THE DEVELOPMENT OF A DESIGN AND CONSTRUCTION PROCESS PROTOCOL TO SUPPORT OCCUPATIONAL THERAPISTS IN DELIVERING EFFECTIVE HOME MODIFICATIONS

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Abstract

Occupational therapists are experts in analysing the transaction between the person and the home environment and they use design and construction methods to redress any imbalance caused by the ageing process or disability. This skill is recognised by many, including governments, who utilise the expertise of occupational therapists to deliver housing modification programmes. However, the role of the occupational therapist within housing modifications services has been criticised. It is claimed that therapists' professional practice is disorganised and not founded on theoretical principles and concepts underpinning the profession. This thesis explores the development of, and a proof of concept for, a design and construction process protocol for home modifications, which seeks to address the issues highlighted above.

Using a multi-method research design, the study involved three distinct phases. The first phase involved an on-line survey which was completed by 135 occupational therapists practising in the field of home modifications in the UK. Through a series of open and closed questions, the existing home modification process used by occupational therapists was explored. The second phase comprised a directed content analysis of the qualitative data generated from the online survey. Using the Occupational Therapy Intervention Process Model (Fisher, 2009) and the Design and Construction Process Protocol (Cooper et al., 2008) as the theoretical frameworks, the Home Modification Process Protocol was developed. To identify the benefits of using the Home Modification Process Protocol in occupational therapy practice, the final phase of the study used a single holistic case study design to test the concept of using the protocol in practice.

The results of the first phase revealed that existing home modification processes used by occupational therapists throughout the UK lack the theoretical framework that underpins their professional practice, which is evident in other areas of clinical practice. The second part of the study revealed that a 4 phase, 9 sub-phase design and construction process protocol for home modifications could be developed using an inductive and deductive approach to the thematic analysis of the qualitative data, collected during the first phase of the study. The final phase revealed that as a concept, the Home Modification Process Protocol improved participants'

understanding of their intervention as a design and construction process and importantly, it provided a theoretical framework for them to understand and articulate their practice as occupational therapists.

Overall, the study found that the Home Modification Process Protocol potentially provides occupational therapists working in this area / field with a design and construction process to guide their professional practice. As the Protocol is underpinned by a combined occupational therapy and design and construction theoretical framework, it also has the potential to offer other professionals involved in modifying home environments a more systematic and effective approach to designing and delivering services for older and disabled people in their own homes.

Chapter 1 Why study the home modification process?

1.1 Introduction

This chapter introduces the motivation and literature underpinning the rationale for this study. To do this, the chapter has been divided into a number of sections. Following an account of the personal motivation for conducting this research, there is a description of occupational therapy, followed by a definition of what comprises a home modification. The middle sections of the chapter consider why a home might need to be modified and the role of both legislation and occupational therapists in this process. The next section of the chapter provides an overview of the present issues with the process used by occupational therapists when modifying the home environment. The final part of the chapter introduces the aim and objectives of the study and gives an overview of the thesis structure.

1.2 Motivation

My interest in the built environment started over twenty years ago when I began a professional career in occupational therapy. Through professional practice, I observed the health and well-being benefits experienced by older and disabled people from having the built aspects of their home modified to enable them to continue to do the activities of daily living they wanted, needed, or had to do. Wanting to increase my knowledge and understanding of the technical aspects of designing and constructing home modifications, I completed an MSc in Accessibility and Inclusive Design in 2011 at the University of Salford, and it was during this course that I was introduced to the theoretical concepts of the design and construction process for the first time.

The aim of the design and construction process is to provide a sustainable approach to the design and construction of the built environment, which can be achieved in a number of ways. For example, by identifying what information is needed at each phase of the design and construction process, the project manager of a building scheme ensures that information flows readily through the various phases of the project, avoiding time and financial resources being

wasted waiting for information. The process also identifies the key tasks that need to be performed at each phase, thus ensuring those working on a project understand what they should be doing and when they should be doing it, again improving the flow of the work, saving time and resources which are wasted when projects are delayed through poor project management. Finally, central to the design and construction process is the desire by those involved in the project to develop a 'product' which when built, will meet the needs of those who will be using and occupying the building. In theory, this systematic approach to the design and construction process avoids the unnecessary waste of financial and material resources, and lessens the negative impact on society of poorly designed or constructed building projects.

As both an occupational therapist and Master's student, I began to consider whether occupational therapists could benefit from using the theories underpinning the design and construction process, and so I undertook a small-scale study that examined how occupational therapists identify the design needs of people requiring home modifications. As part of the research design, I considered the process used by occupational therapists in their role of providing home modifications. Findings, from this small scale study, showed that the process was difficult to negotiate for the therapists and they also questioned whether it was the most effective way to conduct professional practice. The literature appeared to support this and pointed to the financial waste and personal harm caused by an ineffective home modification process. Therefore, it seemed logical to consider if the theories underpinning the design and construction process could be applied to the context of professional practice by occupational therapists involved in the provision of home modifications.

In 2011, I was awarded a scholarship from the Engineering and Physical Sciences Research Council (EPSRC) to investigate the above concept further. Initially, the research aim was to consider how occupational therapists could use Building Information Modelling (BIM) to support professional practice and the process of designing home modifications. However, as with most postgraduate research projects, the aim was modified following the initial data gathering and analysis, which identified that occupational therapists were not basing their home modification process on the concepts underpinning the profession core values and skills, and this was therefore the appropriate place to start the investigation.

1.3 What is Occupational Therapy?

The term 'occupation' is not to be confused with factors related to employment. Occupations are the everyday activities humans either need, want, or have to perform (Creek, 2003; Ainsworth and Desleigh de Jonge, 2011). The World Federation of Occupational Therapists' (WFOT, 2012) description of Occupational Therapy provides a useful definition for this study because it recognises the role of the environment, including the built environment, in enabling people to do the things they want and need to do.

> '… Occupational therapy is a client-centred health profession concerned with promoting health and wellbeing through occupation. The primary goal of occupational therapy is to enable people to participate in the activities of everyday life. Occupational therapists achieve this outcome by working with people and communities to enhance their ability to engage in the occupations they want to, need to, or are expected to do, or by modifying the occupation or the environment to better support their occupational engagement (World Federation of Occupational Therapy, 2012).

Further, this definition recognises that health and well-being goes beyond the mere absence of disease and it closely aligns with that of the World Health Organisation (WHO) where health and well-being are measured through a person's ability to perform and participate in the everyday tasks that are part of being an active member of society (WHO, 2001). The definition from WHO (2001) also describes how disability is the consequence of not being able to participate in some element of that society (Thomas, 2004). This supports the social model of disability whereby society creates barriers, including architectural barriers (Hall and Imrie, 2004) causing a person to become disabled. Therefore, in this thesis the phrase 'health' is used with reference to a person's ability to perform and participate in activities of daily living and not the absence of disease.

Occupational therapists work in a variety of health and social care settings, providing a range of interventions. The purpose of these interventions is to improve health and well-being through maintaining, restoring, or improving a person's ability to both participate in, and perform occupations (Creek, 2003; Fisher, 2009). In England, the skills of occupational therapists in 'problem solving, enablement, prevention and environmental adaptations' (Riley, 2008 p11) are being used to help health and social care departments deliver their legislative responsibilities for the assessment and provision of care needs of older and disabled people as

directed by the Care Act (2014). In 2008, 1220 occupational therapists worked in adult social care in England and whilst they only constituted 2% of the workforce, they 'dealt with approximately 35% of referrals' (Riley, 2008, p.6).

1.4 What is a home modification?

In everyday practice, occupational therapists in the UK predominately use the phrase 'home adaptation' or 'housing adaptations' to describe what the academic literature refers to as a home modification. Bridges (2010) argues that the phrase 'modification' is better suited to what occupational therapists do in practice because what they do 'is associated with the process of change and correction [which is] time limited' (Bridges, 2010, p.410). However, the phrase 'adaptation' can be associated with the way in which a person gradually alters either their home environment or the way they do the task in response to changes in their own capabilities.

Sanford (2012) and Seinfeld & Maisel (2012) from the field of built environment and Stark (2003) and Bridges (2010) from the field of occupational therapy agree that the purpose of a home modification is to increase the safety, security, and independence of a person who is having difficulty carrying out everyday activities of daily living. However, as occupational therapy values activities that people want, need, and have to do, Stark (2003) and Bridges (2010) further extend the purpose of a home modification to include activities that have both meaning and purpose to the individual.

Whilst there is general agreement as to the purpose of a home modification, there is debate in the literature as to what constitutes a home modification because in occupational therapy the scope of a home modification tends to be broad. For example, Table 1 is taken from Stark's (2003) description of a home modification which lists three types of environmental modification. The first type of modification is physical alteration to the home environment, including structural changes and the provision of equipment. The second type of modification involves modifying the method the person uses to complete an activity in the environment. The third and final type of modification involves the provision of support from another person.

Types of environmental modification to the home	Description
Changes to the physical environment	• Modify the layout (remove a door to make the opening wider) • Provide adaptive equipment • Architectural modification (provide a ramp, bathroom modifications)
Modification of the occupation	• Education about how to use the environment in a different way • Use of everyday items to achieve a goal
Support from people	• Caregiver education (proper transfer techniques, how to use a lift) • Engage social service (home delivery of a meal)

Table 1 Types of home modification (Stark, 2003)

Literature pertaining to the built environment has a narrower definition of a home modification. Interventions are limited to reconfiguration of the layout of the physical environment, the arrangement of fixtures and fittings, and installation of specialist designed products (Sanford, 2012). Given the scope of this PhD study, the occupational therapy specific definition of home modification is too broad, however the Sanford (2012) definition does not focus on the meaning of the activity, so, for the purpose of this study, a home modification is defined as:

An intervention, using knowledge from both occupational therapy and the built environment, which seeks to:

• Maintain, restore and improve an older or disabled person's ability to do the everyday tasks they want, need, or have to perform, and in a way they want or need to perform the task;

• Support the delivery of health and social care in order for an older or disabled person to remain living in their home.

Furthermore, a home modification uses design and construction principles to improve the accessibility and usability of the home environment by providing a permanent or semi-permanent alteration to the physical aspects of the home environment, which could include:

- Changes to the structural features and changes to the layout of the home environment;
- Installation and positioning of fixtures, fittings and specialist products.

1.5 Why do homes in the UK need to be modified?

Both the process of ageing and the design of housing are complex as both are multifactorial in nature and include aspects beyond the impact that biological changes and chronic illness may have on a person's ability to perform activities of daily living in their homes as they age (McIntyne, 2013). This complexity is demonstrated by Sixsmith et al. (2014) who listed the following factors influencing the experience of ageing in the home environment. Firstly, how a person's perceives their general health; secondly, economic factors that influence a person's access to financial and material resources to maintain the home environment; thirdly, a person's access to family and community support. Finally, the individual's psychological resilience, including their perception of how they are managing at home as well as how the person values how others in society perceive they are managing living in their home and as part of a wider community. Thus, whilst the focus of this PhD study is on how the physical aspects of the home environment can be modified to support ageing, it is important to recognise that this does not occur in isolation of all the other factors that contribute to the experience of ageing.

Keeping people in mainstream housing as they age, or experience ill-health has been identified by the current UK Government as a key policy strategy, recognising that keeping people in their own homes provides a more sustainable approach to managing the social and economic demands of an increasing ageing population, when compared to other more costly forms of health and social care provision, such as hospital or residential care (House of Lords Select Committee on Public Service and Demographic Change, 2013).

In an attempt to get mainstream housing developers to consider the design needs of older and disabled people in new build projects, the UK government launched the Housing Our Ageing

Population: Panel for Innovation (HAPPI) initiative. HAPPI has begun to outline the economic incentives of building attractive mainstream homes for people to live in as they age. It is also providing designers with ideas on how to achieve mainstream homes that accommodate the needs of people as they age or experience disability (Homes and Community Agency, 2009 and 2012). HAPPI (2009) has also identified the range of housing options for older and disabled people and this is illustrated in Figure 1. The illustration differentiates between the three different types of housing - mainstream housing, specialist housing and care homes. Under each of these three categories are further subdivisions. It is a useful diagram because it helps professionals and non-professionals to identify the range of different housing options that exist in the UK. It also shows the relationship and connection of the housing options.

mainstream housing	specialised housing	care homes
Individual homes to buy or rent – not designated for any specific user group though Lifrtime Homes includes age-friendly features and wheelchair housing is specially designed. Personal care, support, other services and amenities available within the community.	Groups of homes (usually flats) to buy or rent – designated for older people (typically 55+). Personal care and support usually arranged or provided within the development together with shared facilities and activities.	Residential care rather than independent living.

mainstream housing: adapted home, general needs, wheelchair home, Lifetime home

specialised housing: very sheltered, extra care, sheltered retirement, retirement village, cohousing, close care

care homes: dementia care home, nursing home, residential care home, hospice, hospital

Planning: current use class C3 'dwelling houses'

Planning: currently classified as C2 or C3 - would a new class or classes be useful?

Planning: current use class C2 'residential institution'

Figure 1 Illustration of housing options available to older and disabled people (HAPPI, 2009)

Whilst initiatives such as HAPPI have the potential to reduce the future health and social care costs of an ageing population by supporting people to live at home for longer, the literature from those who advocate on behalf of older and disabled people indicates that the majority of

older and disabled people will continue to live in homes not designed to meet their needs. For instance, Care and Repair England (2016a), who advocate on the housing needs of older people, claimed that only 4% of older people currently live in a home specifically designed with features in place to support ageing. Care and Repair also suggest that the majority of older people currently live in homes that create barriers to independence and safety.

In 2012, The Papworth Trust, a charity supporting older and disabled people, undertook a survey to investigate the impact of poorly designed homes on these demographic groups. The survey, which involved 640 people, found that two fifths of the respondents were unable to perform simple activities of daily living due to the design of their home environment. Again, home modifications were identified as an important approach to removing the design barriers identified by participants. Similarly, Age Concern, the UK's largest charity advocating for the rights of older people, published a report in 2014 into housing in later life. This report (Age Concern, 2014) recommended the continued support by government of modifications provided through the health and social care system.

Whilst the literature from research by organisations, such as Age Concern and Care and Repair England, highlight the personal and societal impact of poorly designed mainstream housing, they do not fully examine the cost benefits of modifying the home environment. Attempting to demonstrate the cost benefits to society of providing home modifications is difficult to achieve (Bligh et al., 2016). Bligh et al. (2016) in a scoping review of the evidence base around housing and its contribution to health and social care outcomes, identified three issues related to any attempt to evaluate the cost benefits of suitable housing. Firstly, there is no agreed definition on what should be measured. Secondly, many of the cost benefits associated with having suitable housing, for example the concepts associated with well-being, are difficult to measure and thus to calculate. Thirdly, there is a lack of relevant data currently being collected. For example, whilst it is acknowledged that 'economic evaluations in social care should always value the cost of unpaid care associated with the services or intervention under evaluation' (Bligh et al., 2016 p7) it appears that this data is rarely collected. Despite the difficulties, a small number of other studies have attempted to consider the cost implications of poor housing and design and the cost benefits to society of home modifications.

Lansley et al. (2004) used a novel research design in their study to estimate whether the costs of modifying the home environment and providing assisted technology would be recouped through the savings made to health and social care costs. They selected 82 properties and estimated the cost benefits of installing home modifications and assistive technology for seven types of people with a range of disabilities. They compared these costs to those associated with providing health and social care to the seven person types over the remaining estimated life expectancy of those person types. They identified that the modifications were more costly to provide to the properties that were more difficult to alter, for example, where space was limited. The cost of the modifications was also dependent on the level of mobility impairment, being more expensive for the person types where the person needed to use mobility equipment. Despite the cost of the modification, Lansley et al. (2004) concluded that the savings made from reducing social and health care costs meant that the cost of installing the modification could be recouped within the life expectancy of the seven person types chosen for the study.

Heywood and Turner (2007) attempted to calculate the health and social care cost benefits of modifying the homes of older and disabled people by comparing the cost of installing a home modification with the cost of care. Using this model, they estimated a £6000 home modification could prevent one person from having to move into residential care, potentially saving a local authority £400,000 over a ten year period.

More recently, the Building Research Establishment (BRE) Group (2014) has attempted to estimate the cost of poor housing conditions and housing design to the National Health Service (NHS). To do this, BRE used hazards identified in the Housing Health and Safety Rating Scale (Office of the Deputy Prime Minister, 2004) which is guidance published by the English government identifying the factors associated with risks to health and safety in the home environment. BRE (2014) estimated that in 2011, the NHS spent between £1.4 and £2.4 billion treating people because of hazards caused by poor housing design; the top five hazards being excessive cold, falls on stairs, falls on the level, falls between levels and fire. They also attempted to estimate the cost benefits to the NHS of spending money to remove hazards in the home and although the report (BRE, 2014) did not provide specific detail of what

interventions were used for this calculation, home modifications such as grab rails were mentioned as one of the methods for removing hazards in the home. Taking falls in the bath as an example, they estimated it would cost the NHS, in 2011, approximately £51 million to bring those homes with this hazard up to standard, but only 3.2 years before this intervention would pay for itself.

1.6 The legislative context for the provision of home modifications in England

Due to the perceived social and health care benefits of modifying the home, the assessment for and provision of home modifications has been part of health and social care legislation in England for a number of decades (Picking, 2006). In the 1970s, for example, the Chronically Sick and Disabled Person's Act (1970) (CSDP Act) made it a statutory duty for a local authority to help a person who was identified as disabled to arrange or carry out home modifications 'designed to secure [their] greater safety, comfort or convenience' (CSDP Act, 1970, p.2).

In April 2015, the CSDP Act was repealed and replaced by the Care Act. The Care Act (2014), like the CSDP, is concerned with the health and well-being of older and disabled people (Department of Health, 2014). However, unlike the CSDP, the Care Act does not state the types of services a local authority should provide. However, because the guidance accompanying the acts identifies 'suitability of living accommodation' and modifying poorly designed homes as a way of promoting health and well-being, and preventing needs from developing, it is anticipated that home modifications will continue to be an important service provided by social services departments (Care and Repair England, 2016b).

A further piece of legislation that has shaped the provision of home modifications in England has been the Housing Grants, Construction, and Regeneration Act (1996). This legislation makes it a statutory duty for the local authority, through the housing department, to provide Disabled Facilities Grants (DFGs). The purpose of the DFG is to support a person with impairments to remain in their own home by removing the physical barriers that are preventing access to essential facilities. The Act identifies specific ways DFG monies / funding can be used to modify the home environment, ranging from 'facilitating access by the disabled occupant to and from the dwelling...' to 'facilitating the preparation and cooking of food by the disabled occupant' (Housing Grants, Construction, and Regeneration Act, 1996, p.13). Central

government currently invests £157 million in Disabled Facilities Grant funding, yet it suggests that the need for the DFG is potentially much higher than the government currently invests (Department of Communities and Local Government DCLG, 2011). The authors of the report estimate, based on data from the English Housing Condition Survey, if those individuals who are theoretically eligible to apply for a home modification did so, then based on 2005 costs, the government would need to invest £1.9 billion to fund the DFG (DCLG, 2011).

In the previous paragraph, the legislative context for the provision of home modifications was discussed. When awarding a Disabled Facilities Grant, the housing authority must assess 'the relevant works necessary and appropriate to meet the needs of the disabled occupant' (Section 24, Housing Grants, Construction and Regeneration Act, 1996). In other words, the housing authority has to ensure any alterations to the home environment will improve the health and well-being of the person, including improvements in their independence and safety. As housing professionals are not deemed to have the necessary knowledge and skills to determine what is necessary and appropriate for the disabled occupant, the legislation stipulates that the housing authority must consult with the local welfare authority who are expected to have the necessary skills and knowledge. The legislation is not specific as to 'who' in the welfare authority is responsible for assessing what is necessary and appropriate, but the role has traditionally been undertaken by occupational therapy practitioners because they 'are generally seen as the professionals with most relevant skills and knowledge to fulfil this duty' (Grisbrooke and Saffron Scott, 2009). Chapter 2 and Chapter 3 will examine in detail why the theories, knowledge, and skills relevant to their profession means that occupational therapists are best placed to assess and recommend what modifications to the home environment are necessary and appropriate.

1.7 Why investigate an alternative to the current home modification process?

A number of empirical studies have reported on the health and well-being benefits of home modifications as an intervention for supporting older and disabled people to remain in their own homes, and evidence shows that home modification, as defined in this thesis, improves the health and well-being of older people. Examples include Stark et al. (2009) who demonstrated an increased participation in activities of daily living following installation of

home modifications; whilst Hwang et al. (2011) observed an improved sense of well-being in older people who were able to remain in their own home because of the installation of the home modification. Johansson et al. (2013) argue that the reason these interventions are successful is due to the use of theories underpinning the practice of occupational therapists, which is discussed in Chapter 2.

However, a number of studies have begun to raise concerns about the process used by occupational therapists when modifying the homes of older and disabled people. For example, Heywood's (2001) study on the effectiveness of money spent on home modifications in England provides a number of quotes from the researchers' field notes to highlight issues with the home modification process. In the following quote, the researcher highlights the gratitude shown by the respondent for the provision of the modification, but there then follows a description of the problems that have occurred due to the way the shower has been designed. The issue appears to be the size of the shower area which is too small for the person to be able to sit whilst washing her hair. Heywood (2001) suggests the need to sit to shower had been identified by the participant in the early stages of the design process, but despite this, the design flaw still arose due to the occupational therapist not specifying that the person would need a seat and the space to sit on it. Although the modification was intended to improve the person's independence, the quote suggests she is now at risk of falling.

> "[Respondent] is very grateful to have [the shower] but there are problems because it is not big enough. There is not enough room for the seat under the shower as respondent doesn't want to wash her hair when she has a shower (has a hairdresser who comes for that). Result is, although was meant to be able to sit, has to stand. Has to go very gingerly so as not to fall, and has to catch hold of the rail they've put in, but gets tangled up in the curtains. Has to be very, very, careful when turning because of poor balance." (Heywood, 2001, p.24).

Similarly, studies by Klein et al. (1999) and Fange & Iwarsson (2005), both involving an evaluation of a home modification programme in the USA and Sweden respectively, found participants having difficulties using the modification provided and it had not improved the accessibility of the home environment. Again, in these two studies, the authors allude to issues with the design process used by therapists, particularly in respect to tailoring the design of the modification to the person's capabilities:

'…these results indicate that some of the adaptations undertaken were not specifically tailored to the person's functional capacity, and thus the reduction of environmental barriers was not reflected in improved accessibility' (Fange & Iwarsson, 2005, p.55).

In another a small scale study, Sapey (1995) investigated the satisfaction levels of people provided with a home modification. Surprisingly, the findings suggested the majority of the participants being dissatisfied with the modification. In the thematic analysis of the data, Sapey identifies the cause of the dissatisfaction as being the occupational therapist not involving the person in the design and construction process. Similarly, in a study by Nocon and Pleace (1997) people's satisfaction with the modification process was also considered. Whilst their findings contradicted Sapey's study, indicating the majority of respondents were satisfied with the modification, where a respondent did complain about the process, not feeling part of the decision making process was again cited as the cause of the dissatisfaction. In the same study, an occupational therapist justified excluding the person from the process due to the complexity involved in the modification process.

Questions have also been raised about the complexity of the home modification process in health and social care programmes. Adams (1996) and Pynoos et al. (1998) suggest that the process is complex because of the number of agencies and professionals involved. Pynoos et al. (1998, p.4) supports this argument by using the analogy of a 'patchwork of services', which are relatively 'unplanned and uncoordinated' in nature. The document entitled 'Delivering Housing Adaptations for Disabled People: A Good Practice Guide' (DCLG, 2006) aims to provide guidance on how home modification services should be delivered in England. In the chapter on how modification services should be designed and managed, the guidance identifies 12 different professional groups and organisational representatives who should be stakeholders in delivering the housing adaptation service. Whilst not all of these individuals will be involved in the design and construction of a home modification for a specific individual, it does indicate the potential complexity of delivering home modifications within health and social care.

Pynoos et al. (1998) suggest people's experience of the process, and satisfaction with the home modification, would improve if professionals had a greater understanding of their role. There is a question as to whether occupational therapists fully understand their role in the design and construction process. For example, Picking and Pain (2003) raised concerns about

the lack of guidance for occupational therapists regarding their role in supporting people during the modification process. This issue is further exacerbated by a lack of design and construction knowledge (Pynoos, 1998) and according to Milikan (2012) this leads to occupational therapists making the assumption that the modification process is simple.

Professional tension, communication problems and disagreement over modification design can arise from the assumptions occupational therapists make about what is technically feasible when modifying the built environment (Cowell et al., 2007). In study by Klein et al. (1999) the manager of a home modification programme illustrates the tensions that arise from the assumptions made by the occupational therapists. The assumption has led to confusion and frustration between the professionals involved.

> 'The occupational therapist often believes that, if they can imagine it, construction staff can make it happen. This assumption can lead to confusion and frustration between the therapist and the construction manager' (Klein et al., 1999, p.25).

In the design and construction industry, a number of influential government reports in the 1990s highlighted similar issues to those described in this section of the chapter. The industry was criticised for poor building design, and wasting financial and material resources. One prominent report, Rethinking Construction (Egan, 1998), identified fragmented services, poor co-ordination, and the lack of a coherent design and construction process as the cause of these issues. The design and construction industry, supported by the UK government, responded to the criticism by investing in research from which a number of design and construction processes have been developed. The two main processes, namely the Generic Design and Construction Process Protocol (Cooper et al., 1998) and the Royal Institute of British Architects Plan of Work (RIBA, 2013) are discussed in detail in Chapter 2. The purpose of these processes is to provide a framework for initially capturing, then maintaining the values and requirements of users of the building throughout the process of design and construction. The framework also ensures the project does not progress until all essential information for the next phase is acquired and communicated to those involved in that element of the process (Kagioglou et al., 2000; RIBA, 2013). Overall, this response to the criticism of government by design and construction academics and professionals has helped them to make visible their practice thus enabling them to improve the overall delivery of design and construction projects.

Similarly, the occupational therapy profession has a number of generic process frameworks (Creek, 2003; Fisher, 2009; Roger, 2010). As with the design and construction industry, these processes help practitioners structure the evaluation, diagnosis, treatment, and re-evaluation phases of therapy. However, the occupational therapy process is generic and applied to the full range of interventions provided by the profession and does not make visible the process required for a specific type of intervention. Chapter 3 demonstrates that there is little evidence to show that the profession has made visible what practitioners need to do at the various phases involved in the process of modifying the home environment. This should be a concern for the profession, as practitioners have an ethical and professional requirement and duty to make visible their practice. By making their practice visible, practitioners can demonstrate that the interventions they provide are effective and the person receiving the intervention is able to understand and consent to all aspects of the treatment they are receiving (Health and Care Professions Council, 2013; College of Occupational Therapists, 2015). The profession now has to be able to articulate to those who are in the position of purchasing health and social care for local populations, as well as to those individuals who looking for ways to address their own health and social care needs, what occupational therapy can offer over other professions who provide similar interventions (Atwal & Caldwell, 2003; Wilding, 2010). By making the practice visible it supports the profession to be able to do this.

