognitive Stimulation | Mini-Cog Assessment Tool |
| Mobility | Music & Movement<br>Instrument Playing | Visuospatial Skills<br>Concentration<br>Balance and Gait | Elderly Mobility Scale |
| Quality of Life | Routine Songs<br>Music & Mindfulness<br>Group Sing-Along | Familiarity and Routine Establishment<br>Social Wellbeing<br>Stress and Anxiety Relief | CASP-12 Quality of Life Index |

**Table 3.4:** Employed methods to elicit effects on health and wellbeing domains.

The activity structure and sequence were determined through the review of previous literature detailing strategies used in group music across educational, community and therapeutic settings, noting the importance of transitions between activities (Register and Humpal 2007, Moss, et al. 2022). Feedback obtained from the six-week study completed in 2024 was also considered when designing the activity structure. The sessions begin with a 'Hello Song', establishing a routine for introducing the session. It then moves to a sequential song, using well-known and repetitive melodies with accompanying actions. The sequential song is followed by the Instrument Parade, allowing participants to explore the instruments and recall the order in which they appear. Participants are then each given an instrument for the music and movement section, and the facilitator plays the accompanying upbeat song as directed in the

session plan. The Sing-Along Jar activity follows, where a participant picks a song out of the jar to listen and sing along to as a group. The Music and Mindfulness section includes the playing of a classical music piece, which is accompanied by bubbles blown by the facilitator. The bubbles activity was selected due to the positive feedback that is received in the programme completed in 2024 (Kelly 2024). The sessions conclude with a 'Goodbye Song' establishing the end of the session. Table 3.5 depicts the structure of each music session and the approximate length of each activity.

| Activity Name | Method | Length |
|---|---|---|
| Hello song | Short passage of song to introduce the session. | 2.5 minutes |
| Sequential song | Songs with simple, well-known, and repetitive melodies | 5 minutes |
| Instrument Parade | 'Parade' of instruments, presented in interchangeable patterns. | 5 minutes |
| Music & Movement | Instruments, body percussion with upbeat music. | 5 minutes |
| Sing-Along Jar | Music (inspired by residents) sung as a group. | 5 minutes |
| Music & Mindfulness | Classical music played while interacting with bubbles | 5 minutes |
| Goodbye song | Short passage of song to complete the session. | 2.5 minutes |
| | | Total: 30 minutes |

**Table 3.5:** Structure of music sessions completed in the programme.

The pre-programme questionnaires asked residents to share their preferences in musical styles, musicians, and songs that they listened to throughout their lives. The caregiver pre-programme questionnaire also asked for any suggestions of music they knew residents enjoyed. This input was utilised for the selection of music that was incorporated into the programme. The programme used MP3 and MP4 files of songs and musical pieces. Music for each activity was chosen with both the preferences of participants and the intended effects of the activities considered.

### 3.8 Qualitative Data Analysis

The questionnaires completed as part of this study were analysed using content analysis. This approach allows flexibility when analysing qualitative data, where information on specific subject areas may be limited. As advised by Hseih and

Shannon (Hseih and Shannon 2005), a conventional content analysis was used for its suitability for analysing data from open-ended questions and additional feedback. The data collected was first repeatedly examined to acquire codes (Hseih and Shannon 2005). Then, each word within the data related to specific concepts and outcomes was highlighted and sorted into categories, allowing qualitative data to be organised by its themes. Elo et al. further suggest that quotations linked to each main concept from the qualitative data should be provided within the reporting of data from content analysis (Elo, et al. 2014). For analysis of the caregiver observations and focus group, an interpretative phenomenological analysis (IPA) was applied. The goal of an IPA approach is to investigate how a participant interprets their experience (Pietkiewicz and Smith 2014), and aims to create a rich contextual description (Smith, Flowers and Larkin 2009). This approach is typically used for small sample sizes and is suitable for diary-entry style data and interviews (Pietkiewicz and Smith 2014). The emergent themes when using IPA are selected due to their contextual impact rather than their frequency in the data. Samples of the coding from qualitative data analysis are available in Appendix G.

### 3.8.1 Quantitative Data Analysis

The results from the CASP-12 Quality of Life assessment, the EMS, and the Mini-Cog were collated in Excel. Before analysis, an additional exclusion criterion was applied to this set of results. Participants who experienced a severe event that could have significantly affected their ability during the period of the music programme and assessments had their results removed from the final analysis. Care staff were asked to apply these criteria to the list of participants based on their recent history. They were blind to the quantitative assessment results at this time. Differences between pre- and post-programme results that were still included were then established. The mean difference between pre- and post-programme results for each group was then determined. These were analysed for their effect size and statistical significance using Cohen's *d* and a two-tailed T-test, allowing for sizes of effects to be compared between pre- and post-programme results, and between groups (Sullivan and Feinn 2012, Cumming 2014).

### 3.9 Methodology Limitations

A number of limitations occurred within the methodology of the study. These largely surrounded the recruitment of participants. Many of those living in the residential care centre were experiencing age-related health changes and challenges. Furthermore, some residents who were completing the programme had to drop out due to declining health. As a result of these circumstances, the study faced difficulty in the recruitment and retention of participants. The environmental constraints relating to the impracticality of moving participants further from their rooms also created an uneven division of participants within the groups. While quantitative assessments were validated and previous used with this population, challenges arose where a number of participants in this study were unable to complete some of the assessments. Within the materials and activity selection, the sensory activity used for Music and Mindfulness remained constant for the duration of the programme. A larger variety of sensory activities should be considered in future programming to accommodate the diverse needs of this cohort.

### 3.10 Methodology: Conclusions

This study adopted a mixed-method experimental design. It incorporates pre-and-post programme questionnaires for both participants and facilitating caregivers, pre-and-post programme quantitative assessments on cognitive ability, mobility and quality of life from participants. The study also collected observations, and a post-programme focus group feedback from participating caregivers. Caregivers received training prior to facilitating music sessions with the participants. Participants were allocated into four distinct groups, three of which took part in the music programme different facilitators or session frequency. The remaining group took part in alternative activities as the control. The music programme was designed to impact cognitive ability, mobility, and quality of life of participants, with activities and repertoire inspired by participant input and consideration of the participant and caregiver experience. The methods of data analysis employed included content analysis, interpretive phenomenological analysis and statistical analysis, to create a complete

picture of the impacts of the music programme, which are presented in the following results chapter.

# Chapter 4: Results

The results presented emerged from qualitative and quantitative data collected before, during, and after the eighteen-week music programme. The qualitative data collected from the questionnaires, observations, and the focus group are presented alongside their identified key themes, categories, and qualitative descriptions. The quantitative data reported consists of pre- and post-programme CASP-12 quality of life index, the Elderly Mobility Scale, and the Mini-Cog assessment. These results are presented with their p value, effect size, and 95% confidence interval.

## 4.1 Caregiver Pre-Programme Questionnaire

Thirteen responses to the caregiver pre-programme questionnaire were recorded before implementing any music sessions with the residents. The answers from the questionnaire were coded using the content analysis detailed in the methodology section, of which a sample is included in Appendix G. Figure 4.1 shows the themes and categories that emerged from this analysis.

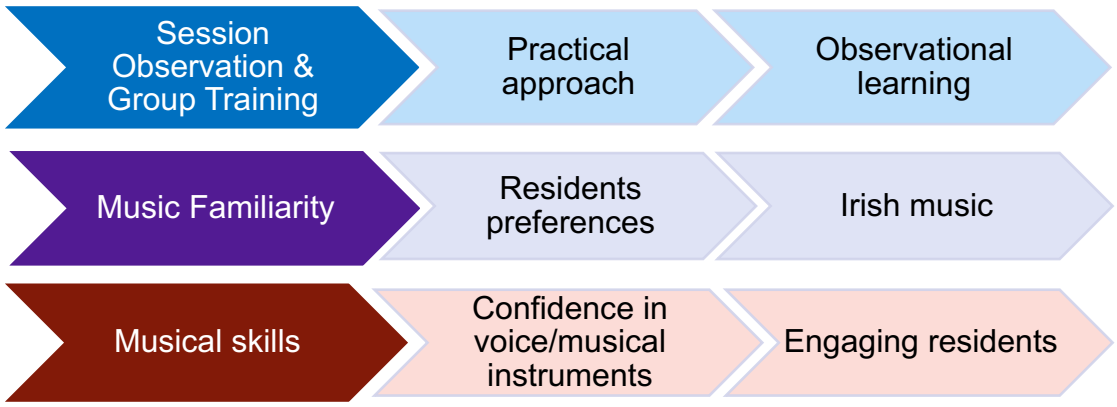



**Figure 4.1:** Themes and categories that emerged from the caregiver pre-programme questionnaire responses.

### Session Observation and Group Training

When asked about their preferred method of training, one of the main themes which emerged was **session observation and group training**. The caregivers expressed interest in partaking in a **group training session** with fellow staff and the researcher.

Practising with fellow staff and the researcher was suggested as something that would best prepare them to lead the music sessions. One caregiver mentioned that they would like to "**observe a session initially**" before delivering one themselves. Similarly, another added that "**the first session can** [be used to] **judge future sessions**". **Active training** also appeared to be preferred among caregivers. They noted that onsite training, **a 'hands-on' approach**, and being able to **actively learn** during the early sessions in the programme would best prepare them to lead the subsequent music sessions.

**Music Familiarity**

The second theme that emerged from the responses to this questionnaire was an interest in becoming more familiar with music for the programme. One caregiver stated that they would "like to know more songs, especially **residents' kind of music and choices**". A caregiver also mentioned that they wished to become more comfortable with the songs and know the lyrics to enable them to sing along. Another asked for a track list of the songs used in the music programme to be created, so they could familiarise themselves with the music prior to the sessions. Included in this theme was becoming familiar with **Irish songs**. Responses indicated that most residents enjoyed **older Irish music**. Some caregivers were not as familiar with these songs or musicians, including one respondent who wished to "learn more of the Irish music" in order to feel more **confident** in facilitating music sessions.

**Musical skills**

The third theme that emerged from this questionnaire was the enhancement of their music-related skills and knowledge. Several caregivers expressed an interest in using their singing voice, with one stating that they wanted to "grow **more confidence with my voice**". Others mentioned musical instruments, citing the use of "instruments that are easy for the residents to use", and **becoming more familiar with instruments** that they do not yet know how to play. **Communication and engagement** were also noted as important for caregivers facilitating music sessions, as one caregiver wanted to know "how best to **encourage residents** to participate" and another hoped to gain a better understanding of residents to "help better **communication"** with them.

Caregivers also wished to gain experience in navigating music files on the computer, ensuring that technical difficulties did not negatively impact the session or delay its commencement. When asked if they knew any genres, songs, or musicians that residents have enjoyed, suggestions included music from the 1950s, 1960s, and 1970s, as well as faster music that promotes movement, and genres such as country, rock, Irish, and classical.

### 4.2 Resident Pre-Programme Questionnaire

Sixty-five residents completed the pre-programme questionnaire. This gathered information on musical preferences, perceived benefits of music engagement, and their current relationship with their caregivers. The first question asked residents about their music preferences, where 95.5% of the residents said that they enjoyed music. Of the 4.5% who said that they did not particularly enjoy music, one cited declining health as the reason, “I haven’t with years, my voice is gone now”. Speaking with other residents who said they did not enjoy music, a caregiver added that they “need encouragement”. Figure 4.2 displays the most popular musical genres amongst participating residents. Each mention of the genre, or an artist associated with the genre, was included in the figure. The most popular style was Irish music, including traditional Irish music and Irish ballads. This accounted for 28% of the genres mentioned. Both opera/classical and country/western were referred to eleven times, representing 22% of the genres respectively. Music from the 1960s or music perceived as “old” accounted for 12% of responses, as did music described as fast and upbeat. Two participants said that pop music was their preference, representing 4% of the total genre mentions.

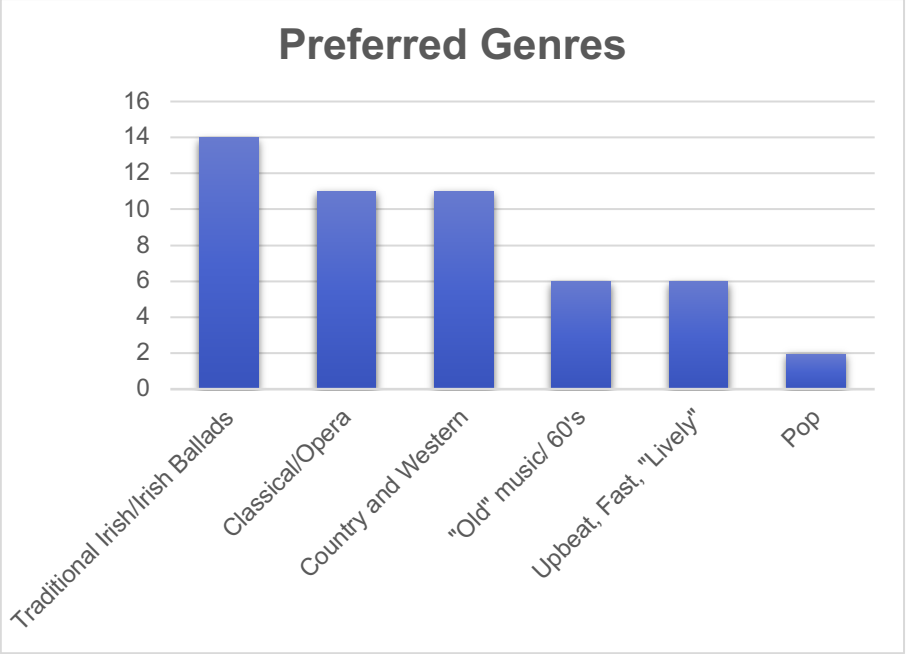



**Figure 4.2:** Preferred musical genres of participating residents.

The questionnaire also explored what residents enjoyed about engaging with music or what they gained by participating in music activities. Figure 4.3 displays these key themes that emerged from the content analysis coding. These included health and wellbeing benefits of music, the social and interactive experiences that can occur from music activities, and opportunities to express themselves creatively.

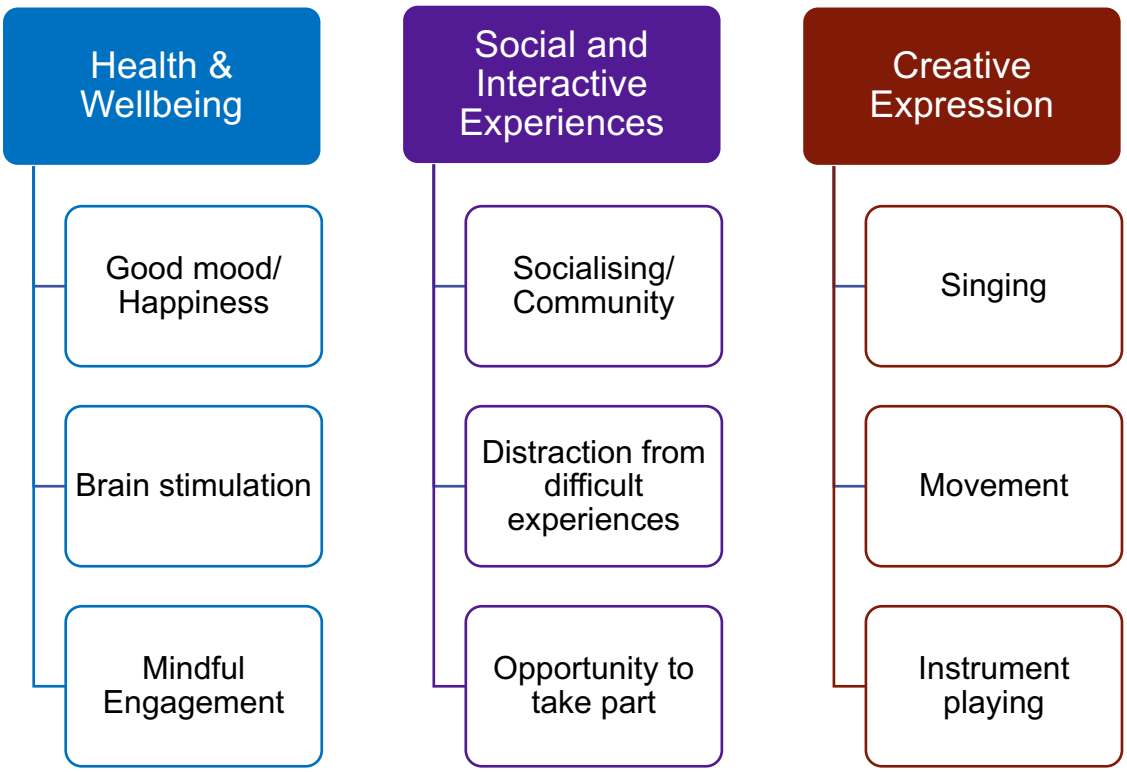



**Figure 4.3:** The themes and categories that emerged from the qualitative data obtained in the resident pre-programme questionnaire.

### Health and Wellbeing

The effect of music on the **health and wellbeing** of residents was among the main themes to emerge from the questionnaire. Notably, residents cited music activities as a source of **happiness** and often had the ability to put them in a **good mood**. Twenty-four residents who completed the questionnaire referenced their **mood** when asked what they liked about music. Many specified that engaging with music resulted in them smiling, and said it makes them feel good. One resident stated that they "feel happy whenever I hear it", while another noted that it is "a bit of enjoyment during the day". Over 70% of participating residents liked to listen to music often, with one resident adding that they like to listen "every day: on the television, from people who come in, CDs in my room and in the dining room". The subcategory of **music for brain health and stimulation** also emerged within the **health and wellbeing** theme. Several residents believed that engaging with music kept their minds active. One resident said that they felt as though listening to music was "good for the mind" and that it "relaxes the mind".

Also emerging from the theme of **health and wellbeing** was mindful engagement. Music was viewed as an essential medium for **relaxation**, with 25% of residents identifying it as a primary benefit of engaging with music. One resident said that you can "**relax**… sit back and enjoy", while others mentioned its calming effect, "it's very soothing… **relaxes** you". Similarly, other residents liked to engage passively with music by "**listening** away". Some respondents enjoyed **listening intently** to music and its content, as one resident stated, "I like to **listen** with a soft ear… listening to lyrics and taking them in". Another noted that while listening to music, they become focused and mindful of the experience, stating that while listening to music "you forget yourself… [you're] in the moment".

**Social and Interactive Experiences**

A second recurring theme within the questionnaire responses were the **social and interactive experiences**. Residents referenced music as a medium for creating social connections with their fellow residents and staff, as well as an opportunity to feel supported and comforted while facing difficulties. Having **the opportunity to take part** in a musical activity was valuable to several residents, as one said, "I love to join in and feel part of the activity". Another respondent cited the social interactions as a vital part of music activities, highlighting the "**social aspects**" as a beneficial factor. A related subcategory identified was **community**, as residents expressed that the **community** spirit is strengthened with activities such as music, enabling "companionship". One participant mentioned that music activities would give them "**community in hard times**".

**Creative Expression**

Creative expression was referenced throughout questionnaire responses, including singing, movement, and instrument playing. Many residents enjoy **singing** or humming along to music, with one noting that they like to "feel the rhythm and join in singing". Another said that they "know a lot of lyrics" and listed many musical artists and songs that they liked to sing. **Dancing** and other movements to music were also highlighted as favourable aspects of music-based activities. Residents described music as eliciting movement: "I like to tap my feet", "tapping away", and "loves

moving to music". Others explicitly mentioned **dancing** as their preferred way to engage with music, as participants remarked that music "makes me move," while another added, "I love **getting up to dance**". Some residents spoke of their attendance of dance halls when they were younger. Lastly, some responses referenced their enjoyment of **musical instruments.** Particularly noted were instruments that the residents or their family members play or have played, such as traditional Irish instruments.

**Caregiver relationships**

Residents were also asked about their **relationships** with the caregivers and staff in the residential care facility. The responses to this question were largely positive, with 85% of residents stating they have a good relationship with their caregivers. Such residents remarked that they are "happy to **chat away to them**" and that "when I am upset, they listen". Communication and company were notable aspects of these good relationships, as one respondent said that they enjoy talking to staff, "I am a talker". Some respondents referred to the assistance they receive from caregivers as **"helpful"** and that "they **look after me**". Others specifically mentioned caregivers who offered the residents activities, describing one as "great for songs, reading books, and gets along with everyone". Of the responses that did not describe an entirely positive relationship with caregivers, one said that it depends on how they are feeling. Others remarked that they try to build good relationships. One resident had recently moved into the facility and said that they were "hoping to get on okay".

### 4.3 Resident Post-Programme Questionnaire

Each resident who participated in the music programme (participants in groups A, B, and C) completed a post-programme questionnaire in the weeks following the cessation of the music programme. All thirty-seven participants completed the questionnaire, which gave them the opportunity to provide feedback on what they enjoyed, the impact of the programme on their relationships, the frequency of sessions, and the accessibility of the activities.

### Overall Enjoyment

The first question in the post-programme questionnaire asked if they had enjoyed the music programme. Approximately 94.5% of respondents enjoyed the programme, as illustrated in Figure 4.4. Of the residents who did not express satisfaction with the programme, one specified that they preferred solitary activities, with a caregiver explaining that they "value their personal space".

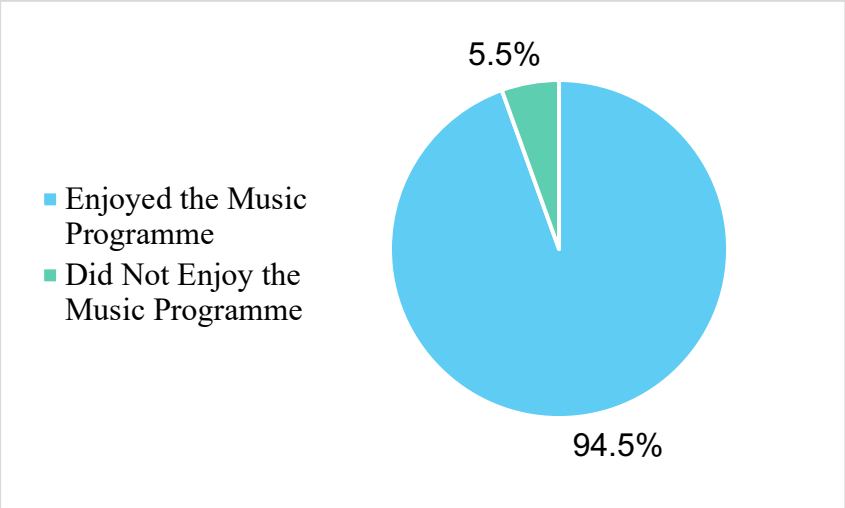



**Figure 4.4:** Results from the question, "did you enjoy receiving music sessions?" from the post-programme questionnaire.

### Accessibility

Participants were asked if they felt that the activities were accessible to them. All respondents reported that they found the activities to be accessible. Two participants said that the familiarity of the songs helped them to engage with the programme, "they're still in my mind, the songs", "I knew most of them, and that makes it easier". Others mentioned specific aspects of the music programme that made the activities accessible to them. This included having the lyrics of the songs available on the screen and being able to choose seating within the group that was most comfortable for them, "in their own format… sitting to the side". Two participants referred to the actions of the caregivers that enhanced the accessibility of the programme. One appreciated "the assistance" of caregivers, and another mentioned a caregiver explaining the upcoming

activities before beginning or handing out instruments, “at times, we’d say a few words”.

**Dosage**

Regarding the dosage or frequency of the music sessions, participants were asked whether the number of sessions they received each week was sufficient or whether they would prefer more or fewer. Just below 60% of respondents said that twice a week was their preferred amount of music sessions, as seen in Figure 4.5. One participant explained how they found twice a week to be beneficial, saying, “if you had to miss one, you could get to the other one”. Others expressed that this was their preferred amount of music, as they had sufficient time to do other things they enjoy, “there are other things going on other days”, including solitary time and other ways they engage with music: “I also like having music on the TV at other times”. One respondent, who enjoyed singing, was mindful of their own health in not wanting to “overdo” participation, “twice is enough, I must keep my voice from going hoarse”. Another added that they felt that twice a week was enough, and that they would partake whenever staff were available to facilitate, “I would leave it up to the organisers, as much as they can”.

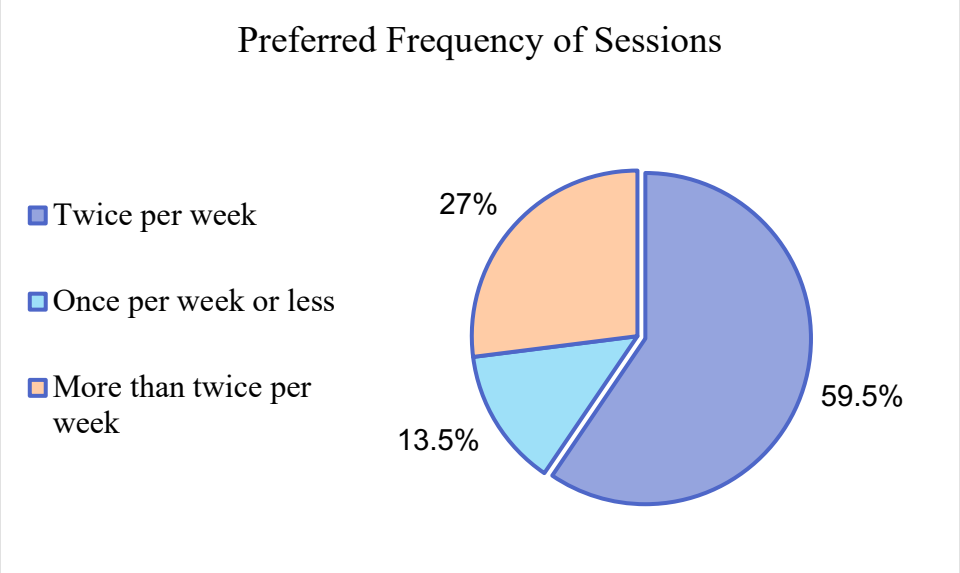



**Figure 4.5:** Results from the question, "was the weekly amount of sessions adequate? Or would you prefer less/more?" from the post-programme questionnaire.

### Caregiver Relationships

The participants who were part of the caregiver-led music programme groups (Groups B and C) were explicitly asked if they felt as though participating in the sessions with the caregivers directly had impacted their relationship. As shown in Figure 4.6, over 63% of respondents said that the caregiver-led music programme had positively impacted their relationship with caregivers. Approximately 26% of respondents reported little to no change in their relationships with the caregivers after the music programme. The remaining participants were unsure if the music programme had made a positive impact on their relationships with the caregivers or stated that it depended on the caregiver.

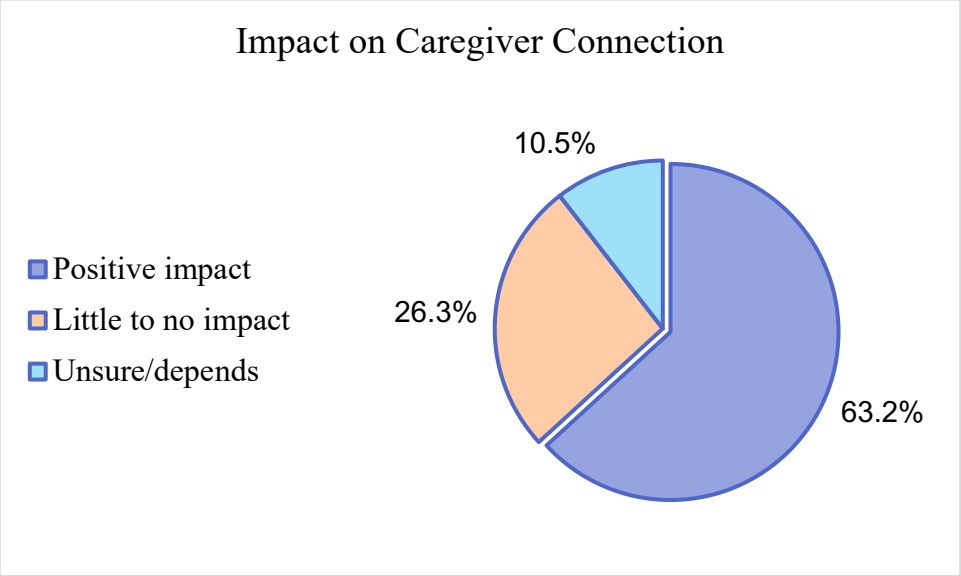



**Figure 4.6:** Results from the question, "Do you feel more connected with the caregivers after the music programme?" from groups B and C supplement to the post-programme questionnaire.

### 4.3.1 Qualitative Description of Residents' Experiences

Participants were invited to elaborate on each of the questions that were asked during the questionnaire (e.g. what did you enjoy about participating in music sessions?). Figure 4.7 displays the key perceived impacts and notable aspects that emerged from the content analysis coding of responses from participants when they elaborated on their experiences.

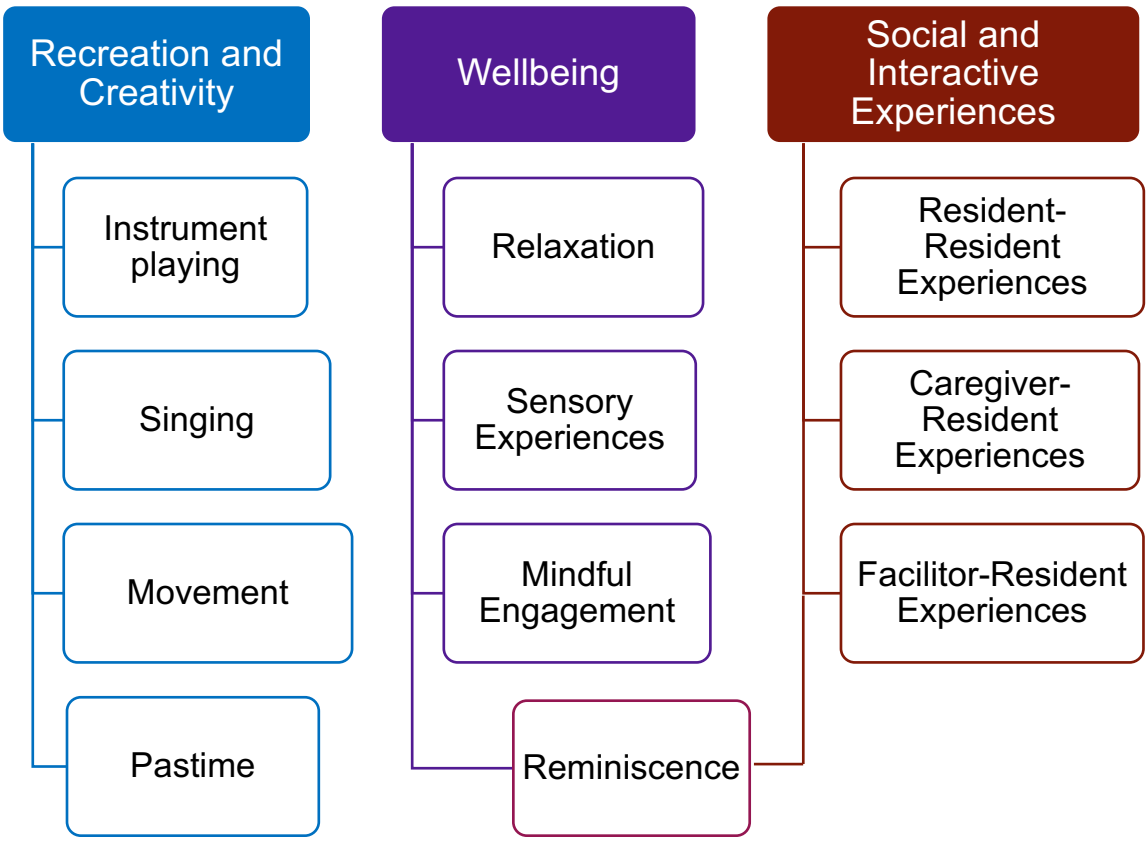



**Figure 4.7:** The themes and categories that emerged from the content analysis of the resident post-programme questionnaire.

### Recreation and Creativity

The most commonly referenced enjoyable aspects of the music programme relate to the opportunity for creative expression, with approximately 45% of participants reporting that engaging with **instruments, singing, and moving to the rhythm of the music** was enjoyable. Several participants said that playing the **instruments** provided was "their favourite" and was "fun". Others mentioned the specific **instruments** that they enjoyed exploring, including the agogo bell. Many others said that **singing along** to the songs was most enjoyable. Some participants enjoyed engaging with the music with **movement**, by clapping and tapping their feet, and that they "liked to dance". When asked if they believed that the music activities made an improvement to their day, over 91% of respondents agreed that it did. Participants referred to how the music sessions gave them something to look forward to, to **occupy themselves** and provide **interactive entertainment**. They reported that the sessions "made the day shorter", "passed away the time", and "made the weeks better". Other participants cited the

music sessions as a motivating factor, claiming that they "**keep you going**". One respondent compared the music sessions to some of their usual, more passive activities, stating, "if you're sitting and doing nothing… it [the music session] is much better". Another response referred to **the universal enjoyment** of music within the residential care centre, noting that "music is a part of everyone's life". Other participants expressed that the music activities were a **welcome supplement to their daily schedules**, "it does… it's a nice cooperation, as a group, and in addition to other things", and "it's great to have now and then". Of the remaining participants who did not believe that it made an improvement to their daily life, one elaborated to say, "it's **just something to do".**

**Wellbeing**

An emerging theme from the perceived benefits of the music sessions is their contribution to **wellbeing**. Over 16% of participants cited **relaxation, sensory experiences,** and the classical music section as their favourite aspects of the music programme. One participant remarked that they "quite enjoyed listening to Mozart" as part of the sessions, with another referencing this section as **"therapeutic"** for them. Two more referred to the bubbles as their favourite aspect of the music sessions, and one participant specified "**using the senses**" as a benefit that they experienced from participating. These enjoyable moments relating to **wellbeing** were largely through passive engagement. A subtheme that emerged within the theme of wellbeing was participating with **mindful engagement**, such as attentively listening to the music. Some respondents specified aspects of the music they listened to as most enjoyable, including the "lively parts" or "lively stuff" and stating that "the Irish songs were fantastic". A caregiver added that some residents were "demonstrative in reactions" to the music. Another participant expressed that the music programme was a learning experience for them, that through **engaging with the music and instruments,** they had "learned a lot".

Another subtheme that emerged within the **wellbeing** theme was only apparent within the responses from groups who completed the caregiver-led music sessions. This was the theme of **reminiscence**, **remembering** events and experiences of the past, with a number of participants from these groups referring to the **old memories** from the music as their favourite part of the experience and enjoyed **sharing the**

**memories** with the group. One respondent referred to a specific song that appeared on the music programme. This song was commonly associated with the soccer team that the participant follows. When they heard this song being played, it **brought back the memories** of fans singing the song in the 1970s. Another participant enjoyed listening to the Irish ballads that reminded them of their family, as they shared that their mother was a singer and they grew up learning many of these songs. Others noted that they enjoyed hearing songs they had first heard in their early adulthood, and that they could still recall many of their lyrics, "I knew most of them [the songs]", "the old songs just come back to you". As the references to **reminiscence** also included the act of **sharing and discussing those memories** with others in the group, this subtheme is closely aligned with another central theme, **social and interactive experiences**.

**Social and Interactive Experiences**

Among the most referenced enjoyable aspects of the music programme were the **social experiences** associated with participation. Participants from various groups expressed enjoyment from watching with peers, participating, getting involved as a group and the "togetherness" associated with it. Those in the group whose sessions were led by the music facilitator noted the **facilitator-resident relationships** that were built during the programme. One stated that "we look forward to you coming in every Wednesday and Friday". Another participant from this group mentioned the contagious nature of the mood of the facilitator, saying, "when you come in, happy, smiling and ready to go, it rubs off on us". Those in the caregiver-led groups shared similar sentiment in benefitting from the social element but focused more upon **resident-resident relationships**, as well as the social experiences they had with caregivers. One respondent's enjoyable moment was the group singing, "not everyone can sing in tune, but we all try together". Participants in these groups that expressed a positive impact on **caregiver-resident relationships** elaborated on this point, stating that although they already had a good rapport with many of the caregivers, doing the activities together helped "bring them together". Similarly, another participant said, "you know the staff, but it helps us to gel together". Others valued the involvement of caregivers as a means to help them participate, with one stating this method is "inclusive", they valued "**interactions with them**", and a caregiver added that "the encouragement helps them participate". One respondent stated that participating as a

group with their fellow residents and caregivers reminded them of how they engaged with music in group settings as a child, “we all sing together… I love it as a group, as a child I played instruments in the school band, we performed for Christmas”. Some respondents found little to no impact on their relationships with the caregivers. One explained that as they engage with music on both an individual and group basis, they felt it made little difference, “not particularly – I sing all the time, alone, with people”. Two other participants who said that it made little to no impact reported that they had remained distant from the programme in general. The remaining respondents were unsure if the music programme had made a positive impact on their relationships with the caregivers. For one participant, it depended on how they were feeling on the particular day, and which caregiver it was, and thus it was “difficult to know”. Another felt that “when you’re with them during the day, you just get to know people”, that the relationships strengthened naturally, if interactions are “done in the right way”.

### 4.4 Caregiver Post-Programme Questionnaire and Observations

Six caregivers who facilitated music sessions as part of this study completed the post-programme questionnaire. The first question in the questionnaire asked caregivers about their current level of confidence in facilitating music sessions for the residents. As depicted in Figure 4.8, four of the caregivers said that they are now more confident (66.6%), while the other two felt they have the same level of confidence that they had before participating in the programme (33.3%). One caregiver elaborated on this point, stating, “It was the best… it built my confidence”.

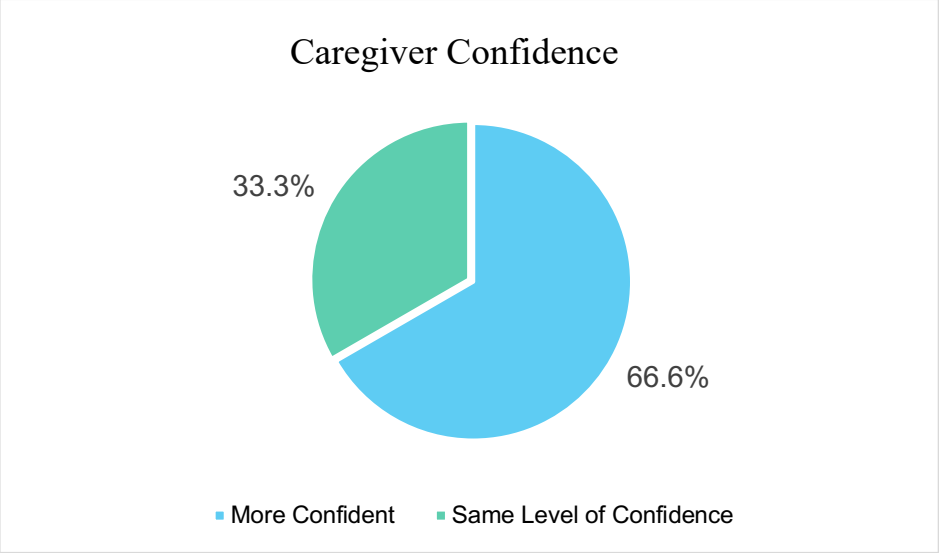



**Figure 4.8:** Responses to the question, "How confident do you now feel in facilitating music sessions for residents?" from the caregiver post-programme questionnaire.

Caregivers were also asked if facilitating music sessions allowed them to connect more with the residents. As displayed in figure 4.9, four of the caregivers (66.6%) believed that they had connected with the residents more after completing the music programme. Another respondent thought that the music programme had somewhat further connected them with the residents, while the remaining caregiver said that their it was the same as before the programme.

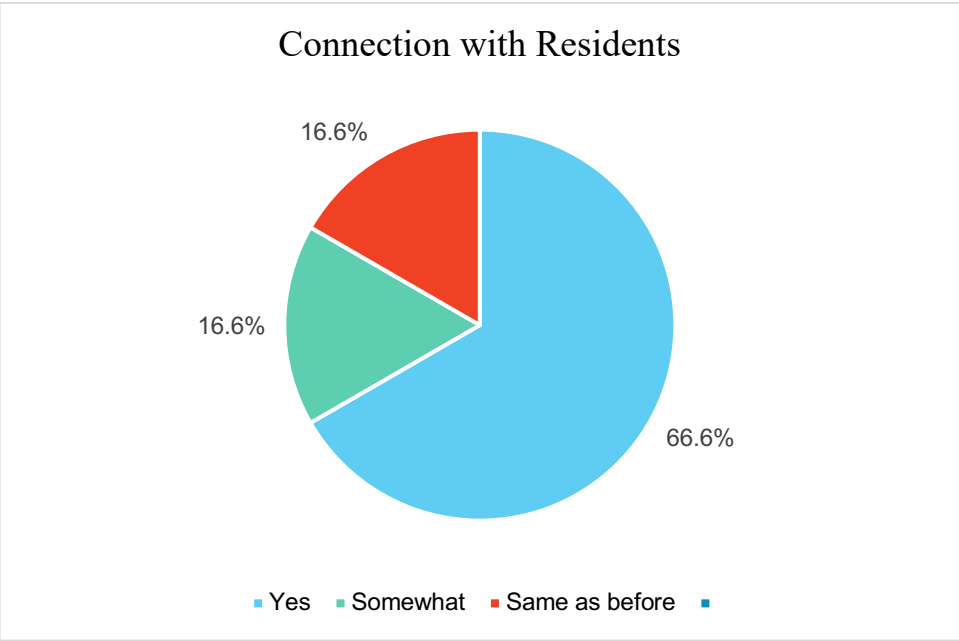



**Figure 4.9:** Responses to the question, “Has facilitating music sessions allowed you to connect more with the residents?” from the caregiver post-programme questionnaire.