1.8 Summary of the context for this research

The previous sections of the chapter provided the contextual reasons for the research presented in this thesis. The personal motivation was briefly discussed, before using the literature that explored the other contextual reasons for this research. In defining and identifying the purpose of a home modification, a link between occupational therapy and the design and construction industry was established. Current government policy is encouraging the design and construction industry to build new mainstream housing that supports people to age in place and to reduce the architectural barriers that previous design standards have caused disabled people. Despite this policy, the majority of older and disabled people live in homes that are not designed to meet their needs. Whilst there can be significant health and social care costs to the way homes have previously been designed and constructed, current policy in England also recognises the social and economic benefits of enabling older and

disabled people to remain in their own home. Current legislation supports people to remain in their own home by making it a statutory obligation for the assessment and provision of services to enable older or disabled people to remain in their own home. Home modifications are one such service provided. Home modification is a traditional area of practice for occupational therapists and their acknowledged assessment and practice skills have been used by adult health and social care departments and local authority housing departments to help them in the process of delivering home modifications.

Despite the perceived positive role of the occupational therapist in this field of practice, evidence exists to suggest that the current process used by practitioners is not delivering the services older and disabled people want, and there is a suggestion that this is leading to the installation of home modifications that fail to meet the person's needs. When faced with similar criticism, the design and construction industry conducted research to develop processes that made visible their practice and this has helped to improve the way building projects are delivered. Whilst occupational therapy has long had a generic process to guide the delivery of effective interventions, it appears that little research has been conducted to make visible the process involved in home modifications practice.

1.9 Research Aim and Objectives

The aim of this research is to develop an occupational therapy design and construction process for modifying home environments. Embedded in this aim are the following objectives:

- To identify the factors that influence the current process used by occupational therapists when modifying the home environments of older and disabled people.
- To appraise the existing design and construction processes used by occupational therapists to determine the reasons for, and importance of developing a new process model to improve professional practice.
- To develop an occupational therapy, design and construction process protocol specifically for home modifications.
- To test the proposed protocol in practice, and to critically evaluate the potential for the new process protocol to improve professional practice within the context of home modification.

1.10 Structure of the thesis

Dunleavy (2003) has challenged the way the traditional thesis has been structured in terms of a literature review, methodology, research design, findings and conclusions, arguing it should reflect instead the research process undertaken. With regards to this study, the thesis is divided into eight chapters that reflect the research process as follows:

Chapter 2

There is no one overarching theory to explain why and how modifying the home environment improves the ability of older and disabled people to perform activities of daily living. Thus, the purpose of this chapter is to examine the theoretical concepts from environmental gerontology, occupation therapy, and the built environment and how it explains the improvements home modifications make to the health and well-being of older and disabled people. This chapter also introduces the Generic Design and Construction Process Protocol (Cooper et al., 1998) and explains how this framework has improved the design and construction of buildings.

Chapter 3

Little is known about the real-world practice and the process used by occupational therapists when planning effective home modifications. What is known of this practice, and process, is examined through the literature in this chapter and the negative impact this is having on the health and well-being of older and disabled people through the design and construction of home modifications. By examining this literature, the argument for developing the home modification process protocol is made.

Chapter 4

The methodological chapter has been structured using the methodological framework known as the 'Research Onion' (Saunders, 2012). This framework introduces the researcher's worldview position on the generation of knowledge and evidence. The framework is then used to describe the multi-method approach taken to achieve the aim and objectives of the study,

which involved three phases, a survey, development of a home modification process protocol, and case study to examine the use of the protocol.

Chapter 5

Chapter 5 presents the findings and discussion from phase 1 of the study, the survey. This survey involved an on-line questionnaire, which was completed by 135 occupational therapists in the UK. The findings and discussion have been presented in the same chapter to provide the reader with a coherent understanding of the outcome of this phase of the study.

Chapter 6

Chapter 6 presents the findings and discussion from phase 2 of this PhD study. This second phase involved an iterative approach that led to the development of the Home Modification Process Protocol. Each of the four steps required to develop the protocol is discussed separately. Again the findings and discussion of phase 2 have been presented in the same chapter to provide the reader with a coherent understanding of the outcome of this second phase of the study.

Chapter 7

Chapter 7 presents the findings and discussion from phase 3 of the study. It describes the scholarship of practice that was developed to examine the use of the Home Modification Process Protocol with four members of an occupational therapy team based in a local authority housing department. The findings are discussed from the perspective of the participant and from the perspective of the researcher.

Chapter 8

Based on the aim and objectives, the final chapter begins by presenting the main conclusions of the research. After discussing the main conclusions, the contribution to knowledge the study has made to theory, methodology, and practice are identified and discussed. The challenges and limitations experienced during the research process are also stated. Finally, the opportunities for future research are presented.

Chapter 2 Theory of home modifications

2.1 Introduction

The home environment is complex, since it involves a combination of the physical, social, and psychological environment (Peace et al., 2007). Currently, there is no one overarching theory to explain why and how modifying the home environment improves the ability of older and disabled people to perform activities of daily living. Instead, the theoretical basis for interventions involving home modifications has been strongly influenced by theories developed from within environmental gerontology. Given the complexity of environment as a concept, the theory development in environmental gerontology has been interdisciplinary in nature drawing upon knowledge from psychology, geography, anthropology, sociology, architecture, engineering, and health studies. Specifically, within the field of health studies, occupational therapy has been recognised (Golant, 2003) as a significant contributor of theoretical models to explain the observations made when a person performs activities within the environment, and the factors to consider when designing an effective home modification.

This chapter explores the key theories, which, when taken as a whole, explain why and how home modifications improve the ability of older and disabled people to perform activities of daily living. The discussion starts with architecture, and how studies influenced by theories developed from the 'environmental press' model have explained the contribution the built environment has on a person's behaviour as they age. This then leads into congruence models of ageing which offer an understanding of the built environment as a resource to support ageing. These models have evolved to include people with physical, sensory and cognitive impairments who are disabled by aspects of the built environment. Finally, from the field of occupational therapy, a number of Person Environment Occupation (PEO) models are considered. These models explain how observation of a person's performance of an activity of daily living can help to identify the cause of a person's difficulty interacting with the built environment. Furthermore, these models can be used to explain the aspects of the built environment requiring modification in order to improve performance.

2.2 The influence of the built environment on ageing

Environmental gerontology has been significantly influenced by the seminal work of Lawton and Nehemow (1973). The underlying assumptions of Lawton and Nehemow are based on the ecology of ageing where it is argued that it is not possible to study and understand a person's behaviour as they age without considering the reciprocal relationship between the person and the environment. Lawton and Nehemow describe ageing as a process of 'continual adaptation' (1973, p.621) where both the person and environment change over time as a response to one another in that the environment influences the way an older person performs activities of daily living, and conversely the person can alter the environment to influence how they perform these everyday activities.

The Environmental Press Model developed by Lawton and Nehemow (1973) explains behaviour as we age as being a response to the 'press' exerted by the environment on the person (Scheidt & Windley, 2006). Lawton (1974) described the environment as having five layers; namely the physical, personal, small group, supra personal, mega – social. Although, during his research, Lawton (1999) tended to look at each layer as separate variables, he also recognised the need to consider the transaction between the various layers' influence and the effect they have on one another (Wahl & Lang, 2003). This concept of transaction was developed further by occupational therapist theorists. For example, Law et al. (1996) used a Venn diagram (illustrated later in this chapter to explain how the performance of an occupation occurs in the area where person, the environment, and occupation factors transact. Thus, the theory of Law et al. (1996) explains how a person's ability to perform an activity is because of the transaction between the person, environment, and the occupation.

The Environmental Press Model (Lawton & Nehemow, 1973) is illustrated in Figure 2 and it provides a visual representation of the effect of the environment on behaviour and the level of satisfaction as the person ages. The X axis in Figure 2 represents 'environmental press' which relates to the physical, sensory, and cognitive demands the built environment exerts on the individual. Weak press, therefore, indicates an environment which places little demand on the physical, sensory, and cognitive abilities of the person, whereas strong press indicates a built

environment that place significant demands on the person's physical, sensory, and cognitive abilities.
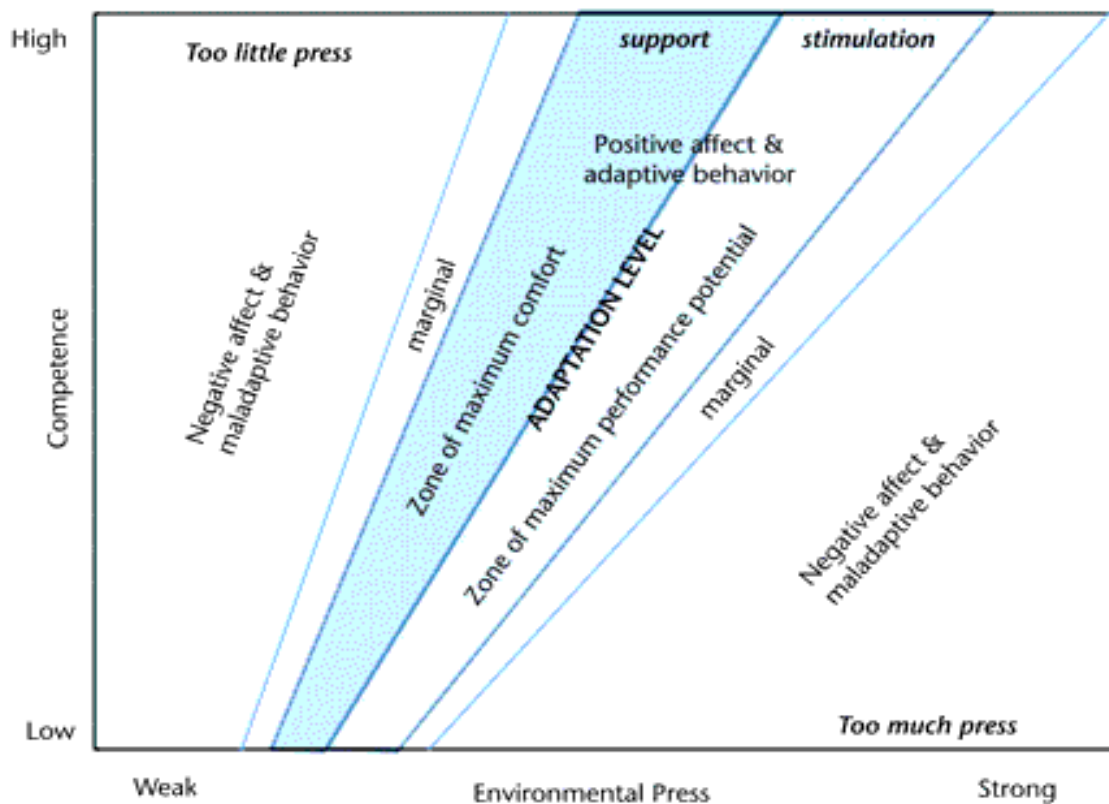
Figure 2 Environmental Press Model (Lawton and Nehemow, 1973).

The Y axis represents the person's competence. Although an emotive word, competence in the Environmental Press Model refers to the person's behavioural competencies and the external resources they have available to them, for example the home environment, social support, or financial resources. Moore et al. (2003), in examining the work of Lawton and Nehemow (1973), suggest behavioural competence is formed of both biological health and functional health. Lawton and Nehemow (1973) define 'functional health' as the person's ability to carry out activities of daily living. As with the layers of the environment, to understand a person's competence, the transaction between the different types of behavioural competencies should be considered (Lawton & Nehemow, 1973). Again, this concept of transaction in respect to the nature of competence was developed further by occupational therapist theorists (Rigby & Letts, 2003).

The Environmental Press Model shown in Figure 2 also shows a series of zones. The *Zone of Maximum Comfort* (shaded blue) represents the situation where a person feels supported by the environment and is said to be comfortable. This is the person's subjective, or affective, evaluation of the environment. The *Zone of Maximum Performance Potential* represents the area where a person will be objectively observed to competently perform activities of daily living. This zone is described as providing the person with the appropriate level of stimulation and challenge. The two *Marginal Zones* indicate the situation where a person may begin to express that they feel unsupported by their environment, or where an observer may begin to note that the person is having difficulties performing routine activities of daily living. There are two broad reasons why people experience these marginal zones. One reason arises when changes to environmental press occur, perhaps either through the person moving to a different home environment, or if changes are made to the person's existing home environment. This change to the environment may increase the environmental press or conversely the change may not provide enough challenge or stimulation. The second reason is when the person's level of competence changes relative to the demands of the environment. For example, a person may experience subtle changes to their physical, sensory, or cognitive capabilities making the use of a familiar aspect of the home environment more difficult. Finally, the two *Zones of Negative Affect and Maladaptive Behaviour* indicate a situation where the environmental press or the person's competence becomes so great that the person experiences significant emotional and psychological distress or they are unable to perform activities they need to do in order to live safely or independently.

Environmental Docility is the main hypothesis developed from this Environmental Press Model. This hypothesis describes how the demands of the environment negatively or positively affect behaviour (behaviour here refers to the ability to carry out activities of daily living) and the person's perceived level of satisfaction (Lawton, 1985). The hypothesis surmises that an environment with too little press may have negative consequences on mood and behaviour for a person with relatively high levels of competence. Conversely, an environment with too high a level of press may have negative consequences on the mood and behaviour for a person with lower levels of competence.

When applied to the context of the home, the Environmental Press Model and Environmental Docility hypothesis provide an explanation as to why people's performance in everyday activities and their level of satisfaction declines as their motor, sensory, and cognitive capabilities decline with the ageing process. It also explains how the design of the home environment can create a barrier, or be a facilitator, to independence in activities of daily living.

Whilst environmental-press theory explains the interaction between the person and their environment as they age, it does not take account of the natural adaptations a person makes to their environment as their capabilities decline with age. As Cvitkovich and Wister (2001) have suggested, environmental press tends to focus on the person being a passive participant in their environment and the theory fails to explore the phenomenon of the person actively modifying their environment to accommodate the changes that naturally occur with ageing. Within environmental gerontology, congruence theories have developed to address this gap.

2.3 Why and how the built environment can be used to influence 'fit' between the person and the environment as they age or experience disability

Congruence models use the concept of 'fit' to understand the reciprocal influence the environment and person have on one another (Peace & Wahl, 2007) and they help to explain how older people can use resources in the environment to reduce any 'misfit' that there may be. Congruence models are useful because they begin to explain how modifying the built environment can be a resource to restore the fit between the person who may be experiencing physical changes through the ageing process, and the home (Lawton, 1980: Lawrence & Low, 1990).

Two congruence theoretical models have influenced theory development in environmental gerontology; namely the Congruence Model of Person Environment-Interaction (Kahana, 1982) and the Complementary / Congruence Model of Well-being or Mental Health for Community Elderly Residents (Carp & Carp, 1984). In a critique of these two congruence models, Wahl and Lang (2003) suggest the main difference between these two is the types of resources identified

in the environment that the person uses to improve the fit between themselves and the environment.

To overcome issues with congruence, the Congruence Model of Person Environment-Interaction assumes the most effective way a person can re-establish fit is by using the resources from the social environment (Kahana, 1982). The model also recognises the degree of fit a person perceives is influenced by their evaluation of the significance of the need being affected, for instance if the person does not value the activity as important then they will not perceive the lack of fit to be significant. Conversely, if the activity is valued as important to the person then they will perceive a greater degree of misfit between themselves and the environment (Kahana, 1982; Cvitkovich & Wister, 2001).

Carp and Carp (1984) take an alternative view of the environment by placing emphasis on the influence of the physical and environmental resources available to provide the person with support. The model also categorises needs as either 'lower order or life maintenance needs' or 'high order needs' (Carp & Carp, 1984). Lower order needs are concerned with the competent performance of, and satisfaction with, activities of daily living. According to Carp and Carp (1984) satisfactory performance of lower order needs is required for basic survival in the environment. Schia and Willis (1999) associate higher order needs with well-being, and specifically preferences related to where the person wants to live, and how connected the person feels with their environment. 'Person-Environment fit' occurs when the environment supports the person's performance with, and satisfaction of, activities of daily living associated with lower and higher order needs. Where a lack of congruence occurs between the demands of the environment and the needs of the person, then the model assumes the use of resources in the physical environment will support the person to adapt to the demands they are experiencing (Carp & Carp, 1984).

Since both environmental press models and congruence models are concerned with explaining the influence the environment has on an older person as they experience the sensory, cognitive and motor changes of the ageing process, Scheidt and Norris-Baker (2003) argue that these theories can be applied to other 'vulnerable populations' (p.36). By vulnerable populations, Scheidt and Norris-Baker are referring to any person who has sensory, cognitive,

or motor impairment. In an earlier example, the Enabling-Disabling Process model developed by Brandt and Pope (1997) demonstrate how the environmental gerontology models discussed so far have been applied to other vulnerable populations. This model is also useful as it specifically identifies why and how the built environment influences functional well-being in the home environment. As a way of explanation, in Figure 3 the home environment is represented by rectangular boxes. Box (a) represents the person living at home and there is the appropriate level of fit between the person and the environment. However, changes to the person's sensory, cognitive, and motor abilities results in their needs (functional health) becoming greater than the available environmental support and this is illustrated by box (b) which shows a misfit between the person and the environment. Boxes (c) and (d) represent the two ways in which resources within the environment can be used to re-establish a fit between the person and their environment. One method to improve the person's health is through functional restoration, as illustrated in box (c), where the environment remains the same as box (a); instead the person is changed to fit into the environment. In this situation, a better fit between the environment and person is achieved by providing interventions to improve the person's ability to perform activities of daily living, for example rehabilitation. Box (d) demonstrates the other method of improving functional health, which is done by modifying the environment to re-establish a fit. In this situation, the person's functional needs have not changed, instead, the environment box has changed in size to support the person's needs. Lawton (1974) uses the phrase 'environmental prosthetic' to describe the enabling process of modifying the environment to support functional health.
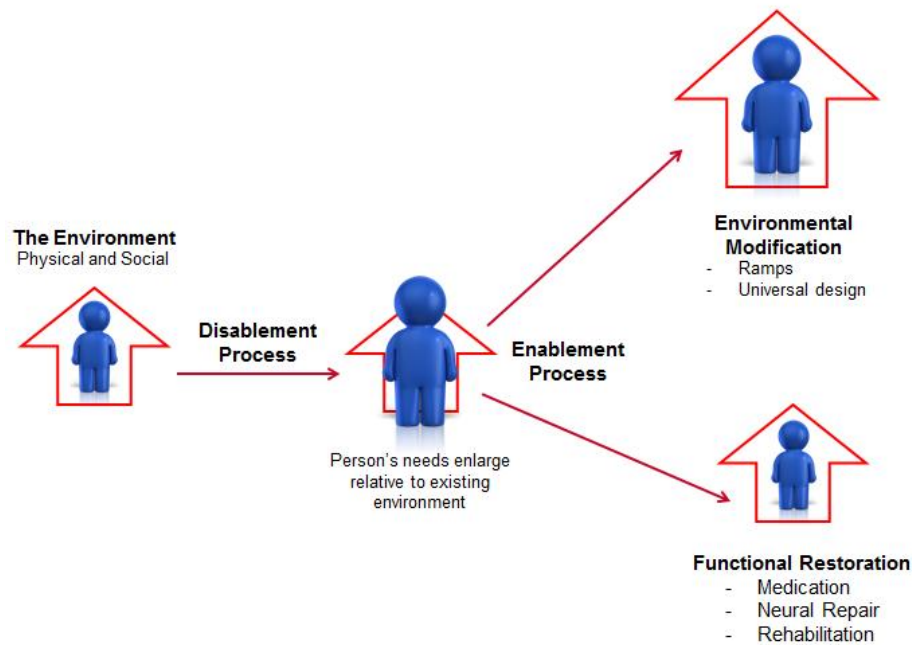
Figure 3 Enabling Disabling Process Model (Brandt & Pope, 1997).

Using the environmental press and the congruence models, a number of studies have explained how the demands of, and resources in, the environment influence the subjective and objective experience of the ageing or disablement process, and how these resources can improve functional health and restore a person's sense of well-being. For example, Sixsmith et al. (2014), through in-depth interviews with 190 older people, identified that it was the 'physicality and spatiality' of the home environment that supported older people to live purposeful and meaningful lives such that the design of the built environment assisted or hindered older people to perform the activities they wanted and needed to do. These findings from Sixsmith et al. (2014) align with a study by Stark (2001). In the study by Stark, 326 people aged between 16 and 80 completed a questionnaire to examine how the design of the home influenced their performance in activities of daily living. From the analysis of the data, Stark concluded the architectural features in the home were important in supporting people to perform everyday activities and that they can be used as a resource to improve functional health.

Studies by Iwarsson (2005) and Iwarsson et al. (2009) used congruence models to explain how a person's competence, combined with the design of the environment, influences a person's

ability to perform everyday activities. The study by Iwarsson (2005) interviewed 72 older people and Iwarsson concluded that the lack of congruence between the person's physical, sensory and cognitive capabilities combined with physical barriers in the environment resulted in the person having difficulty in effectively performing activities of daily living. A later study by Iwarsson et al. (2009) concluded that understanding the fit between the person and their environment was a better predictor of falls than an environmental checklist (designed to identify architectural barriers associated with falls) alone. This conclusion was based on a study involving 834 people where the methodology included a researcher conducting an objective evaluation of the home environment and the participants completing a self-reported functional health questionnaire. The findings from these two studies (Iwarsson, 2005; Iwarsson et al., 2009) clearly show that it is important to understand how the person interacts with their environment in order to design and implement effective interventions in the home.

Similarly, a systematic review by Wahl et al. (2009) investigated the link between the design of the built environment and people's ability to perform everyday activities, investigating the influence of the built environment on people's experience of ageing and disability. Whilst Wahl et al. (2009) reported difficulties in analysing the data, due to the lack of methodological description in the papers they reviewed, the authors tentatively concluded an association between the interaction of the person in their environment and their ability to perform everyday activities.

Werngren-Elgstrom et al. (2009) used the Environmental Press Model (Lawton & Nehemow, 1973) to explain findings from a longitudinal study involving 133 participants. Participants completed an evaluation at the start of the study comprising of an objective measurement of the person's functional health and a subjective evaluation of their sense of well-being. After a ten year period, participants were followed up. Comparing pre and post evaluations, Werngren-Elgstrom et al. (2009) concluded that although functional health had declined, the person's sense of well-being had not. The Environmental Press Model (Lawton & Nehemow, 1973) suggests it is possible for a person to be observed objectively to have difficulties with their performance of everyday tasks but this does not necessarily influence the person's own experience of their sense of well-being.

Further, by reducing the environmental press or improving the fit between the person and their home environment, a number of studies have found that home modifications contribute to people living longer in their own homes. For example, a study by Hwang et al. (2013) used both objective and subjective evaluation of people living in their home environments. 376 older people were included in the study and all participants were from one geographical location in England. To identify the variables influencing a person remaining in their own home for longer, a multiple regression analysis of the data was undertaken. This analysis identified 'home modifications and housing type as the most important variables contributing to the length of residence. Those who had home modifications done and did not live in a multifamily home had lived longer at the current housing' (Hwang et al., 2013, p.53). This research supports the premise that the built environment, through modifying the architectural features of the home, can improve the fit between the person and the environment thereby enabling them to remain in their own home for longer.

Despite the empirical evidence supporting the value of the environmental press and congruence models on our understanding of how the built environment influences functional health and a person's sense of well-being, Golant (2003) identifies a conceptual gap in these models by arguing that those models:

> '…fail to incorporate adequately two areas of inquiry that promise to explain and predict more effectively appropriateness of the settings occupied and used by their older occupants. These include (a) the conceptualisation of the temporal properties of environments and individuals and (b) the conceptualisation of environmental behaviours or activities describing how individuals use, manipulate or perform tasks in their settings' (Golant, 2003, p.638).

Thus, the models discussed so far in this chapter are only able to provide part of the explanation as to how the interaction of the person in their environment influences their experience of the process involved in ageing or disability. The models do not provide the necessary theoretical concepts to understand or examine the importance of the everyday tasks an older or disabled person does, nor do these models provide the concepts to understand, or examine, the observations made when a person performs an activity in their home environment. Environmental gerontology therefore turned to the field of occupational therapy to seek the link which Golant (2003) recommends.

2.4 Examining the temporal and contextual factors of the home environment and their influence on functional health and sense of well-being

Occupational therapy theoretical models provide theoretical concepts to understand the temporal and contextual factors important in the everyday activities an older or disabled person does. Pierce (2000) explains this is because as a concept:

> '…occupations are a subjective event in perceived temporal, spatial, and social cultural conditions that are unique to that one time occurrence. Although an occupation can be observed, interpretation of the meaning or emotional content of an occupation by anyone other than the person experiencing it is necessarily inexact' (Pierce, 2000, p.139).

Occupational therapy models also provide the concepts to help examine and understand the phenomena of what is observed when a person performs an activity in the home environment and these models have been given the generic label of Person Environment Occupation (PEO) Models (Rigby & Letts, 2003). This section of the chapter provides a brief overview of the three most well-known PEO models.

2.4.1 Person Environment Occupation Model (Law, 1996)

Stewart and Law (2003) suggest that the Person Environment Occupation Model (PEOM) is the most cited of all the Person Environment Occupation (PEO) models. As a model, the PEOM (Law, 1996) has two elements. The first element, a Venn diagram, see Figure 4, illustrates performance in occupation as a result of the complex transaction of three elements - a *person* carrying out an *occupation* in an *environment*. The first element 'person' considers the physical, cognitive and sensory capabilities of the individual. This person element also includes the perception the person has on the value of the activity to them, and the role they have as a member of a family and as part of a wider community (Law, 2002). The second element, considers the physical, psychosocial and political 'environment' in which occupation is performed. The third element 'occupation' considers the specific activity the individual needs or wants to perform.