### 4.4.1 Qualitative Description of Caregiver Questionnaire

Caregivers were asked about the training sessions that they underwent, the activities that were provided for the residents, and impacts to their relationships with the residents. These responses were analysed to identify key themes, presented in Figure 4.10. These included the practical and convenient nature of facilitation, the social connections that emerged from participation, and various challenged that caregivers faced with creating the programme.

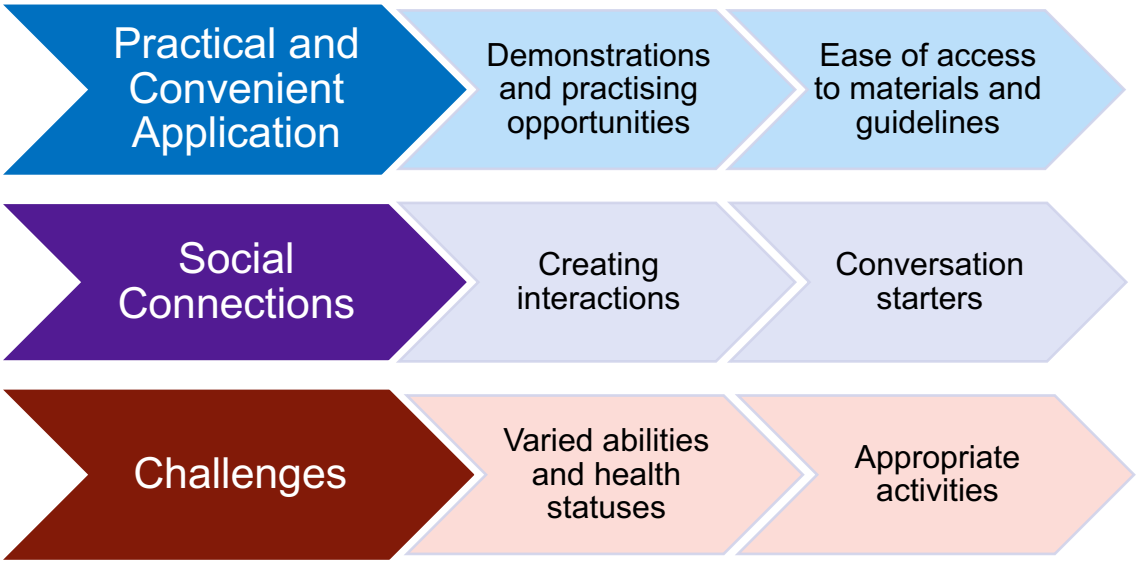



**Figure 4.10:** Themes and categories that emerged from the content analysis of caregiver post-programme questionnaires.

#### Practical and Convenient Application

One major theme that emerged from caregiver respondents relates to the enabling of caregivers to successfully implement the music sessions within their practice. The importance of **practising opportunities** and the convenient layout of materials and session plans was noted by several respondents. Within the development of skills for facilitating the sessions, one caregiver noted that it "required a few **demonstrations and prompting**" for them to facilitate. They also agreed that the practical session was a helpful supplement to their training. Another expressed that this style of training suited them, stating, "I do better when being shown what can be done and then

practising". Respondents also referred to the session facilitation as an "**easy**" way to provide an activity. One caregiver stated, "it is easy to grab the bag of instruments now and start off a session at any stage. I have learned that 'Country Roads' appeals to all residents". Another caregiver mentioned the ease of facilitation in relation to creating opportunities to engage with the residents; "it gave me a lot of ideas for how to encourage residents to engage."

**Social Connections**

Caregiver respondents described positive effects that the programme had on their social experience and relationships with the residents. Caregivers mentioned having "**great interactions"** with the residents during the sessions. They also noted that participating in the activities "**helps start off conversations**" with the residents. Another respondent noted that it has made engaging with residents easier and more effective, "it is an easier way to engage and see positive results".

**Challenges Encountered**

Caregivers also reported some of the circumstances or components of the session that may have hindered the perceived benefits of the programme for the residents. Half of all respondents identified the vast diversity within **residents' abilities** and **health statuses** as a contributing factor to less accessibility of the activities, and a potential hindrance to engagement and overall enjoyment. One caregiver wrote, "with mixed dependencies, it is not always possible for all residents to receive the same benefit from the content", while another added, "some [residents] were unwell and declined to get involved at times". One respondent added that they were sometimes unsure if the activities were accessible, and that it depended on whether or not a participant was "unwell or having a bad day". Concurrently, one caregiver felt that some of the session content was not enjoyed by residents who found it to be too simple or childish, adding, "some residents found it **a bit juvenile".**

### 4.4.2 Caregiver Observations

One caregiver who facilitated music sessions with Groups B and C completed the observations sheets provided, detailing the experiences they saw during the music programme. These observations were completed for each week of the programme. Prompt questions on the observation sheets included what the most enjoyable element was, any changes noticed in engagement, enjoyment, or ability, and if there were any moments of significance (a 'magic moment') in the sessions. These observations were analysed with interpretative phenomenological analysis, suitable for diary-entry style data. Samples of the observation sheet entries and their codes are available in Appendix G. The most salient themes from this data are described below along with key citations from the observations.

#### Evolution of perceptions and experiences throughout the programme

The most significant theme derived from the caregiver observations was the **overall evolution** of participant experiences throughout the programme. Forms of participation interpreted by the caregiver cycled through senses of **curiosity, reservations, active engagement** and **reminiscence.** Evolution within the engagement and enjoyment of fellow caregiver facilitators was also observed throughout, where continued effort to create enjoyable experiences for the participants led to positive interactions in the group.

#### Initial Reactions

Upon seeing the arrival of the programme materials, the caregiver observed a sense of **curiosity** among participants. With the first session beginning, some **uncertainty** was also observed in the room, as the caregiver saw

> chat and engagement in the discussion around music programme, impressed we were joining with UCC. Were we going to get certificates? Are there exams? What was in the bags, boxes?

The observations noted that participants were **"unsure"** about the musical instruments, judging by their "expressions". In the first music session, they saw **small**

**movements** and positive expressions, including tapping of feet, smiling, and "body movement for some residents". While the caregiver described most participants as interested, they noted that some expressed **hesitancy.** The caregiver encouraged them to keep an open mind to the opportunity, which was at this point, still unfamiliar to them, stating that

> some residents were negative, had reservations and declined to engage in the process. Discussed turning negatives into positives for the music programme, keeping an open mind.

**Development of Interest**

With additional sessions, the caregiver perceived **developments in interest, engagement levels, and optimism**. They referred to this as participants becoming **"more open"** to using musical instruments, as they were seen discussing music preferences with one another, and singing along to songs. The observations noted that reservations within engagement lingered longer with some participants. Certain activities, described as less familiar to the participants, appeared to take longer for them to get used to. One example of this was the music and mindfulness activity. Facilitators blew bubbles simultaneously to the classical music being played, which was a concept that **initially caused uncertainty** for some participants, as the caregiver wrote in week two that

> bubbles appeared to be tolerated, and some residents are afraid of bubbles. Further discussions, no experience of bubbles in the past, appeared annoyed and nervous of the bubbles.

A **change in this outlook** occurred in week four, where a recollection of memories and more **positive experiences incurred**. At this point, the caregiver believed that

> most residents appear to enjoy bubbles, and some remembered using water and washing up liquid to make bubbles in the past.

While active engagement and enjoyment was becoming perceptible to the caregiver in most participants, a small part of the group did not express this level of interest. However, they did note that despite this apparent lack of interest, it appeared that they continued to join the sessions and displayed **small acts of engagement**, as it was observed that

> there are still a couple of residents not interested, but they remained present, and I could see one resident lip moving to the song.

### Active engagement

The caregiver frequently referred to the level of **encouragement** that they and their colleagues offered for participants to engage in the music sessions. From initial sessions where additional efforts were required, the caregiver observed that less encouragement was needed after approximately five weeks. The group were observed doing the actions **"without much prompting".** Participants also became **more familiar** with the session structure and format, noted by the caregiver. For example, within the consistent opening and closing song, many were observed "clapping with a little **more enthusiasm".** The effort that was applied to the activities was noted several times in the observations at this point in the programme. The caregiver believed that participants were more interested in trying to remember the names of instruments, and **"putting energy"** into shaking instruments like the egg shakers. The expressions that they observed became **"spontaneous** verbally and with body language". The caregiver described this concept in one of their final observations, stating that

> as weeks continued, residents showed more interest and responded without much encouragement.

The observations noted that facilitating caregivers also worked to **familiarise themselves** with the programme content and **improve their skills** in music programme facilitation. Along with the participants, the caregiver said that they were "still trying to remember the names of the instruments" by week five. With time, these "mix-ups" became less frequent. The caregiver also mentioned their **efforts in remembering the actions** that go along with the sequential songs, aiming to "keep up" with the external facilitator. Beyond the musical content, progression was apparent in caregiver and participant interactions. The caregiver wrote that they enjoyed watching these interactions unfold, writing that

> [I was] enjoying watching everyone, including staff, interacting and laughing in responding to music and bubbles.

**Reminiscence**

Concurrent with the progression in engagement in the activities, instances of **reminiscence,** often **narrative** and **personal,** were reported further into the observations. This was also noted by the participants themselves in their post-programme questionnaire. The discussions of memories observed by the caregiver included positive and negative experiences, having **"triggered memories** from the past and sometimes a sense of **sadness and happy times were expressed**". They noted that participants shared memories with their peers and caregivers that they associated with the songs being played, including "ballroom romance", and "dancing days". The caregiver referred to specific activities that evoked memories which was not necessarily related to the musical content, including the egg shakers, where

> one resident thought it was a real egg, which opened a reminiscing chat on collecting eggs as a child after the session".

One moment that caused the caregiver to reflect and consider a 'magic moment' was when participants discussed their **lack of access to music** as children. The caregiver found it interesting that most had **never played an instrument before**, and that some described having "little encouragement within families". While participants told the caregiver they did "not having access to instruments", they believed that the group loved **having the opportunity** to sing, for which they stated, **"on reflection, that is a magic moment"**. Similar expression of the lack of musical access in the past came with a participant sharing a story about sharing music playing devices across households in their area, as the caregiver wrote in week fourteen that

> one of residents mentioned after the session that they had a Gramophone and records and every weekend neighbours would call in for to listen to music as few could afford their own records. Not everyone had a radio.

These discussions appeared to allow participants to discuss **shared experiences**, while the caregiver learned **new information** about their lives.

### 4.5 Focus Group Results

Six members of staff who were involved in the provision of the music programme took part in the follow-up focus group, completed ten-months after the programme cessation. This included the operations manager, who oversaw much of the organisation of the programme, and five caregivers who used the music programme. The prompt questions asked to the focus group included whether the programme elicited lasting impacts in the residential care centre, how resources and materials are still in use, how staff facilitate music sessions in comparison to the external musician, and what changes they would make to the programme. The responses were also analysed using IPA, an approach suitable for focus group data. Figure 4.11 depicts the most salient themes that emerged from the focus group, followed by a qualitative description of their responses and key excerpts from responses that reflect these themes.

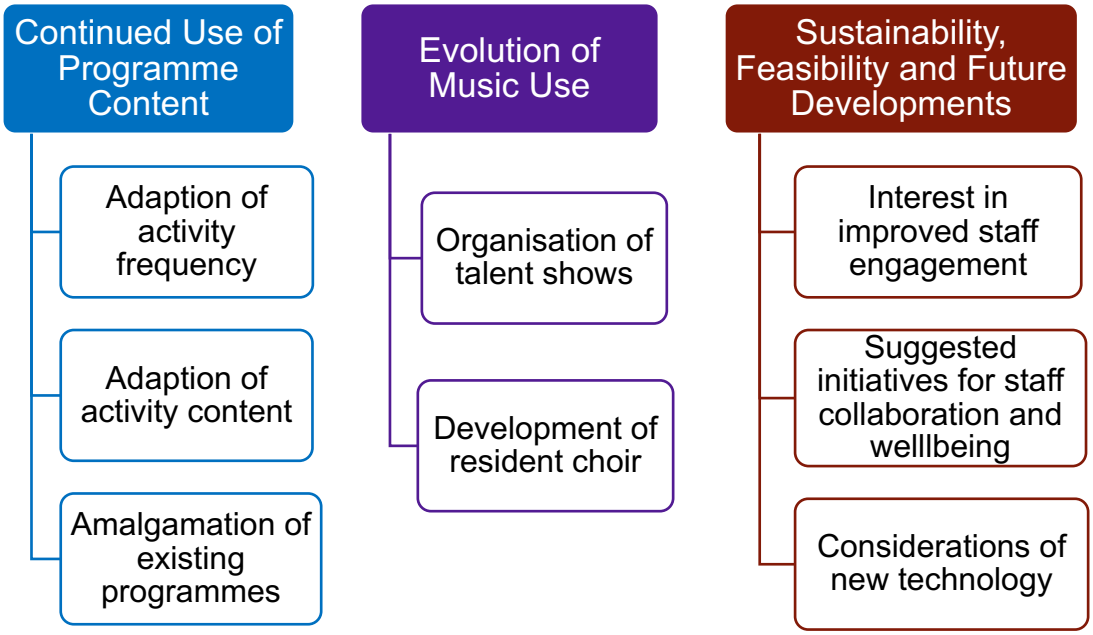



**Figure 4.11:** Emergent themes from the post-programme follow-up focus group.

#### Continued Use of Programme Content

All members of the focus group explained their **continued use of the music programme** since the study conditions ceased. Key elements of the programme valued by the caregivers such as its **structure, repetition,** and **continuity** were

referenced frequently. The **frequency of programme use varied** across members of staff, with some incorporating daily use of the activities, while others employed the programme less frequently. Each caregiver had their own method of **adaption of the programme content** to suit the needs and preferences of the group that they worked with. For example, one caregiver who often used the programme with residents who had dementia, adapted the content to make a **quieter**, more **gentle music session**. They primarily focused on activities that induced **memory recall** and **relaxation,** such as the sing-along jar and music and mindfulness section. In choosing music for these sessions, "upbeat" music was omitted, to avoid making the environment "too noisy" for these residents. They instead picked slower tempo, "classic" songs in which "you are going to get a response". Sharing their experience of experimenting with music choices, the caregiver said that

> now people know the kind of songs they will respond to. 'You are my sunshine', 'John Denver'. Abba doesn't really work with the [name of room] … Don't make it too noisy, because I think Abba is too upbeat.

In contrast, two other caregivers working with other groups **opted to use the upbeat music**, employ the musical instruments, and **stay** mainly **within the programme structure**. One expressed that the residents they worked with "like the noise" that comes with playing along to upbeat music with the instruments. The musical instruments continued to **elicit discussions** within the group. One caregiver explained that the music instruments created a **"talking point"** for the group that they "wouldn't have done beforehand". The musical instruments also continued to serve as a memory task for those taking part, with this caregiver adding that

> we'd try to get them to remember the names. And some would be very good, and others, like me, weren't great, I'd have to look at the list. But look, it was an opening up…it was an engagement.

One respondent's adaption of the programme included **incorporating elements of another programme.** They merged 'Sounds in Time' with 'Sonas', a multisensory therapeutic activity programme. This programme was originally created in 1990 by Engaging Dementia, an Irish charity organisation that provides training and resources for dementia care (Engaging Dementia 2026). Through this, the sessions incorporated **scent, sound,** and **touch.** In particular, the caregiver noted the importance of **keeping**

**the structure** for participants, for which the Hello and Goodbye song was beneficial. While the Hello song played, the caregiver would "make sure **each person was greeted individually"** and thanked for attending during the Goodbye song. This approach to the use of music allowed the caregiver the **flexibility to choose** between activities to elicit the most positive engagement, while also having the **familiar structure** that participants were comfortable with, as the caregiver explained

> they loved that as well, because the structure and routine again, was absolutely perfect, it really was. It just meant that they knew what was coming next.

**Evolution of Music Use**

One of the salient points expressed within the focus group was the ability of the programme to **inspire further exploration of music use** in the setting. Several musical experiences and adjacent activities arose from the programme, including the organisation of a **talent show** and a **resident choir**. Referring to the talent show, the focus group spoke of the hidden talents that they discovered through the experience, the **enthusiasm expressed** by the residents in getting involved, and the **collaboration** between staff and residents that occurred. One caregiver who led a talent show entry explained that before the music programme, they would "do odd songs" with the residents, but the **"momentum"** and **"defined plan"** created by the programme enabled these new experiences. This structure enabled the caregiver to become involved with such new initiatives, as they expressed that

> that would've started I think really from our Sounds in Time. Because I wasn't really great at doing that in terms of before the programme came about, and before UCC came on board.

The provision of the song list and song recordings played a role in the **development of a resident choir,** who are planning to sing at an upcoming religious service. Both **residents and staff have become involved** in its organisation, discussing song choices and developing themes within their setlists. The caregiver conveyed how their **learnings** and **increased engagement in singing** initiated this, stating,

> we're doing the choir thing, I talked about that to the residents…I was saying to them, why don't we do a choir now, when we are so far, and we know so much, and we have so many songs on our repertoire.

**Feasibility, Sustainability, and Future Developments**

The members of the focus group expressed their keen interest in the **further use and development of the music programme** within the residential care centre. They concurred on the importance of staff facilitation in music activities. They described this as both **direct and indirect involvement,** such as sitting with the residents to watch, or helping them turn pages on lyric sheets. While several staff continue to regularly engage with the music programme, **encouraging more caregivers** to facilitate sessions remains a challenge, as one respondent explained,

> what you see here are people really interested in kind of developing it…there's a package there, there's a programme there…it's how do we get other colleagues to embrace it?

The focus group believe that one of the main remaining barriers to caregiver involvement is **confidence development.** This was noted particularly for initially trying out facilitation. The group mentioned several **strategies** that they have employed, or would like to employ, to both mitigate this barrier and increase staff collaboration and wellbeing. One respondent **spearheaded the involvement of their colleagues** in their room by identifying their strengths and assign them to roles within the group they would be comfortable with. For example, the caregiver placed colleagues who say they are "not very good in front of people", or "can't be singing and dancing" in less forward-facing and **supportive roles** in the session. This method allowed for caregivers who preferred a less prominent role in facilitation to become involved, while developing their ability to facilitate with **assistance from the more confident facilitator**. This in turn creates sustainability in the facilitation of sessions, as the caregiver has

> identified a few [caregivers] downstairs, ones I can actually rotate with…even when I'm not on shift, they will do the music. Because they have seen the impact is has. Because everyone is laughing, everyone is happy.

A suggestion made for future development was the organisation of a **staff choir.** The group concurred that this would provide an opportunity for staff to become further included in music use in the environment, **develop confidence in singing** within a group environment, and create events **with residents and the wider community**. The staff choir was considered a way to "uplift" their colleagues to join, as many have

"hidden talents" One caregiver explained how such an initiative could be developed gradually, saying that

> …because want we want to do is [to give] staff confidence to get out of the shell… won't have to be very big choir, maybe if we could get eight to start off with, and let people join, and see 'oh maybe I think I would like to do that'… Then before you know it, everybody is going to be involved in music.

Beyond the recruitment of facilitating caregivers, other improvements that the focus group discussed were related to the **technology** used. They described the overall use of technology of a **learning experience**, requiring practise to become efficient in setting up the audio and video supplements. One focus group member proposed the development of an app, whereby all of the digital resources used would be integrated into one space. Another respondent suggested **developing a more streamlined version** of the songs, whereby

> maybe rather than having to click a button every time changing something, if it ran with more of a flow, rather than stopping and being like okay, now we put on something else.

### 4.6 Description and Analysis of Musical Repertoire

Activities where participants engaged in singing included the Hello and Goodbye songs, the sequential song, music and movement, and the sing-along jar. The Hello and Goodbye song were chosen for their melodic and rhythmic characteristics, which made them relatively easy to remember and sing along to. Participants were encouraged to clap and sing along to these songs. The Hello song, which signifies the beginning of the session, starts with a two-note chime, similar to that of a doorbell. The Hello song is in the key of D major and sung by a male and a female voice. The song's simple melody has a five-note range, repeating just three musical motifs. The melody of the opening two lines of the Hello song is depicted in Figure 4.12. At eighty-five beats per minute (bpm), the song is accompanied by block chords on the piano and clapping on the downbeat, creating a strong, rhythmic foundation.

**Figure 4.12:** Notated melody of the first line of the Hello song.

The Goodbye song signifies the end of the music session. In the key of D minor, the song features a staccato chord piano accompaniment. Figure 4.13 notates the repeating melody of the Goodbye song.

**Figure 4.13:** Notated melody line of the Goodbye Song.

Like the Hello song, the melody is sung by a male and a female voice. It ranges from D to B♭, featuring stepwise motion followed by an ascending third interval and a return to the tonic note. The Goodbye song is one hundred bpm, providing an upbeat, cheerful allegro finale to the music session. Despite having not heard these songs before the programme, participants quickly became familiar with the Hello and Goodbye song. In the fifteenth week, technical difficulties arose with the computer at the end of the session. One participant spontaneously initiated the Goodbye Song acapella, and fellow participants then joined in to help, indicating a newly developed confidence in singing these songs. Within the caregiver-led groups, caregivers were also observed interacting with participants individually, moving through the group, holding their hands and keeping them engaged.

The sequential song activity included three songs, each chosen for its repetitive nature and pronounced rhythm. The first song in this section was ‘Zippity Zap’ by Judy Cranston (Cranston 2021), in C# major. The song was used in this activity from weeks one to six, allowing residents to become familiar with it and its corresponding

actions. As notated in Figure 4.14, the melody has a three-note range and repeats three distinct sections.

**Figure 4.14:** Notated melody line of ‘Zippity Zap’ by Judy Cranston.

The first section asks participants to clap along, the second asks to tap their shoulders, and the third to slap their knees. This sequence repeats, allowing participants to anticipate the next action. The second song used in the sequential song activity was the Hokey Pokey (Ray Anthony and His Orchestra 1953), which appeared in weeks six to twelve in the session plans. Pre-programme caregiver input revealed that this sequential song was already known and enjoyed by many residents. The melody can be characterised by its short range and repeated motifs, as depicted in Figure 4.15. These characteristics make the song repetitive and thus listeners can anticipate the next section of the song.

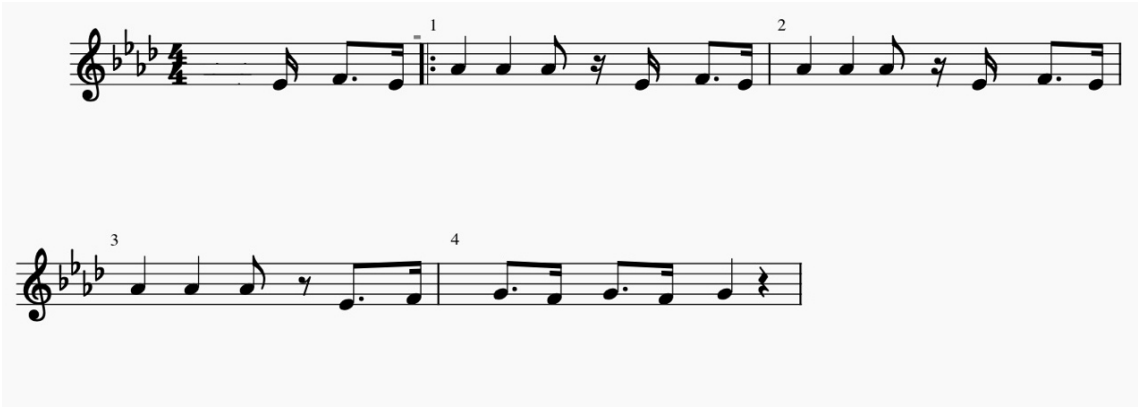


**Figure 4.15:** First phrase of the melody line in ‘Hokey Pokey’, performed by Ray Anthony.

Actions in this song require movement of feet, hands, and head. A version of the Hokey Pokey performed by Ray Anthony was chosen for this activity. This 1953 big

band recording of the popular song was chosen for its relatedness to the musical preferences expressed by participants in the pre-programme questionnaire, where "older" styles of music from the 1950s and 1960s were mentioned. The third sequential song used during the programme was the YMCA (The Village People 1978), used from weeks twelve to eighteen of the programme. An example of the sequences in this song can be seen in Figure 4.16, where the chorus features recurring motifs.

**Figure 4.16:** The melody line of the chorus in The Village People's 'YMCA'.

Staff noted that this song had also been used in the residential care centre previously, and so was a familiar song to most participants.

### 4.7 Quantitative Results

The first assessment analysed was the CASP-12 quality of life assessment. It consists of twelve questions, each scored on a four-point scale, with a possible range of zero to thirty-six. In Group A, fourteen participants completed both the pre-programme and post-programme CASP. After applying the illness and injury exclusion criteria, eleven sets of results remained for analysis. As depicted in Table 4.1 and Figure 4.17, the CASP results for Group A went from an average of 25.6 to 27, with a mean difference of 1.40 ($d$=0.27, 95% CI [-2.13, 4.93]). In Group B, seven participants completed the pre-programme and post-programme CASP. One result set was removed after applying the exclusion criteria, leaving six for analysis. Group B CASP results decreased from 31.33 to 28.83, leaving a mean difference of -2.50 ($d$=0.78, 95% CI [-5.80-0.80]). Three sets of results remained from Group C's CASP assessment. The pre-and post-programme results for this group remained the same, thus the mean difference was 0. Three participants from Group D remained in the analysis after

applying the exclusion criteria. However, as some participants were unable to complete the assessment before and after the programme, a mean difference could not be established, as seen in table in Table 4.1.

| | Mean Difference | Standard Deviation | Sample Size | Standard Error of Mean | Cohen's *d* | P Value | 95% Confidence Interval |
|---|---|---|---|---|---|---|---|
| **CASP – Group A** | 1.40 | 5.25 | 11 | 1.58 | 0.27 | 0.42 | -2.13 to 4.93 |
| **CASP – Group B** | -2.5 | 3.15 | 6 | 1.28 | 0.78 | 0.11 | -5.80 to 0.80 |
| **CASP – Group C** | 0 | 3.66 | 3 | 3.27 | 0 | 0.91 | -14.05 to 14.05 |
| **CASP – Group D** | - | - | 3 | - | - | | -14.05 to 14.05 |

**Table 4.1:** Statistical analysis of results from CASP-12 quality of life assessment.

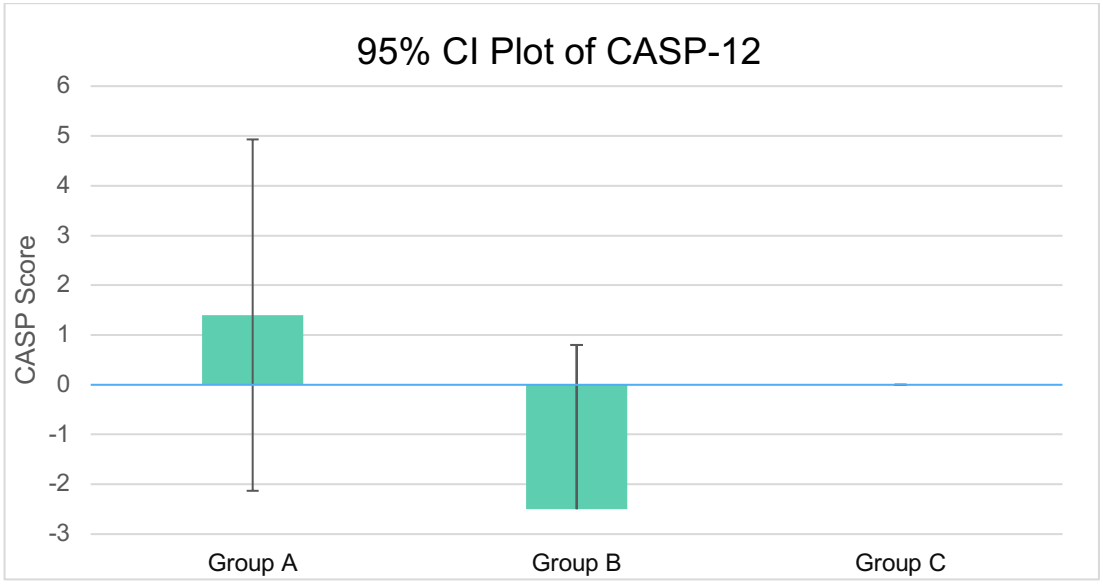



**Figure 4.17:** Interval plot of CASP-12 results of Group A, B, and C, with 95% CI for the mean.

The second assessment analysed was the EMS, which is scored out of twenty. As this assessment could be completed by proxy (with a knowledgeable caregiver), each participant in the study had pre-and post-programme EMS results. The score from Group A increased from 9.55 to 10.82, with a mean difference of 1.82 ($d$=0.25, 95% CI [-3.08, 6.72]). From the results of the six participants in Group B, EMS scores rose

from 12.17 to 14.33, a mean difference of 2.17 (*d*=0.67, 95% CI [-1.24, 5.58]). EMS results from Group C, with a sample size of three, remained stable at 12.67. The average of results from Group D decreased from 11.67 to 9.67, a mean difference of -2.00 (*d*=0.44, 95% CI [-13.38, 9.38]). Table 4.2 and Figure 4.18 depict the statistical analysis and confidence intervals of EMS results.

| | Mean Difference | Standard Deviation | Sample Size | Standard Error of Mean | Cohen's *d* | P Value | 95% Confidence Interval |
|---|---|---|---|---|---|---|---|
| **EMS – Group A** | 1.82 | 7.29 | 11 | 2.20 | 0.25 | 0.47 | -3.08 to 6.72 |
| **EMS – Group B** | 2.17 | 3.25 | 6 | 1.33 | 0.67 | 0.16 | -1.24 to 5.58 |
| **EMS – Group C** | 0 | 0 | 3 | 0 | 0 | | |
| **EMS – Group D** | -2 | 5.48 | 3 | 2.65 | 0.44 | 0.53 | -13.38 to 9.38 |

**Table 4.2:** Statistical analysis of results from the Elderly Mobility Scale.

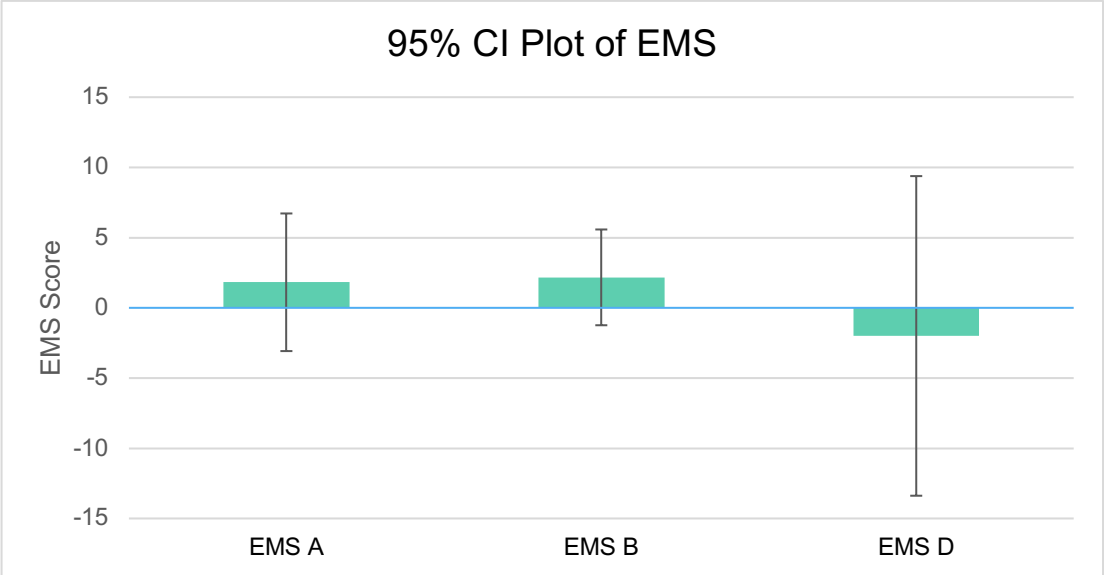



**Figure 4.18:** Interval plot of EMS results of Group A, B, and D, with 95% CI for the mean.

The third and final assessment that was analysed was the Mini-Cog, which has a score range from zero to five. As shown in Table 4.3 and Figure 4.19, Group A remained at an average of 3.30 in both pre-and post-programme assessments (*d*=0, 95% CI [-1.16,

1,16]). Results from Group B decreased from 3.17 to 2.50, a mean difference of -0.67 (*d*=0.78, 95% CI [-2.50, 1.17]). Group C results remained constant, at 0. Of the three participants in Group D that remained after applying the exclusion criteria, none were able to complete both a pre-programme and post-programme Mini-Cog assessment. Thus, results could not be analysed for this group.

| | Mean Difference | Standard Deviation | Sample Size | Standard Error of Mean | Cohen's *d* | P Value | 95% Confidence Interval |
|---|---|---|---|---|---|---|---|
| **Mini Cog – Group A** | 0 | 1.73 | 11 | 0.52 | 0 | 1.00 | -1.16 to 1.16 |
| **Mini Cog – Group B** | -0.67 | 1.75 | 6 | 1.71 | 0.78 | 0.39 | -2.50 to 1.17 |
| **Mini Cog – Group C** | 0 | 0 | 3 | 0 | 0 | 0 | |
| **Mini Cog – Group D** | - | - | 0 | - | - | - | - |

**Table 4.3:** Statistical analysis of results from the Mini-Cog assessment.

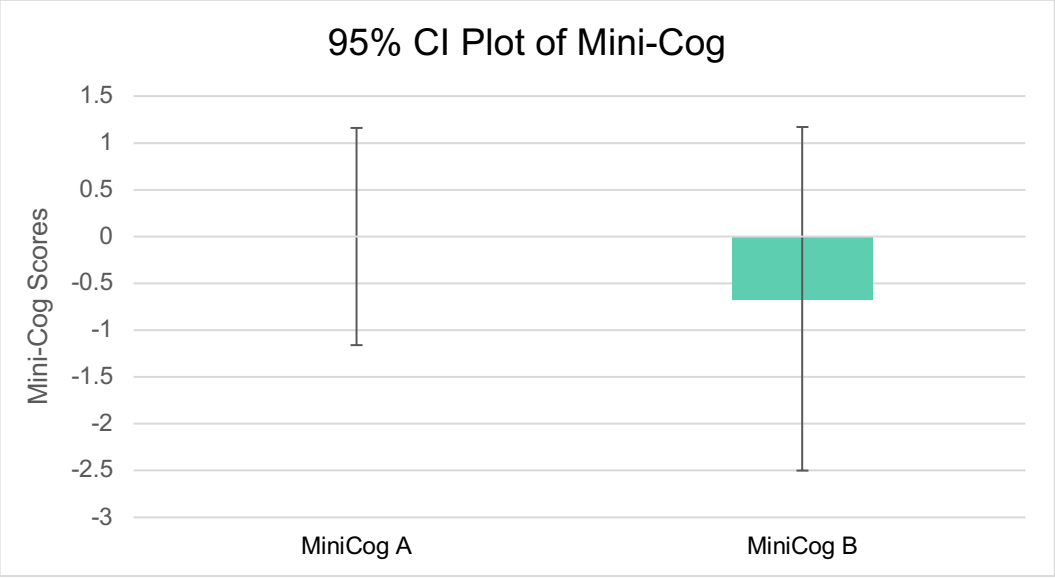



**Figure 4.19:** Interval plot of Mini-Cog results of Group A and B, with 95% CI for the mean.

## Power Analysis

A power analysis was conducted in order to estimate what sample size would be necessary to detect an effect of the size observed in this study. Pre- and post-programme EMS scores in Group A showed a small effect size ($d$ = 0.25). With this effect size and a two-tailed paired-samples t-test, using a significance level of a = 0.05, and a statistical power of 0.80, the power analysis showed that 128 participants would be needed. Table 4.4 depicts this power analysis.

| **T tests – Means: Difference between two dependant means (matched pairs)** | | |
|---|---|---|
| **Tails** | = | Two |
| **Effect size** | = | 0.25 |
| **Significance level (a)** | = | 0.05 |
| **Power** | = | 0.8 |
| | | |
| **Degrees of freedom** | = | 127 |
| **Total sample size** | = | 128 |

**Table 4.4:** Power analysis depicting required sample size.

If an effect of this size exists in the population, a study with 128 participants would have an 80% probability of detecting it as statistically significant (a significance level of 0.05). The present study, with its much smaller sample, had insufficient statistical power to detect an effect of this size. Therefore, the absence of a statistically significant change in EMS scores cannot be interpreted that the programme had no effect. Instead, the study was not adequately powered to determine whether an effect of this size was present. Furthermore, as the calculations of effect size were based on a small sample, the evaluations should be interpreted cautiously.

## 4.8 Results: Conclusions

Before completing the music programme, participants noted their existing interests and perceived benefits to various methods of music engagement. In their pre-programme questionnaire, caregivers also expressed their awareness of resident's

enjoyment of music. In facilitating music sessions, caregivers wished to become more competent with musical instruments and technology required, become more confident with their singing voice, and become familiar with the music preferences of participants. In the resident post-programme questionnaire, key benefits of the programme described were opportunities for creativity, contribution to wellbeing, and social experiences with peers and facilitators. Caregivers used the programme as a means to start conversations and interactions with participants. They also noted the benefit of practical training and ease of application of session activities and materials. Some challenges relating to engaging participants with varying health statuses, abilities and preferences remained for some caregivers. Feedback from the caregiver observation sheets revealed that the group experience developed from some initial reservation to an increase in engagement and discussion. This was reiterated in the focus group, where respondents also shared how the music programme had evolved within the residential care setting. Quantitative data showed improvement in mobility and quality of life scores of some groups but lacked a sample size large enough to confirm these impacts.

# Chapter 5: Discussion

This study aimed to assess the impact of an eighteen-week music programme on the cognitive abilities, mobility, and quality of life of older adults living in a residential care setting, comparing a caregiver-led facilitation model with an external musician-led model. At the end of the study, the following was observed:

- Most residents reported to have enjoyed the music programme, with creativity, improved wellbeing, and social experiences as the most referenced benefits.
- While some quantitative outcomes showed positive trends and moderate effect sizes, the present study was insufficiently powered to determine whether these reflect the genuine impacts of the programme.
- Differences were noted between participants of the caregiver-led and the external musician-led model. These differences were mainly within social experiences and types of engagement.
- Twice per week was the preferred frequency of music sessions among residents, and key considerations for promoting the sustainability of the programme were identified.

## 5.1 Enjoyment of the Music Programme

Activities involving instrument playing and singing were the preferred activities of the programme across groups. Following Boonrod's guidelines on selecting musical instruments for older adults, the instruments used were intuitive and did not require physically demanding manoeuvres (Boonrod 2024). For example, tambourines and egg shakers required only shaking to create their sound. For instruments that required a beater (such as the agogo and chime bar), facilitators were able to hold the instruments up for participants, allowing them to use one hand if necessary. The instruments did not require precision in striking a particular point of the instrument, making them accessible to participants with dexterity issues or visual impairment. The instruments were also largely tactile, thus not reliant on sight abilities to play. Participants described playing the instruments as "easy enough to do" and that they

could “cope with it”. One caregiver noted that the lollipop sticks were the least accessible instrument used in the programme. Citing their quiet and lightweight characteristics, they expressed the view that some participants may not have been able to hear them properly or found them difficult to hold. Larger, heavier and louder handheld percussion instruments, such as a drum beater or drumstick, have been used previously in studies with older adult participants (Cheng, et al. 2025, Miyazaki, et al. 2023).

The instrument parade involved facilitators introducing new instruments to the participants in the same order each week. Facilitators removed one instrument from the parade and asked if the group could recall which instrument was missing. Participants were also given the opportunity to try out the instruments in the parade, improvising to create rhythms and songs with them. This interactive and multi-sensory activity was chosen for its potential to engage participants’ visuospatial functioning through improvisation (Dos Santos, et al. 2020). It also served as a memory task (Usher and Cohen 1999), engaging word-list memory recall. There was a noted progression in the ability of participants to remember instrument names. One caregiver observed “many mix-ups of names” in the fourth session of the programme, while participants were “getting to name the instruments without much prompting” further into the programme. When offered instruments, participants were observed to create rhythms, improvise with their instruments, and offer support and encouragement to their peers while playing. During this activity, participants’ concentration, spontaneity and connections with others resembled the state of *flow,* for which music participation, individually or as a group, has been attributed to (Csíkszentmihályi 1990).

Voice projection difficulties and a decrease in vocal range are frequent symptoms among older adults (Pessin, et al. 2017). As previous research suggests that overly challenging music, or pressure in performances, can discourage singing participation (Bloska, et al. 2025), the limited range within the Hello and Goodbye song may have alleviated difficulty in singing along and encouraged participation. Though participating in the Hello and Goodbye song was attainable for most participating residents, one caregiver noted that they may have been too simplistic for some participants, described in their feedback as childish. This highlights the importance of person-centred, preferred and choice-based activities in residential care to prevent infantilisation of older adults (Salari 2005). While some activities which reminded participants of childhood were perceived as positive (reminiscing on playing

instruments as school children), consideration should be given to avoid the use of infantilising materials when developing activities for this demographic (Noriega, et al. 2023).