The central area, labelled 'Occupational Performance', represents the result of this complex transaction and is what is observed as the person carries out the activity. It is also what the person experiences, which is expressed through how they describe their level of satisfaction

with the performance. As with the congruence models, a lack of fit between one or more PEO elements results in the person being observed to have difficulty performing an activity, or the person may express a lack of satisfaction with how they performed the activity (Law et al., 1996; Steward & Law et al., 2003). The PEOM is useful therefore as it supports the argument of needing to examine both the person's subjective views of their environment and how they perceive their performance, as well as objectively evaluating the design of the home environment and how this facilitates or hinders the performance of occupations.
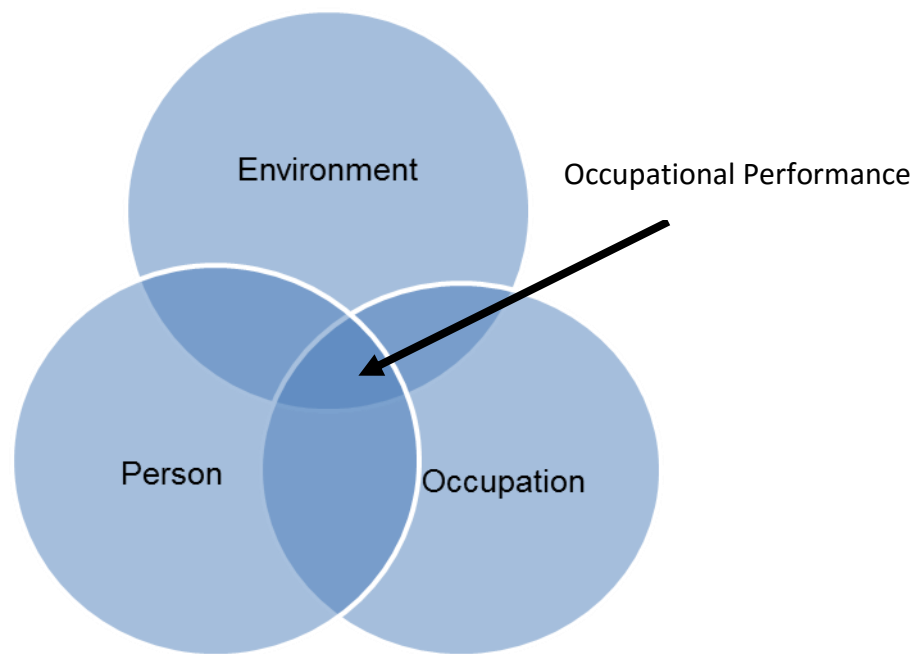
Figure 4 Person Environment Occupation Model (Law, 1996).

The PEOM also acknowledges that a person's performance changes over time. For example, a person may become a carer for their grandchildren to enable their own child to go out to work such that a room they once used for relaxation now becomes a space for interacting with a child during play, such that the space requirements of this room changes accordingly. Alternatively, a person's sensory, cognitive, or motor abilities may change due to the ageing process, injury, or illness and as a result the design of the home environment will influence the person's ability to perform the activity of occupation. Again, using the occupation of caring for a grandchild this change in performance may lead to the person abandoning the activity because the person may lack the space to use a walking frame, and negotiate safely around the child's toys.

2.4.2 Person Environment Occupation Participation Model (Christiansen & Baum, 1997).

The Person Environment Occupation Performance (PEOP) model is another visual model representing the transaction of the person in the environment. In developing this model, Christiansen and Baum (1997) identified the specific concepts within each element of PEO that should be considered in explaining occupational performance. For example, in Figure 5, the person concepts, which influence performance, are listed as physiological, spiritual, cognitive, neurobehavioral, and psychological. Environmental concepts are similar to the environmental layers described earlier by Lawton (1974), and include the social and built environment and the influence of social and economic systems.

The PEOP model considers how the person experiences the performance. Specifically, the model suggests that environmental concepts influence how the person perceives their quality of life, which relates to how the person evaluates their functional health as described earlier by Lawton (1993), whereas the concepts associated with the person element influence the person perception of their well-being. Cole and Tufano (2008, p.131) suggest that the advantage of PEOP over PEOM is that the 'PEOP model represents a top-down approach [where the person's] view of the problem is of primary concern. The [person's] perception of the performance issue becomes the cornerstones for intervention'. The relevance of this difference will be discussed in the following chapter.
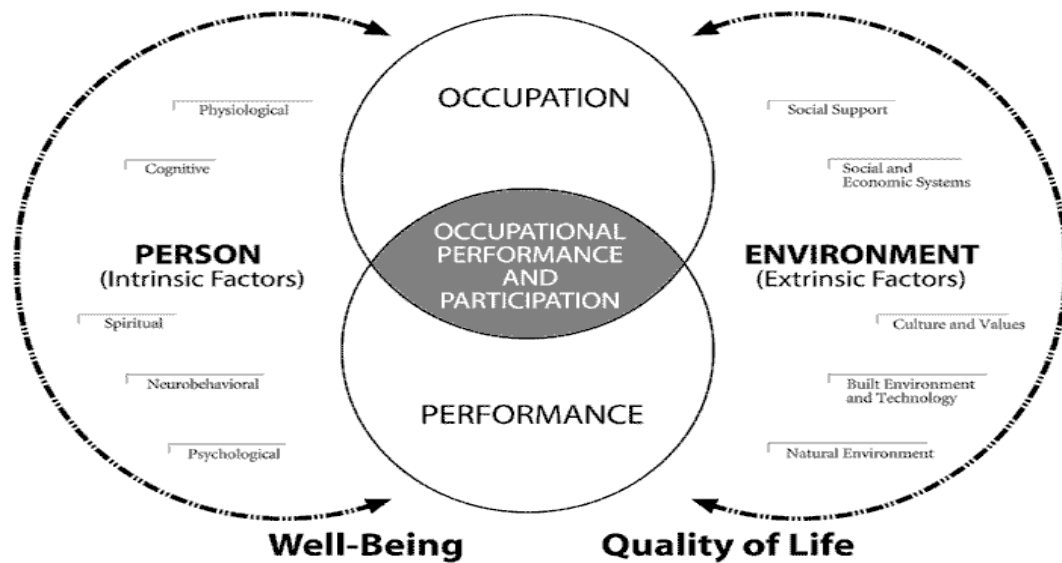
Figure 5 Person, Environment, Occupation Performance Model (Christiansen & Baum, 1997).

2.4.3 Canadian Model of Occupational Performance (Townend et al., 1997, 2002).

As with the previous PEO models discussed in this section, the Canadian Model of Occupational Performance (CMOP) recognises occupational performance as a result of 'a dynamic interplay' of a person performing an activity in the environment (Kavanagh, 2006, p.67). However, unlike the previous models, it does not illustrate a transactional relationship between the person, environment and occupation resulting in occupational performance or participation. Instead, at the centre of the model, see illustration in Figure 6, is the phrase spiritual which is surrounded by the elements the authors have associated with concepts of person, environment and occupation (Townend et al., 2002). Spiritual, or Spirituality, refers to the 'uniqueness of every individual regardless of the similarity of their disabilities' (Kavanagh, 2006, p.67) such that the person's values, beliefs, and life goals contribute to the uniqueness of each person. Therefore, rather than occupational performance it is the unique person at the centre of the model (Kavanagh, 2006).
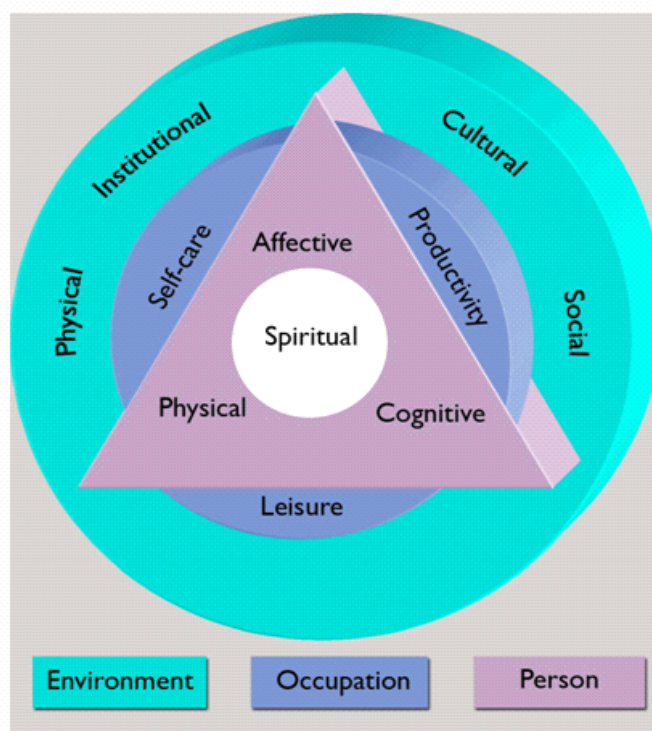
Figure 6 Canadian Model of Occupational Performance (Townend et al., 1997, 2002).

In the PEOP model discussed earlier in this section, the environment was categorised as physical, social, cultural, and institutional. Similar to the previous models, the CMOP (Townend et al., 2002) provides an explanation as to how the physical and social aspects of the home environment influence performance and participation in occupations. Additionally, it contributes to understanding the influence of institutional environments on a person's ability to perform and participate in occupations in their home. To do this, the authors first describe the institutional environment as the political and social systems which govern aspects of a person's life which the authors suggest can be a facilitator or a barrier to performance and participation in occupations (Townend et al., 2002). For example, the installation of a home modification provided through a statutory funded programme improves a person's ability to perform and participate in the occupations they found difficult due to either the ageing or disablement process. Conversely, not meeting the eligibility criteria for a statutory funded home modification can be a barrier to a person performing and participating in occupations they feel are important to them as they do not receive the modification.

In the Canadian Model of Occupation Performance (Townend et al., 2002) occupations are categorised as self-care, productivity and leisure, which reflects the traditional way occupations have been categorised in the literature. Categorising occupations in this way helps to provide a way of understanding and examining the different types of activities people perform. However, Hammell (2004) has criticised this approach, as she argues it underplays the complexity of the meaning and purpose of activities to an individual. Furthermore, Hammell (2008) has also questioned the cultural relevance of self-care, productivity, and leisure to non-western cultures – where these labels have less meaning and significance in everyday life.

Table 2 below, taken from Rigby and Letts (2003) provides a summary of the models discussed so far in this section. The table helpfully provides the reader with a direct means to compare and contrast the models.

Model	Characteristics of Environment	Major Assumptions about Environment	Person-Environment Relationship
Person Environment Occupation Model (PEOM) (Law 1996)	Broadly defined to include the cultural, social, economic, institutional, physical, and social domains. Each domain is considered from the unique perspective of the person, household, neighbourhood, and community.	Environment provides the context of occupational performance; influences performance but is also influenced by performance. A person's environment is continually shifting and changing over time and space, and as these change, the behaviour necessary for occupational performance also changes; the environment can either enable or constrain performance. Environment is considered to be more amenable to change than the person.	Behaviour is influenced by and cannot be separated from contextual influences. Occupational performance is the outcome of the transaction of the person, environment, and occupation. Assessment includes looking at environmental conditions and influences (positive or negative) Intervention can target the environment as a way to optimise PEO fit and occupational performance.
Person Environment Occupational Performance (PEOP) model (Baum and Christiansen 1997)	Physical, social, or societal condition; environmental conditions are either objective perceived or are perceived by the person.	Environment creates demands or expectations for occupational behaviour.	Occupational performance is an outcome of complex interactions between person and the environment in which he or she carries out tasks and roles. Performance is facilitated by environmental enablers. Attention should be paid to the individual's environment and the potential to modify environment and/or access environmental enablers during assessment and intervention.
Canadian Model of Occupational Performance (CMOP) (Townend et al.,	Defined as having comfortable, institutional (including political,	Occurs outside of the person and elicits responses from him or her.	Occupational performance is the result of the dynamic

Model	Characteristics of Environment	Major Assumptions about Environment	Person-Environment Relationship
1997,2002)	economic and legal aspects), physical, and social elements. Includes community, provincial, national, and international factors.	Individuals ascribe meaning to the environments around them, which can change over time and vary between persons. Environments are influenced by the behaviours of the person.	relationship of the person, environment and occupation. Environmental conditions influence a person's occupational performance. Environment provides a context for occupations.

Table 2 Comparison of the PEO models (Rigby & Letts, 2003).

As stated at the beginning of this chapter, it was determined that no overarching theory explains our understanding of how home modifications influence the functional health and sense of well-being of older and disabled people. One of the issues has been the availability of research to support current theories and theory development. Further, Heywood and Awang (2011) suggest that the available evidence lacks methodological rigour. Despite Heywood and Awang's concerns, the existing evidence does support the use of PEO models when designing and constructing home modifications to improve functional health and a person's sense of well-being. For example, literature reviews by Tse (2005) and Chase et al. (2010) investigating research on interventions designed to decrease the occurrence of falls, identified home modifications as a factor in reducing the risk and occurrence of falls. Although they do not specify as such, Tse and Chase et al. indicate that in the majority of cases the home modifications being provided followed the involvement of the occupational therapist. Therefore, it is assumed the PEO models described above influenced the design of the modification.

A random control trial by Pighill et al. (2011) provides further evidence for the use of PEO theories in preventing falls. This study involved 238 people aged 70 years and above, that were randomly assigned to three groups. The first intervention group received a home visit by an occupational therapist and following assessment of the person and the home environment they received the necessary home modification. The second intervention group received a similar visit by a non-qualified health worker, whilst the third group received standard care. Whilst the number of participants involved in this trial reduced the power of the findings, the analysis of the data nevertheless provides encouraging evidence. In particular, whilst there was no significant difference between the three groups regarding reduction in the fear of falls, a significant difference was found in the occurrence of falls between the groups. The group visited by the occupational therapist was statistically less likely to experience a fall when compared to the other participants.

The conceptual models underpinning occupational therapy have contributed to the development of standardised environmental assessment tools, which have been used in both research and to support practitioners in practice. For example, The Housing Enabler (Iwarsson, 1999) was one of the first standardised assessments to consider the PEO factors associated with accessible features of the home environment and subsequently this standardised assessment has been extensively used in a number of research studies.

Similarly, Stark et al. (2010, 2015) are currently in the process of standardising the In-Home Occupational Performance Evaluation (I-HOPE) assessment tool. I-HOPE guides the occupational therapist to directly observe and analyse the interaction of the person performing activities of daily living in their home environment. The tool is designed to help identify the environmental barriers impacting on the person's performance, thus allowing the therapist to identify the most appropriate modification to remove the barrier. Aplin (2013) has developed a standardised assessment tool which enables the therapists to capture PEO concepts related to the meaning of home. This tool supports the therapist to understand the potential impact that modifying the home environment will have on the person and other people living in the home environment. Finally, the Residential Environment Impact Scale (REIS) was developed by Fisher et al. (2015). Similar to I-HOPE, the REIS is designed to evaluate the transaction of the person in the home environment, enabling the therapist and the person to identify barriers to the performance of activities of daily living. Again, the REIS is a guide to support the occupational therapists' professional reasoning, which helps them to identify the most appropriate way to modify the home environment.

So far, this chapter has provided a broad overview of the theoretical models to explain and examine:

- How people's functional health and sense of well-being is influenced by the design of the home environment;

- How resources in the home environment can be used to restore functional health and a sense of well-being for a person who has experienced changes in their sensory, motor, or cognitive abilities;

- How understanding the transaction of the person whilst performing an occupation in their home environment can provide opportunities for subsequent interventions to restore or maintain a person's functional health and sense of well-being.

Whilst these models have increased understanding of how home modifications improve health and well-being, they do not satisfactorily explain or help to examine the contribution the design and construction process makes to restoring or maintaining a person's performance and participation in occupations. Therefore, the remainder of this chapter will

consider the theoretical principles of the design and construction process. A PEO model with concepts closely aligned to principles from design and construction will be examined.

2.5 Homes modification and the design and construction process

In design and construction, a home modification is classed as a building adaption or modification as illustrated by Douglas (2006):

> 'It includes any work to a building over and above maintenance, to change its capacity, function, or performance (i.e. an intervention to adjust, reuse or grade a building to suit new conditions or requirements). As regards existing buildings, adaptation [or modification] traditionally comes to have a narrow meaning that suggests merely some form of change of use. The term has also been commonly used to describe improvement work such as adaptation [or modification] to buildings for use by disabled or elderly people' (Douglas, 2006, p.1).

A home modification uses design and construction methods and processes to improve an aspect of the home environment. The purpose of this type of design and construction intervention is to improve the performance of the environment (Douglas, 2006) so that it better suits the requirements of the person who has difficulty performing an occupation due to their sensory, cognitive, or motor impairments.

Following a number of high profile government reports in the 1990s (as discussed in chapter 1), which highlighted the inefficient nature of the design and construction process, two factors contributing to the problem were identified (Egan, 1998). One factor concerned the difficult nature of co-ordinating the project because a building project requires the careful management and co-ordination of a number of phases and sub-phases (Egan, 1998). To be able to do this, the project manager has to be able to co-ordinate and manage the activities and outcomes of each phase of the project thus ensuring the building is designed and constructed as requested and within the time and financial targets identified at the beginning of the project (Fewings, 2013). The project manager's role is challenging because of the number of individual professional groups involved in a project, and the number of sub-phases contained within each phase (Fewings, 2013). Frequently the professional groups involved are highly specialised, they do not work alongside each other and typically only have a broad understanding of what the other professionals do (Gould & Joyce, 2009). Whilst there may be little understanding of each other's roles, professionals are often reliant on the outcome from others in the process so that it enables them to fulfil their role in this process in order for them to be able to do their role (Cooper et al., 2008).

To help the project manager, it was identified that it was necessary to produce a framework to make visible the logical order of phases and sub-phases involved in a building project and to identify the key tasks and the outcome from each of these phases (Cooper et al., 1998).

The second factor contributing to the inefficient nature of design and construction projects is the flow of information through the various phases of the process (Egan, 1998). For a building project to be completed within time and financial constraints, the flow of information is crucial, since a building project is sequential in nature and therefore each phase is dependent on information from the previous phase in order to be able to progress on-time (Coates et al., 2010). Therefore, it is important that each professional group understands the value of the information they produce to the other professionals involved in the project (Koskela et al., 2002). They also need to be aware of what information needs to flow through to the next phase of the process (Koskela et al., 2002). Professionals also need to know how soon their information is needed in order that the subsequent phases are not delayed. The people involved in the building project should also include representatives from the end-users of the building, thus ensuring that information necessary to design and construct a building to meet their needs and requirements is captured at the start of the project (Tzortzopoulos, 2006). This then ensures, at each phase of the process, that end-users' requirements are clearly known, thereby allowing professionals to consider how the design and construction decisions they are making at any particular phase may impact on the requirements of the end-users of the building (Christiansson et al., 2011).

In response to these challenges, design and construction process frameworks have been developed, namely the RIBA Plan of Work (1963, 2000, and 2013) and the Generic Design and Construction Process Protocol (Cooper et al., 1998). The RIBA Plan of Work was originally developed by the Royal Institute of British Architects in the 1960s and it focused predominately on the design element of a building project without including the subsequent construction phases. Hughes (2003) describes how the earlier versions of the RIBA Plan of Work had four phases. The first phase, 'assimilation', described the requirement of the design team to collect information about the problem the client wanted to resolve through the design and construction of a building. Using information from the first phase, the Plan of Work advised the designers in the second phase to carry out a

'general study' that involved conducting analyses on why the client's current building or situation was not meeting their current or future needs. With this information, during the third 'development' phase designers produced drawings to help them to provide solutions to address the problems identified in the earlier phases. Finally, in the 'communicate' phase the designers presented the drawn solution to the client and other professionals to be involved in the construction of the project.

In the early and mid-2000s the RIBA Plan of Work was developed further. The key differences from the 1963 version to the version published in 2007 (as illustrated in Appendix 1), is the level of detail. The 2007 version divides the design and construction process into five distinct phases and 11 sub-phases. Each phase and sub-phase is supported by a description of the key task involved and a separate framework was produced to illustrate the procurement decisions which should be made at each sub-phase. The first phase and associated sub-phases of the RIBA Plan of Work (2007) 'preparation' is similar to the tasks involved in the earlier assimilation phase. The second phase 'design' has been divided into a number of sub-phases that represent the different iteration phases the design process goes through, from the initial conceptual ideas of what the building will look like, through to the detailed technical and specification drawings required in the later phases of the construction process. The pre-construction phase and sub-phases relate to the activities and information required for the procurement of the building project. The fourth phase, 'construction' and the two sub-phases are concerned with the construction of the building, at 'mobilising' sub-phase information collected during the design phase is passed to the contractor so that building construction can begin enable to construct the building. The final phase, 'use' is concerned with ensuring the building is handed over to the client, including understanding how the building operates, so that the building performance supports the end-users of the building.

The RIBA Plan of Work was subsequently revised in 2013 (RIBA, 2013) (see Appendix 2). Whilst the content of the Plan has not changed significantly from the 2007 version, the most obvious change is in the way that the information is presented. For example, compared to earlier versions, the 2013 version of the Plan of Work has the process running along the x-axis of the table, and it now includes specific objectives for each phase and sub-phase; specific tasks required at each sub-phase; procurement actions needed; and the outcome of each phase along the y-axis of the table. Additionally, where previously the

sub-phases were ordered using letters of the alphabet, they are now numerical in order beginning with phase 0. This new approach taken by the RIBA (2013) is similar to the Generic Design and Construction Process Protocol.

The Generic Design and Construction Process Protocol (GDCPP) was developed at the University of Salford (Cooper et al., 1998) and it is based on principles from the field of New Product Development (NPD). Prior to NPD, Kagioglou et al., (1998) explain how manufacturing involved the separate phases of development, design, and production. These separate phases did not encourage collaboration between professionals involved in each of the phases which often resulted in delays, material and financial waste, and because users of the product were not involved in the process the final product often did not meet their needs (Kagioglou et al., 1998).

NPD challenged this way of bringing together the separate phases involved in developing a product, the tasks involved in those phases, and the people involved in performing those tasks under one unified systematic process (Takeuchi & Nonaka, 1986). However, to achieve this it is necessary to make the phases of the process visible and the tacit knowledge of the people involved in the performing the tasks evident (Leonard-Barton, 1992). As each phase of the product development is dependent on information and data from the previous phase, NPD encourages the collection and flow of information through the process (Takeuchi & Nonaka, 1986). The GDCPP has taken the principles of NPD and created a unified approach to the design and construction process, such that, rather than elements of the design and construction process being seen as separate entities, involving a variety of stakeholders and professionals, carrying out separate tasks in isolation, the GDCPP maps the whole process in a systematic way. Cooper et al. (1998) explains the GDCPP is a process for 'getting the right information, to the right people, at the right time,' which facilitates the successful construction of buildings.

The GDCPP (Cooper et al., 1998) was developed through a research initiative involving a partnership between researchers and industry. Using a mixed methods approach to the research design, the study began with a literature search which aimed to understand the process used in the design and construction industry and from which a questionnaire was developed and administered to professionals working at three case study sites. Using data from the questionnaire and insights from the literature review, the research team designed

an initial GDCPP (Cooper et al., 1998). Subsequently, focus groups from the case study sites were convened to evaluate and further refine the design of the GDCPP (Cooper et al., 1998).

Whilst there have been no longitudinal follow-up studies investigating the long-term benefits gained from using the GDCPP, it is reported (Kagioglou et al., 2000) that the case study sites involved in the research continued to use the GDCPP (Cooper et al., 1998) after the formal research project was concluded. Cooper et al. (2008) reported that these organisations were continuing to use the GDCPP as a direct consequence of the business benefits they experienced from its use, including improved communication and working relationships between professionals, and a reduction in the waste of financial and material resources during the design and construction phases of a construction project.

In describing the process, Cooper et al. (2008) explain that the GDCPP breaks down the design and construction process into four phases and within each phase there are sub-phases. Each phase and sub-phase is associated with specific actions and these actions are linked to different elements of design and construction, such as design management and facilities management. Each phase is reliant on information, or deliverables, from the previous phase, therefore each phase needs to be completed before moving on to the next phase. Process 'Gates' act to prevent the process moving forward prematurely, as this could lead to inappropriate and wasteful decisions being made. The four main phases and ten sub-phases are presented in Table 3.

Main Phase	Sub Phase
Pre-project phase	Phase 0: Demonstrating the need
	Phase 1: Conception of need
	Phase 2: Outline of feasibility
Pre-construction phase	Phase 3: Substantive feasibility study
	Phase 4: Outline conceptual design
	Phase 5: Full conceptual design
	Phase 6: Co-ordinate design, procurement and full financial authority
Construction Phase	Phase 7: Production information
	Phase 8: Construction
Post Completion Phase	Phase 9: Operations and Maintenance

Table 3 The phases and sub-phases of the Generic Design and Construction Process Protocol (Cooper et al., 1998).

As with the occupational therapy process (to be discussed in the following chapter), the design and construction process is not always linear, thus, some flexibility is required to allow some elements of the process to occur simultaneously. To overcome this potential barrier, the research team incorporated the use of soft and hard gates. Soft gates allow some actions to occur concurrently across phases, whereas hard gates are installed at points where the process cannot continue until the action and deliverables from the previous phases are completed. The advantage of the use of soft and hard gates is that they prevent detrimental decisions or actions being taken (Cooper et al., 2008).

The GDCPP (Cooper et al., 1998) presents each phase and sub-phase in a framework, similar to the RIBA Plan of Works. This has been reproduced in Figure 7, however due to the size of the framework a detailed version has been presented in Appendix 3. In the

framework, the phase and sub-phases run along the x-axis of the table. Along the y-axis of the framework there is a description of what is involved in the process including key questions, which should be answered before progressing to the next sub-phase, action required prior and during the sub-phase, and the outcome of the particular sub-phase. An example of the description of Sub-phase 1 is illustrated in Table 4.