Within the caregiver observations, the sequential songs were perceived as the most enjoyable element in seven of the sessions. They were described as “catchy”, “interactive”, receiving “great reaction” and creating a fun and energetic atmosphere. It was observed that participating in the actions was mostly accessible, as they could be done while sitting. In the residential care setting, the benefits of the “catchy” elements of sequential songs is evident in previous studies. One such study noted a reduction in cognitive decline among participants (Tai, Wang and Yang 2016) when repetitive structures of Buddhist hymns were employed. The close relationship between music perception and prediction described by Vuurst may explain this cognitive engagement (Vuurst, et al. 2022), where the brain perceives musical information by comparing it to what is expects based on previous experiences. Anticipation has been described as fundamental to musical pleasure, and both the fulfilling and violation of anticipation can create a pleasurable experience within music listening (Gebauer, Kringelbach and Vuurst 2012). The activation of the reward system within the brain may be connected to the positive emotional response to these songs that were observed in this programme. The sequential songs that elicited these effects shared common characteristics in their limited range, repeating melodies, and accompanying actions. Using repeating melodies has been noted as a key factor of music engagement that can elicit social cohesion within groups (Margulis 2013). Within cognitive domains, the use of repeated melodies has been shown to establish stronger short-term memory and facilitate memory retrieval (Wallace 1994).

The ‘sing-along jar’ included approximately thirty songs that were largely inspired by the musical preferences of participants conveyed in the pre-programme questionnaire. Suggestions from staff in their pre-programme questionnaire were also considered. The music included Irish folk songs from Foster and Allen and The Dubliners, popular 1950s singers such as Frank Sinatra and Bing Crosby, and well-known country and western songs from Johnny Cash and John Denver. Each of the songs in this section were played with an accompanying lyric video on the television for residents to read along. The importance of familiarity with musical stimuli has been noted in several previous studies, where positive impacts on both cognitive and emotional health have been observed (Wallace 1994, Sung, Chang and Lee 2010,

Alter, et al. 2015, Costa, Ockelford and Hargreaves 2018). The element of familiarity was noted by the participants, with one stating, “they are still in my mind, the songs”. Resident involvement in the design and planning of activities is recommended by HIQA in their standards for activity provision in residential care for older adults (Health Information and Quality Authority 2016). The sing-along activity was reported as particularly popular, as the caregiver perceived many of the songs to be “firm favourites” among participants. They also noted the group dynamic within this activity when participants sang together in unison, especially during the verses of well-known songs. At a neuroscientific level, these connected singing moments have been shown to create neural synchronisation, developing a sense of shared cooperation and eliciting joy (Osaka, et al. 2015). Synchronisation was also noted in participants’ movement to the sing-along music, including clapping and tapping their feet in unison. Prior to the commencement of the music programme, caregivers had expressed their interest in becoming more confident in engaging in music, particularly within singing. One caregiver wrote that their goal was to “grow confident with my voice”. Evidence from music psychology in choir participation indicates that collaboration, cohesion, and teamwork are key factors in confidence building among amateur singers (Bonshor 2020). The majority of caregivers who completed the post-programme questionnaire reported that they had gained confidence in engaging in music with the residents through facilitating sessions.

In feedback from the 2024 music programme ‘Timeless’, completed in the residential care centre, caregivers noted that the music and mindfulness activity was met with distraction. Some participants were observed as “tuned out” during the classical music listening. In that programme, the classical music listening section came directly after the music and movement activity. This transition from high engagement and energy to a passive and relaxing activity may have been too stark. To help alleviate this, the ‘sing-along jar’ activity was incorporated in between the movement and mindfulness activities, serving as a more comfortable transition from a high-energy to low-energy activity. Two music pieces were chosen for the music and mindfulness activity in the music programme: ‘Miserere Mei’ by Gregorio Allegri, and a section of Mozart’s ‘Sonata in D major for Two Pianos’ (Barenboim and Argerich 2014). Both pieces have been used previously in studies assessing psychological responses to music listening (Scheufele 2000, Nater, et al. 2006). The recording of Miserere Mei used was performed by the Tenebrae Choir (Tenebrae Choir 2018). The piece is

written for two SSATB choirs that sing alternating verses. The recording of Mozart's sonata was performed by Daniel Barenboim and Martha Argerich. Participants who referenced the music and mindfulness activity as their favourite part of the study referred to it as "therapeutic" and "relaxing". This feedback supports previous research on the use of these songs for relaxation, with lower heart rate and cortisol levels associated with listening to these musical pieces (Scheufele 2000, Nater, et al. 2006, Thoma, et al. 2013).

### 5.2 Quantitative Outcomes and Statistical Power

Prior to the statistical analysis of the data collected from participants, an exclusion criterion was applied to the data. This was completed to remove results that may have been impacted by external factors, such as illness or injury, before or during the music programme implementation. This resulted in twenty-three participants being included in the final analysis, six of whom were unable to complete at least one of the health assessments. The study was thus underpowered, and so quantitative findings were inconclusive. The results may be indicative of the impact of a music programme on cognitive ability, mobility, and quality of life, which could be further investigated in a study with a larger pool of participants.

In this study, the CASP (Control, Autonomy, Self-Realisation, Pleasure) scale was used to assess changes in quality of life (QOL) of the participants. The CASP was designed specifically for use with populations of older adults (Wiggins, et al. 2008). The CASP models have also been used for an older Irish cohort comprising a random sample from the TILDA studies (Sexton, et al. 2013). The study agrees that the revised CASP-12 scale provides more adequate conceptual coverage and fits well with the data, in comparison to different item versions of the scale (Sexton, et al. 2013). The CASP scale was also used in a study on music making for older adults (Hallam and Creech 2016). Despite the validity and reported suitability of the scale for this population, some participants in this study were unable to complete it. Analysis of the results revealed that one group, Group A, saw an improvement in their average CASP score after the music programme. The CASP scale included items such as 'I look forward to each day' and 'I enjoy the things that I do'. Similar responses were communicated by Group A participants in their post-programme questionnaire (e.g.

looking forward to the sessions). The sample size of this group was not large enough to equate statistical significance within these results, and thus a conclusive effect on QOL through this metric could not be reported.

The Mini-Cog was chosen to evaluate cognitive ability in this study. The Mini-Cog is suggested as an appropriate tool for routine dementia screening by the HSE (Health Service Executive, 2024). In a 2003 validation study for the Mini-Cog, the assessment was used on more than 17,000 older adults (S. Borson, J. Scanlan and P. Chen, et al. 2003). Researchers compared the Mini-Cog to a Mini-Mental State Examination (MMSE) and a standardised neuropsychological battery. The Mini-Cog proved just as effective as longer screening and assessment instruments. This, combined with its brevity, improved the identification of older adults in a population who may be cognitively impaired (Borson, Scanlan and Chen, et al. 2003). In another study, no language biases were found for the Mini-Cog, unlike the MMSE and Cognitive Abilities Screening Instrument (CASI) (Borson, Scanlan and Brush, et al. 2000), making it an accessible screening tool for a wide variety of older adults. In this study, twenty-four participants were able to complete the Mini-Cog. Similar to the CASP, the Mini-Cog was unsuitable for many of the participants. The scores in the Mini-Cog assessment in this study remained stable within groups A and C, while a decrease in score was noted in Group B. Due to the small sample size for analysis, these results are inconclusive.

The Elderly Mobility Scale (EMS) was used to assess the functional mobility of participants in this study. The EMS was completed by proxy, whereby a caregiver with knowledge of the abilities of participants was invited to answer the questions. This method of data collection has been assessed and used in previous cluster randomised controlled feasibility trials. The Research Exploring Physical Activity in Care Homes (REACH) trial assessed the most appropriate study protocol for evaluating a physical activity intervention in a care home setting (Forster, Airlie, et al. 2017). The protocol included the EMS, which was completed by staff members in relation to residents known to them (Forster, Airlie, et al. 2017). As the EMS was completed by a proxy, this was the only test that allowed each participant to provide results. An increase in mobility was noted in groups A and B, with group C remaining stable. Group D experienced a large decrease in mobility, dropping by an average of 2 points on the EMS. The largest increase was observed within group B, increasing by 2.7 points on the scale. This was a caregiver-led group, where caregivers were

observed supporting participants in moving to the music or getting up to dance. Although statistical significance was not achieved, the observed effect size for mobility in group B was moderate (d = 0.67). These results may indicate the potential of the caregiver-led programme in maintaining mobility of participants when supported to dance and move along to the music, warranting further research with a larger sample size.

### 5.3 Differences Between Caregiver-led and External Musician-led Models

Feedback from participants and facilitators highlighted shared and contrasting experiences and outcomes between the programme models. The biggest differences between experiences for participants in the caregiver-led groups and the external musician-led group were within social experiences. Some outcomes, such as a sense of community and strengthened existing relationships, were apparent in all groups that completed the music programme. Participants across groups described the togetherness of the programme. Among older adults in Ireland, participating in creative arts activities is often enjoyed as part of an organised group or with friends (Hennelly 2023), a concept that appeared in this study. Certain aspects of participant experiences and group dynamics diverged depending on the facilitator. Within group A, facilitated by the external musician, the participants described their relationship with the facilitator as positive, looking forward to their arrival each week, and noting the transmission of positivity and energy from the musician to the participants. Activities with people from outside the residential care setting can be a transformative and meaningful way for residents to remain connected to the wider community (Struthers and Ågotnes 2023). These initiatives can also provide an opportunity for residents to create social connections with younger generations (Cook and Bailey 2013).

Strengthened relationships with caregivers and social reminiscence occurred within caregiver-led groups. In the pre-programme questionnaire, descriptions of relationships with caregivers, while mostly positive, suggest the presence of acquaintanceship or functionality rather than close friendships (“chat away to them”, “they look after me”). After the programme, participants described “gelling together” with caregivers throughout the sessions. Resident-staff relationships have previously

been noted as crucial in these settings, not only for the social wellbeing of residents and better outcomes, but also for work satisfaction of staff (C. Welford, et al. 2010, Phelan and McCormack 2016). Before the programme began, caregivers displayed great interest in the project. They aimed to ensure that they could handle any technical difficulties and deliver the sessions effectively, indicating their dedication to delivering positive experiences for participants. This dedication was also expressed by members of the focus group, who continued to use the music programme with the residents after study conditions had ceased. They described resident-staff interactions and relationships prompted by music engagement as "beautiful to see", and that "with staff involved, it's so much better". Participatory arts activities, such as music, have a unique ability to create these social dynamics both verbally and non-verbally (Dadswell, et al. 2020). Feedback from the programme supports this idea. For example, observations described the ability of caregivers to lift the "energy" of the room, without mentioning a specific verbal interaction.

Notably, instances of reminiscence were mentioned only within the caregiver-led groups. Participants appeared to share more of their personal memories in the caregiver-led sessions in comparison to the external musician-led sessions. Activities that incorporate reminiscence are popular within residential care settings, connecting residents with their past and encouraging social interactions (Misiak, et al. 2025). The return of distant or long-term memories through familiar music has also been a pleasurable experience for participants in previous studies (Götell, Brown and Ekman 2000). The prevalence of reminiscence in the caregiver-led groups may have been due to the baseline level of familiarity that the participants and caregivers shared. This initial personal knowledge and comfort may have given participants more confidence to share their personal anecdotes and experiences.

Concepts of Irishness, through songs, traditions, and experiences, were recurring themes in the examples of reminiscence. Irish songs were noted as particularly enjoyable, and some of these ballads brought back personal memories for the residents. These songs also evoked memories of local performers who would play these songs in the past. Engagement in creative arts activities relating to an individual's culture can contribute to improved social and personal outcomes (O'Shea and Ní Léime 2012). One Irish example comes from a previous study on older adult's participation in the Bealtaine festival, where participants valued the opportunity to express themselves and engage with their community (O'Shea and Ní Léime 2012).

Discussions throughout the programme often revolved around rural Irish life, with topics such as farm animals, collecting eggs, and times of economic hardship or subsistence living. From a psychological perspective, these instances of sharing autobiographical memory can be employed to build rapport with others, finding shared experiences, and maintaining a sense of self (Allen, et al. 2021). These effects have been observed previously in a study with older Irish adults (Allen, et al. 2021). The study also highlighted how family, community, and historical context can change and form sense of self over time (Allen, et al. 2021), similar to how participants of this programme contextualised their past experiences with societal changes that occurred.

Differences in accessibility were also noted between the caregiver-led and external musician-led models. Participants in the caregiver-led groups referred to the additional instructions that they could receive from caregivers to assist them in participation and noted that activities were accessible "with assistance". One clear indication of this difference was observed within the music and movement section of the sessions. Caregivers have completed extensive training in manual people handling and have previous knowledge and experience with each participant. Thus, they were better equipped to assist participants in getting up from their seats and support them while dancing when they wanted to. Staff support and supervision have been previously identified as vital in facilitation of dance programmes in residential care settings (Gomaa, et al. 2020). In contrast to the caregiver-led groups, the same level of support could not be afforded to participants by the individual external musician. This resulted in less opportunity to get up and dance during the activity. One participant in the external musician-led group noted this, as they expressed, "I wish I could get up to dance more". While quantitative results were underpowered, this difference in ability to facilitate movement mirrors the results of the EMS. Group B, a caregiver-led group, experienced a greater improvement in mobility than the external musician-led group, warranting further research to explore this effect.

### 5.4 Sustainability Considerations for Music Programmes

The feedback from participants indicated that two music sessions per week was the preferred frequency of music engagement. Included in those who reported this preference were some of the participants who only took part in one session per week.

The group who received one session per week (Group C) experienced a high withdrawal rate, going from ten participants to just four by the end of the programme. Thus, discerning the impact of frequency on results from the health assessments was unachievable. Through examination of the qualitative feedback from participants on frequency, sustainability appears to be a central consideration. This included consciousness of health and ability for continuous engagement in the programme, and the ability of staff to facilitate sessions. Such responses from participants indicate their consideration and awareness of the challenges experienced by staff in facilitating activities. Challenges for staff have been previously documented in the literature across residential care settings, with factors such as a lack of time, support, and resources being commonly expressed (Struthers and Ågotnes 2023, McAuliffe, et al. 2024).

Caregivers in the post-programme questionnaire spoke of their continued use of the music sessions after the study conditions had ceased. Their comments largely revolved around the provision of resources and training. Caregivers mentioned the ease of starting a session spontaneously as they can "grab the instruments bag and start off a session at any stage". The booklet of activities and songs was also noted as helpful, as it gave one caregiver "lots of ideas on how to encourage residents to engage". Having sufficient numbers of trained staff to support activities is listed as part of the HIQA standards for recreational and stimulating activities in residential care settings for older people (Health Information and Quality Authority 2016). The song recordings and lyric videos were provided in the form of MP3 and MP4 files downloaded to the staff laptop. Caregivers were able to easily access music based on participant preferences. Successful use of resident-chosen music on digital platforms within residential care settings has been seen in studies on the Music and Memory programme (Music & Memory 2025). This method has previously created staff-resident interactions beyond that of typical care (Hamiduzzaman, et al. 2023). The provision of downloaded files also meant that materials were accessible without internet connection. This averted the risk of difficulties relating to poor internet connection, which has been previously noted in music programmes employed in residential care settings (Ofosu, et al. 2023). Having left the programme booklet and materials in the possession of the residential care centre, staff continue to utilise their training and knowledge to use these resources in the provision of care. The programme is also introduced to new staff at the residential care centre as part of their induction.

The frequency at which staff employed the programme after the study conditions varied by caregiver and participant demographic. Some caregivers incorporate daily, shorter instalments of the activities, and others use longer sessions but less often.

The focus group undertaken by staff members provided additional insight into how the programme has created a sustained interest and engagement in music in the residential care centre. According to the respondents, the by-product activities and events such as resident choirs, music-supported 'spa days', and talent shows stemmed from the skills and experience gained in facilitating the programme. The continuity and momentum gained from the programme is attributed to these further engagements. This finding highlights the importance of an organised framework to support staff in embedding the sustained use of music in everyday situations in the residential care environment. This consideration was recently addressed by Bev Foster in the context of dementia care (Foster 2026). Caregivers were able to continue using the programme through the structure and direction provided by the resources. It also provided caregivers with a basis to develop new ways to incorporate musical activities.

The focus group expressed an interest in further empowering caregivers to facilitate music activities, as hesitancy remains among some colleagues. These were assumed to be mainly psychological barriers, including a lack of confidence. Assuming a leadership role within facilitation was one strategy developed by a caregiver. They were thus able to recognise any reluctance on the part of their peers and place them in less forward-facing facilitating roles, creating inclusion at a comfortable level. Recent reports indicate ongoing staff retention challenges within the residential care setting, with an NHI publication on private and voluntary nursing homes reported a 36% staff turnover rate in 2025 (Nursing Homes Ireland 2025). As the staff composition is likely to evolve after the programme has ceased, the ownership of the programme undertaken by caregivers who are familiar with facilitation may enable new staff to use the programme. The focus group also explored the prospect of organising a staff choir. The use of workplace choirs within the healthcare sector has been studied both in Ireland and abroad (Vaag, et al. 2015, Moss and O'Donoghue 2020). Insights from healthcare staff choir members in Ireland indicate its impact in social connectedness, staff engagement and stress reduction (Moss and O'Donoghue 2020). Another study on a hospital choir noted that there were only slight differences in uptake between extraverted and introverted individuals (Vaag, et al. 2015). The researchers suggest that this indicates the ability of the choir to include staff with less

sociability (Vaag, et al. 2015). This is a key factor for the focus group, as they aim to "uplift" staff, encourage "embracement", and "stimulate" music engagement among staff. Further research could explore whether a staff choir would encourage more staff engagement with music activities for the residents.

Overall, results from this study indicate benefits that music programmes in residential care settings can elicit for both residents and staff. In Ireland, research on the scope of similar music programmes for the health and wellbeing of older adults is limited. A 2022 publication by Helitzer and Moss catalogued the 'first national map' of singing groups for health and wellbeing in Ireland (Helitzer and Moss 2022), providing some insight into the prevalence of similar groups. While 185 singing groups were identified, only approximately 6.5% of groups were specifically organised for older adults. None of these groups were organised within the residential care setting. Furthermore, the study highlighted geographical disparity in the prevalence of groups. Dublin-based groups accounted for 23% of all singing groups, with Cork, Limerick and Galway being the only other counties that accounted for more than 5% of the groups respectively (Helitzer and Moss 2022). These findings indicate the current barriers to participation that older adults face, where opportunities to engage in music-based activities for health and wellbeing appear limited. The development of 'Sounds in Time' prioritised co-creation by engaging with organisational staff and gathering pre-programme data from caregivers and residents. This ensured that the programme was both feasible within the environment and aligned with participant needs and preferences. This created an implementation model that has been sustained after study conditions have ceased. Helitzer and Moss call for a larger scale implementation of such a process in the context of their study, recommending "partnerships with healthcare professionals, stakeholders and the HSE" (Helitzer and Moss 2022). They suggest that this would align singing for health and wellbeing with clinical need and ensure geographical access equity. The 'Sounds in Time' project demonstrates the potential of sustainably embedded music-based programmes. This programme could be more widely implemented with collaboration and support at an organisational level, thereby improving access to music for the greater health and wellbeing of older adults in residential care settings.

## 5.5 Discussion: Conclusions

This study provided insight into the experience of both the residents and caregivers who took part in the eighteen-week music programme. Overall, participants appreciated taking part in the programme, noting singing and instrument playing as particularly enjoyable activities. Feedback relating to these activities support previous research suggesting such forms of music engagement can initiate states of flow (Csíkszentmihályi 1990), create pleasure through anticipation (Gebauer, Kringelbach and Vuurst 2012), initiate reminiscence (Costa, Ockelford and Hargreaves 2018), and promote relaxation (Thoma, et al. 2013). Within these activities, opportunities for further accessibility and person-centred activity design were also identified. When quantifying the effect of the music programme on cognitive ability, mobility, and quality of life, insufficient data collected led to the study being underpowered. Further research is required to explore results that indicated potential benefits, such as a maintenance in mobility where participants are supported by caregivers. Differences between the caregiver-led model and external musician-led model were identified within social experiences, types of engagement, and accessibility for participants. The programme resulted in a sustained engagement with music within the residential care home, highlighted for its importance in recent literature (Foster 2026). The feedback from this study also offers suggestions for further development of such programmes, including a focus on skill and confidence development within caregivers, peer support, and involvement of the entire residential care setting community in music-based initiatives.

# Chapter 6: Conclusions

## 6.1 Limitations

While the study revealed interesting findings, several limitations that restricted the project occurred. In the residential care home environment, many residents are experiencing physical and cognitive morbidities, physical disabilities, and age-related changes (Romero-Ortuno, et al. 2020), and thus were unable to participate in the study due to such circumstances. Along with the proportion of residents who declined participation, the numbers of participants in the study were insufficient and impacted data analysis. Based on the quantitative analysis of health assessments and a power analysis, it is estimated that 128 participants would be needed to ascertain the true significance of the music programme engagement on the health and wellbeing domains that were assessed. Thus, conclusions are based exclusively on the qualitative data provided by participants and their caregivers. The study environment led to limitations in participant recruitment and group allocation. The residential care facility consists of three floors, each with separate bedrooms, dining areas and day rooms. Moving a large group of participants between floors twice per week was not feasible for care staff, as many had limited mobility or impairments that made this process time-consuming. Such challenges within the residential care setting have been identified by staff in previous studies (Struthers and Ågotnes 2023). As a result, participant groups had to be allocated based on their proximity to day rooms, so that they did not have to travel to a different floor for their music session. Thus, group allocation could not be randomised. While the researcher was blinded to participants' cognitive ability, mobility, quality of life, and prior engagement in music, the lack of randomisation may have introduced bias.

Further limitations occurred within scheduling in the residential care environment. Enthusiasm and effort were shown by many participating caregivers. However, a number of both logistical and implementational limitations hindered the ability of the caregivers to fully engage in the music programme. While fourteen caregivers signed up to participate, many of them were unable to facilitate more than two sessions. This was largely due to scheduling conflicts. Some caregivers found that they were not rostered during the allocated weekly slots for the caregiver-led music

sessions. Others had alternative duties that they were attending to at that time of the sessions (e.g. setting up for mealtime and other activities of daily living). Lack of staff availability for activities is an ongoing challenge identified within residential care settings (McAuliffe, et al. 2024). Adherence to specific time slots was necessary during the assessment of the programme to ensure accuracy within the study results. Mitigating this issue outside of a controlled study environment may include facilitating sessions when resident schedules are free to do recreational activities and caregivers are available to facilitate them.

Assessments for quality of life, mobility and cognitive ability were chosen based on their validity, use and recommendation for older adults. Despite the design of the assessment for use by this cohort, both of the self-report-only assessments were unsuitable for some of the participants. Twenty-six of the participants in this study were unable to complete the CASP assessment, and twenty-eight of the participants were unable to complete the Mini-Cog Assessment. This decreased dataset, along with the post-programme exclusion criteria and the initial small sample size, meant that statistical analysis and obtainment of significant results were limited. While these limitations reduced the ability to detect quantitative change, they do not detract from qualitative and implementation-centred findings from the study.

Music sessions often had twenty or more residents participating, each with individual music tastes and preferences. Efforts were made to ensure a variety of music was played during each session. Despite this, some participants still felt less interested in the activities while music that was not their preference was being played. A large flat-screen wall-mounted television was used to display the lyrics of songs. While the television was placed at a forty-five-degree angle to allow participants to view it, some participants were still not always able to see the screen from where they were sitting. As requested by caregivers, the music facilitator was present for the caregiver-led music sessions to provide support during the activities. While this presence allowed caregivers to ask for assistance or advice while facilitating, it also may have hindered some caregiver's ability to learn how to lead the session independently.

## 6.2 Recommendations for Practice

Certain aspects of the music programme design need to be addressed prior to further delivery of such initiatives. For example, the hello and goodbye songs were considered juvenile by some participants. To align with person-centred, choice-based principles for activities in residential care, and promote dignity and autonomy for participants, future programming should consider alternative hello and goodbye songs and offer choice by inviting resident input when choosing music for this purpose. While the bubbles activity was enjoyed by many participants, the constancy of the activity may have been unfavourable for those who disliked the activity or had difficulty in engaging with it. Future programmes could consider other forms of sensory engagement to vary this activity and ensure participants with diverse needs or those experiencing changing abilities could engage fully with this programme element. Further implementation of the programme should also include improvements to the accessibility of activity resources for participants. For example, for participants who may find reading lyrics from the screen difficult, lyric sheets could be provided It could also be ensured that all participants chairs are positioned where the screen is visible. As many participants are unable to move their chairs unassisted, this consideration may be taken by caregivers (who are qualified in manual people handling) to ensure participants can view song lyrics. For caregivers who require additional assistance in singing development, the introduction of a facilitator that has experience in singing development, such as a vocal coach, may provide additional expertise on singing to improve the confidence of caregivers. Participants also mentioned experiencing hoarseness, which may be alleviated through guidance and advice on vocal care from a facilitator with singing expertise.

## 6.3 Recommendations for Further Research

Within the quantitative assessment of the music programme, this study had an insufficient number of participants to fully explore the effects of the programme on cognitive ability, mobility, and quality of life. The power analysis completed using the t-test results from EMS scores suggest that a sample size of 128 participants would have sufficiently powered the study. Future projects may consider widening the

recruitment pool to more than one residential care home to ensure adequate sample sizes, accounting for the potential of participant withdrawal due to changes in health. Beyond the small participant group, many participants were unable to complete health assessments. The sensitivity and accessibility of assessments should be carefully examined for subsequent research, to ensure assessments used will be suitable for participants and adequately observe any changes in results. This consideration, along with a larger group of participants should ensure that, in the case of impacts, statistical significance can be measured.

Caregivers referred specifically to growing confidence within their singing voice as a goal for taking part in the programme. Group singing in a supportive, collaborative environment may have led to gained confidence. While an increase in overall confidence was reported by caregivers, future research should explore the impact of such programmes specifically on caregiver confidence. A singing group for staff could also be explored for this purpose. A 'leader' within singing groups, such as a conductor or more experienced key singer within the group, could contribute towards the confidence of singers around them, offering musical guidance and moral support (Bonshor 2020).

The broader theoretical framework for music, health, and wellbeing, as described by MacDonald et al., encompasses music education, music therapy, community music, and everyday uses for music (MacDonald, et al. 2012). When applying this framework to the current study context, the contribution of the fields of healthcare and residential care was imperative in the design of a music programme for this environment. Furthermore, the inclusion of caregivers themselves elicited distinct benefits for participants, as well as providing a basis for the continued engagement of participants in music activities that evidently contributed to their wellbeing. Collaboration in this context could see the removal of previously held standards of a disconnect between external musicians, engagement with music, and caregivers (Garrido, et al. 2021), and empower caregivers to connect with residents and improve care outcomes (Batt-Rawden and Stedje 2020). Therefore, this contribution to the field should be considered in further studies of music-based programmes conducted in residential care settings, to further develop its standing within music, health and wellbeing research and improve the accessibility of such beneficial activities for older adults.

## 6.4 Concluding Remarks

The increase in life expectancy that has been experienced globally (where high-quality data is available), is testament to a variety of health and societal changes. This includes advancements in healthcare, reductions in environmental, behavioural and biological risk factors, and control of communicable diseases (Mathers, et al. 2015). Supporting this growing population of older adults in maintaining their quality of life throughout the ageing process is a multifaceted objective, requiring a holistic view of health and wellbeing. While improvements are evident, negative impacts on quality of life such as levels of loneliness remain largely constant among older adults in Ireland (Ward 2025). Approximately 20% of TILDA respondents in their 2025 report shared that they felt lonely more than one day per week. While such statistics are not available for the residential care population, global studies indicate a prevalence of loneliness in these environments (Gardiner, et al. 2020). For those living in a residential care setting, this is often associated with factors such as change in living circumstances or health status, loss of autonomy and sense of self, the presence of superficial relationships, and a lack of 'belonging' (Gardiner, et al. 2020). Thus, efforts must be made to support older adults in navigating age-related changes, within physical, psychological, and cognitive health and wellbeing. The provision of meaningful activities that support the health and wellbeing of residents is considered a standard that residential care settings should uphold (Health Information and Quality Authority 2016). A lack of support for caregivers in providing these activities has in the past been recognised as an inhibitor in creating these opportunities for residents (McAuliffe, et al. 2024).

As this thesis has explored, music-based activities have the potential to impact several health and wellbeing domains, including social connections, physical movement, cognitive stimulation and emotional processing. In the context of older adults in residential care, research has been conducted on programmes with external facilitators, including music therapists, music educators, healthcare musicians, and community musicians. Studies have also explored caregiver-led music programme initiates, such as caregiver singing and playlist distribution (Bakerjian, et al. 2020, Batt-Rawden and Stedje 2020). Based on the available literature, a direct comparison between the two models of music programme facilitation has not yet been explored within research. A lack of caregiver support has also been reported to have hindered the impacts of some programmes (Galinha, Garcia-Martin and Lima 2022). Previous

research which trained caregivers to use music lacked follow-up on how the caregivers may have implemented music post-training (Lai 2011), or limited the type of music engagement to one activity, such as singing (Hammar, et al. 2011, Engström, et al. 2011, Batt-Rawden and Stedje 2020). This study aimed to address these gaps by comparing the same music-based programme delivered by two types of facilitators: the external musician and the caregivers, while assessing its impact on cognitive ability, mobility, and quality of life. Additionally, it delivered two levels of frequency of sessions within caregiver-led groups, exploring the effect of frequency on participant experience and feasibility for facilitating staff.

This study provided insight into the experience of both residents and caregivers in a residential care home taking part in a music programme. Two sessions per week was the overall preferred frequency of the music programme for participants. Within the external musician-led group, participants appreciated the involvement of a visitor from outside of the residential care setting, looking forward to their involvement each week. Strengthened relationships and reminiscence engagement was widely observed between residents and caregivers. This facilitation model also increased access for participants to engage physically with the music activities. Participating in music sessions that were led by the caregivers, who are already familiar to those living in the environment, appeared to provide a basis for deeper connections to be fostered through story sharing, reminiscing and learning about one another. In the external-led sessions, participants supported each other through the musical experiences, rather than by engaging in reminiscent discussions, a key difference between the experience within an external-led and caregiver-led model. External facilitators can bring their expertise in music activity facilitation, practical advice, resources, and support to those engaging in the programme. Concurrently, these insights highlight the value of including caregivers in these activities, where stronger resident-caregiver relationships can develop and the necessary support for engagement is provided to residents who wish to actively participate. Crucially, the training and experienced gained by facilitating caregivers enabled the residential care centre to continue using the music programme and sustain engagement in music. With their new knowledge and dedication to continuity, several caregivers have worked to create an environment that incorporates music in a variety of settings and range of participants. This outcome corresponds with Foster et al.'s recommendations, where internal ownership of music programmes and commitment and understanding of the concepts of music in care are considered crucial

elements for the development of music in care settings (Foster, Pearson, et al. 2021). The results of this study highlight the advantages of including both external facilitators with skills and experience in music facilitation and staff who bring their caring expertise and profound knowledge and understanding of the older adults participating.

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# Appendices

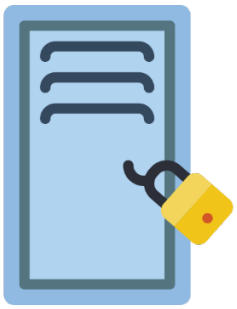
## Appendix A: Information Leaflets, Consent Forms

University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

**Information Sheet for Residents**

| | |
|---|---|
| **Purpose of the Study:** I am researching the effects of a music programme on cognitive ability, mobility, and quality of life in residential care settings. The benefits of music exposure through an accessible programme will be explored, as well as a comparison of caregiver-led music sessions to those led by a music practitioner. | Sounds In Time |
| **What will the study involve?** The study will last 18-week weeks. The participants will be divided into groups. The groups will be as follows:<br><br>• Group A will receive 2 music sessions per week with caregivers.<br><br>• Group B will receive 2 music sessions per week with music practitioners.<br><br>• Group C will receive 1 music session per week with caregivers.<br><br>• Group D will partake in an alternative activity (e.g., walking, puzzles) during the first instalment. All music resources will remain available to the care centre for 18 weeks after the study has been | <br> <br> |

| | |
|---|---|
| completed to allow members of Group D to take part in music sessions led by caregivers. | |
| **Why have you been asked to take part?** You have been asked because my research directly concerns residents in care settings. By taking part in this study, I will be able to explore the outcomes of a revised music programme, gathering the thoughts and opinions of both the caregivers and residents on the experience. Participating residents will be asked to take part in assessments before and after the study. As a resident, your opinions and experiences are important for the study. | <br>Participants will also be asked a series of questions by the researcher. |
| **Do you have to take part?**<br><u>Participation is voluntary</u>.<br>Participants will be provided with a consent form to fill out and may keep this information sheet and a copy of their consent form.<br>Participants reserve the right to withdraw from the study, even after initial consent has been given.<br>Participants also reserve the right to request any identifying data be destroyed if they remove consent. | <br>You also have the option to skip questions or assessments you do not want to do. |

| | |
|---|---|
| **Will your participation in the study be kept confidential/ Will due acknowledgement be given** I would like to give due acknowledgement and will attribute content to you unless you specify that you would prefer to participate anonymously. If this is the case, I will make every effort to ensure that no clues to your identity appear in the thesis. Any extracts from what you say that are quoted in the thesis will be anonymous. | |
| **What will happen to the information which you give?** The data will be kept confidential for the duration of the study. On completion of the thesis, they will be retained for a further ten years and then destroyed. |  |
| **What will happen to the results?** The results will be presented in the thesis. They will be seen by my supervisor, a second marker and the external examiner. The thesis may be read by future students on the course. The study may be published in a research journal or presented in educational or research settings. | |
| **What are the possible disadvantages of taking part & What if there's a problem?** I do not envisage any negative consequences for you in taking part. I will be happy to discuss with you how you found the experience, and we can pause or discontinue | |

| | |
|---|---|
| your participation at any time. You do not need to give a reason. | |
| **Who has reviewed this study?** Approval must be given by the Department of Music and the Social Research Ethics Committee before studies like this can take place. | |
| **Any further queries?** If you need any further information, you can talk to Fiona Kelly, who is conducting the study. My email address is 121315191@umail.ucc.ie | |
| If you agree to take part in the study, please sign the consent form overleaf. You may choose the recognised name version if you do not mind your name appearing in the study, or the anonymous version if you would prefer to remain anonymous. | |

University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

**Information Sheet for Caregivers**

**Purpose of the Study.** As part of my MPhil Music degree at University College Cork, I am researching the effects of a music programme on cognitive ability, mobility, and quality of life in residential care settings. The benefits of ongoing, internal methods of music exposure through an accessible programme on the aforementioned will be explored, as well as a comparison of caregiver-led music sessions to those led by a music practitioner.

**What will the study involve?** The study consists of devising an 18-week music programme within the nursing home. The programme can be separated into groups that vary in dosage level and facilitators. The groups will be as follows:

- Group A will receive 2 music sessions per week with caregivers.
- Group B will receive 2 music sessions per week with music practitioners.
- Group C will receive 1 music session per week with caregivers.
- Group D will partake in an alternative activity (e.g., walking, puzzles) during the first instalment. All music resources will remain available to the care centre for 18 weeks after the study has been completed to allow members of Group D to take part in music sessions.

- Training will be provided to allow you to carry out the music programme successfully. These will be provided before the project starts, including the observation of a session in practice with Eva and me. A series of pre-programme interviews, questionnaires and assessments with both caregivers and residents will also be conducted before the project. The information gathered will be used to analyse the results of the programme

**Why have you been asked to take part?** You have been asked because my research directly concerns care setting residents and their caregivers. By taking part in this study, I will be able to explore the outcomes of the music programme, gathering the thoughts and opinions of both the caregivers and residents on the experience.

**Do you have to take part?** Participation is voluntary. Participants will be provided with a consent form to fill out and may keep this information sheet and a copy of their consent form. Participants reserve the right to withdraw from the study, even after initial consent has been given. Participants also reserve the right to request any identifying data be destroyed if they remove consent.

**Will your participation in the study be kept confidential/ Will due acknowledgement be given** I would like to give due acknowledgement and will attribute content to you unless you specify that you would prefer to participate anonymously. If this is the case, I will make every effort to ensure that no clues to your identity appear in the thesis. Any extracts from what you say that are quoted in the thesis will be anonymous. The same effort will be made for residents that are providing any information for the study.

**What will happen to the information which you give?** The data will be kept confidential for the duration of the study. On completion of the thesis, they will be retained for a further ten years and then destroyed.

**What will happen to the results?** The results will be presented in the thesis. They will be seen by my supervisor, a second marker and the external examiner. The thesis may be read by future students on the course. The study may be published in a research journal or presented in educational or research settings.

**What are the possible disadvantages of taking part & What if there's a problem?** I do not envisage any negative consequences for you in taking part. I will be happy to discuss with you how you found the experience, and you can pause or discontinue your participation at any time. You do not need to give a reason.

**Who has reviewed this study?** Approval must be given by the Department of Music and the UCC Social Research Ethics Committee before studies like this can take place.

**Any further queries?** If you need any further information, you can contact me by email: Fiona Kelly, 121315191@umail.ucc.ie

If you agree to take part in the study, please sign the consent form overleaf. You may choose the recognised name version if you do not mind your name appearing in the study, or the anonymous version if you would prefer to remain anonymous.

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## Consent Form: Anonymous Version

Sounds in Time: Effects of a Caregiver-led Music Programme on Cognitive Ability, Mobility and Quality of Life in a Residential Care Setting.

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

The purpose and nature of the study have been explained to me in writing.

I am participating voluntarily.

I understand that I can withdraw from the study, without repercussions, at any time, whether before it starts or while I am participating. I do not need to give a reason.

I understand that every effort will be undertaken to ensure anonymity will be ensured in the writing up and any other project outputs. Deductive disclosure of identity may still be possible despite these efforts.

If I give permission below, the information I provide may be included in the study and any subsequent publications or presentations:

Yes ☐ No ☐
Please tick one box

I understand that I can withdraw permission to use the data within two weeks of the interview, in which case the material will be deleted.

Signed.....
Date.....

University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

## Consent Form: Recognised Name Version

Sounds in Time: Effects of a Caregiver-led Music Programme on Cognitive Ability, Mobility and Quality of Life in a Residential Care Setting.

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

The purpose and nature of the study have been explained to me in writing.

I am participating voluntarily.

I understand that I can withdraw from the study, without repercussions, at any time, whether before it starts or while I am participating. I do not need to give a reason.

If I give permission below, the information I provide may be included in the study and any subsequent publications or presentations:

Yes ☐ No ☐
Please tick one box

I understand that due acknowledgement will be given in the final study and any subsequent publications or presentations for all material that represents my own intellectual property.

I understand that I can withdraw permission to use this material within two weeks of the interview, in which case the material will be deleted.

Signed.....

Date.....

University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

**Information Sheet for Post Programme Focus Group Interview**

Thank you for considering participating in this focus group. The purpose of this document is to explain to you what the work is about and what your participation would involve, to enable you to make an informed choice.

The purpose of this focus group is to examine the impacts of the Sounds in Time music programme within the residential care centre since the programme ceased. You have been asked to take part in the focus group to gather thoughts and opinions on the experience.

Participation in this study is completely voluntary. There is no obligation to participate, and should you choose to do so, you can refuse to answer specific questions or decide to withdraw from the focus group. Once the focus group has been concluded, you can choose to withdraw your contribution at any time in the subsequent two weeks after the conclusion of the focus group. However, as the transcript will be an amalgam of voices generated from the focus group audio file, it may not be possible to delete your data.

All the information you provide will be kept confidential and anonymous and will be available only to me, Fiona Kelly, and the supervisor, Dr Eva McMullan Glossop. Once the focus group is completed, the recording will be saved on a University College Cork supported cloud storage platform, Microsoft OneDrive. The data will then be transcribed by the researcher, and all identifying information will be removed. Once this is done, the audio-recording will also be deleted and only the anonymized transcript will remain, also stored on Microsoft OneDrive. The data will be stored for minimum of ten years. The information you provide may contribute to research publications and/or conference presentations, and to the student thesis.

We do not anticipate any negative outcomes from participating in this focus group. This study has obtained ethical approval from the UCC Social Research Ethics Committee.

If you have any queries about this research, you can contact me at 121315191@umail.ucc.ie, or supervisor Dr Eva McMullan at e.mcmullan@ucc.ie.

If you agree to take part, please sign the consent form overleaf.

University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

I, ……agree to participate in the focus group, as part of the Sounds in Time research study.

The purpose and nature of the study have been explained to me in writing.

I am participating voluntarily.

I give permission for my focus group with Fiona Kelly to be audio recorded.

I understand that I can withdraw permission to use my data within two weeks of the focus group, in which my material will be deleted from the transcript; however, for the reasons outlined above, I understand that this may not be possible. All audio files will be deleted after the transcript is complete.

I understand that data from fellow participants in the focus group will be retained.

I understand that anonymity will be ensured in the write-up by disguising my identity. I also undertake to maintain the confidentiality of the focus group.

I understand that disguised extracts from the focus group (e.g. my name / location won't be used) may be quoted in presentations and publications (e.g. article, book chapter, student thesis, social media publicity of the study's findings, etc.), if I give permission below (please tick one box):

**I agree to participate in this study** ☐

**I do not agree to participate in this study** ☐

Signed: …….