Sub-phase 1: Conception of need
What are the options and how will they be addressed?
Before the phase • Approval to proceed obtained • Approval for funding obtained • Results of studies to define need(s) are available • Initial stakeholders are identified
During the phase • Identify and refine the statement of need(s) • Develop the project brief according to the business case developed in phase 0 • Update the stakeholder list / group membership • Identify options, i.e. do nothing, manage the problem, develop a solution • Process execution plan (updated): plan phase reviewed
Goals/Outcome • Identify potential solutions to the need and plan for feasibility (phase 2) • Gain authority and financial approval to proceed to phase 2
Gate status • Soft gate

Table 4 Sub-phase 1 from the Generic Design and Construction Process Protocol (Cooper et al., 2008).
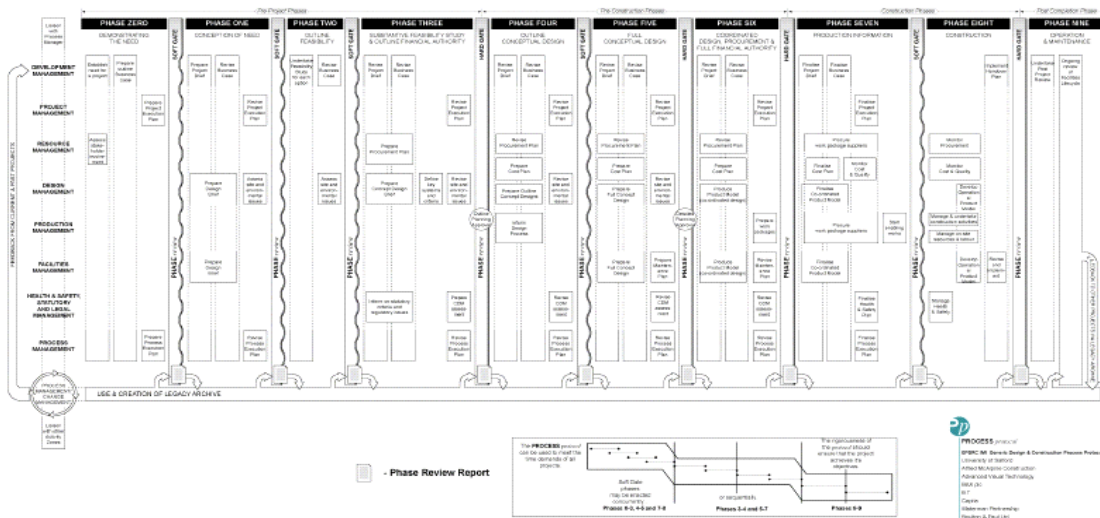
Figure 7 Generic Design and Construction Process Protocol taken from Kagioglou et al. (1998). See Appendix 3 for a detailed version.

Within the design and construction process as a whole, the end user of the building is frequently not the person paying for the project. This person, or organisation, paying for the project is referred to as the client. For example, the design and construction of a supermarket is likely to be financed through the company who owns or is developing the supermarket and not directly by the end user of the supermarket. This is similar to the provision of home modifications through the housing and social care system in England (as detailed in Chapter 1) where the modification is financed, in part, by the local authority, and not necessarily by the end user of the modification. Unlike earlier versions of the RIBA Plan of Work, the research team at Salford University deliberately designed the GDCPP (Cooper et al., 1998) to involve and incorporate the needs and requirements of the end users of the building, whereas the RIBA Plan of Work specifically focuses on the needs of the paying client.

Zeisel (1981) argues that not including the end user at the start of the process leads to a 'design gap'. Figure 8 illustrates how the designer of the building has no (or little) information on what the end user of the building requires in order to be able to perform tasks and to use the environment effectively. This gap leads to the building or product not meeting the end users' requirements and expectations and further resources have to be used to rectify the issues or profits are lost when products fail to sell.

58
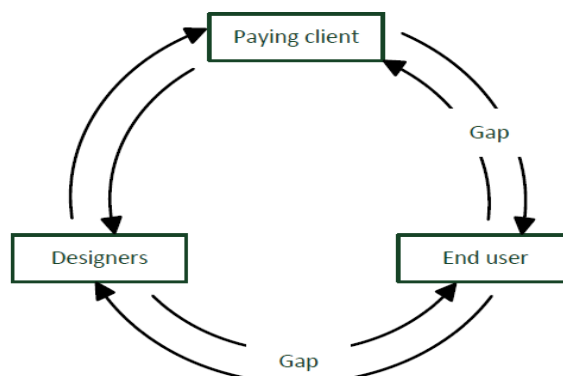
Figure 8 End User Design Gap (Zeisel, 1981).

This assumption is supported by Kagioglou et al. (1998) who argue that a project involving the end-user at the start of the process is likely to lead to a happy end user at the end of the project and in turn this then leads to better business outcomes, e.g. financial profit. Further, Koskela et al. (2002), through a review of empirical studies on design and construction projects, showed how failure to understand and communicate end users' requirements throughout the whole of the design and construction process results in significant construction delays and post occupancy dissatisfaction from users of the building. The understanding of end user requirements and their involvement within a proposed project is therefore a critical success factor within project delivery.

2.6 The Occupational Therapy Intervention Performance Model (OTIPM) and parallels with the design and construction principles and process.

This section discusses the Occupational Therapy Intervention Performance Model (OTIPM) which is not included in Table 2 as it was developed subsequent to the publication of Rigby and Letts (2003) work. Developed by Fisher (2009), OTIPM has potential for explaining the contribution of the design and construction process in restoring or maintaining a person's performance and participation in occupations. As such, OTIPM (Fisher, 2009) provides this link in two key ways, since it shares terminology similar to the built environment literature, and secondly the conceptual model is supported by a process framework.

As stated above, the OTIPM (Fisher, 2009) uses similar terms associated with the built environment literature. For example, when discussing the challenges of developing

computer-aided design software for architects, Kim et al. (2002) use the phrase 'space requirements' to describe the software's ability to calculate the space end-user needs in order to perform an activity. The phrase 'space and tools' is similarly used by Kim et al. (2002) to describe space standards, equipment, or other items a person uses during the course of performing an activity which the architect needs to identify during the design process. Finally, Kim et al. (2002) use 'user activities and actions' when describing the software's ability to simulate the performance of an activity by a person. Additionally, within OTIPM, Fisher (2009) uses the phrases 'required space', 'required tools,' and 'required actions', when describing how space, equipment and objects people use to perform an activity and the sequence of cognitive and motor actions involved in completing an activity all contribute to the demands of performing an occupation.

Secondly, unlike the PEO models, the OTIPM (Fisher, 2009) operationalises the process for delivering intervention (see Figure 9). Whilst a number of occupational therapy processes exist, these have been predominantly developed separate to the conceptual PEO models. The relevance of the occupational therapy process to professional practice will be discussed in detail in Chapter 3. When compared to other occupational therapy processes, Fisher (2009) argues that the OTIPM process is different because it captures the person's goals for improving their health and well-being and maintains this through the three phases of the therapy process. The OTIPM (Fisher, 2009) also encourages occupational therapists not to proceed to the next phase of the process until they have all the necessary information to continue, thereby reducing the risk of planning ineffective interventions.
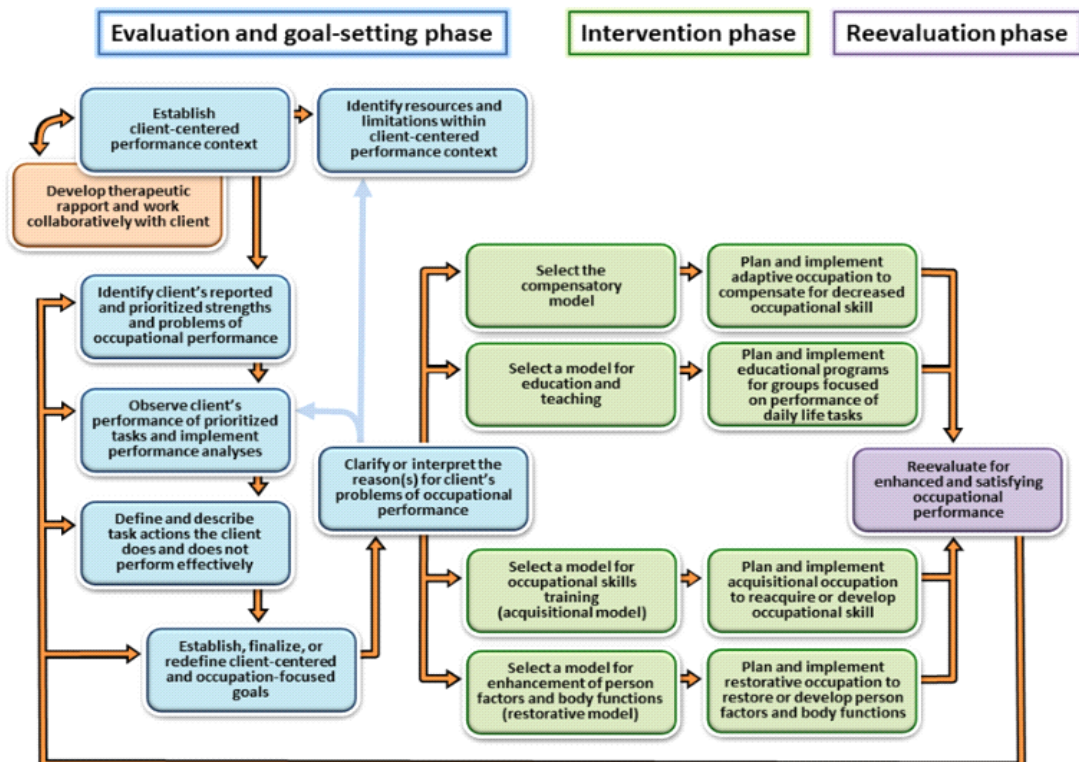
Figure 9 Occupational Therapy Intervention Model - Process Framework (Fisher, 2013)

The OTIPM process map is similar to the GDCPP (Cooper et al., 1998) in that it presents the process on an x-axis and y-axis (Fisher, 2009). The x-axis represents Fisher's (2009) three phases of the OT process which have been labelled 'evaluation and goal setting', 'intervention', and 're-evaluation'. Unlike other occupational therapy process frameworks, which tend to show the process either as a flowchart or as a cycle, the y-axis of the OTIPM (Fisher, 2009) represents a broad range of tasks and decisions that should be made at each phase of the process. However, unlike the GDCPP (Cooper et al., 1998), the OTIPM (Fisher, 2009) applies to all types of occupational therapy interventions and as such it does not provide a detailed description of the information that should be collected, the actions which should be taken, nor the outcome of each of the phases. This is possibly because each intervention will require different types of information to be collected, particularly during the intervention and evaluation phases. For example, interventions involving home modifications will need to collect information about which elements of the physical aspects of the home are impacting on occupational performance, whereas interventions designed to manage anxiety will need to collect information as to what causes the anxiety.

The PEO model of the OTIPM (Fisher, 2009) divides occupational performance into two. The first part considers performance as the participation in occupations, and these occupations

have been divided into personal activities of daily living, instrumental (domestic) activities of daily living, sleep, education, work, play, leisure, and social participation (Fisher, 2009). The second element of performance concerns what can be observed objectively as the person performs an activity (Fisher, 2009). The OTIPM (Fisher, 2009) assumes when observing the performance of an activity, we are observing the person's motor, process, and social interaction skills, that is, the occupational performance skills.
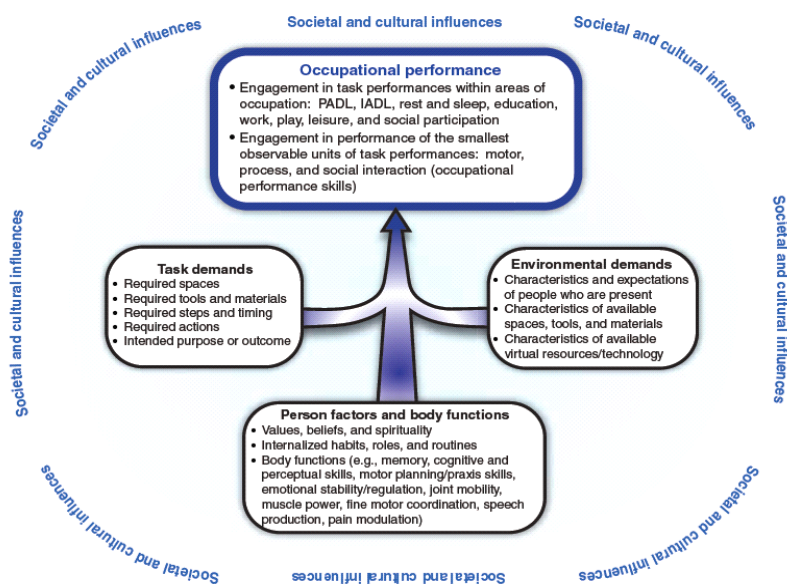
Figure 10 Occupational Therapy Intervention Process Model - PEO conceptual model (Fisher, 2013)

The model also assumes that performance of an occupation is both dependent upon and influenced by the transaction of the task demands, environmental demands, and person factors and body functions. Each element of the person, environment, and task elements is formed of a number of concepts, which can be seen in Figure 10. Unlike other PEO models that have societal and cultural influences as an element of the environment, the OTIPM model (Fisher, 2009) has all elements of occupational performance being potentially facilitated or hindered by societal and cultural influences (Fisher, 2009; 2013).

2.7 Chapter Summary

This chapter has shown that there is no current over-arching theory to explain the role of home modification as intervention for supporting older and disabled people to remain living in their own home environment. Instead, a series of theories from the field of environmental gerontology and occupational therapy have been described in order to build a theoretical understanding of home modification as an intervention for improving

functional health and wellbeing for older and disabled people. The series of theories begins with the Environment Press Model, which explains the influences the built environment has on the ability of the person to be able to perform and participate in everyday activities. Then, congruence models, or person environment fit models, help to explain how the design of the built environment can be used to improve the fit between the person and the environment, enabling the person to once again be able to perform or participate in the activities of daily living. Finally, the PEO models, from occupational therapy, help to explain what concepts are important to consider when designing a home modification so that it provides the appropriate level of fit for the person.

This chapter has discussed the three most well-known PEO models in occupational therapy. A fourth PEO, the OTIPM (Fisher, 2009; 2013) was introduced later on in the chapter. This is a relatively new conceptual model in occupational therapy, however, unlike the other models, it shows promise in the field of home modifications because it shares concepts and terms that are associated with design and construction. Also, unlike the other models, it has a process framework that guides the therapist through the key phases of the occupational therapy process, identifies key questions and highlights decisions that therapists have to make when delivering interventions.

This chapter has also examined the theory of design and construction process frameworks and their relevance in the design and construction of building projects. These frameworks are relevant because they not only improve the efficiency of delivering building projects, but they ensure that valuable information needed during the different phases of a project, particularly relating to the requirements of the end-user of the building, flow through the process. The framework also makes transparent the roles and responsibilities of professionals involved in the process. The Generic Design and Construction Process, similar to the OTIPM (Fisher, 2009), also describes the key tasks that need to be performed but then describes the decisions that need to be made, and the outcome of each phase. Overall, the Generic Design and Construction Process Protocol makes transparent the design and construction process and provides a logical and systematic approach to the construction of major building projects.

Chapter 3 Examination of the practice of occupational therapists when modifying the home environment

3.1 Introduction

The previous chapter examined how occupational therapy theory has been critical in the successful design and construction of a home modification. Whilst there have been significant developments in theory building in occupational therapy, and of the emergence of assessment tools to support practitioners in the field, little is known about the core skills required, and the process used by occupational therapists to plan effective home modifications. This chapter therefore further examines the literature to explore what is known about the skills and the process used in practice, and how the development of specific processes is both relevant and necessary to ensure that effective practice is conducted.

3.2 Professional core skills and the occupational therapy process

A skill, as defined by the English Oxford Online Dictionary (2016) is 'the ability to do something well' and it is associated with expertise in performing a particular action or role. Within the context of health and social care, making core skills of a profession visible is becoming increasingly important as it enables professions, such as occupational therapy, to articulate the unique contribution they make towards improving functional health and wellbeing (Couston & Whitcombe, 2008). In her seminal work on the core skills of occupational therapy, written for the College of Occupational Therapy, Creek (2003) lists occupational therapy core skills as being:

- Collaboration with the client
- Assessment
- Enablement
- Problem solving
- Using activity as a therapeutic tool
- Group work
- Environmental [modification]

However, there is current debate (Turner & Alsop, 2015) within the occupational therapy profession as to whether it can be argued that all the core skills identified by Creek (2003) are indeed unique to the profession. For example, in the USA, the National Association of Home Builders, a professional organisation for builders, offers members and non-members a Certificate in Ageing in Place Specialist (CAPS) and the following description of the requirements of CAPS demonstrates that the skill of using home modification to enable older people to live independently is not unique to occupational therapy.

> 'The CAPS designation helps you [referring to builders] make your clients' homes more visitable. Even if the home owners don't think they need additional task lighting, grab bars, and other home modifications for their own use, their family members and visitors might. CAPS helps you help your clients make the right choices, and it gives you more security in the [modfication] market niche that's continuing to grow in popularity' (National Association of Home Builders, 2016).

Turner and Alsop (2015) provide clarity around this debate by suggesting that generic practice skills, such as home modifications, become a unique core skill when they are combined with the unique perspectives of functional health and wellbeing alongside the unique reasoning skills of the occupational therapy profession. Turner and Alsop (2015) also observe how the practice skills are often what the public and other professionals see the therapists doing, whereas unique core reasoning skills are often the hidden and unarticulated aspects of professional practice. Turner and Alsop (2015) have illustrated their views in Figure 11.

This is invisible | **Professional belief in the impact of occupation on health and well-being** | **Central philosophy**

These skills are mainly invisible | Identifying and assessing occupational needs | Analysing & prioritising occupational needs in co-operation with service user | Facilitating occupational performance/ engagement | Evaluating, reflecting and acting on occupational outcomes | **Unique core reasoning skills**

The public face of practice | Group work | Wheelchair assessment | Listening and interviewing skills | Home visits | **Examples of context dependent practice skills**

Leadership skills | Teaching skills | Business skills | Research skills

ADL | Vocational rehabilitation | Creative activities | Leisure activities | Supervision skills

Health promotion | Environmental adaptations | Mobility | Management skills | Splinting | **Etc.**

These practice skills are driven and changed by fashion, research, legislation, context and technological development

Figure 11 Unique Core Skills of Occupational Therapy (Tuner & Alsop, 2015).

Figure 11 demonstrates how the profession's unique philosophical or world view of health and well-being (the top tier), flows down to influence the reasoning skills of the practitioner. Professional reasoning is described by Unsworth and Baker (2016, p.5) as the 'thinking processes of the [practitioner] as s/he moves into, through and out of the therapeutic relationship and therapy process with the client'. As stated earlier, professional reasoning in occupational therapy is not always self-evident; 'because the planning for successful interventions is not visible and low-tech assessments and interventions may be barely noticeable [or] look mundane' (Robertson, 2012, p.133), thus, Turner and Alsop (2015) have shown this to be an invisible skill in the above diagram.

Further, Turner and Alsop (2015) have identified four types of unique reasoning skills. Starting on the left side of Figure 11, in identifying and analysing the occupational needs, Turner and Alsop (2015) describe this as the approach taken by the practitioner to begin to understand the activities of daily living the person wants, needs, or has to do in order to achieve functional health and a sense of well-being. The next core reasoning skill identified is analysing and prioritising occupational need in co-operation with the person. Here the

occupational therapist uses their reasoning skills to identify how the person's performance and participation in activities of daily living are affected by the interaction of the person, in an environment, carrying out the occupation. By doing this collaboratively with the person, the therapist then enables them to identify goals for any intervention the therapist may provide. The next reasoning skill identified by Turner and Alsop (2015) is facilitating occupational performance / engagement. Here the therapist uses the skill involved in delivering the generic practice skill to provide an intervention to restore, maintain, or enable the person to acquire the ability to perform and participate in their chosen occupation. The final reasoning skill is evaluating, reflecting, and acting on occupational outcomes. This reasoning skill provides the opportunity, alongside the person, to evaluate how successful the intervention has been. Also, the therapist, from reflecting on the process they have used, can identify potential areas of improvement in their skills and knowledge, thus the therapist is in a continual process of learning and improving the effectiveness of the interventions they provide.

Whilst the unique skill of occupational therapy is important to effective practice, the occupational therapy process is also important for providing effective interventions (Hagedorn, 1995). This is because occupational therapy is a problem solving profession, and the occupational therapy process provides a logical route to improving health and well-being (Duncan, 2010). The process is a way for therapists to 'operationalise' what he or she does (Iwama & Turpin, 2011, p.60). A number of authors have described the occupational therapy process and whilst there is a difference in the terminology used to describe each phase, there is general consensus that the process involves four main phases, namely assessment / evaluation – including goal setting and intervention - and re-assessment / re-evaluation (Creek, 1990; Fisher, 2009; Duncan, 2011; Roger, 2010). As it provides a reasonable overview of the occupational therapy process, Duncan's description of the occupational therapy process is used to provide an explanation of the process. This description of the process begins to indicate how particular unique professional reasoning skills have influence at certain points of the occupational therapy process.

Duncan (2011, p.37) starts by describing the purpose of the assessment phase as gathering 'relevant information' in order to understand what activities a person is having difficulty performing and which they feel is impacting upon their functional health and sense of well-being, and gaining the person's perspective of why they may be having difficulty

performing or participating in activities of daily living. At this stage, the therapist also begins to collect data about the interaction of the person, environment and occupation. In the next phase, goal setting, the therapist, in collaboration with the person, identifies the goals the intervention aims to target. For example, the goal for a person reporting difficulties with bathing could be to maintain hygiene without assistance from a family member. This phase of the process is important as it sets the benchmark from which the therapist and the person can monitor and measure whether the intervention being provided is working, and whether there is a need to continue with it further. To avoid problems with measuring the success of any intervention provided, Duncan (2011) suggests that goals be written collaboratively with the person, and that they are clear and measurable. Intervention is the next stage of the process and involves the strategies or actions the therapist uses to achieve the intervention goals (Roger, 2010). A home modification is one of a range of intervention skills used by occupational therapists. Despite this range, fundamentally, interventions are being used to restore, maintain, or acquire (Fisher, 2009; Iwama & Turpin, 2011) occupational performance skills and / or the ability to participate in activities of daily living. Therefore, it can be argued that a home modification can be designed to restore someone's ability to cook, or by providing access to facilities a home modification may allow a person to acquire the skills to cook. Alternatively, modifying the environment may enable a person to maintain their performance skill despite the person experiencing increasing impairments from a degenerative condition. Whilst the design of the modification may be the same for each individual, the approach to the intervention will differ. For example, the person who has never learnt to cook will also need the opportunity to work with a therapist to develop the motor and processing skills required to do the activity. Whereas, the person returning to cooking, for example following a spinal injury, will have some of the motor skills and all the processing skills required to carry out the activity and therefore will need less, or no, skills training in order to start using the modification. The final stage of the occupational therapy process is the re-evaluation phase. Duncan acknowledges that whilst the therapist will continuously evaluate the progress the individual is making during the intervention, 'it is the final evaluation that is often most significant' (Duncan, 2011, p.41). This is because the success (or otherwise) of the intervention is measured against the goals that were set during that earlier phase of the process.

In discussing the unique reasoning skills of the profession and the occupational therapy process, there is an apparent relationship and interconnection between the two. Table 5 shows the relationship between the four unique core reasoning skills (Turner & Alsop, 2015) and the four phases of the occupational therapy process.

Unique core reasoning skill	Phases of the occupational therapy process
Identifying and assessing occupational need	Assessment
Analysing and prioritising occupational need in co-operation with the person	Collaborative Goal Setting
Facilitating occupational performance / engagement	Intervention
Evaluating, reflecting on occupation performance outcomes	Re-assessment

Table 5 Link between the four unique core reasoning skills and the occupational therapy process

Turner and Alsop (2015) conclude their paper on the unique core skills of occupational therapy by noting that:

> 'The challenge for all occupational therapists is to make the invisible reasoning process visible through the appropriate use of profession-specific language in discourses, assessment, reports, outcome measures, presentations, so that sound evidence is shown to underpin occupational therapists' visible practice. In this way, the next generation of occupational therapists can be educated to think, reason and act as confident and competent practitioners in a changing and challenging professional world' (Turner & Alsop, 2015, p.747).

Making visible and articulating the reasoning skills and the process practitioners use is a requirement of the Health and Care Professions Council (HCPC) which is the governing body that oversees the professional standards and proficiency of occupational therapists in the UK. In section 8.1 of the Standards of Proficiency (HCPC, 2016, p.9) practitioners have to demonstrate that they are able to communicate 'information, advice, instructions and professional opinion', particularly in respect of all aspects involved in the occupational therapy process and the intervention being provided. Similarly, the professional body which represents occupational therapy in the UK, the College of Occupational Therapists (COT), publishes the Code of Ethics and Professional Conduct (COT, 2015). This Code determines how ethical practice should be conducted and how the practitioner should behave in everyday practice. As an example, the practitioner is again expected to articulate and make

visible their practice in order that the person is able to provide informed consent for the assessment and intervention undertaken by the practitioner:

> 3.2.4 'You must always provide adequate information to [the person] in order for them to provide informed consent. Every effort should be made to ensure that the [person] understands the nature, purpose and likely effect of the intervention before it is undertaken (see section 3.3 on informed consent and mental capacity). This is particularly relevant where there is any element of risk, or where any intervention may cause pain or distress' (COT, 2015, p.17).

Despite the professional and ethical requirements to make visible the core reasoning skills and the process used in professional practice, Clemson and Lever (2014) have raised concerns that whilst home modifications have been a traditional part of occupational therapy, very few research studies have evaluated or attempted to describe the process and make visible the practice involved. Further, support for making the process visible comes from the conclusion of a Swedish study by Johansson et al. (2009). Their research involved a case study design involving four older people and the aim of the study was to generate rich data on the lived experience of older people negotiating the process of having their home modified. The findings of this study are discussed in detail later in this chapter, however an area for future research suggested by Johansson et al. (2009) is of relevance here because from the findings they identified a gap in the knowledge known about the home modification process from the perspective of the practitioners and the need therefore to conduct research to make this more visible.

Taking the work of Turner and Alsop (2015) and their focus on the unique core reasoning skill forward, alongside the four phases of the occupational therapy process, the remainder of the chapter has been structured to discuss professional practice in home modifications using the following headings:

- Identifying and assessing occupational need – assessment phase
- Analysing and prioritising occupational need in co-operation with person – collaborative goal setting phase
- Facilitating occupational performance / engagement - interventions and home modification process – intervention phase
- Evaluating, reflecting on occupational performance outcomes – re-assessment phase.

3.2.1 Identifying and assessing occupational need – assessment phase

To understand why occupational therapists identify and assess occupational need, it is necessary to examine the profession's unique view of a person's functional health and sense of well-being. McColl (2003), in reviewing the literature on how occupational therapy has been defined within the literature, identifies three common themes of how functional health and well-being is understood. In the first theme, a person's health and well-being is not achieved through the mere absence of disease. Instead, Meyer (1948), one of the founders of occupational therapy, suggests that it is the use of time, through the doing of meaningful and purposeful activities, which contributes to health and well-being, hence, the phrase *functional health* is used in this thesis to differentiate between health viewed as an absence of disease, and health viewed as the ability to perform activities of daily living (Lawton, 1973). Yerxa (1992) states that occupational therapy's unique perspective of health and well-being is of particular value to society when medical or surgical interventions have been unable to improve the person's ability to participate or perform activities of daily living. The second theme suggests that a person's ability to perform or participate in everyday activities is influenced by 'internal and external demands on the individual' (McColl, 2003, p.1). Internal demands relate to the person's physical, sensory, and cognitive capabilities which can be impaired by illness, injury or the developmental delay of changes such as those associated with the ageing process. External demands relate to factors in the social, cultural, and physical environment discussed in previous chapters, but which can include the design of the built environment. This interaction between the person and the environment can contribute both positively and negatively to health and well-being (Parnell & Wilding, 2010), and again this interaction was discussed at length in the previous chapters. Finally, McColl (2003, p.1) concludes that occupational therapy is founded on the belief that it is possible for occupations to be 'structured, manipulated, or used' by practitioners to improve a person's health and sense of well-being. For example, occupational therapists manipulate the design of the home environment to restore or maintain the person's health and sense of well-being (Sanford, 2012).