Date:…….

PRINT NAME: …….

**Appendix B: Health and Wellbeing Assessments**

**ELDERLY MOBILITY SCALE**

(This assessment is completed by a caregiver knowledgeable of the resident's abilities.)

Subject Code:_____ Date_____

TASK

| | | | | |
|---|---|---|---|---|
| Lying to Sitting | 2 Independent<br>1 Needs help of 1 person 0 Needs help of 2+ people | | | |
| Sitting to Lying | 2 Independent<br>1 Needs help of 1 person 0 Needs help of 2+ people | | | |
| Sitting to Standing | 3 Independent in under 3 seconds 2 Independent in over 3 seconds 1 Needs help of 1 person<br>0 Needs help of 2+ people | | | |
| Standing | 3 Stands without support and able to reach<br>2 Stands without support but needs support to reach<br>1 Stands but needs support<br>0 Stands only with physical support of another person | | | |
| Gait | 3 Independent (+ / - stick)<br>2 Independent with frame<br>1 Mobile with walking aid but erratic / unsafe<br><br>0 Needs physical help to walk or constant supervision | | | |
| Timed Walk (6 metres) | 3 Under 15 seconds<br>2 16 – 30 seconds<br>1 Over 30 seconds<br>0 Unable to cover 6 metres | | | |
| Functional Reach | 4 Over 20 cm.<br><br>2 10-20cm.<br>0 Under 10 cm. | | | |
| | **Scores** | /20 | /20 | /20 |

Scores under 10 – generally these patients are dependent in mobility manoeuvres; require help with basic ADL, such as transfers, toileting and dressing.

Scores between 10 – 13 – generally these patients are borderline in terms of safe mobility and independence in ADL i.e. they require some help with some mobility manoeuvres.

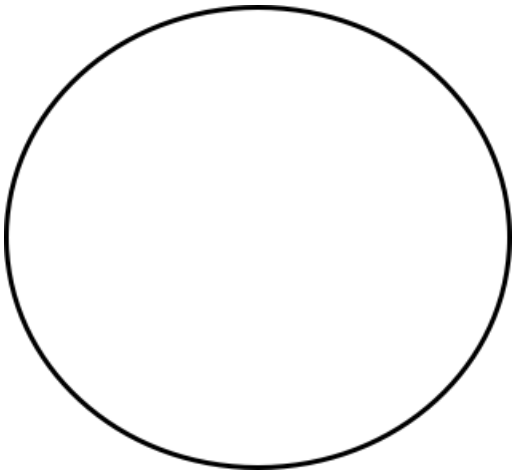
Scores over 14 – Generally these patients are able to perform mobility manoeuvres alone and safely and are independent in basic ADL.

## The MINI-COG

Subject Code:_____ Date:_____

**Instructions**

Inside the circle draw the hours of a clock as if a child would draw them Place the hands of the clock to represent the time “forty five minutes past ten o’ clock”



1. Instruct the patient to listen carefully and repeat the following ` APPLE WATCH PENNY

2. Administer the Clock Drawing Test

3. Ask the patient to repeat the three words given previously

_____ _____ _____

**Scoring**

1 point for each word repeated

Normal Clock Test: 2 points

Abnormal Clock Test: 0 Points

**Quality of Life Index**

**CASP** **Subject Code: _____**

**Date**

| | Often | Sometimes | Not Often | Never |
|---|---|---|---|---|
| My age prevents me from doing the things I would like to do (C1) | | | | |
| I feel that what happens to me is beyond my control (C2) | | | | |
| I feel left out of things (C3) | | | | |
| I can do the things I want to do (A1) | | | | |
| I feel that I can please myself what I do (A2) | | | | |
| A lack of money stops me from doing things I want to do (A3) | | | | |
| I look forward to each day (P1) | | | | |
| I feel that my life has meaning (P2) | | | | |
| I enjoy the things that I do (P3) | | | | |
| I feel full of energy these days (S1) | | | | |
| I feel that life is full of opportunities (S2) | | | | |
| I feel that the future looks good for me (S3) | | | | |

**Scoring**

0- Never

1- Not Often

2- Sometimes

3- Often

Negative scoring on C1, C2, C3, A3.

**Appendix C: Questionnaires**

These questionnaires were distributed/documented on Qualtrics, which is a university-approved survey tool.

## Caregiver Pre-Programme Questionnaire

Q1 How confident do you feel in facilitating music sessions for your residents?

- Confident
- Somewhat confident
- Not confident

Q2 What kind of training would best prepare you to lead music sessions?

_____

Q3 What specific skills or knowledge would you like to develop to feel more confident in facilitating music sessions?

_____

Q4 Any suggestions for songs, genres, musicians etc. that residents may enjoy.

_____

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# Caregiver Post-Programme Questionnaire

Q1 How confident do you now feel in facilitating music sessions for residents?

- ○ Less confident
- ○ Same level as before the programme
- ○ More confident

Q2 Was the demonstration session a helpful supplement to the training for the music programme?

_____
_

Q3 Do you feel as though the content of the music sessions was accessible to all participating residents and caregivers?

_____
_

Q4 Has facilitating music sessions allowed you to connect more with the residents?

_____
_

Q5 Any other comments or feedback on the music programme:

_____
_

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# Resident Pre-Programme Questionnaire

**(Caregiver-led Groups)**

Subject Code:

_____
_

Q1 Do you enjoy listening to music/what music do you enjoy?

_____
_

Q2 What do you hope to get out of doing the music activities?

_____
_

Q3 How often would you like to partake in musical activities?

_____
_

Q5 How is your relationship with your caregivers?

_____
_

Q6 Any additional Info:

_____
_

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# Resident Post-Programme Questionnaire

**(Caregiver-led Groups)**

Subject Code:

_____
_

Q1 What did you enjoy about receiving the music sessions with the caregivers?

_____
_

Q2 Do you feel more connected with the caregivers after the music programme?

_____
_

Q3 Do you feel as though it has improved your daily life?

_____
_

Q4 Was the weekly amount of music sessions adequate?

_____
_

Q5 Did you find the activities to be accessible to you?

_____
_

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University College Cork, Ireland

# Resident Pre-Programme Questionnaire

**(External musician-led Groups)**

Subject Code:

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Q1 Do you enjoy listening to music/what music do you enjoy?

_____
_

Q2 What do you hope to get out of doing the music activities?

_____
_

Q3 How often would you like to partake in musical activities?

_____
_

Q4 Any additional Info:

_____
_

Coláiste na hOllscoile Corcaigh
University College Cork, Ireland

# Resident Post-Programme Questionnaire

**(External musician-led Groups)**

Subject Code:

_____
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Q1 What did you enjoy about receiving music sessions with the music practitioners?

_____
_

Q2 Do you feel as though it has improved your daily life?

_____
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Q3 Was the weekly amount of music sessions adequate?

_____
_

Q4 Did you find the activities to be accessible to you?

_____
_

**Appendix D: Caregiver Session Observation Sheet**

## Caregiver Observations

Date:

| What elements did the residents enjoy the most during this session? | Did you observe any engagement/enjoyment/ability changes in this session? |
|---|---|

| Was there a ‘magic moment’ that stood out to you this week? |
|---|

## Appendix E: Focus Group Prompt Questions

1. What lasting impacts, if any, have you seen in the residential care centre after completing the music programme?
2. Are the resources and materials from the music programme still in use? If so, in what way?
3. If taking part in a music programme like this again, what, if any, changes would you make?
4. Did you observe any differences between how staff facilitate the music sessions and how the external musician facilitated?
5. Is there anything else you would like to add about the experience of the music programme?

## Resources

In the bag, you will find all of the instruments that you will need to carry out the music session. These include:

**Small Tambourines**

**Egg Shakers**

**Lollipop Sticks**
**(Each resident gets two to hit off each other)**

**Hand Drums**

**Big Tambourine**

**Agogo**

**Sleigh Bell**

**Triangle**

**Chime Bar**

**Maraca**

**Beaters**
**(Used to hit agogo, triangle and chime bar)**

**Sing Along Jar**

- **Bubble wands and bubble mixture**

## Caregiver-Led Music Session Schedule:

Wednesday: 11:30 am in (upstairs) Lounge (with group B and C)

Friday: 11:30 am in (upstairs) Lounge (with Group B only)

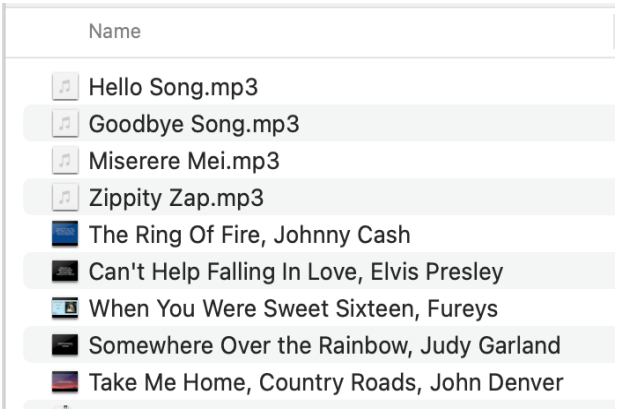
(Fiona is facilitating the music sessions on the ground floor with Group A, on Wednesdays and Fridays at 11 am).

## Computer Tips

- The cable to plug the laptop into the television is in the music bag. Plug this cable into the back of the television in a port labelled ‘HDMI’. Plug the other side of the cable into the laptop.

- Using the remote, select HDMI on the television settings. You should then be able to see the laptop screen displayed on the television

- The music you will need each week will be on the laptop in the files section. Each file is labelled with the title of the song.




## Tips for Bubbles:

- Lightly coat the blower bubble mixture to avoid excess or dripping. Blow the bubbles towards the residents, allowing them to look at and catch them.

- Please take care if any bubbles/bubble mixture lands on the floor as it may be slippery. The bubble mixture is fast drying, so will not remain slippery for long, but residents should remain seated while bubbles are being used.

## List of songs and musicians

Feel free to take note of these songs which will appear throughout the programme if you would like to get to know them.

- The Furey's: 'When you were sweet sixteen'
- Foster & Allen: 'Flying without Wings', 'Old Flames'
- Bing Crosby: 'Dream a Little Dream', 'Swinging on a Star'
- Bob Marley: 'Three Little Birds'
- Cliff Richard: 'Congratulations
- Dean Martin: 'That's Amore', 'You're Nobody 'til Someone Loves You'
- Doris Day: 'Que Sera Sera'
- Frank Sinatra: 'Fly Me to the Moon', 'New York', 'Something Stupid'
- Harry Belafonte: 'Jump in the Line'
- McGuire Sisters: 'Sugar in the Morning'
- Jim Reeves: 'He'll Have to Go'
- Joe Dolan: You're Such a Good-looking Woman'
- Johnny Cash: 'Ring of Fire', 'I Walk the Line'
- Julie Andrews: 'My Favourite Things'
- Nathan Carter: 'Wagon Wheel'
- Nolan Sisters: 'I'm in the Mood for Dancing', 'I'd Like to Teach the World to Sing'
- The Beatles: 'Here Comes the Sun', 'Yellow Submarine'
- The Dubliners: 'Grace', 'The Fields of Athenry', 'The Wild Rover'
- Tina Turner: 'What's Love Got to do with it'
- The Irish Rovers: 'Star of County Down'
- Julie Garland, 'Somewhere Over the Rainbow'

# Week 1

**Hello Song**
Play Hello Song to begin the session. Encourage residents to clap or sing along.

**Sing-Along Song**
Today's Song: "Zippity Zap'. Follow along the actions described in the song.

**Instrument Parade**
Introduce the instruments, pass them around. You can then try taking the tambourine away to see if residents can spot which one is missing.

Tambourine Agogo Sleigh Bells Triangle Chime Bar Maracas

**Music & Movement**
Today's song: 'Ring of Fire' by Johnny Cash
Today's instrument: Tambourine
Introduce the tambourine and pass them out. Once everyone has one and has tried it out, play the song.

**Sing-Along Jar**
Pick a song from the jar to listen or sing along to today.

**Music Mindfulness**
Today's song: 'Misère Mei'
Blow some bubbles during this activity.

**Goodbye Song**
Play the goodbye song to finish the session. Encourage clapping and singing along.

## Week 2

**Hello Song**
Play Hello Song to begin the session. Encourage residents to clap or sing along.

**Sing-Along Song**
Today's Song: "Zippity Zap'. Follow along the actions described in the song.

**Instrument Parade**
Introduce the instruments, pass them around. You could then try taking the agogo away to see if residents can spot which one is missing.

Tambourine

Agogo

Sleigh Bells

Triangle

Chime Bar

Maracas

**Music & Movement**
Today's song: 'Sugar in the Morning', by McGuire Sisters
Today's instrument: Egg Shakers
Introduce the egg shakers and pass them out. Once everyone has one and has tried it out, play the song.

**Sing-Along Jar**
Pick a song from the jar to listen or sing along to today.

**Music Mindfulness**
Today's song: 'Sonata for Two Pianos', by Mozart
Blow some bubbles during this activity.

**Goodbye Song**
Play the goodbye song to finish the session. Encourage clapping and singing along.

# Week 3

**Hello Song**
Play Hello Song to begin the session. Encourage residents to clap or sing along.

**Sing-Along Song**
Today's Song: "Zippity Zap'. Follow along the actions described in the song.

**Instrument Parade**
Introduce the instruments, pass them around. You could then try taking one away to see if residents can spot which one is missing.

Tambourine

Agogo

Sleigh Bells

Triangle

Chime Bar

Maracas

**Music & Movement**
Today's song: 'You're Such a Good-Looking Woman' by Joe Dolan
Today's instrument: Tambourines
Introduce the tambourines and pass them out. Once everyone has one and has tried it out, play the song.

**Sing-Along Jar**
Pick a song from the jar to listen or sing along to today.

**Music Mindfulness**
Today's song: 'Miserere Mei'
Blow some bubbles during this activity.

**Goodbye Song**
Play the goodbye song to finish the session. Encourage clapping and singing along.

## Week 4

**Hello Song**
Play Hello Song to begin the session. Encourage residents to clap or sing along.

**Sing-Along Song**
Today's Song: "Zippity Zap'. Follow along the actions described in the song.

**Instrument Parade**
Introduce the instruments, pass them around. You could then try taking one away to see if residents can spot which one is missing.

Tambourine

Agogo

Sleigh Bells

Triangle

Chime Bar

Maracas

**Music & Movement**
Today's song: 'Yellow Submarine' by The Beatles
Today's instrument: Lollipop sticks (Two for each person, tap together)
Introduce the sticks and pass them out. Once everyone has one and has tried it out, play the song.

**Sing-Along Jar**
Pick a song from the jar to listen or sing along to today.

**Music Mindfulness**
Today's song: 'Sonata for Two Pianos' by Mozart
Blow some bubbles during this activity.

**Goodbye Song**
Play the goodbye song to finish the session. Encourage clapping and singing along.

# Week 5

**Hello Song**
Play Hello Song to begin the session. Encourage residents to clap or sing along.

**Sing-Along Song**
Today's Song: "Hokey Pokey'. Follow along the actions described in the song.

**Instrument Parade**
Introduce the instruments, pass them around. You could then try taking the triangle away to see if residents can spot which one is missing.

Tambourine

Agogo

Sleigh Bells

Triangle

Chime Bar

Maracas

**Music & Movement**
Today's song: 'Blue Suede Shoes'
Today's instrument: Tambourines
Introduce the tambourines and pass them out. Once everyone has one and has tried it out, play the song.

**Sing-Along Jar**
Pick a song from the jar to listen or sing along to today.

**Music Mindfulness**
Today's song: 'Miserere Mei'
Blow some bubbles during this activity.

**Goodbye Song**
Play the goodbye song to finish the session. Encourage clapping and singing along.

# Week 6

**Hello Song**
Play Hello Song to begin the session. Encourage residents to clap or sing along.

**Sing-Along Song**
Today's Song: "Hokey Pokey'. Follow along the actions described in the song.

**Instrument Parade**
Introduce the instruments, pass them around. You could then try taking chime bar away to see if residents can spot which one is missing.

Tambourine

Agogo

Sleigh Bells

Triangle

Chime Bar

Maracas

**Music & Movement**
Today's song: 'Jump in the Line'
Today's instrument: Egg shakers
Introduce the egg shakers and pass them out. Once everyone has one and has tried it out, play the song.

**Sing-Along Jar**
Pick a song from the jar to listen or sing along to today.

**Music Mindfulness**
Today's song: 'Sonata for Two Pianos'
Blow some bubbles during this activity.

**Goodbye Song**
Play the goodbye song to finish the session. Encourage clapping and singing along.

# Week 7

**Hello Song**
Play Hello Song to begin the session. Encourage residents to clap or sing along.

**Sing-Along Song**
Today's Song: "The Hokey Pokey" Follow along the actions described in the song.

**Instrument Parade**
Introduce the instruments, pass them around. You could then try taking maracas away to see if residents can spot which one is missing.

Tambourine

Agogo

Sleigh Bells

Triangle

Chime Bar

Maracas

**Music & Movement**
Today's song: 'Jolene'
Today's instrument: Tambourines
Introduce the tambourines and pass them out. Once everyone has one and has tried it out, play the song.

**Sing-Along Jar**
Pick a song from the jar to listen or sing along to today.

**Music Mindfulness**
Today's song: 'Miserere Mei''
Blow some bubbles during this activity.

**Goodbye Song**
Play the goodbye song to finish the session. Encourage clapping and singing along.

# Week 8

**Hello Song**
Play Hello Song to begin the session. Encourage residents to clap or sing along.

**Sing-Along Song**
Today's Song: "The Hokey Pokey" Follow along the actions described in the song.

**Instrument Parade**
Introduce the instruments, pass them around. You could then try taking tambourine away to see if residents can spot which one is missing.

Tambourine

Agogo

Sleigh Bells

Triangle

Chime Bar

Maracas

**Music & Movement**
Today's song: 'Can't take my eyes off of you'
Today's instrument: Lollipop sticks
Introduce the sticks and pass them out. Once everyone has one and has tried it out, play the song.

**Sing-Along Jar**
Pick a song from the jar to listen or sing along to today.

**Music Mindfulness**
Today's song: 'Sonata for two pianos'
Blow some bubbles during this activity.

**Goodbye Song**
Play the goodbye song to finish the session. Encourage clapping and singing along.

## Week 9

**Hello Song**
Play Hello Song to begin the session. Encourage residents to clap or sing along.

**Sing-Along Song**
Today's Song: "The Hokey Pokey" Follow along the actions described in the song.

**Instrument Parade**
Introduce the instruments, pass them around. You could then try taking one away to see if residents can spot which one is missing.

Tambourine

Agogo

Sleigh Bells

Triangle

Chime Bar

Maracas

**Music & Movement**
Today's song: 'Wagon Wheel'
Today's instrument: Tambourines
Introduce the tambourines and pass them out. Once everyone has one and has tried it out, play the song.

**Sing-Along Jar**
Pick a song from the jar to listen or sing along to today.

**Music Mindfulness**
Today's song: 'Miserere Mei'
Blow some bubbles during this activity.

**Goodbye Song**
Play the goodbye song to finish the session. Encourage clapping and singing along.

# Week 10

**Hello Song**
Play Hello Song to begin the session. Encourage residents to clap or sing along.

**Sing-Along Song**
Today's Song: "The Hokey Pokey" Follow along the actions described in the song.

**Instrument Parade**
Introduce the instruments, pass them around. You could then try taking one away to see if residents can spot which one is missing.

Tambourine

Agogo

Sleigh Bells

Triangle

Chime Bar

Maracas

**Music & Movement**
Today's song: 'Sugar in the Morning'
Today's instrument: Egg Shakers
Introduce the egg shakers and pass them out. Once everyone has one and has tried it out, play the song.

**Sing-Along Jar**
Pick a song from the jar to listen or sing along to today.

**Music Mindfulness**
Today's song: 'Sonata for two pianos'
Blow some bubbles during this activity.

**Goodbye Song**
Play the goodbye song to finish the session. Encourage clapping and singing along.

# Week 11

**Hello Song**
Play Hello Song to begin the session. Encourage residents to clap or sing along.

**Sing-Along Song**
Today's Song: "The Hokey Pokey" Follow along the actions described in the song.

**Instrument Parade**
Introduce the instruments, pass them around. You could then try taking one away to see if residents can spot which one is missing.

Tambourine

Agogo

Sleigh Bells

Triangle

Chime Bar

Maracas

**Music & Movement**
Today's song: 'Ring of Fire'
Today's instrument: Tambourines
Introduce the tambourines and pass them out. Once everyone has one and has tried it out, play the song.

**Sing-Along Jar**
Pick a song from the jar to listen or sing along to today.

**Music Mindfulness**
Today's song: 'Miserere Mei'
Blow some bubbles during this activity.

**Goodbye Song**
Play the goodbye song to finish the session. Encourage clapping and singing along.

# Week 12

**Hello Song**
Play Hello Song to begin the session. Encourage residents to clap or sing along.

**Sing-Along Song**
Today's Song: "The Hokey Pokey" Follow along the actions described in the song.

**Instrument Parade**
Introduce the instruments, pass them around. You could then try taking one away to see if residents can spot which one is missing.

Tambourine

Agogo

Sleigh Bells

Triangle

Chime Bar

Maracas

**Music & Movement**
Today's song: 'Yellow Submarine'
Today's instrument: Lollipop sticks
Introduce the sticks and pass them out. Once everyone has one and has tried it out, play the song.

**Sing-Along Jar**
Pick a song from the jar to listen or sing along to today.

**Music Mindfulness**
Today's song: 'Sonata for two pianos'
Blow some bubbles during this activity.

**Goodbye Song**
Play the goodbye song to finish the session. Encourage clapping and singing along.

# Week 13

**Hello Song**
Play Hello Song to begin the session. Encourage residents to clap or sing along.

**Sing-Along Song**
Today's Song: Today's Song: "The Hokey Pokey" Follow along the actions described in the song.

**Instrument Parade**
Introduce the instruments, pass them around. You could then try taking one away to see if residents can spot which one is missing.

Tambourine

Agogo

Sleigh Bells

Triangle

Chime Bar

Maracas

**Music & Movement**
Today's song: 'Congratulations" Cliff Richard
Today's instrument: Tambourines
Introduce the tambourines and pass them out. Once everyone has one and has tried it out, play the song.

**Sing-Along Jar**
Pick a song from the jar to listen or sing along to today.

**Music Mindfulness**
Today's song: 'Miserere Mei'
Blow some bubbles during this activity.

**Goodbye Song**
Play the goodbye song to finish the session. Encourage clapping and singing along.

## Week 14

**Hello Song**
Play Hello Song to begin the session. Encourage residents to clap or sing along.

**Sing-Along Song**
Today's Song: Today's Song: "The Hokey Pokey" Follow along the actions described in the song.

**Instrument Parade**
Introduce the instruments, pass them around. You could then try taking one away to see if residents can spot which one is missing.

Tambourine

Agogo

Sleigh Bells

Triangle

Chime Bar

Maracas

**Music & Movement**
Today's song: 'Jump in the Line'
Today's instrument: Egg Shakers
Introduce the shakers and pass them out. Once everyone has one and has tried it out, play the song.

**Sing-Along Jar**
Pick a song from the jar to listen or sing along to today.

**Music Mindfulness**
Today's song: ''Sonata for two pianos''
Blow some bubbles during this activity.

**Goodbye Song**
Play the goodbye song to finish the session. Encourage clapping and singing along.

## Week 15

**Hello Song**
Play Hello Song to begin the session. Encourage residents to clap or sing along.

**Sing-Along Song**
Today's Song: "YMCA"
Encourage residents to sing along and try the actions.

**Instrument Parade**
Introduce the instruments, pass them around. You could then try taking one away to see if residents can spot which one is missing.

Tambourine

Agogo

Sleigh Bells

Triangle

Chime Bar

Maracas

**Music & Movement**
Today's song: 'Whiskey in the Jar'
Today's instrument: Tambourines
Introduce the tambourines and pass them out. Once everyone has one and has tried it out, play the song.

**Sing-Along Jar**
Pick a song from the jar to listen or sing along to today.

**Music Mindfulness**
Today's song: 'Miserere Mei''
Blow some bubbles during this activity.

**Goodbye Song**
Play the goodbye song to finish the session. Encourage clapping and singing along.

# Week 16

**Hello Song**
Play Hello Song to begin the session. Encourage residents to clap or sing along.

**Sing-Along Song**
Today's Song: "YMCA"
Encourage residents to sing along and try the actions.

**Instrument Parade**
Introduce the instruments, pass them around. You could then try taking one away to see if residents can spot which one is missing.

Tambourine

Agogo

Sleigh Bells

Triangle

Chime Bar

Maracas

**Music & Movement**
Today's song: ''Can't take my eyes off of you''
Today's instrument: Lollipop Sticks
Introduce the sticks and pass them out. Once everyone has one and has tried it out, play the song.

**Sing-Along Jar**
Pick a song from the jar to listen or sing along to today.

**Music Mindfulness**
Today's song: 'Sonata for two pianos'
Blow some bubbles during this activity.

**Goodbye Song**
Play the goodbye song to finish the session. Encourage clapping and singing along.

# Week 17

**Hello Song**
Play Hello Song to begin the session. Encourage residents to clap or sing along.

**Sing-Along Song**
Today's Song: "YMCA"
Encourage residents to sing along and try the actions.

**Instrument Parade**
Introduce the instruments, pass them around. You could then try taking one away to see if residents can spot which one is missing.

Tambourine

Agogo

Sleigh Bells

Triangle

Chime Bar

Maracas

**Music & Movement**
Today's song: 'It's Not Unusual' by Tom Jones
Today's instrument: Egg Shakers
Introduce the egg shakers and pass them out. Once everyone has one and has tried it out, play the song.

**Sing-Along Jar**
Pick a song from the jar to listen or sing along to today.

**Music Mindfulness**
Today's song: 'Miserere Mei'
Blow some bubbles during this activity.

**Goodbye Song**
Play the goodbye song to finish the session. Encourage clapping and singing along.

# Week 18

**Hello Song**
Play Hello Song to begin the session. Encourage residents to clap or sing along.

**Sing-Along Song**
Today's Song: "YMCA"
Encourage residents to sing along and try the actions.

**Instrument Parade**
Introduce the instruments, pass them around. You could then try taking one away to see if residents can spot which one is missing.

Tambourine

Agogo

Sleigh Bells

Triangle

Chime Bar

Maracas

**Music & Movement**
Today's song: 'You're Such a Good-Looking Woman' by Joe Dolan
Today's instrument: Tambourines
Introduce the tambourine and pass them out. Once everyone has one and has tried it out, play the song.

**Sing-Along Jar**
Pick a song from the jar to listen or sing along to today.

**Music Mindfulness**
Today's song: 'Sonata for two pianos''
Blow some bubbles during this activity.

**Goodbye Song**
Play the goodbye song to finish the session. Encourage clapping and singing along.

## Appendix G: Qualitative Data and Content Analysis Coding Samples

### Resident Pre-Programme Questionnaire Coding Sample

| Questions | Answers | Codes |
|---|---|---|
| What do you hope to get out of doing music activities? | Good for the brain, good mood, taking part, singing along<br>Fun, dancing, engage the brain<br>Happiness, forget yourself in the moment<br>Just enjoyment<br>I enjoy quite a lot, its community in hard times<br>Relax, sit back and enjoy<br>Listening along<br>Relaxing, and faster music<br>Feel good<br>Make me smile<br>Love to sing along, knows words of lots of songs<br>Getting to dance<br>Good for the mind, relaxes the mind<br>Relaxing, and dancing<br>Enjoyment, relaxing, music and dancing<br>Singing away, it's good for health<br>Learning, enjoyment<br>Enjoyment, smiling<br>Listening with soft ear, listening to lyrics and taking them in<br>sing along, tap her feet<br>happiness<br>loves getting up to dance<br>dancing, singing along<br>bit of enjoyment<br>Relaxed and Happy<br>very soothing<br>No dancing at the moment, but will listen away<br>Relaxes you, soothing, singing along<br>Relaxation<br>dancing and making her happy<br>Interactions, the social aspect<br>Love to join in and feel part of the activity<br>I like taking part sometimes<br>Relaxing | Blue: Relaxation<br>Red: Mood/Enjoyment<br>Green: Social interactions<br>Pink: Dancing/Moving<br>Yellow: Singing<br>Brown: Listening<br>Turquoise: Mind/brain health |

| | | |
|---|---|---|
| | **Makes me feel happy**<br>**Feel happy when I hear it** | |

| | | |
|---|---|---|
| How is your relationship with your caregivers? | Very good, happy to **chat away to them**<br>**Good communication**<br>Yes, being back home from England, it's a **good community**<br>**I try to,** I **chat away with them**, I love company<br>good, **chat away with them**<br>**I hope I do**<br>Get on very well, **they're helpful**<br>Very good, **they look after me, when upset they listen**<br>**Great for songs, reading books**, gets along with everyone<br>**Depends on my mood**<br>**I am new to here, hoping to get on okay,**<br>Nicest people, we get on well<br>Very good, lovely people<br>Get on okay<br>Great, I **can talk away with them**<br>All okay, **very demonstrative**, **communicate well**<br>**Good at moments**<br>I **enjoy talking to staff**, I am a talker<br>**Fine**<br>**Fine, not very interactive but get on fine** | **Blue: Communication**<br>**Green: Trying to build relationships**<br>**Purple: Helpful acts**<br>**Red: Depends/not always positive** |

**Caregiver Pre-Programme Questionnaire Coding Sample**

| Questions | Answers | Codes |
|---|---|---|
| What specific skills or knowledge would you like to develop to feel more confident in facilitating music sessions? | I would like to **learn more about songs** and music.<br>I would like to **know more songs** especially **residents' kind of music and choices**<br>Better understanding of dementia, help to better communication with residents<br>**Singing** but I'm fine with it<br>**How to play other music instruments** I cannot play<br>Learn more of the Irish music | **Green: Music familiarity**<br>**Blue: Musical skills**<br>**Purple: Confidence** |

| | | |
|---|---|---|
| | **Sing and dancing**<br>IT skills<br>**Grow more confidence with my voice**<br>Playing musical instruments and singing<br>**Being comfortable with the songs**, **knowing the words** and how best to encourage residents to participate<br>**Know more music** that is suitable | |
| What specific skills or knowledge would you like to develop to feel more confident in facilitating music sessions? | Music training<br>**Group training**<br>Gesture would perfectly fine<br>Music training with **a guide of a list Irish and other international music** that residents like.<br>More instruments that are easy for the residents to use<br>Activities<br>**Practice** with other staff first<br>**Session 1 can judge future sessions**<br>**On site training and small group sessions**<br>Voice lesson and song activities<br>**Observing the sessions initially** and then **delivering them**<br>**Practice with Fiona first**<br>**Hands on, practical** | **Red: Practical approach**<br>**Pink: Observational learning** |

**Resident Post-Programme Questionnaire Coding Sample**

| Question | Answers | Codes |
|---|---|---|
| What did you enjoy about receiving the music sessions? | Liked it all, **lively stuff** was nice | **Purple: Creative Expression**<br>**Grey: Reminiscence**<br>**Red: Recreation/ Engagement**<br>**Orange: Wellbeing**<br>**Green: Social Experiences** |
| | I enjoyed it, whole experience, nothing I didn't like, | |
| | enjoyed the music, **listening, instruments - learned a lot** | |
| | I enjoyed all of it, **lively part**s, "'Que sera **at Wembley" – they used to sing it before Man united matches** | |
| | Enjoyable, **instruments, agogo bells, classical** | |
| | I enjoyed it - **the instruments were nice, sing a long** | |

| | | |
|---|---|---|
| | I loved it - **my mother was a singer**, so the Irish songs are fantastic, | |
| | I enjoyed it, I love any kind of music, **sing along,** | |
| | I enjoyed the music, when I am in the form, especially | |
| | **The old songs come back to you** | |
| | I enjoyed all of it. **Instruments were favorite** and **singing**, **Mozart** | |
| | **Singing along**, **doing it with people** | |
| | I enjoyed the **instruments** | |
| | **Pass away the time**, **instruments,** | |
| | Enjoyed it all, although sometimes I fall asleep**, relaxing,** "**when you come in, happy, smiling and ready to go, it rubs off on us**" | |
| | **Using the senses**, nothing extra but I love it | |

**Resident Post-Programme Questionnaire Coding Sample (caregiver-led groups)**

| Question | Answers | Codes |
|---|---|---|
| Do you feel more connected with the caregivers after the music programme? | **Not really** | **Green: Positive Impact**<br>**Orange: Unsure/It depends**<br>**Red: Little/No impact** |
| | **When you're with them during the day, you just get to know people, if it's done in the right way** | |
| | **Yes - all lovely** | |
| | **Yes- good interaction with them** | |
| | **I think it did** | |
| | **Not particularly - I sing all the time, alone, with people** | |
| | **I think so- you know the staff, but it helps gel us together** | |
| | **We all sing together, when I can, I love it as a group, as a child played the instruments, in a band,** | |
| | **It is, brings them together** | |
| | **Yes –- it's inclusive** | |

**Caregiver Post-Programme Questionnaire Coding Sample**

| Question | Answers | Codes |
|---|---|---|
| Was the demonstration session a helpful supplement to the training for the music programme? | Yes, very helpful | **Blue: Practical and Convenient Application**<br>**Purple: Social Connections**<br>**Red: Challenges** |
| | Some what | |
| | Yes, and **requires a few demonstrations and prompting** | |
| | Yes, **I do better with being shown what can be done and then practicing** | |
| | Yes | |
| | Yes, it was | |
| | | |
| Has facilitating music sessions allowed you to connect with the residents? | Yes, with many I feel it has | |
| | Some what | |
| | Yes, **great interactions** | |
| | Yes, **it helps start off conversations and is an easier way to engage and see positive results** | |
| | I would say the same | |
| | Yes | |
| | | |
| Any other comments or feedback on the music programme? | Really valuable experience for both staff and residents | |
| | **Some residents found it a bit juvenile** | |
| | Some residents enjoyed the engagement, and **more residents did not enjoy the experience. Some unwell and declined to be involved at times.** | |
| | The sessions were great. **It's easy to grab the instruments bag now and start off a session at any stage. I've learnt that Country Roads appeals to all residents.** | |
| | It was a nice program to participate in | |
| | It was the best built my confidence and **gave me lot of ideas how to encourage residents to engage.** | |

**Caregiver Observations Coding Sample**

| Questions | Answers | Codes |
|---|---|---|
| **(Week 1)** | | **Purple: Initial Reactions: Curiosity, uncertainty, dislikes** |
| What elements did the residents enjoy the most during this session? | Chat, engagement in the discussion around music programme, impressed we were joining with UCC. Were we going to get certificates? Are there exams? **What was in the bags, boxes? Sense of excitement and interest.** | |
| Did you observe any engagement/enjoyment/ability changes in this session? | Sense of surprise and wonderment repeated questions. **Bubbles not a hit, messy, wet, brushing off clothes, floor slippery. Unsure about musical instruments in expressions and their need to use them.** | |
| Was there a 'magic moment' that stood out to you this week? | Response to music, especially upbeat music, smiling, tapping of feet, body movement for some residents. **Some residents were negative had reservations and declined to engage in the process. Discussed turning negatives into positives for the music programme, keeping open mind**. Discussed music choices, as per pre plan session opened interest in reminiscence | |
| **(Week 2)** | | |
| What elements did the residents enjoy the most during this session? | **Residents more open and engaging during these sessions. Developing interest in musical instruments, but not enjoyed by all residents Residents said Hello and Goodbye song were childlike.** | **Blue: Interest Development: Openness, progression** |
| Did you observe any engagement/enjoyment/ability changes in this session? | **Residents more open for chat on music choices** and appear to enjoy the staff involvement in clapping and singing along to the music. We could hear some residents singing along to the song. | |

| | | |
|---|---|---|
| Was there a 'magic moment' that stood out to you this week? | Music, **especially classic pieces I think residents are beginning to experience the rhythm, of the classical pieces.**<br>**Bubbles appeared to be tolerated, and some residents are afraid of bubbles.** Further discussions, no experienced of bubbles in the past, appeared annoyed and nervous of the bubbles. | |
| **(Week 3)** | | |
| What elements did the residents enjoy the most during this session? | **Residents are beginning to enjoy the process and are more engaging in their feedback.**<br>**They are enjoying Instruments and music from discussion and feedback.**<br>**Small group can't or won't engage in music and continue to be a little negative.** | |
| Did you observe any engagement/enjoyment/ability changes in this session? | **Enjoying bubbles not as daunting re sense of feeling of bubbles and appear as snowflakes on clothes.** Residents can brush them off skin and clothes. | |
| Was there a 'magic moment' that stood out to you this week? | Their smiles and response to rhythm of music. **Follow on chat smiles and interaction in clapping and song they remember from the past.** | **Red: Reminiscence: Music related, personal, positive/negative** |
| **(Week 14)** | | |
| What elements did the residents enjoy the most during this session? | Song and actions of Sing- Along YMCA **residents and staff joining in as they enter the room. Catchy song appears to receive upbeat energy in the room.** | **Green: Active Engagement: Less prompting, 'automatic'** |
| Did you observe any engagement/enjoyment/ability changes in this session? | Energy, laughing, chatting, **memories of going to cinema unable to articulate film etc.**<br>**Automatic clapping for few residents.** | |

| | | |
|---|---|---|
| Was there a 'magic moment' that stood out to you this week? | **Egg Shakers received a good response, putting more energy into shaking different coloured eggs** and **one resident thought it was a real egg which opened reminiscing chat on collecting eggs as a child after the session. One of residents mentioned after session they had Gramophone and records and every weekend neighbours would call in for to listen to music as few could afford their own records. Not everyone had a radio.** | |

**Follow-up Focus Group Coding Sample**

| Prompt Question | Answers | Codes |
|---|---|---|
| If taking part in a music programme like this again, what, if any, changes would you make? | Participant 1: I like the small group, **because I had to adapt it for people with dementia,** so the smaller group worked best. But because they had dementia, **I included parts of Sonas,** so we had a lot of tactile stuff like the moisturiser, the diffuser for different scent around the room. You have a starting tune thing, so what I did with that was incorporate the Sonas, make sure each person is greeted individually, and at the end it was making sure I went around and thanked them individually as well for coming. And they loved that as well because the structure and routine again, was absolutely perfect, it really was. It just meant that they knew what was coming next. And you as a person knew what was coming next, as a staff member, because I know sometimes, when I was doing activities, Id totally get into something, and it could go on for ages, and we'd have to watch our time, we really would. So having structure is really good and I think it would benefit staff who are afraid to | **Red: Adaption of activity content**<br><br>**Purple: Amalgamation of existing programmes** |

| | | |
|---|---|---|
| | get involved and engage in some sort of activity. This at least they know they can see… oh, okay 20 minutes, that's not going to kill me, it starts this. Especially because a lot of people wouldn't have confidence, I think, in doing these things. So having it laid out like that, you know, even I found it easy and I've was doing things like that for a long time. I really thought it was good. It's just adapting the music and stuff again, because I found the same with the instruments, they would work on some days, but only with ones who would like the quieter ones. So it was something like, almost sounded like rainfall when you moved it. But then if you shook it too hard it was like, the maracas, it was too much. So, it depended as well on the music we were playing and how they would kind of move with the instruments. One person shaking like the tambourine, but another person might be just very gentle and soothing. I found actually there is a huge difference with different people: I found that classical music worked with some, didn't work for others. The upbeat music again worked for some. It's like ourselves, it depends on the day, it depends on who we are. So, I liked the flexibility of having the two programmes together so that they could be flexible.<br><br>IWER: Yes, merge them and switch things.<br><br>Participant 1: Yeah, even though there's structure and a time frame, it was still done in such a way that it could be flexible, you know? | |

| | | |
|---|---|---|
| | IWER: I like that as well, for the greeting and the finishing up: the going around to everyone and concluding it.<br><br>Participant 1: Exactly, so they knew there was a start and they knew there was an end. It was kind of I suppose a few years ago, [staff member name] would use the hokey pokey to end activities. And they were comfortable with that, so I thought yeah, we won't do the hokey pokey, but we'll go around. And I think they really like that, it's like thanks for coming, thanks for showing up, and it just make them leave with a bit of a smile.<br><br>Participant 2: Have you any observations, because I know you're under pressure?<br><br>Participant 3: No, definitely the start and the end, maybe rather than having to click a button every time changing something, **if it ran with more of a flow, rather than stopping and being like okay, now we put on something else.**<br><br>IWER: The clicking out and clicking in? [of songs]<br><br>Participant 3: Yeah, so leave everything flowing, rather than stopping and starting. But yeah, no it was a nice programme.<br><br>Participant 2: Of course, we had an awful lot of learning, you know, setting it up, and doing that<br><br>IWER: The logistics? | **Green: Considerations of new technology** |

| | | |
|---|---|---|
| | Participant 4: And the different windows having to be open<br><br>Participant 2**: And our IT issues as well at the start, it took us ages you know to get the right thing and put it on the screen** and so there was a real learning in that as well. **So you need to develop an app or something!** [laughs]<br><br>Participant 5: **You know what didn't work? The lollipop sticks.**<br><br>IWER: Oh yes.<br><br>Participant 5: I just thought of it there, they just didn't work. So that's something if it's going into another nursing home. Just did not work. They didn't like it, what was it for, they couldn't hear anything from it. | **Blue: Resource challenges/ adaption** |