Role of conceptual models in home modification practice

As stated earlier, identifying and assessing occupational need is the approach taken by the practitioner to begin to understand the activities of daily living the person wants, needs, or has to do in order to restore health and a sense of well-being. This is a complex part of the

occupational therapy process and practitioners use a conceptual model as 'an organising tool' to help structure and 'make sense' of it (Davis, 2006, p.57). Although as an organising tool, Boniface (2012, p.26) reminds therapists that conceptual models are not to be used as a 'rule book' as to what they should do; instead, models provide the therapist with the necessary knowledge to guide the general direction that professional practice should take. There is general agreement in the literature (Rigby & Letts, 2003; Stark, 2003; Tanner, 2011) that the Person Environment Occupation (PEO) models are the most relevant conceptual model to practitioners who use home modifications as an intervention. Four PEO models, including the Occupational Therapy Intervention Process Model (Fisher, 2009) were discussed at length in Chapter 2. To date, little evidence exists as to which PEO models are being used by practitioners in this field of practice, and Rousseau et al. (2001), in a discussion paper on the use of PEO models in home modification, was critical of the usefulness of these model to practitioners. The main criticisms of Rousseau et al. (2001) are that the PEO models do not fully capture the concepts occupational therapists require to guide effective home modification practice. This review was done prior to the development of the Occupational Therapy Intervention Model (OTIPM) therefore its relevance to this field of practice has not yet been formally established.

Evidence is also limited on which PEO models are being used in home modification practice; however, why a practitioner selects a particular conceptual model to support their practice has been investigated. A study by Lee et al. (2009) sought to understand why occupational therapists chose particular conceptual models to support their practice. To do this, 1000 practitioners were asked to complete a questionnaire. Although only 259 practitioners responded, on analysing the data, the researchers were able to make some tentative findings. One of the findings suggested that the choice of model was influenced by how well it helped participants to decode what they observed during the assessment, and how well it helped them to plan the intervention. Respondents also identified that the conceptual model chosen needed to be congruent with the overall culture and systems being used within the organisation. In conclusion, Lee et al. (2009) stated that, taken overall, respondents were positive about the influence of conceptual models on ensuring quality of practice.

If practitioners are unable to find a conceptual model to meet their practice needs, then findings from a study by Ikiugu (2012) suggest that the practitioner attempts to combine

models. The study by Ikiugu (2012) sought to establish, through a postal questionnaire, if the use of conceptual models was being used extensively to guide professional practice. Whilst it is difficult to generalise from the results, as only 46 occupational therapists participated in the study, the findings did identify respondents mixing elements of models. However, due to the limitations of the data collection method, Ikiugu (2012) was unable to identify how practitioners approached combining models. Despite having to combine models to meet their practice needs, respondents stated that using a model was important in supporting them to deliver effective professional practice.

Whilst the above studies indicate that respondents were generally positive about the role of conceptual models in practice, other studies have reported respondents being negative towards the use of conceptual models in practice. O'Neal et al. (2007) also conducted a study involving a questionnaire, the purpose of which was to gather data on the use of conceptual models by occupational therapists working with adults with developmental disabilities. The questionnaire was sent to 275 therapists. When the data was analysed from the 145 respondents who completed the questionnaire, only 25% reported valuing the use of conceptual models in supporting their professional practice. The findings also suggested that the value and use of models declined the longer the participant had practiced as an occupational therapist. The concern of O'Neal et al. (2007) from the findings was the risk of practitioners formulating interventions based on inadequate information. From the findings, O'Neal et al. (2007) recommended the need for further research to understand why theory is not being used in practice. A small scale explorative study in 2002 has examined why conceptual models were not being used in practice. In this research, Elliot et al. (2002) conducted in-depth interviews with three occupational therapists. Subsequent thematic analysis of the transcripts identified several reasons why the practitioners found conceptual models difficult to use in practice. The themes included the therapist being unable to recall what they had been taught about the model, the lack of relevance of the model to their area of practice, and difficulty incorporating the model into the culture of the practice setting.

Given the importance of conceptual models, a study by Boniface (2008) examined how practitioners could be supported to adopt a conceptual model into practice. The study sought to explore the practical requirements required to incorporate the Canadian Model of Occupational Performance (2002) into a hospital setting in the UK. As part of the study,

the authors considered the approach needed to 'embed' the CMOP into the practice setting. Through cycles of action research, Boniface et al. (2008) found structures that support the use of the conceptual model have to suit the particular practice setting as these structures are the practical way therapists become engaged with the model. To achieve this, Boniface et al. (2008) concluded that time is needed to embed these structures, and thus the model, into the practice setting. The authors also suggest that time is necessary because to rush the process creates the risk of therapists using assessment tools developed as part of embedding the model without fully understanding why they are being used. Understanding why tools, or other elements of providing an intervention, are used is important because the HCPC standards state that therapists have to be competent and have the appropriate level of knowledge to be able to assess the individual and to deliver the intervention safely (HCPC, 2016).

Role of assessment tools in home modification practice

This study of Boniface et al. (2008) highlights how assessments developed from conceptual models can support the practitioner to assess and analyse occupational need. Fawcett (2013) has written extensively on the purpose and role of assessment in occupational therapy practice. She describes the purpose of the assessment at the beginning of the occupational therapy process as helping the practitioner gather relevant information about the person's occupational performance and participation so that the appropriate intervention can be chosen. Later in the occupational therapy process, assessments can also help the therapist to structure their observations, which helps them to identify the intrinsic and extrinsic factors affecting occupational performance and participation and this ensures the intervention is delivered in the appropriate way (Fawcett, 2013). For example, a practitioner will initially use an assessment to understand the factors impacting on the person's activities of daily living and this will identify if a home modification is the appropriate intervention to improve the person's occupational performance or participation. During the intervention phase of the occupational therapy process, the practitioner will assess the person in the environment to establish how the modification should be designed, so that it improves the person's ability to perform or participate in the occupation when installed.

When collecting data during an assessment, whether it is during the evaluation or intervention phase, Fawcett (2013) recognises that occupational therapists are highly

skilled at combining 'knowledge, experience, creative and original thought' (Fawcett, 2013 p32). Despite this skill, Hagedorn (1995) recommends practitioners be guided to collect good quality assessment data as it is this information which is pivotal to the decision the practitioner makes regarding the choice of intervention and how the intervention will be administered / provided. This argument is supported by Iwarsson and Stahl (2003) who conclude that an inadequate approach to assessment and the collection of relevant data during the home modification process by occupational therapists, risks installing facilities that do not address the actual problem, and, perhaps, that the person does not want.

To guide practitioners, Fawcett (2007, p.390) suggests that the use of standardised assessments, as unstructured or 'home grown' tools developed to meet the needs of individual client groups or practice environments, lack the validity and reliability of standardised assessments. In the field of home modifications, a number of standardised assessments have been developed to support practitioners to engage with conceptual models, specifically assessments designed to ensure that the occupational therapist has a good understanding of the factors that are impacting on the person's performance of an activity in the built aspects of the home environment. A number of these assessments were identified and discussed in the previous chapter, for example the Enabler (Iwarsson, 1999) and I-Hope (Stark, 2010). In a book on occupational therapy and home modification practice, Ainsworth (2010) recommends a range of standardised assessments that practitioners can use, from standardised tools that help to identify occupational need during the assessment phase, to standardised assessments that support with the design and construction of a home modification. This list is provided in Appendix 4.

If practitioners do not use standardised assessment, they are at risk of not fully capturing the data upon which the conceptual models are based, making it more difficult for the practitioner to fully decode what they are observing (Fawcett, 2013). A number of studies in the field of home modifications have considered the issue of collecting relevant data during the process. The studies do not always make it clear as to which aspect of the process the assessment and collection of data is referring to, therefore, the following is a general discussion on assessment and data collection during all aspects of the home modification process.

One study has identified the importance of assessment tools that ensure the practitioner collects information about all concepts that underpin the models of practice. In a study by Steward (2000) she concluded that therapists should collect a broader range of PEO factors when designing a home modification. Steward's (2000) recommendations came from the findings of a mixed methods study that sought to understand the experience of people who had to change the home environment to accommodate their employers' need for them to work from home. The study collected data initially when the person first made changes to the home environment and then five times during the course of a six-month period. Although the 54 participants did not have a disability, Steward (2000) argued that the findings were still relevant to occupational therapy practice because, like a disabled or older person, the workers were having to make changes to the home environment at the request of another person, namely the employer. In the findings, Steward (2000) observed how employers failed to have regard for the conflict between the employee and with other members of the household due to the changes they were forced to make to the home, as one worker explained "I just couldn't conceive of having a bigger room and the children having a smaller room. I just couldn't see that as being right" (Steward, 2000, p.107). A recommendation from the research identified that occupational therapists should not only be collecting assessment data relevant to improving functional performance but they also need to collect information about the potential impact of the modification on other members of the household as well as the value and meaning the person places on their home.

A number of studies have also attempted to identify which elements of the PEO model occupational therapists should consider when designing home modifications. For example, in a qualitative study, Aplin et al. (2013) investigated the PEO dimension that practitioners should consider when they are involved in modifying a person's home. To do this, Aplin and her colleagues interviewed 44 people who had received a home modification. Through the thematic analysis of the interview transcripts, Aplin identified the PEO factors that the therapist considered, or did not consider and which contributed to the person's satisfaction or dissatisfaction with the home modification. The findings from the study suggested that a person's satisfaction with a modification occurs when the design incorporates the PEO concepts associated with how the built environment can be modified to enhance a person's safety and independence. However, dissatisfaction will arise when the occupational

therapist fails to use PEO concepts associated with how the built environment contributes to the meaning and value the person places on their home.

Similarly, in an earlier study, Heywood (2004) attempted to identify the PEO concepts that the occupational therapist should be considering in their practice. To do this, Heywood conducted a secondary thematic analysis of data gathered from a previous study on home modifications (Heywood et al., 2001) which had involved structured interviews with participants who had received a home modification. Heywood (2004) identified the factors that contributed to the success or failure of the modification. Failure was defined by the person and related to how the home modification had, or had not, improved their ability to perform activities of daily living and the effect on quality of life. Through the thematic analysis, Heywood identified ten concepts participants identified as contributing to the success or failure of the home modification. It could be argued that the data analysis used by Heywood was weak; for example there appears to have been no peer or member checking of the concepts she generated. However, when Heywood's concepts are compared to those in the Occupational Therapy Intervention Performance Model (OTIPM), there appears to be a similarity between the two. To illustrate this argument, the concepts identified by Heywood (2004) have been shown alongside the corresponding PEO elements of the OTIPM (Fisher, 2009) in Table 6.

Heywood Concepts	OTIPM PEO Concepts
Need to have values recognised Need for some element of choice	Values, beliefs, and spirituality
Need for relief from pain, discomfort, and danger	Body functions (e.g., memory, cognitive and perceptual skills, motor planning / praxis skills / emotional stability / regulation, joint mobility / muscle power, fine motor coordination, speech production, pain modulation)
Need to minimise barriers to independence Provision for children, provide growth for change, need for space Need for light	Required spaces Required tools and materials Required steps and timing Required actions Characteristics of available virtual resources / technology Characteristics of available spaces, tools, and materials
Need for other family member and of the family as a whole Need for good communication as part of giving choice	Characteristics and expectations of people who are present
Need to retain or restore dignity Need to be able to take part in society	Intended purpose or outcome Internalised habits, roles, and routines

Table 6 Similarity between concepts described by Heywood (2004) and Fisher (2009).

Influence of the practice setting and legislation / policy

Heywood (2004) concluded that the reason for occupational therapists focusing on a small number of PEO concepts appeared to be related to the practice setting. She argues that the welfare culture of Western countries creates policymakers who are not interested in addressing individual needs but are concerned with how limited financial resources can be fairly distributed. Heywood (2004) suggests that this policy culture leads to administrative systems, including systems used by occupational therapists, being designed in a way that they can 'compare need and control the demand for public policy assistance' (Heywood,

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2004, p.711). Occupational therapists are thereby focusing on a narrow range of PEO concepts in order to fulfil their role in distributing the limited resources available for the provision of state funded home modification. The following quote from a study by Sakellariou (2015a), provides evidence of what Heywood describes, as it identifies how the professional's worldview of why the person needed the modification was being shaped by the documentation which was designed to manage limited resources. Therefore, the funding decision for the modification was based on the practitioner's priority for improving the person's safety rather than the person's priority of maintaining his relationship with his wife:

> 'They [man and wife] were caught between two different worldviews: where what mattered was to be able to sleep together, and the worldview articulated in official document and enacted by professionals, where what mattered was efficiency and functionality' (Sakellariou, 2015a, p.23).

Evidence from a systematic review by Bridges et al. (2007) supports the argument made by Heywood (2004) and Sakellariou (2015a). The purpose of the systematic review was to investigate the barriers preventing older and disabled people accepting the installation of a home modification. Bridges et al. (2007) found that 'service funders typically place the highest priority on functional outcomes, but the failure of the therapists to understand the meaning of the home and not allowing for personalisation of the design can lead the client to rejecting the [modification]' (Bridges et al., 2007, p.4). Thus, resources are wasted either when the assessment is carried out by the occupational therapist but the person declines the installation of the modification, or the modification is installed but the person refuses to use it (Heywood, 2005).

Fange et al. (2012) suggests that despite the range of assessment tools available to practitioners in this field of practice, the use of them is compromised by the culture in which they work. Fange et al. (2012) comments come from a study conducted to investigate the views of occupational therapists working in home modifications services in which data was gathered from a questionnaire that was completed by 600 respondents in Sweden. In the findings, respondents reported the constant tension caused by the conflict between the profession's values and the use of standardised assessments (that are underpinned by the conceptual models) with the constraints imposed by departmental policies and funding streams.

By contrast, Fisher (2009) disagrees with the findings of Fange et al. (2012) by reminding practitioners that their practice context is one of the concepts that underpin most conceptual models of practice. Fisher (2009) supports her argument by reasoning that the practice context is part of the wider social cultural environment in which the person lives, and therefore the practitioner needs to make it explicit to the person how these departmental policies and funding criteria will influence the intervention provided. So, rather than these contextual factors impeding practice, Fisher (2009) suggests that it provides an opportunity for the occupational therapist and person to identify how these factors will influence the intervention outcomes. For example, when evaluating the design options for home modifications, these concepts provide the therapist with opportunity to discuss how any funding criteria will influence the final design. However, Fisher (2009) also recognises that practitioners should to be given the necessary theoretical tools and structures to support their practice. Thus, when developing the process framework that accompanies the OTIPM, Fisher included 'identify resources and limitations within the client-centred performance context' (Fisher, 2009, p.16) during the initial assessment / evaluation phases in order to ensure that practitioners considered, with the person, how factors such as the practice setting influence all aspect of the process including how this might impact on the delivery of the intervention.

3.2.2 Analysing and prioritising occupational need in co-operation with the person – collaborative goal setting

Before discussing the literature on analysing and prioritising occupational need in co-operation with the person, it is necessary to explore the importance of setting collaborative goals through a co-operative relationship. Duncan (2011) describes goal setting as an important part of the occupational therapy process because it identifies what the intervention aims to achieve in terms of improving the person's functional health and well-being. Setting the goals for the intervention also provides the benchmark by which the therapist and the person can monitor and measure whether the intervention has achieved the desired outcome or whether the intervention needs to continue. Duncan (2011) suggests that the goals be written collaboratively with the person, and that they are clear and measurable.

Turner (2003) asserts that collaborative practice is an essential skill for practitioners to develop. Without this skill the occupational therapist is unable to develop the type of

sensitive relationship where the older or disabled person feels able to identify the occupations that they want, need and have to do, in addition to the factors contributing to their difficulties in performing and participating in these tasks, and the goals they want to achieve from the intervention (Turner, 2003). This skill involves allowing the person to have autonomy and choice over the decisions they make when setting their goals for the intervention (Law et al., 1995; Creek, 2003). Essentially, for the intervention to be effective, the collaborative relationship also needs to ensure goals chosen by the person are congruent with the roles and responsibilities they have in the family and as a member of a community (Fisher, 2009).

Collaborative practice in the home modification process

Two studies (Horowitz, 2002; Johansson et al., 2009) have examined the benefits of a collaborative relationship between the person and the occupational therapist on interventions involving home modifications. Research by Horowitz (2002) involved a case study design of two participants going through the home modification process. From the rich data collected from the researcher's observations it was noted how the collaborative relationship between the occupational therapist and person was of particular importance for developing and understanding how the modification would improve the person's daily routine and the impact it would have on how the person felt about their home. Horowitz (2002) concluded that whilst the construction of the modification had been relatively simple, it was the relationship between the person and the practitioner that had made the design of the modification successful.

In a study by Johansson et al. (2009), the purpose of the research was to gain an understanding of the older person's experience of the process of having a home modification installed. To do this the researchers conducted four in-depth interviews with older people who had received a modification through the state funded system in Sweden. The findings suggest that whilst the participants were aware that the modification was primarily being designed with the goal of improving their functional ability to perform an activity of daily living, participants valued the way the therapists had conducted the collaborative process with them. The researchers reasoned this was because the relationship enabled the person to express the complexity of their daily lives to the occupational therapist and that this was then taken into account in the design of the modification. Johansson et al. (2009) concluded that the participant's active involvement in

the process alongside the collaborative relationship with the occupational therapist whilst not always easy, due to the differences that arose at times between participants' views and the therapists' opinions, it is an important aspect of a person accepting the need for a home modification and then using it once installed.

When designing and constructing a home modification, the involvement of the carer appears to be an important part of the collaborative relationship, particularly for people with cognitive impairments. This was evident from the finding from a Random Control Trial (RCT) by Rose et al. (2010). The RCT was evaluating the delivery of the ABLE intervention, which is an intervention that involves occupational therapists working with a person with dementia, and their carer, to identify environmental strategies to improve performance in activities of daily living. These environmental strategies include decluttering the environment and the installation of home modifications. This particular study aimed to identify the factors that contribute to a person's readiness to accept changes to their home environment. 148 participants were randomly assigned to either the intervention group or the control group. The intervention group received five sessions of ABLE, however the authors do not indicate what the control group received. To identify the factors contributing to a person's acceptance of changes to their home environment binary logistic regression was used as the main tool of analysis. The main finding from the study suggested that people were more likely to accept home modifications where the occupational therapist had used a collaborative approach with the carer when exploring the benefits of modifying the home environment. It appears that when the carer and occupational therapist collaborate, it enables the carer to then reinforce to the person with dementia what the occupational therapist has advised, helping them to accept the modification.

A study by Mayes et al. (2011) also illustrates the importance of including the carer in the collaborative relationship. Taking a grounded theory approach, Mayes et al., conducted in-depth interviews with 80 mothers of children with disabilities. The purpose of the study was to gain insight into how caring for a disabled child influences the mothers' use of the space in the home environment. During the interviews, a number of participants described the emotional and psychological impact of the home being modified to meet the child's physical needs, and that it was important for the participants to overcome this so that the child could be integrated into the daily routines. Mayes et al. (2011) concluded that the occupational therapist's collaborative approach to practice was essential for understanding

the emotional impact of the home modification process. This sensitive approach allowed the practitioner to build a relationship with the mother, and through this relationship the practitioner was then able to understand the roles and responsibilities of both the child and parent, then using this information to ensure that the design and construction of the modification integrated the child in to the family's daily routine.

Few quantitative studies have attempted to evaluate the effectiveness of the collaborative relationship on the success of home modification process used by occupational therapists. However, a study by Cumming et al. (2001) appears to imply the there is a need for a collaborative approach. In this Australian study, the aim of the research was to establish whether people carry out home modifications following recommendations made by occupational therapists. The study involved 148 participants who received a home visit from an occupational therapist. During the visit, the occupational therapist made recommendations for reducing the risk of falls by improving the home environment, including the removal of rugs, purchase of better fitting footwear, and the installation of home modifications. After one year, participants were followed up to see if they had adopted the recommendations. On analysing the data, only 52% of people had adhered to the recommendations made by the therapist. The findings were analysed by statistically comparing the group who had untaken the recommendations with the group who had not. From this comparison, no statistical difference between the two groups could be established such that Cummings et al. (2001) concluded there was some evidence to suggest that adherence was more likely to occur when a person agreed with the occupational therapist that the home modification would reduce the risk of falling. Therefore, based on this finding, it appears that modifications are likely to be accepted and used by the person if the occupational therapist develops a relationship where they fully understand why the modification is required or designed in a particular way.

Lack of collaborative practice

Surprisingly, in studies where research participants have acknowledged the positive contribution that the collaborative relationship has made to the process, some of these participants have suggested that their level of involvement has been inadequate, and a study by Picking and Pain (2003) is an example of this. In this study, the researchers conducted focus groups with 17 people across three groups. In the findings, participants were predominantly positive about the relationship they had with the occupational

therapist and there was general agreement that occupational therapists were the appropriate professionals to lead the modification process as it was the collaborate approach used by the occupational therapists that enabled the participants to cope with the process of having their homes modified. However, despite this positive finding, a number, although the authors do not state how many, of participants expressed a desire to be more involved in the process.

A number of studies have found that the collaborative relationship between the occupational therapists and person has a negative impact on setting and achieving the goals for home modifications. One qualitative study by Sapey (1995) involved interviews with 11 disabled people. The aim of the research was to investigate the participant's experience of how their housing needs had been considered and viewed by different professionals involved in housing in one local authority area in the UK. A particular participant, Mike, described the dissatisfaction caused when the occupational therapist failed to involve him in the choice of modifications. Sapey (1995) explains how Mike had requested a modification where his personal goal had been to improve his ability to access the property. Mike describes how he had wanted a ramp to the door to be installed so that he could be independent in getting his wheelchair in and out. Instead, the builder followed the recommendations from the occupational therapist and fitted two building blocks - making the steps shallower. Mike indicates that no explanation or rationale was given by the occupational therapist as to why the modification had been constructed in this way. Following the installation of the modification, Mike reported continuing to need to have help from his wife to negotiate the step in and out. Mike's overall experience left him feeling he had had no choice or control over the modification installed and this left him dissatisfied that his goal for greater independence had not been achieved because he was still dependent on others to help him get in and out of the property. Due to the research design, the rationale for the occupational therapist's behaviour was not discussed by the researcher and therefore the reasons for the decision could not be examined.

A study by Nocon and Pleace (1998) has investigated the collaborative relationship from both the perspective of the person needing the modification and of the occupational therapist involved in the case. The aim of the study was to identify the issues that should be taken into account if the housing needs of disabled people were to be adequately addressed by one local authority area of the UK. This qualitative study involved 22 disabled

people across three focus groups, as well as one-to-one interviews with professionals including occupational therapists. Consistent with the findings of Sapey (1995), the lack of choice and control the participants felt they had been given during the home modification process was a theme identified by the researchers, such that occupational therapists were specifically criticised for 'imposing their own ideas' of what modification should be installed and 'taking over' the process (Nocon & Pleace, 1998, p.365). In defending the behaviour of occupational therapists, one practitioner participant suggested it was necessary to take over due to the complexity of the process. Furthermore, she needed to impose her ideas because the person requiring the modification did not want to consider their future needs when considering the goal for the modification which she argued was necessary to ensure that public money used to fund the modification could be spent appropriately in funding a long term solution. This supports the earlier observation of Johansson et al. (2009) where developing a collaborative relationship was challenging due to the differences that arose between the participants' views and the opinion of the occupational therapist.

The negative impact of not giving choice and control to the carer when identifying the occupational needs and goals for the modification has been identified by Heywood (2005). Based on her seminal research (Heywood et al., 2001), evaluating the effectiveness of home modifications, provided mainly through a Disabled Facilities Grant (DFG), 104 in-depth interviews were conducted with carers of people who had received a home modification. From one of these interviews, she describes a situation where a mother had requested a modification to help reduce the risk of carrying her disabled child upstairs to the bedroom. The mother reported her preference had been for an extension to the property, however, the occupational therapist had recommended a through-floor lift which is what was installed. Despite the installation of the lift, the mother continued to carry her child up the stairs. Although the mother did not state why she continued to risk carrying the child upstairs, Heywood (2005) reasoned it was due the occupational therapist not fully understanding the occupational needs and goals of the child and mother, and how these might have influenced the mother's preference for an extension. From this, and other examples from her research, Heywood (2004) concludes that money is being wasted in providing modifications that are 'at best not useful, [and] at worse harmful' (Heywood, 2004, p.711).

The most recent research of people's experience of applying for a Disabled Facilities Grant continues to identify issues with the occupational therapists' understanding of people's occupational needs through a collaborative relationship with the person. In a research design involving a case study, Sakellariou (2015a) explored the lived experience of one couple involved in applying for a state funded home modification. Whilst there was agreement between the couple and the professionals as to the type of modification which should be installed (a through-floor lift), there was disagreement between them as to why the modification was required. For the person, the occupational 'need' was primarily about the emotional and psychological benefits he gained from sharing the same bedroom as his wife. However, the professionals, including the occupational therapist framed the need in terms of providing access to a bedroom. Whilst it could be argued that despite the difference of opinion described above the appropriate modification was eventually installed, however, Sakellariou (2015a, p.22) argues that the couple 'had to work hard' to frame their needs in a way that the professionals would recognise, and this does not appear to support the skilled collaborative relationship espoused by the occupational therapy profession and described earlier in this section.

In the specific context of the Disabled Facilities Grant, the government guidance published to support the delivery of DFG (DCLG, 2006) reinforces the importance of involving the person and carers in the process of designing and constructing home modifications. Furthermore, they recommend professionals develop a collaborative relationship to enable the person to have the power and opportunity to make their own choices and decisions about the design of the home modification. If professionals act in this way, the guidance states that the outcome will be a home modification that provides an individualised solution to meet the person's goals and occupational needs. Therefore, it appears the guidance supports the values underpinning the core skill of collaborative practices identified by Law et al. (1995) and Creek (2003) discussed earlier in this chapter.

However, Sakellariou (2015b) challenges the rhetoric of social care legislation and DFG guidance based on his findings from a detailed account of one person's experience of negotiating the installation of home modifications to address her difficulties experienced due to Motor Neurone Disease. Through a number of encounters over an extended period, the participant described her struggle to have her choice of modifications be recognised and accepted by professionals. Sakellariou (2015b) describe how this situation still arose

despite control and choice being a unique core skill of a collaborative relationship of occupational therapy and the government guidance supporting the person's right to have choice and control over what they identified as being necessary to support their functional health and well-being. Based on the previous study discussed earlier in this chapter, Sakellariou (2015a) concluded that the professions' ability to collaborate in the way that the profession espouses will continue to be compromised wherever occupational therapists are put in a position where the person's 'choices involve funding, and thus needs [have] to be established as both necessary and cost-effective' (Sakellariou, 2015a, p.50). Here Sakellariou (2015a) is referring to the DFG guidance and its underpinning housing legislation, which supports the funding of home modifications where a welfare authority and the local authority housing department deem it to be cost effective, necessary, and an appropriate solution to enable the person to access essential facilities in the home (Housing Grants, Construction and Regeneration Act 1996, DCLG, 2006). Again, this is a situation where Fisher (2009) would remind practitioners that legislation is part of the practice context and as such it should not be viewed as a barrier to collaborative practice.

3.2.3 Facilitating occupational performance / engagement - interventions and home modification process – intervention phase

As stated earlier in this chapter, the practice skill, or intervention approach (Boniface, 2012), is the visible element of occupational therapy practice and is what the practitioner employs in collaboration with the person to improve functional health and well-being. Influenced by the conceptual practice model, the occupational therapist is using the intervention to restore, maintain, or improve the person's ability to perform or participate in occupations (Fisher, 2009; Iwama & Turpin, 2011). Boniface (2012, p.27) describes how the intervention approach is the 'practical link between the [conceptual] model of the profession and the practitioner's actions.' Therefore, the intervention (or practice skill) is what the occupational therapist is seen doing with the person to improve performance and participations in an occupation. When applied to home modifications, the practitioner is seen supporting and advising the person and housing professional during the different phases required for the design and construction of a modification which, when installed, will restore, maintain, or enable the person to acquire the ability to perform or participate in occupations.

Unlike other interventions provided by the occupational therapist, when using home modifications as an intervention, practitioners require the support of professionals outside the health and social care sphere to ensure the that modification installed provides an effective outcome. This is because both occupational therapy knowledge, alongside design and construction principles and techniques (including the design and construction process) to modify the architectural features of the home, is required, since this construction knowledge and techniques is not taught as part of the basic training of occupational therapy students (Bridges, 2010; Steinfeld, 2012).

When using a particular approach to practice, the College of Occupational Therapy's Code of Ethics (2013) states that the occupational therapist should have the relevant skills and knowledge to perform the intervention. However, as stated at the beginning of this Chapter, very little published work has made visible the skills and knowledge required of the occupational therapists in this field of practice, and there is little guidance as to how the intervention should be conducted. A number of text books have been published (Sanford, 2012; Ainsworth and de Jonge, 2010; Clutton et al., 2006) on the role of the occupational therapist in the design and construction of home modifications. For example, Occupational Therapy in Housing (Clutton et al., 2006) was published with the support of College Occupational Therapy Specialist Section in Housing. It was written with the aim of providing 'occupational therapists with firm foundations on which to build their understanding and practice in housing' (Clutton et al., p.xi). However, none of the contributors to the chapters is a built environment professional.

Knowledge needed to support professional reasoning in home modifications

A review of the literature for this thesis indicates that only two studies have empirically investigated the types of knowledge the practitioner requires when providing home modification as an intervention. The study by Stark et al. (2015) used a multi-methods approach with the aim of identifying the knowledge practitioners require in order to support their professional reasoning during the home modifications process. Phase 1 of the research involved focus groups, field observations, and key informant interviews with occupational therapists with a view to generating a list of the intrinsic and extrinsic factors required by occupational therapists to support their professional reasoning during the home modification process. The second phase involved expert peer review of the list from six international experts in the field of modifications. The experts were asked to rate the

relevance of each of the factors identified in the first phase. From the analysis of the two phases, Stark et al. (2015) concluded occupational therapists should have knowledge of a range of intrinsic and extrinsic factors related to the field of occupational therapy, design, and construction and these have been listed in Table 7 below.

Intrinsic knowledge used by occupational therapists to support professional reasoning in the design and construction of a home modification	Extrinsic factors knowledge used by occupational therapists to support professional reasoning in the design and construction of a home modification
• Clinical course of the disease • Personal assistance [carers] preferences • Ability to maintain home modifications • Readiness for change and compliance • Concerns for aesthetics • Compliance • Literacy	• Financial Resources • Personal assistance available • Social support • Lives with others • Structural condition of the home • Housing type • Available space and layout • Portability of any equipment

Table 7 Professional reasoning and knowledge requirements when designing and constructing a home modification (Stark et al., 2015).

The research by Stark et al. (2015) highlights that occupational therapists need the support of a building professional as the therapist lacks the training and competence to be able to structurally design and construct a home modification (Bridges, 2010; Ainsworth, 2010). Likewise, the building professional needs the knowledge of the occupational therapist to understand how and why the design and construction of the modification will improve the person's participation and performance in activities of daily living (Pynoos, 1998).

This combination of occupational therapy and built environment knowledge was noted to be a positive factor in ensuring modifications were appropriately designed and constructed in research conducted by Nord et al. (2009). As part of a case study designed to compare six individual modification schemes, the researchers interviewed the person, the occupational therapist, and building professional involved in each project. From the findings, the researchers concluded it was the collaboration of the occupational therapist and the builder which ensured an appropriate modification was installed. Also, important in the success of the modification was the ability of the occupational therapist to use their

knowledge to present a rationale to the person as to why the modification should be designed in a specific way. It was this skill that Mike, the participant in Sapey's (1995) study (discussed previously) complained was lacking from the occupational therapist involved in his case. Nord et al. (2009) also found that the occupational therapist acted to help the person understand the design and construction process, and whilst a number of the older people wanted more involvement in the process (Nocon & Pleace, 1995), all participants felt that the occupational therapist had acted in their best interest, particularly as they found the process complex to manage.

Complexity of the home modification intervention / process

The complexity of the home modification process has been mentioned in the general literature on home modifications and from findings from empirical studies of the home modification process. A discussion paper from Pynoos et al. (1998) on improving the delivery of the modification process in the USA describes the process as involving a number of phases, involving various professions resulting in a home modification process that is largely unplanned and unsystematic:

> 'The delivery of home modifications is a process that involves information and referral, assessment, planning, funding, implementation and follow-up. Rather than describing it as a system, the delivery of home modifications is best characterised as a patchwork of services, involving an immense diversity of potential groups and individuals, types of modifications and methods of service delivery. The term patchwork thus refers to the relatively unplanned and uncoordinated nature of delivering home modifications' (Pynoos et al., 1998, p.4).

Whilst Pynoos et al. (1998) was commenting on the delivery of home modifications in the USA, similar concern has been raised about the process used in England. In a study considering the influence of changes to community care practice in the late 1990s, Adams (1996, p.115) described the process as 'complex and can involve a variety of agencies and procedures from start to finish'.

In a later paper, discussing what a systematic and interdisciplinary approach to home modifications would include, Pynoos et al. (2002) suggest a barrier for occupational therapists in contributing to an effective home modification process is that they do not know how their role aligns with the design and construction process involved in installing home modifications. The authors suggest occupational therapists will only be able to effectively contribute to the delivery of home modification services once they know how

their skills and knowledge can contribute to the design and construction process. Pynoos et al. (2002) conclusions are supported by Klein et al. (1999) from an earlier single case evaluation study of a home modification service in the USA. In the following quote, Klein identifies how the occupational therapist's lack of knowledge of the design and construction process was resulting in tension between occupational therapists and building professionals. Whilst Klein et al. (1999) acknowledges the role of education in improving this issue, Klein suggest that is specifically education through joint visits, in which each professional has opportunity to make visible their professional knowledge and expertise to the other professional that the researchers identify as being the solution.

> "The OT often believes that, if they can imagine it, PCA construction staff can make it happen. This assumption can lead to confusion and frustration between the therapist and the construction manager. The team needs more than a basic knowledge of construction if it is to create and implement adaptations in buildings with brick party walls, claw footed iron bathtubs, unheated ''shed kitchens'' or 12 marble steps leading to the front door. For the programs that provide major modifications, whenever possible, a joint evaluation with PCA's construction manager takes place. During these assessments, a better understanding of each professional's expertise emerges and detailed construction issues become clarified' (Klein et al., 1999, p.25).

The American Occupational Therapy Association (AOTA) Occupational Therapy Guidelines for Home Modifications, to be discussed later in this chapter, provides a description of the home modification process but this aligns with the occupational therapy process only. Ainsworth and De Jonge (2010) provide a description of the process in their book on the role of occupational therapists in this field of practice. They describe the process as having the following range of tasks:

- Receiving and analysing the referral information
- Prioritising referrals
- Arranging the home visit with the client
- Preparing the home visit
- Travelling to the home and meeting the client
- Entering the property
- Interviewing the client
- Inspecting the home
- Measuring the client and his or her equipment / or the care giver

- Photographing, measuring, and drawing the built environment

- Planning, selecting and negotiating a range of interventions

- Concluding the home visit

- Seeking technical advice

- Writing the report and completing drawings

- Submitting the report to the referrer

- Educating and training the client in the use of the home modification

- Evaluating the home modification after installation

Ainsworth and De Jonge (2010, p.89).

Ainsworth and De Jonge (2010) do not indicate how they developed this process, and whilst they provided a description of each task, it is not explicit how each task relates to the four phases of the occupational therapy process (Duncan, 2011). The authors make the following statement about the use of their process.

'Occupational therapists can enter and exit at various points of the home modification [process], depending on the type and level of service required by the referrer, their level of expertise and the expertise of the stakeholders involved in the process' (Ainsworth and De Jonge, 2010, p.89).

This statement is of concern since it does not foster the logical route (Duncan, 2011) the occupational therapy process is designed to support and discussed at the beginning of this chapter, nor does entering and exiting the process assist the occupational therapist to operationalise or make visible their involvement in the process, again the importance of which was discussed earlier.

A number of authors have called for the profession to consider providing a better description and making the role of the occupational therapist in this field of practice more visible. For example, Forsyth and Hamilton (2008) came to this conclusion following a study involving 56 occupational therapists in social care in England and Scotland. It is acknowledged that occupational therapists working in social care are frequently involved in providing home modifications as an intervention (Riley et al., 2008). One of the objectives of the Forsyth and Hamilton (2008) study was to understand the role of occupational therapists in social care from the practitioner's perspective. The findings identified that participants were failing to use conceptual models and standardised assessments to underpin their practice. Participants also reported that they lacked the time and financial

resources to do their role effectively. One of the recommendations from the study identified the need to support the occupational therapists making more explicit the role of the profession and to explore ways practitioners could become more occupation-centred. By 'occupation-centred' the authors are referring to the use of structures that support practitioners to conduct their role in accordance with the profession's worldview of occupation and the unique reasoning skills underpinning professional practice (Fisher, 2013).

The study discussed previously by Fange et al. (2009) which investigated the views of occupational therapists of the home modifications process in Sweden, found a number of practitioners wanting a more standardised approach to the whole of the home modification process. Of the 600 participants who completed the questionnaire, 85 respondents identified this requirement. However, the authors addressed this issue by focusing on the need to support practitioners to know when and which standardised assessment tools to use at the various phases of the process. Other findings from this study support the literature discussed elsewhere in this chapter, for example, the researchers identified therapists not using standardised assessment to support their professional reasoning; the complexity of the process being increased by the communication and relationship difficulties with other professionals involved in the process.

Fange and Iwarsson (2005) also support the need for occupational therapists to consider ways in which to improve the effectiveness of the occupational therapy process for home modifications. In a longitudinal study involving 131 participants, the authors evaluated the changes in accessibility and usability of the home environment for older people following the installation of a home modification. The results of this study demonstrated the improvements people experienced in how they accessed and used the home environment in performing activities of daily living. Despite the positive findings, the authors challenged occupational therapists, due to the complexity of this area of practice, to find ways to 'implement systematic assessment, intervention, and evaluation strategies into their practice' (Fange & Iwarsson, 2005, p.57). However, Fange and Iwarsson (2005) do not provide any suggestions about the ways in which occupational therapists could implement a more systematic approach to practice. Iwarsson (2015) suggests a possible reason for this by stating that it is difficult for the process to be standardised as each country provides and

funds home modifications in different ways as well as design standards and regulations being different in each country.

Unlike Fange and Iwarsson (2005), Grisbrooke and Scott (2009) have gone some way to describe how occupational therapists could achieve a more systematic approach to this field of practice. The aim of the study was to identify the types of support occupational therapists working in local authority housing teams require in roles where they work directly alongside built environment professionals. Grisbrooke and Scott (2009) conducted semi structured interviews with occupational therapists working in local authority housing teams. As with the earlier study by Forsyth and Hamilton (2008), the findings highlighted participants wanting a clearer description of their role, and to do this the researchers suggest the profession should consider ways to amalgamate the occupational therapy process into the wider design and construction processes being used by the wider housing teams.

Use of guidance and other practice tools to support the home modification process

When providing interventions, the College of Occupational Therapy states '[any] advice or intervention provided should be based upon the most recent evidence available, best practice, or local / national guidelines and protocol' (COT, 2010, p.17). Stergiou-Kita (2010) describes how practice guidelines are important because they 'assist the practitioners and patients in making decisions about appropriate health care for specific clinical circumstances' based on the best evidence (Stergiou-Kita, 2010, p.76). The only guidance on home modifications available to occupational therapists in England and discussed previously, is concerned with the services delivering home modifications funded through the Disabled Facilities Grant first published by the DCLG in 2006 and updated by the Housing Adaptation Consortium in 2013. This guidance is not based on best evidence in terms of occupational therapy best practice as it is only designed to provide advice to stakeholders as to the ways in which services should be designed to deliver efficient pathways for the delivery of the DFG.

The use of clinical guidelines and protocols is one of the ways occupational therapists support and develop effective professional reasoning. Unsworth and Barker (2016, p.1) define professional reasoning as the 'thinking processes used by occupational therapists when planning, conducting, and reflecting on their practice.' Rogers (2010) identifies

professional reasoning as an essential part of professional practice, as it ensures the decisions made by practitioners are appropriate and therefore do not endanger the person receiving an intervention from the occupational therapist. The only profession-specific guidance on home modification was published in 2015 by the American Occupational Therapy Association (AOTA) and it was developed from evidence based literature alongside knowledge from practitioners (AOTA, 2015). It provides a description of the roles and responsibilities of the practitioner during the design and construction of the home modification and it has used the Environmental Press model as the overarching theory to describe how home modifications improve health and well-being. The Guidance does not specify a conceptual model on which the practitioner should structure and 'make sense' of what they observe, as well as what they need to consider during the different phases modifying the home environment. However, when describing and analysing the factors that contribute to the performance of an occupation, the Guidance uses the same terms described in the Occupational Therapy Intervention Performance Model (OTIPM) - activity demands, space demands, social demands, required action, performance skills, tools, and resources (AOTA, 2015, pp27-28). As with the OTIPM (Fisher, 2009), the Guidance also suggests how home modifications can be used as a method of preventing, restoring, maintaining, or acquiring the ability to perform an occupation. Similarly, the Guidance uses the following headings to describe the process and this incorporates elements of the traditional occupational therapy process, but unlike Ainsworth and De Jonge (2010) it has not made explicit reference to the design and construction elements of installing the home modification:

- Referral
- Evaluation
- Occupational profile
- Analysis of occupational performance
- Areas of occupation performance skills
- Client factors
- Performance patterns, context and environments
- Intervention planning
- Review of the home modification installed (AOTA, pp27-28).

Whilst this Guidance is a useful addition to the home modification literature, it provides only broad description of the role and process used in interventions involving home modifications. Unlike the GDCPP (Cooper et al., 1998), the guidance does not clearly state the key questions the practitioners need to consider at each phase, the tasks involved in each part of the process, and the outcome of each of the phases involved in the modification process.

The Adaptation Design and Communication Toolkit published in 2014 by the Department for Social Development and Health and Social services and Public Health in Northern Ireland is a further example of guidance. The development of this toolkit involved cross professional collaboration between both occupational therapists and built environment professionals. It not only provides guidance on what information the occupational therapists need to provide but it has attempted to simplify the process. It has done this by matching the type of impairment the person might have with suggested home modification solution, alongside the spatial requirement for each type of modification solution. It also guides the therapist as to when they may need to consider a more enhanced design solution. Again, this is a welcome addition to the home modification literature, particularly given the detail of information that is included and evidence base on which the modification templates have been developed. However, the document has been developed for housing practitioners in Northern Ireland, thus the Forms and Templates appear to reflect specific departmental needs and the authors do not identify the conceptual model on which the document is based. Also, there is no clear description of the process involved in each of the phases of the process.

The use of professional guidance, as well as assessment tools, has been identified as an important aspect of developing the professional reasoning skills of occupational therapists working in the field of home modifications. DuBroc and Pickens (2015) conducted interviews with 8 occupational therapists with a range of expertise working in the field of home modifications. From these interviews they were able to produce a model to illustrate how practitioners reasoning developed over time and the model is shown in Figure 12. It illustrates how novice practitioners are initially dependent on the knowledge gained from their undergraduate training; then during their undergraduate training, and when first practicing in this field of practice they further develop their reasoning skills through the experience of working with other practitioners. Further along the continuum, practitioners

use a systematic approach to guide their reasoning. The systematic approach ensures that the practitioners follow the appropriate process in the design and construction of home modifications, and in this stage the practitioner uses guidelines and assessment tools to support professional reasoning. As the practitioner gains experience and confidence, DuBroc and Pickens (2015) describe how practitioners become less reliant on the systematic approach because the reasoning skills developed from the structured approach become habitual and holistic in nature. They argue that the advantages of a habitual and holistic approach to professional reasoning is that the practitioner is able to be more person-centred because they are not distracted by having to rigidly follow the process and guidance, which can be a distraction from actively involving the person in the intervention.
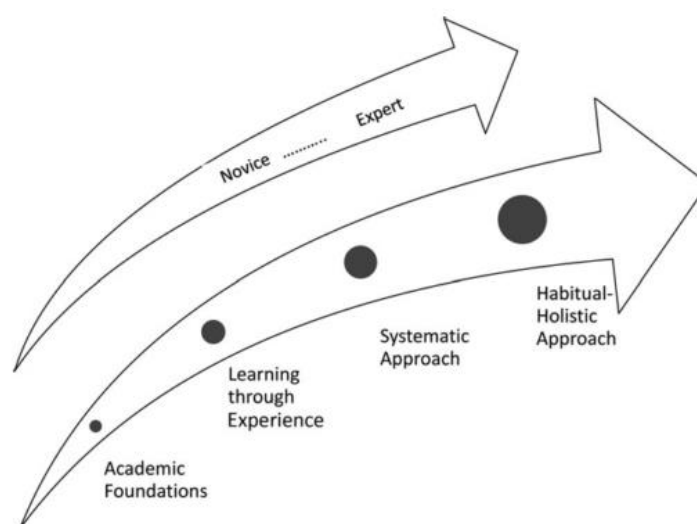
Figure 12 Model of development and reasoning in home modifications (Dubroc, 2015).

Stergiou-Kita (2010) has made a number of recommendations of how practice guidelines can be adopted into practice. These recommendations are based on a literature review of the effectiveness of implementing guidelines in professional practice. From this study, they concluded that guidelines should not be complex; they should be designed to be congruent with the field of practice they are to be used in; they should be explicit in defining what needs to be done and how it should be done; and what the outcome of each element of the intervention should be. Rather than a guideline, Blanche et al. (2011) recommends the use of a protocol because protocols:

> '…help clinicians focus on what is important, specify intervention procedures, delineate the theoretical rationale behind treatment, and contribute to the evolution of the intervention by explicating the reasoning process necessary to solve clinical dilemmas' (Blanche et al., 2011, p.712).

Protocols have been used successfully in studies to improve the interventions provided by occupational therapists. For example, Kuipers and Grice (2009) successfully used a protocol to improve the clinical reasoning skills of novice practitioners using a specific assessment to identify appropriate interventions to reduce upper limb hypertonia. Similar to the Generic Design and Construction Process Protocol (Cooper et al., 1998), this protocol was designed to describe a series of steps that the occupational therapist should to follow in order to conduct the assessment and then take action to develop collaborative goals with the person. The researchers analysed the result comparing the difference the use of the protocol made to the practitioners professional reasoning and they compared novice with expert practitioners' professional reasoning before and after the use of the protocol. Experts were defined as 'as an occupational therapist holding a senior position in a centre offering services to children or adults with brain injury, or nominated by peers to have relevant expertise' (Kuipers & Grice, 2009, p.420), and novice practitioners were those with 4 or less years in the field of upper limb rehabilitation. On analysing and comparing the results, the researchers concluded that the protocol improved the professional reasoning skills of the novice occupational therapist, and whilst the professional reasoning of expert practitioners did not change, the results showed their ability to involve the person in the intervention increased, thus suggesting the use of the protocol increased their collaborative approach to practice. This finding appears to contradict the later study by DuBroc and Walker (2015) discussed earlier, who argue that person-centred practice increases when the practitioner's professional reasoning becomes habitual and holistic because it is not restricted by the use of guidance. One possible explanation for the differences in findings relates to the element of person-centred practice where the practitioner needs to be able to articulate to the person the stages involved in the intervention and then explain what is happening as the intervention is being administered (Law et al., 1995). As the knowledge about the intervention becomes part of the practitioner's habitual and automatic practice they may become less aware of the reasoning they are using at each stage of the intervention, thus potentially they are less able to articulate their practice to the person. Thus, in this study (Kuipers & Grice, 2009), the protocol may have helped the expert practitioners to, once again, become aware of their practice and more able to discuss the intervention in detail with the person.

According to Boniface et al. (2008, p.537) 'theoretical structures' should be developed according to the needs of the practice setting. However, there is very little evidence to suggest current theoretical structures have been developed to support and guide the implementation of PEO concepts over the whole process involved in the design and construction of a home modification. The development of theoretical structures has predominantly been the advancement of standardised assessment. However, the assessments are not an effective tool for guiding the use of PEO concepts during the different design and construction phases involved in providing a home modification intervention. Failure to use the PEO concept in all aspects of the home modification process appears to be a contributing factor to the issues highlighted from the literature in this section. This argument is supported by Bridges (2010) who suggests that occupational therapists need to use a theoretical structure to help them to collect and use the right type of PEO information during all elements of the home modification process.

3.2.4 Evaluating and reflecting on occupation performance outcomes – evaluation phase

The final stage of the occupational therapy process is the evaluation phase. Duncan (2011, p.41) acknowledges that whilst the therapist will continuously evaluate the progress the individual is making during the intervention, 'it is the final evaluation that is often most significant' because it is the final evaluation that measures the success of the intervention against the goals that were set during that earlier phase of the process. Fishpool and Bridges (2012) identify the re-evaluation phase as a vital component of the design and construction of home modifications. They argue that the final visit made by the occupational therapist to evaluate the home modification is their opportunity to ensure that the person is using the modification appropriately and effectively. They also suggest it provides the occupational therapist with a vital opportunity to evaluate and reflect on what they have learnt from the process, which builds their skills and knowledge for the next person they work with. In design and construction this element of the process is known as Post Occupancy Evaluation, and for many it is seen as a way of learning how building performance supports those who use the buildings, and on reflecting what could have been done differently, and why (Preiser, 2010).

Best practice guidance has been developed through research for this phase of the occupational therapy process. Through a systematic review, Fishpool and Bridges (2012) aimed to provide evidence based guidance for occupational therapists conducting re-

evaluation of the home modification once installed. From the review, they concluded that the re-evaluation should check the quality of the installation work, whether the person was using the home modification correctly, whether the modification had achieved the person's goals of improving their performance and participation in the occupation, and whether it improved the person's safety whilst performing the task. They also identified the re-evaluation should be conducted within a 3 month period following the initial installation of the modification and that it should be undertaken by the occupational therapist or other suitable professional.

Similarly, in one study, it was identified that the re-evaluation of home modifications was an important part of the intervention process but there were challenges in being able to undertake this phase. The study was conducted by Cowell et al. (2007) and the findings came from a larger research project investigating the knowledge needs of occupational therapists working in this field of practice. In the following quote a practitioner who was interviewed identified the re-evaluation of the modification as an important opportunity to correct any issues with the installation of the modification. In the quote, she gives the example of a grab rail being positioned inappropriately by the building contractor and it highlights the challenges that can occur, and the issues that can arise, when communication between professionals in the process is ineffective.

> "What I usually find is that I've sent this report and all these drawings and I walk in and the rail is set diagonally in the shower up to the ceiling or something like that and what's happened and the contractor has just walked in according to the client and the client has said they'd like the diagonal rail and I'll have it here thanks, and put it in and left and Department of Housing hasn't followed it up" (in Cowell et al., 2007, p.30).

As stated earlier, reflection during the re-evaluation is an important mechanism to support the practitioner's professional development. However, from the systematic review by Fishpool and Bridges (2012) a theme from a number of the articles reviewed indicates that occupational therapists do not visit the modification once installed and often the re-evaluation is conducted over the phone. Financial and time constraints imposed by the department in which the occupational therapists were working were given for the reason for conducting the re-evaluation over the phone.

3.3 Chapter Summary

At the start of this chapter the importance of making visible the core reasoning skills, as well as the occupational therapy process involved in the delivery of home modification was discussed. Occupational therapists need to make these skills visible to be able to articulate their unique contribution to the health and social care economy, and to provide effective ethical interventions. A review of the literature has identified very few research studies that have specifically attempted to make visible both the practice skills required of therapists in this field of practice and the unique core reasoning skills required to provide effective interventions.

To be able to provide effective home modifications, a synthesis of the research literature suggests that practitioners need to have adequate occupational therapy knowledge based on a conceptual model of practice that is congruent with the concepts of design and construction. Whilst practitioners need a basic understanding of building principles, they also need to have an understanding of their role within the design and construction process as this helps them to effectively communicate with the building professionals, reducing confusion and frustration felt by them and building professionals. Having an understanding of the process assists the occupational therapist to support the older or disabled person through the process.

There has been significant development of standardised assessment tools that help practitioners to collect the right type of PEO information so that the most effective home modification is constructed. However, the literature suggests that practitioners are failing to use these tools and there is a suggestion that this is because practitioners are not always aware of when and where in the occupational therapy process they should be used. Whilst standardised assessments, based on conceptual models of practice, are important at different point of the home modification process, the literature highlights the need for the therapists to ensure the conceptual models are also informing all aspects of the modification process. For example, when recommending a particular design of modification, the concepts beyond independence and safety, such as aesthetic preferences, values, and routine, should also be considered if the risk of the person rejecting the modification is to be avoided.

The literature has identified the value of clinical protocols for guiding and improving professional practice and reasoning skills. The literature has also identified that protocols, as well as conceptual models of practice, are more successful when they are designed and structured to be congruent with the work place environment in which practitioners work. To date only practice guidance or guidance related to the delivery of home modifications services have been published. Other published material on the home modification process has either been unstructured or focused on the traditional occupational therapy process, therefore not capturing the design and construction elements of the process.

In developing a home modification process protocol, the literature indicates a need to incorporate both occupational therapy and design and construction processes. In addition, the protocol needs to provide a logical and systematic description of the therapist's role and the action taken at each phase of the process. The literature also indicates the process needs to be occupation-centred, in other words, based on the worldview of occupational therapy; be person-centred by ensuring a collaborative relationship is maintained throughout the process; and based on occupational conceptual models to support the unique reasoning skills of the profession.

The literature indicates the conceptual model chosen to support the development of a home modification process protocol needs to be compatible and congruent with services in which occupational therapists work. Therefore, it needs to ensure that the regulatory, policy and funding influences on the practitioner's role is a transparent part of the collaborative relationship with the person, so that the person is aware of how this may influence the design of the modification. The conceptual model also needs to have concepts associated with design and construction principles. As the protocol is providing a structure to the process, ideally the conceptual model needs to have clear links with the occupational therapy process. The OTIPM (Fisher, 2009; 2013) is currently the only conceptual model that provides a description of how participation and performance in occupational therapy are influenced by the interactional relationship between the person, environment, and occupation; as well as providing a description of the occupational therapy process.

Chapter 4 Methodology

4.1 Introduction

Methodology is the element of research that ensures the research process is systematic, technical, and generates appropriate knowledge, it does this by providing the 'philosophical, conceptual, and theoretical' context, and the decision made through the research process (Hammell, 2001, p.228). It is important that the researcher expresses and justifies their methodological decisions, because as Creswell and Plano-Clark argue, it allows the critical evaluation of the knowledge generated. Creswell and Plano-Clark also suggests the use of a conceptual framework to help the researcher organise, explain, and justify, their methodological decisions. This study used the research onion (Saunders, 2012) as a framework to inform and guide decisions on methodology. After providing an explanation of the research onion, headings from the onion layers are used to direct the discussion on the methodological decisions made by the researcher.

4.2 The Research Onion

A number of conceptual methodological frameworks exist, each providing a means of supporting the researcher through important methodological decisions. For example, the Four Levels for Developing a Research Study (Crotty, 1998), Figure 13, is a model that illustrates the need to make methodological decisions in a sequential order. The first decision the researcher considers is epistemology and the worldview they have on the creation of knowledge. The epistemological decision is followed by the researcher deliberating on the role and use of theory in the study. And finally, the researcher considers methodology and methods, which influences the choice of research strategy, data collection, and data analysis techniques.
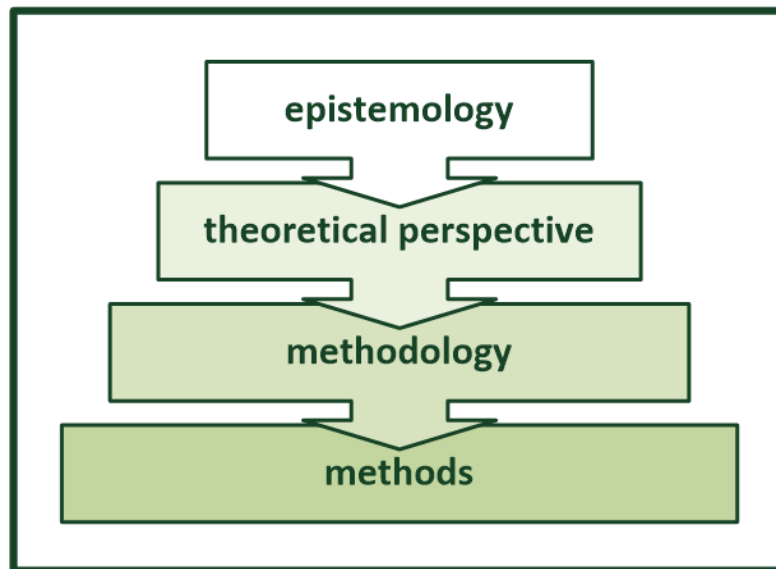
Figure 13 Crotty's Four Levels for Developing a Research Study (Crotty, 1992).

Another example is the Nested Model, by Kaglioglou et al. (1998), Figure 14. The Nested Model suggests a need to ensure a compatible 'fit' between the research philosophy and then the decisions made regarding research approach and research techniques. Silverman (2011) argues that the approaches and techniques need to be compatible with the research philosophy; otherwise, the researcher will fail to measure the phenomena under investigation.
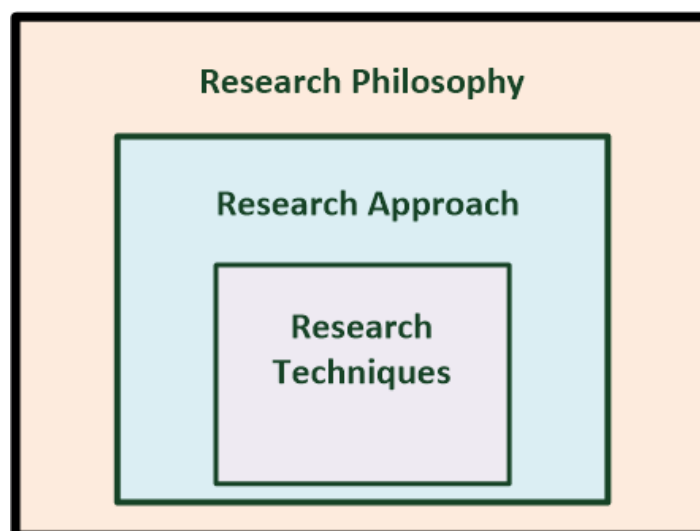
Figure 14 The Nested Model (Kaglioglou et al., 1998).

The Research Onion (Saunders et al., 2012), see Figure 15, combines elements of the previous two frameworks, but extends their ideas further. The Research Onion, for example, continues to illustrate the methodological decisions as sequential layers; however, Saunders (2012) includes 'strategies', 'choices', and 'time horizons' as additional

layers. These additional layers make distinct the sequence of decisions that occur between adopting a research approach and the decisions regarding research techniques.

The Research Onion also extends the concepts described in the previous frameworks, by making explicit the choices available within each decision layer. For example, within the philosophical layer the options available are positivism, realism, interpretism, and pragmatism. Furthermore, as suggested by the Nested Model, the layout and positioning of the choices maintains a degree of methodological compatibility between the decision layers.

In summary, the Research Onion is a framework that conceptualises the research process as a series of sequential decisions, based upon methodological compatible choices. Thus, this framework helps the researcher to explain, justify, and defend the decision made during the various stages of the research process.
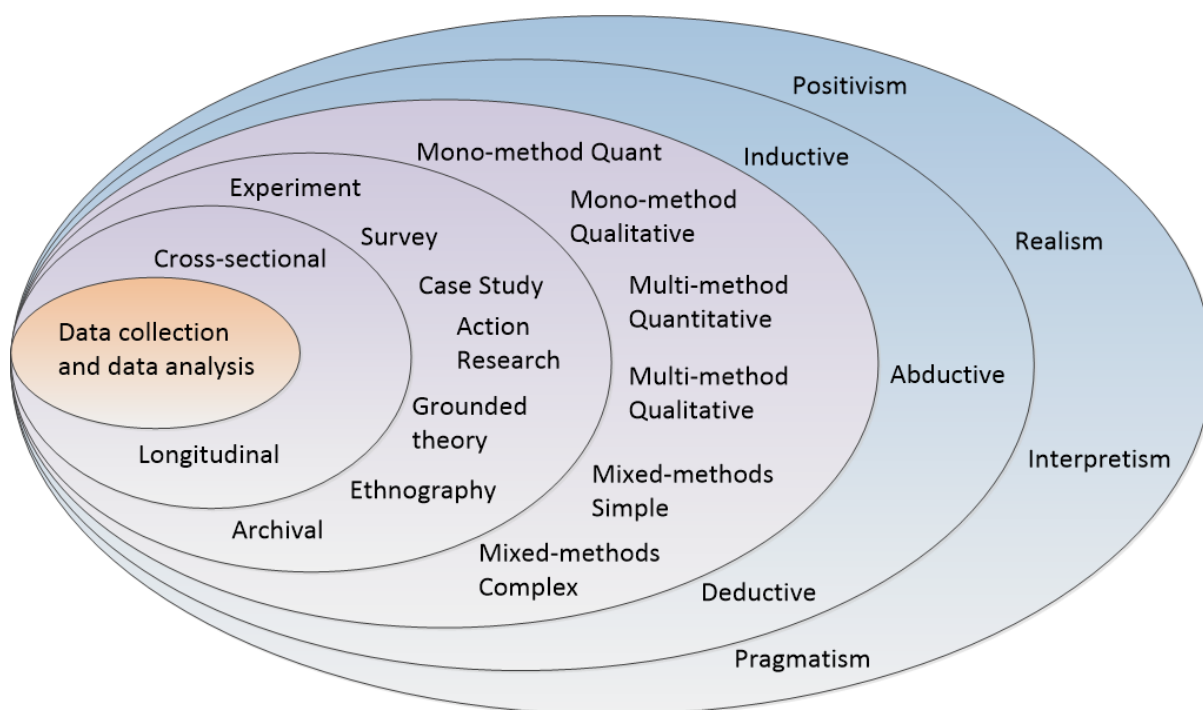
Figure 15 Research Onion (Saunders et al., 2012).

Given its strengths, the research onion has been applied to present a methodological framework for this study, see Figure 16. The adapted research onion will form the structure

of the following discussion on methodological decisions made to date.
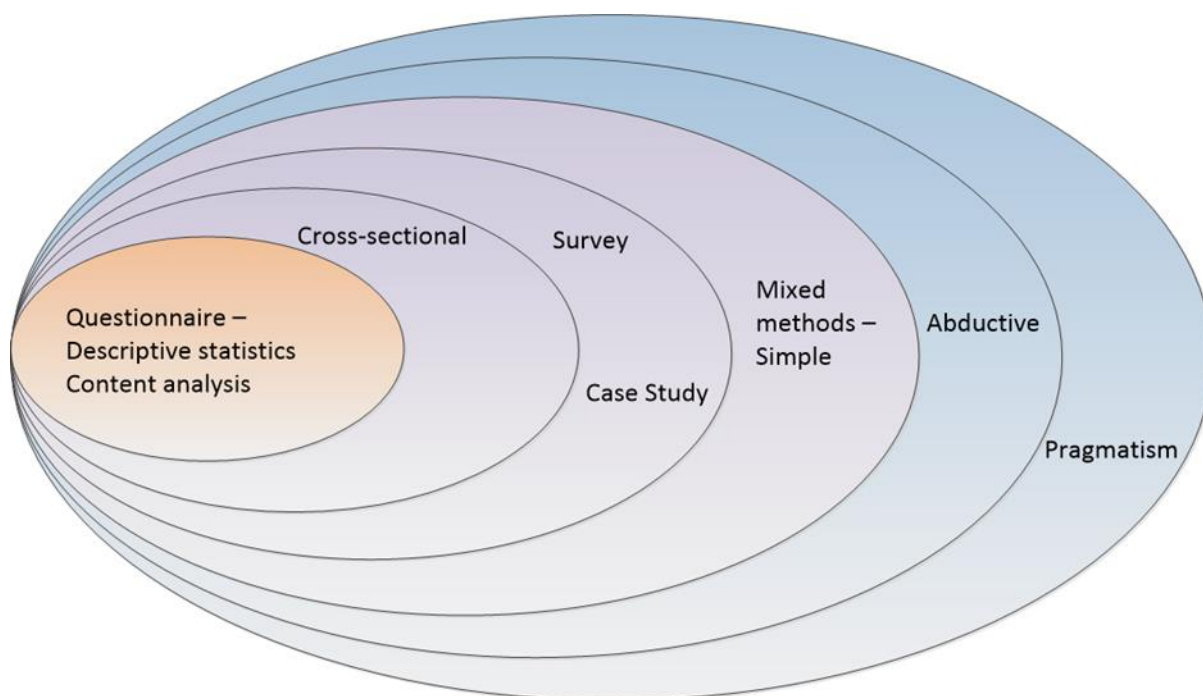
Figure 16 Research Onion as applied to this study

4.2.1 Philosophical and Methodological Worldview for the PhD

As discussed earlier in this section, there should be a coherent argument and guiding order to methodological decisions. This coherence begins with the researcher asking three philosophical questions regarding the use of research for generating knowledge about the world they are exploring. The answers to these questions form the researcher's philosophical assumptions or methodological 'worldview' (Creswell & Clark, 2011).

These methodological worldview questions arise from three areas of philosophical study (Gray, 2009). The first area of study is ontology, which is concerned with the nature of reality, or the existence of the social world. Here the researcher is concerned with whether there is one reality or meaning to the social world, or whether multiple realities or social meanings exist. The second area is epistemology. This involves understanding, 'what type of knowledge is legitimate to know' (Gray, 2004, p.17). Finally, the third question, axiology, considers the meaning of values, and in particular, the researcher's own values and beliefs, and the role this plays during the research process (Gray, 2009).

In answering the above questions, two dualistic worldviews emerge, positivism and interpretism. Positivism is usually associated with quantitative methodologies and the interpretism with qualitative. Table 8, adapted from Amaratunga et al. (2002), provides an

understanding of these two worldviews. The table supports the assertion that a particular worldview favours certain research approaches, methodological choices, and techniques for data analysis (Creswell & Plano Clark, 2011; Saunders et al., 2012). For example, Amaratunga et al. (2002) explain that positivist driven research favours questions that seek to test a theory, where the knowledge generated can be applied to the wider population. Conversely, they describe how interpretivist approaches favour research questions that seek to study the meaning of phenomena, with the knowledge generated from interpretivist research contributing to theory building.

Theme	Positivist [Worldview]	Interpretivist [Worldview]
Basic Belief	The world is external and objective Observer is independent Science is value free	The world is socially constructed and subjective Observer is part of what is observed Science is driven by human interest
Researcher should	Focus on facts Look for causality and fundamental laws Reduce phenomena to simplest elements Formulate hypotheses and test them	Focus on meaning Try to understand what is happened Develop ideas through induction from data
Preferred method in the research	Operationalizing concepts so that the can be measured taking large samples	Using [qualitative] methods to establish view on the phenomena Small samples investigated in depth or over time

Table 8 Key features of Positivist and Interpretivist research (Amartunga et al., 2002).

Feilzer (2009) claims a methodological 'war' exists between proponents of the two different worldviews discussed so far in this section, with each side claiming dominance in the knowledge and evidence generated from their 'type' of research. A number of authors have written about issues in occupational therapy research and practice. The main argument surrounds a hierarchy of evidence that has developed, with evidence generated from positivist approaches to research, for example random controlled trials, being classed as the 'gold standard' (Hyde, 2004, p.90).

However, Hinojosa (2013, p.20) suggests that whilst random controlled trials are useful in providing therapists with the evidence for which type of treatment intervention is suitable for a particular client group, it does not provide the evidence for assisting with 'real-life decision-making in practice.' Blair and Robertson (2005) agree with Hinojosa and go on to argue that this is particularly the case for occupational therapy research, because the everyday practice of therapists is 'messy, convoluted and often [involves] intractable situations' (p.274). Therefore, rather than having a hierarchy of evidence, Taylor (2007) suggests occupational therapy researchers need to provide a range of evidence in order that practitioners can 'think critically about all aspects of OT interventions [by] using the breadth of potential sources of evidence consciously, judiciously, explicitly and critically' (p.4). Therefore, in occupational therapy it is more important that the evidence and knowledge being generated is relevant to the issue needing to be addressed (Reagon et al., 2010).

In the field of the built environment, Barrett and Barrett (2003) noted a similar issue to the one raised above in occupational therapy, and how this has now created a gap between the knowledge practitioner's need, and the knowledge generated by academic researchers. They argue that what the practitioner wants are findings from research to 'tell them what to do', so that they are able to '[do] better things' and '[do] things better', (Barrett & Barrett, 2003, p.755). To achieve this, Morgan (2009) suggests that researchers need to use a pragmatic worldview to knowledge. Pragmatism offers this alternative worldview because it 'sidesteps the contentious issue of truth and reality, accepts philosophically that there are singular and multiple realties that are open to empirical inquiry, and it is oriented towards solving practical problems in the real world' Feilzer (2009, p.8). A researcher with a pragmatic worldview is interested in generating knowledge and extending theory through both the action of and reflections upon the research process, and this approach then helps to bridge the gap between theory and practice (Biesta, 2010; Saunders, 2012; Lewis et al., 2012).

Shank (2013) highlights four particular strengths of the pragmatic methodological worldview. First, it encourages the researcher to understand the research question or aim in a 'holistic' manner, in other words from the many points of reality and meanings that there might be. This philosophical stance allows the researcher to mix research strategies, in a coherent way, to generate the necessary data based on what the researcher needs to

do to answer the question or to achieve the research aim. Secondly, a researcher who adopts a pragmatic worldview respects the existing knowledge within a community, whilst at the same time they help the community to explore the consequences of this knowledge upon their actions and give the community an opportunity to explore alternative ways of doing or thinking, which may or may not be better. Thirdly, research should generate knowledge for the 'good of the community' (Shank, 2013, p.192) in which the research is situated; in other words, research should produce purposeful tools and or knowledge for practitioners to use. Finally, research is value laden, which recognises the positive role the researcher plays in the research process.

In occupational therapy, the term 'scholarship of practice' has been coined to describe a type of pragmatic worldview of research. Scholarship of practice is interested in generating knowledge for the 'good' of occupational therapy. Kielhofner (2005, p.10) describes a scholarship of practice as a way of coupling 'knowledge generated and knowledge used'. The key features of a scholarship of practice are described by Forsyth et al. (2005, p.262) as a way of creating knowledge that 'contributes directly to practice '. It involves developing partnerships between practice and academia, and develops knowledge that advances 'practice and scholarship simultaneously' (Forsyth et al., 2005, p.262). Furthermore, not only does this way of generating knowledge advance practice and theory together, Wilding et al (2012) have observed how practitioners gained a sense of 'autonomy, pride, satisfaction, and professional confidence through their involvement in this type of research. This statement comes from research Wilding et al. (2012) conducted using a scholarship of practice approach, involving 2 researchers and 25 practitioners. Through a series of teleconference calls, the researchers supported the participants to reflect on their practice and to look at the theory and evidence that supports the interventions they provide. At the end of the study, participants were asked to complete a reflection on what they had learnt and gained from being involved in the research. From the data analysis, the researchers identified two themes. The first related to the knowledge they had developed from being part of a scholarship of practice. The second theme identified how participants reported feeling more confident about their professional identify and increased enthusiasm for the profession.

Pragmatism, based around a scholarship of practice, provides a coherent methodological worldview for this study. This is because the research aim and objectives are based on the

current evidence that suggests a gap exists between the theory - the process occupational therapists ought to be using in interventions involving home modification, and the evidence suggesting this is not happening in real-life practice. Pragmatism also allows the use of multiple research strategies to explore and understand this phenomenon, which include the theory of the home modification process, examining the process from the perspective of the practitioners themselves, developing a protocol for home modification based on the theory, and examining practitioner's experience of using it in practice. Finally, it allows the researcher here to use perspective and previous experience of this field of practice to support and guide the research process.

This section has discussed the relevance of the researcher's methodological world view of research on the methodological decisions made during the research process. A rationale has been provided on the choice of a pragmatic worldview, and specifically a scholarship of practice, for this study. The next section explains the role and use of theory in the overall research design.

4.2.2 Approach to the use of theory in the study

Decisions about the use of theory in research are important because they directly influence methodological choice, strategies for data collection, and ultimately data analysis (Saunders et al., 2011). Abesman and Tsang (2006) describe two distinct roles theory can play in the approach taken in the design of the research. First, theory can have a deductive role, generating data to test, confirm, or extend the concepts within a theory. This approach is most often used in positivist-influenced research, and it involves the collection of quantitative data. The second role theory can have is inductive. In this type of research data is collected and used to understand the meaning of the situation, thus helping to create new theory. Interpretivist-influenced research predominately uses this approach, and it involves the collection of qualitative data. There is also a third use of theory, abduction. Johnson and Gray (2010) describe the abductive use of theory as a 'creative, back and forth reasoning'. It can help the researcher understand the situation through testing existing theory; yet data can be analysed to explore the meanings of the situation, from the perspective of the research subject. Abductive approaches are frequently used in mixed or multi-methods research, as it can involve both quantitative and qualitative data. Given the nature of abductive use theory, as a methodological choice it has it's foundations within pragmatism (Morgan, 2007).

This study is using theory in an abductive way, as both inductive and deductive approaches were necessary to achieve the aim and objectives. For instance, in the study it is necessary to use theory deductively to investigate the process used by therapists to deliver home modifications. However, in the development of the Home Modification Process Protocol it is necessary to use theory both deductively and inductively. Finally, an inductive approach will help to explore the consequences using the protocol in professional practice. How theory has been specifically used at these different stages of the study will be explored later in this chapter.

To help guide an abductive approach to research, Evans et al. (2011) strongly advocate the use of a theoretical framework. This is because a theoretical framework can help provide structure, coherence, and order to research design influenced by pragmatism. Evans et al. (2011) uses an example of a research project they designed to investigate the role of nurses in supporting healthy behaviours of patients. They reported how the frameworks supported their choice of research strategies and helped them to structure the data analysis as it provided the themes used to present the findings. However, they warn that researchers need to, 'remember to stay grounded in the data and remain open to the possibility that, ultimately, the data and the framework may be incompatible,' (Evans et al., 2011, p.13). For this study, The Occupational Therapy Intervention Process Model (OTIPM) and the Generic Design and Construction Process Protocol provided an overarching theoretical framework. How and when they were used will be discussed in a later section of this chapter.

This section has discussed how the use of theory influences reasoning the researcher uses to understand the phenomena being studied. An explanation has been provided as to why an abductive use of theory was necessary for this study, which was primarily driven by the aim and objectives of this study. The next section discusses the methodological choice for this study.

4.2.3 Methodological choices

Methodological choice refers to whether the overall design of the research is using a quantitative mono-method, qualitative mono-method, or either mixed or multi-methods. (Saunders et al., 2016). The methodological choice is important as it ensures the researcher chooses a research design whereby the strategies employment, procedures and tools used

to generate, collect and analyse data is coherent with the research question being asked (Flick, 2014; Saunders, 2013). With a lack of coherence, the researcher is at risk of not answering the research question or achieving the aim and objectives of the study.

Given the nature of the aim and objectives of this study, a quantitative method is not appropriate because the research design is not attempting to generate data to test a hypothesis or reducing the phenomena to the simplest elements (Amaratunga et al., 2002; Creswell & Plano-Clark, 2007). The researcher could have considered adopting a mixed-methods approach, whereby quantitative and qualitative methods are employed to examine the phenomena (Mortenson & Oliffe, 2009). One of the advantages of a mixed-method choice is it allows the objective evaluation of a phenomena whilst allowing the researcher the opportunity to explore the deeper meaning and interpretation of the phenomena (Johnson et al., 2007). Nastasi et al. (2007) identify this dual approach as having a particular strength in health and social care research, as it supports the ideology of generating culturally appropriate evidence based research. By culturally appropriate evidenced research, Nastasi et al. (2007) are referring to data analysis which attempts to understand the effectiveness of an intervention as well as the impact and consequence for those receiving the treatment. For example, Nygren et al. (2007) used a mixed method study to objectively investigate the objective accessibility of home environments of older people, and how older people perceived the usability of their home. A quantitate data collecting tool, the Housing Enabler (Iwarsson, 1999) was used to collect objective measurements of the home environment and the number of physical, sensory, and cognitive impairments the person has. The study also used a qualitative data collecting tool, the Usability in My Home assessment (Fange and Iwarrson, 2003). This tool collects participant's subjective opinions of how usable they find their home environment. By comparing and contrasting the data, Nygren et al. (2003) concluded that the number of environmental barriers, often used in home safety check-lists, alone is not an effective indicator as to how older people perceive how well they are managing in their home. Instead, how an older person perceives they are managing at home is influenced by a combination of the number of environmental barriers and the number of impairments a person has.

Given the strengths of mixed-methods research, the researcher could have adopted it for this study. For instance, a quantitative strategy could have been employed to generate and

analyse the data on the current process being used by occupational therapists in practice. Then using a qualitative strategy, data could have been generated and analysed to develop the Home Modification Process Protocol, followed by a further qualitative strategy to examine the therapist's experience of using the protocol in practice. However, Morse (2010, p.340) argues that a mixed-methods approach is often confused with multi-method research.

In mixed method research, there is one central project using a specific method to explore one aspect of the phenomena and the supplemental method is used to help the researcher explore other aspects of the phenomena not accessible through the other method being employed in the central project. For example, in the study by Nygren et al. (2007) the quantitative method generated numerical data on the accessibility of the home environment, whereas the qualitative strategies generated themes on the person's evaluation of their home environment. Where a research design uses multiple strategies, influenced by the same methodological choice to 'address the same research question or different parts of the same research question or programmatic goal' then Morse (2010) states this is multiple-method design (Morse, 2010, p.340). Another distinguishing feature of multi-methods is how the findings from each strategy used in the study can be published as stand-alone studies. This is unlike mixed-method research where all aspects of data need to be published to make sense. For example, in Nygren et al. (2007), the findings would have been meaningless unless the findings from both the quantitative and qualitative data had been published together (Morse, 2010).

The methodological choice for this study is a multi-method approach and influenced by a qualitative approach. This decision is based on the researcher's need to have an overarching methodology choice that supports the coherent use of different strategies, techniques, and procedures. The strategies need to support the generation of data where meaning can be established, as well as enabling the researcher to use the theory, existing evidence, and experience to be able to examine what is happening during the different phases of the study. The research design for the three phases of the study will now be discussed.

4.2.4 Research Design

Each method used in this study was used to support an individual stage of the research design. Using methods in this way is particularly useful when the research objectives are sequential in nature, with each serving a role in achieving the overall research (Nastasi et al., 2007). Figure 17 has been adapted from Nastasi et al. (2007) to illustrate the three distinct phases of this study. The research design for phase 1 needed to generate data to critically evaluate the current process being used by occupational therapists when modifying homes of older and disabled people. Phase 2 needed to generate data to facilitate the design of process for home modifications, which is based on the process used in design and construction. The final stage needed to generate data to evaluate the experience of practitioners using the protocol in professional practice.
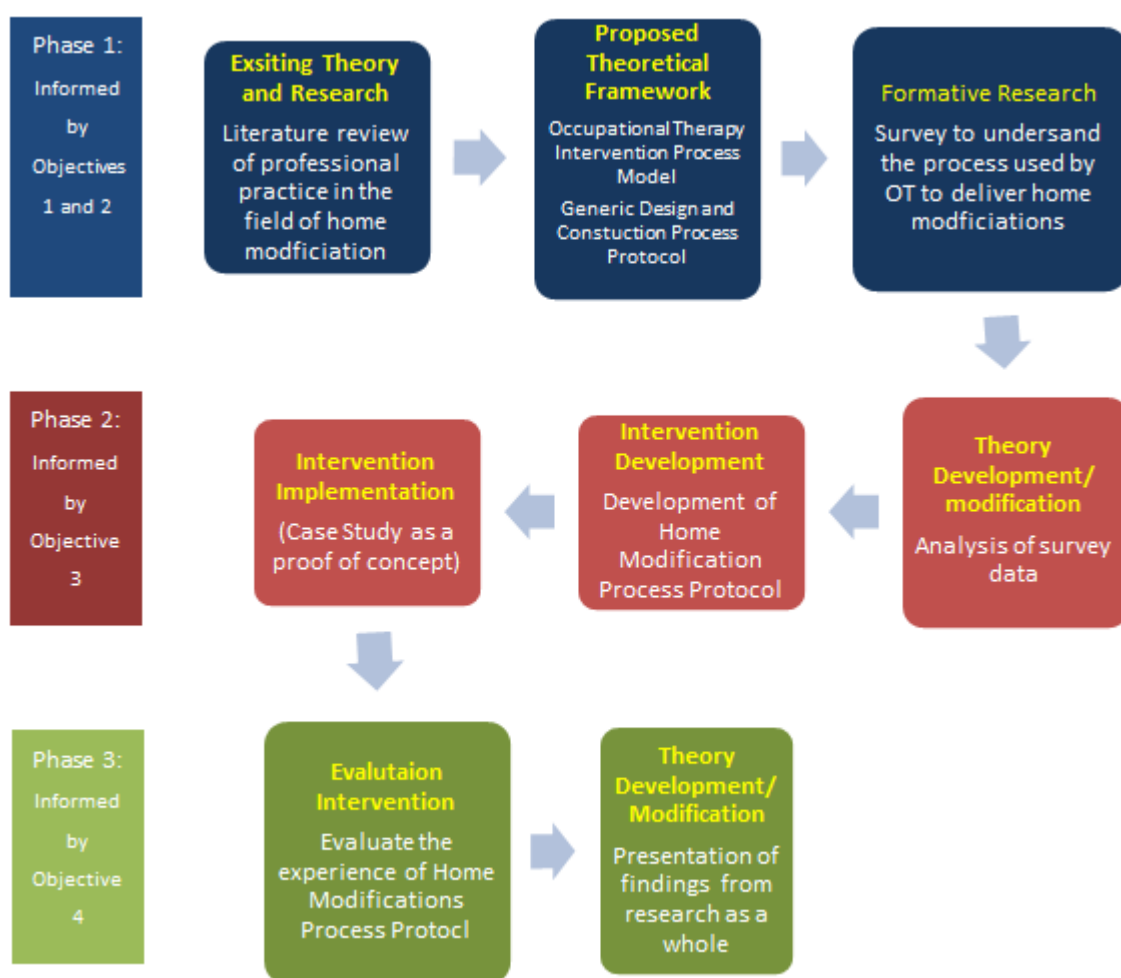
Figure 17 Multiphase Research Design adapted from Natasi (2007).

As stated above, each phase of the research design needed to utilise a different research strategy, with each having a distinct set of procedures and techniques for data collection

and analysis. It could be argued that an action research design could have been adopted as a single research strategy, as it uses cycles of the research process to improve the situation of participants (Atwal, 2002). Action research is advocated by those who support scholarship of practice in occupational research (Kielhofner, 2006) as it supports the rhetoric of practitioners being co-partners in the design of the research. However, to be effective, action research requires the research participants to be in equal partnership with the researcher in all stages of the research process (Coghlan & Brannick, 2009) and due to the constraints of the PhD process, it was only possible to form a partnership with a distinct set of research participants at phase 3, the case study.

For clarity, the research design for each phase will be discussed separately and in sequential order. However, before providing a description of the research design for each phase it is necessary to provide a discussion on the reliability and validity of qualitative research, and how this was achieved in this study.

One of the strengths of positivist influenced research is the ability of the researcher to demonstrate the validity and reliability of the findings from the data (Silverman, 2011). Validity refers to the researcher's ability to demonstrate what they observed or recorded was what actually happened, and no internal or external factors have influenced what they observed (Gray, 2009). Researchers, influenced by this worldview of research, are able to employ a range of strategies to control any internal and external factors (Flick, 2014). Reliability refers to the researcher's ability to demonstrate the same results would occur under different conditions (Bernard & Ryan, 2009). For example, if the test or observation were repeated on a different day whether the same results would be recorded. Or, if a different researcher conducted the same test would the same results be recorded. A further strength of a quantitative research design is the ability of the researcher to discuss the generalisability of the results (Gray, 2009). In other words, whom else, apart from the research subjects, can the findings be applied to. Again, the researcher is able to utilise a number of tools to improve their ability to generalise the findings to the wider population. Together, validity, reliability, and generalisability are important tools for consumers of the evidence from research studies because it enables them to evaluate the quality of the findings presented by the researcher.

In qualitative research design, it is not appropriate to utilise the same tools to demonstrate validity, reliability and generalisability because the data generated from qualitative research is not attempting to yield the same type of findings as quantitative research, where the ultimate goal is to find the one truth. Nor can the tools always be used to manipulate the type of data generated from qualitative research. However, it is still important that the consumers of qualitative data are able to evaluate the quality of the findings. In their seminal work on grounded theory, Guba and Lincoln (1985) referred to the term 'trustworthiness' when describing evaluating the quality of qualitative influence research design. And in occupational therapy, Krefting (1991) took the terms credibility, transferability, dependability, and confirmability discussed by Guba and Lincoln (1985) to describe how these concepts apply to occupational therapy research. Krefting (1991) explains that credibility refers to whether the researcher is giving an accurate account of what is being studied. Transferability concerns if the findings could be applied to a different setting. The term dependability has a similar meaning as the term reliability in quantitative research, however Taylor (2007, p.95) states that it is not possible for the researcher to apply the same 'controls' over the data analysis and has to 'ensure the neutrality of the data' collection and analysis. To do this, the researcher can employ strategies such as peer examination, where the researcher's peers scrutinise and challenge different aspects of the data collection and analysis process (Krefting, 1991). It is acknowledged that the strategies employed in qualitative research make it difficult, if not impossible, to remain neutral from the research process (Bernard & Ryan, 2009). Therefore, techniques used in confirmability assist in 'judging whether the findings emerge directly from the data' and they have not been contrived by the researcher (Bernard & Ryan, 2009). An example of a confirmability technique is the researcher providing a rich written description of the research design and process (Taylor, 2007).

Table 9 has been adapted from Taylor (2007) on key aspects and strategies of trustworthiness. An additional column has been included to list the strategies used by the researcher for this study. These strategies will also be discussed in the context of the research design in the following section.

Aspect	Strategy	Strategy used in this study
Credibility	• Prolonged and varied field experience • Establishing the authority of the researcher • Triangulation • Reflexivity • Member checking • Negative case analysis	• Researcher is an occupational therapist with 22 years of experience, 16 of which have been involved in the use of home modifications as an intervention for improving functional health and well-being • Researcher kept a research journal of developing ideas • Researcher used member checking of the data generated by the participants during the case study • The results from the survey were triangulated by comparing them to the existing literature • Data that did not fit with the themes generated from the content analysis have been included in the findings
Transferability	• Purposeful sample • Rich description of the research setting • Data saturation	• The sample chosen for the survey and for the case study are representative of therapists involved in home modifications • Rich description of the case study site presented in the findings on the case study • All respondents' answers were included in the data analysis • The case study site is representative of occupational therapy teams working in housing in the England
Dependability	• Audit • Triangulation • Negative Case Analysis • Peer Review	• An audit of the research process is provided • Findings from the survey and case study were compared to the existing evidence • Data that did not fit with the themes generated from the content analysis have been included in the findings • Researcher used an occupational therapy mentor and PhD supervisor during the development of the themes from the content analysis of the survey data and during the process of developing the process protocol. The occupational therapy mentor is an expert on the Occupational Therapy Intervention Process Model. The peer review involved the researcher being challenged on the themes being generated and providing justification for each.
Confirmability	• Audit • Triangulation • Peer review • Member checking	• This chapter presents an audit of the research process provided • Findings from the survey and case study were compared to the existing evidence • Peer review given by PhD supervisor and occupational therapy mentor • Researcher used member checking of the data generated by the participants during the case study

Table 9 Trustworthiness strategies used in the research adapted from Taylor (2007).

4.3 Research Design for Phase 1

This section provides a description of the research design for phase 1 of the study. The purpose of Phase 1 was to understand the difference between the literature describing what occupational therapists ought to be doing in professional practice, and the literature that has considered what is actually being done in practice.

The researcher needs to acknowledge that the original research strategy used for phase 1 of the study had been based on the need to evaluate the potential of using Building Information Modelling (BIM) to support the home modification process as a line of enquiry. However, on analysing the data it became apparent that a cohesive home modification process was lacking and thus the aim and objectives of the study changed. The relevance of this change will be discussed later in this section.

Prior to the aim and objectives of the study changing, a survey research strategy had been chosen for this phase of the study. The initial rationale for using a survey strategy was foremost based on the need to critically examine the home modification processes used by occupational therapists. In particular, the researcher needed to understand what information a therapist collected during the process and how this information is used to design an effective home modification. Robson (2002) describes a simple survey as a way of capturing standardised data from a group of respondents, and suitable way to generate data that needs to clarify the situation. Having decided on the type of research strategy, it was necessary to decide on the specific technique to collect the data. An on-line questionnaire was developed as this provided the most effective method of generating knowledge and the most efficient way of delivering the survey to a larger sample of respondents.

Again, the nature of the research objectives influenced the choice of sampling technique. Purposeful sampling was chosen, as this is an effective way to identify a sample of respondents with specific attributes (Kielhofner et al., 2006). The inclusion criteria for the sample are presented in Table 10 along with the rationale for this criteria.

Inclusion criteria	Rational for criteria
Occupational Therapy	The study is interested in occupational therapy and the use of home modifications
Involved in using home modifications as an intervention	For respondents to be able to able to comment of the home modification process, they need to have relevant knowledge of using this as an intervention
UK based	Different countries use different terms for describing concepts within occupational therapy (see previous discussion on adaptations versus home modification in Chapter 3). To reduce the risk of participant not fully understanding the questions only OTs practicing in the UK were included

Table 10 Inclusion criteria for this study

The College of Occupational Therapists (COT) was identified as the most efficient way of recruiting potential participants. COT is the professional body for occupational therapists in the UK. The COT have a number of specialist sections, including housing. These specialist sections are formed of members of the Association who have a special interest in a specific field of practice. The COT specialist section for Housing had, at the time of this phase of the study, a membership of 250 practitioners. These practitioners are based predominately in the UK and their practice involves the process of modifying the home environment. All members of the specialist section receive regular e-mail communication. Therefore, this group seemed to be the most appropriate way of communicating and recruiting potential respondents. As the Specialist Section for Housing communicates via e-mail, it was appropriate to design an on-line questionnaire. It was advertised through an e-mail to all members and then via the monthly e-mail newsletter.

Questionnaires can be designed to include both open and closed questions, thus generating both quantitative and qualitative types of data (Robson, 2002). Closed questions can collect specific information about respondent's attitude, as well as well as fact based information (Oppenheim, 1992). Open questions allow the respondent freedom to express their thoughts; however, in on-line questionnaire encouraging detailed responses from participants can be difficult, as the researcher is unable to provide the necessary encouragement (Oppenheim, 1992).

As the questionnaire needed to collect data on the process of modifying the home environment and participant's attitudes about specific actions involved in the process of

designing modification, the majority of questions were closed in nature. However, for each closed question, participants had the opportunity to record responses not included in the standard list of answers. Table 11 provides a description of the question asked; the purpose of the question; and whether it was an open or closed question. Question 5 has been highlighted, as the data generated from this question was used in phase 2 of the study, and it will be discussed in further detail in the following section. The questions in italic represent those questions not included in the data analysis. These questions became irrelevant to the study when the overall aim of the research changed.

When designing the attitudinal questions, the researcher wanted to ensure respondents were considering the same type of modification when answering the attitudinal questions. To achieve this, respondents were asked to consider responses in terms of their experience in the process of modifying bathroom environments. This type of modification was chosen as they are the most common modification occupational therapists are involved in (Adams & Grisbrooke, 1998).

As recommended by Forsyth and Kviz (2006), prior to the questionnaire being released to respondents, a pilot study was conducted to ensure the validity and reliability of the data generated, as well as ensuring the questions could be understood by the respondents. The pilot study involved five experienced practitioners, familiar with home modifications, and they completed the pilot questionnaire. Their feedback, along with a trial of analysing the data from their responses resulted in minor changes to the questionnaire. A copy of the questionnaire can be found in Appendix 5.

The questionnaire was open for respondents to complete from October 2012 until March 2013. Two hundred and two respondents completed the questionnaire, but only one hundred and thirty five met the sampling criteria. Reasons for exclusion included:

1. Participant retired from practice
2. Participant worked outside of the UK
3. Participant not a qualified occupational therapist
4. Participant main role no longer involves using home modifications as an intervention.

Question	Purpose of the question	Type of question
1. Which of the following statements best describes your place of work?	To check participants met the inclusion criteria	Closed Fact based data
2. How many years' experience do you have in housing modifications?	To establish level of experience of participants	Closed Fact based data
3. What is the purpose of a housing modification – please describe	To establish participants understanding of home modifications on improving health and well-being	Open Attitudinal based data
4. As an occupational therapist, which theoretical model influences your practice?	To establish participants use of theoretical model in practice	Closed Fact based data
5. Briefly describe your role in the process of designing a bathroom modification	To establish a descriptive account of the role of the participants in the home modification process (data used in phase 2)	Open
6. Which of the following statements best describes your use of assessment tools	To establish participants use of assessment tools during the home modification process	Closed Fact based data
7. *Please list the factors you would consider when choosing a wall mounted shower seat for a proposed bathroom modification.*	*To examine the professional reasoning process used by participants (This question became irrelevant following the change in the aim and objectives of the study)*	*Open*
8. *Please list the factors you would consider when deciding upon the layout of the bathroom*	*To examine the professional reasoning process used by participant (This question became irrelevant following the change in the aim and objectives of the study)*	*Open*
9. I do a drawing of the original layout of the bathroom 10. I do a drawing of the proposed layout of the bathroom modification 11. Other professional have the responsibility for drawings the	To evaluate participants attitude towards their involvement in the phases of the home modification process	Closed Attitudinal based data

Question	Purpose of the question	Type of question
bathroom modification 12. I specify the space layout of the bathroom modification 13. I specify the products to be a part of the bathroom modification 14. It is my responsibility to ensure the final design proposal will meet the user's requirements		
15. Which of the following professionals do you routinely collaborate with during the process of designing a bathroom modification? Please indicate the method or methods you use to communicate.	To evaluate who participants collaborate with during the home modification process	Closed Fact based data
16. Please indicate the types of information you routinely generate and/or collect during your involvement in designing housing modifications.	To establish the types of information used by participants during the home modification process (This question became irrelevant following the change in the aim and objectives of the study)	Closed Fact based data
17. What tools do you use when drawing plans of a proposed bathroom modification	To establish techniques used by participants when designing home modification (This question became irrelevant following the change in the aim and objectives of the study)	Closed Fact based data
18. Routinely, how do you discuss the proposed housing modification with the user?	To evaluate the level of involvement the person has the participant during the home modification process	Closed Fact based data
19. Are users routinely given more than one design layout option to consider?	To evaluate the level of involvement the person has with the participant during the home modification process	Closed Fact based data
20. How do you evaluate/analyse the proposed design of the bathroom modification?	To evaluate the level of involvement the person has with the participant during the modification process	Closed Fact based data
21. Please think about the last 5 bathroom modifications you were involved in designing. Now list up to 10 factors you considered	*To examine the professional reasoning used by the occupational therapists during the home modification process (This question*	*Open*

Question	Purpose of the question	Type of question
when analysing whether the design would support the user's occupational performance (e.g. Checked on the plans the door was wide enough for the user's wheelchair to fit through)	*became irrelevant following the change in the aim and objectives of the study)*	
22. When a user or their carer have not been happy with a completed bathroom modification you have been involved with, can you identify the cause of this.	To examine issue for the person not being satisfied with the home modification process.	Closed Fact based data
23. Please tick the information you routinely collect about the person when designing bathroom modifications.	To examine the types of PEO information collected by participants	Closed Fact based data
24. Please tick the information you routinely collect about the user and the occupation they perform when designing bathroom modifications.	To examine the type of PEO information collected by participants	Closed Fact based data
25. Please indicate the information you routinely collect about the bathroom environment.	To examine the type of PEO information collected by participants	Closed Fact based data
26. Please describe 3 things you would change to improve the way you currently design bathroom modifications?	To establish the elements of the home modification participants would change to improve the home modification process	Open Attitudinal based data

Table 11 Purpose and type of question included in the questionnaire

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The software used to examine the qualitative data was Microsoft Excel. This generated simple descriptive data, which is presented in detail in Chapter 5. The rationale for using simple descriptive techniques was based on the researcher only needing to understand the frequency of a particular opinion, action, or attitude from the respondents rather than testing a hypothesis or inferring the results beyond the sample population where complex statistical analysis is required (Gray, 2009).

When using qualitative strategies in a research design it is important that robust procedures for managing and analysing the data are in place, otherwise the researcher may have difficulty in establishing the trustworthiness of the findings produced (Silverman, 2011). Qualitative software can support the researcher to achieve this (Bazeley, 2013). NVivo10 is a well-established qualitative software that provides a range of tools to support the management and analysis of qualitative data (Edhlund & McDougall, 2013). Richards (1999) identifies the particular strengths of NVivo in the following way:

> "As you link, code, shape and model data, the software helps you to manage and synthesise your ideas. It offers a range of tools for pursuing new understanding and theories about the data and for constructing and testing answers to research questions"(Richards, 1999, p.4).

NVivo software was the main tool used to support the researcher in analysing the qualitative data throughout the three phases of the study. In the first phase, a rich amount of qualitative data was generated from open questions numbers 3 and 21, which asked 'What is the purpose of a housing modification – please describe' and 'please describe 3 things you would change to improve the way you currently design bathroom modifications'. Question three was asked to analyse respondents' theoretical understanding of the use of home modifications for improving functional health and well-being, whilst question 21 was included to establish the elements of the home modification participants would change to improve the home modification process.

To analyse the data from question 3, a summative content analysis (Hsieh & Shannon, 2005) of the data was conducted. The advantages of this type of analysis is it avoids the researcher having to immediately react to the data, as it is the frequency of words that initially supports the coding of the data. It then assists the researcher to develop a basic understanding of how words are being used to describe the phenomena, and it is this process the themes are developed from data. Hsieh and Shannon (2005) explain the

process of summative content analysis as beginning with identifying the frequency of words in the responses. Once the frequency of words has been established, analysis moves to the next stage known as latent content analysis. Latent analysis 'refers to the process of interpretation of content' with the purpose of 'discovering underlying meaning of words and content' (Hsieh & Shannon, 2005, p.1284).

To conduct the analysis the word frequency in respondents answers NVivo 10 was used. The advantage of NVivo10 in summative analysis is that the software is able to automatically group words of similar meaning together and then to count the frequency of the grouped words. For example, words counted under the term 'improve' also included 'additional', 'better', 'improve', 'improved', and 'improved'. Using this process, the 25 most common groups of words were used to generate the initial codes. The result of this coding is presented in Table 13 in the findings, however a screenshot of the findings is presented in Figure 18.

Word	Length	Count ▽	Wei	Similar Words
person	6	105	4.0	individual, individuals, person, personal, persons, somebody, someone, someones
independence	12	104	4.5	independance, independant, independence, independent, independently, severe
enable	6	75	3.3	enable, enables, enabling
access	6	61	2.6	access, accessibility, accessible, accessing, additional, admission
living	6	59	2.0	dwelling, existing, experience, inhabitant, inhabitants, lives, living, support, supported, supporting
carers	6	52	2.3	carer, carers
disabled	8	50	2.2	disabilities, disability, disabled, disables, impairments
allow	5	49	1.7	allow, appropriate, provide, providing
safety	6	45	1.7	safely, safety
housing	7	43	1.7	families, family, homes, house, houses, housing
environment	11	40	1.7	environment, environments
assist	6	36	1.1	assist, assistance, assisting, assists, attending, support, supported, supporting
possible	8	34	1.5	possible, potential
improve	7	33	1.3	additional, better, improve, improved, improving
adaptations	11	32	1.2	accommodation, adapt, adaptation, adaptations, adapting, adapts, alter, alteration, alterations
reduce	6	31	1.3	reduce, reduced, reducing
needs	5	30	1.1	demand, involved, needed, needs, require, required, requirements, 'wants'
facilities	10	29	1.2	facilities, facility
occupant	8	26	1.1	occupant, occupants, 'occupation', occupational, occupations, occupier, resident, residents
remain	6	26	0.9	continuance, continue, remain
client	6	25	1.1	client, clients, customer
daily	5	25	1.1	daily, everyday
activities	10	24	0.9	activities, activity, participate, participating, participation
increase	8	23	0.9	additional, increase, increased, increasing
within	6	22	0.9	within

Figure 18 Example of automated word count generated by NVivo10 Software

To conduct the latent analysis, word trees were generated for the 4 most commonly used words by the respondents. Word trees allow the researcher to visually establish how words surrounding the target word are being used to describe the phenomena. This second tier of analysis identified four themes of how respondents understand home modification as an intervention for improving the functional health and well-being, and again these are discussed in detail in the findings in the next chapter. Figure 19 presents the word tree generated for the code 'enable'.
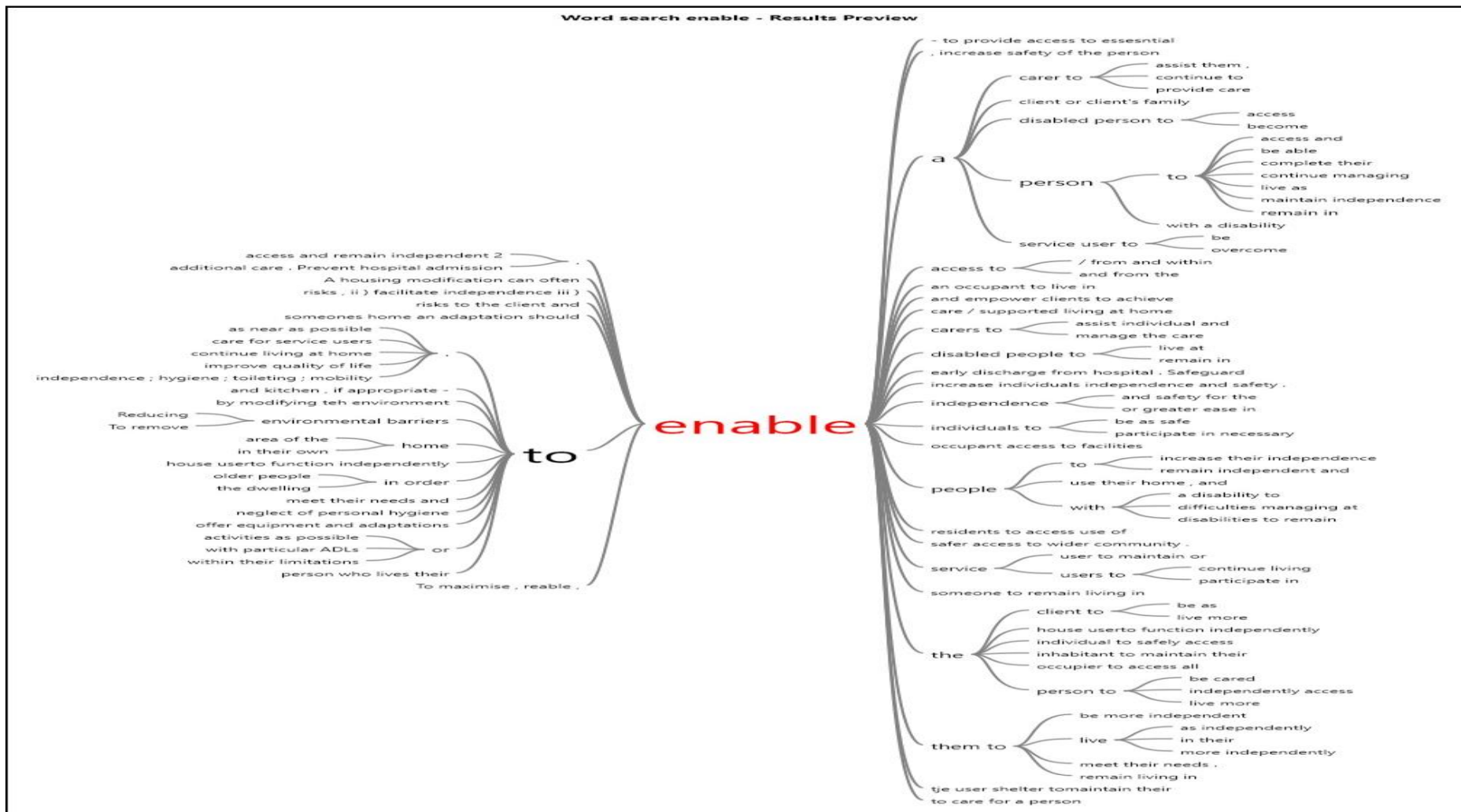
Figure 19 Example of word tree created for question 3

For question 21, the data was analysed using a conventional content analysis (Hsieh & Shannon, 2005). The first phase of the analysis involved reading all the replies, allowing the researcher to become familiar with the data. The second phase involved breaking each respondent's replies into small chunks of data which identified what aspects of the process respondents wanted to change and these became the initial codes. Each individual code was then re-read and similar codes were grouped together and these formed the main thematic codes. Given the large amount of data contained under each theme, a third tier of analysis was conducted to establish further sub-themes. A screen shot of the nodes created from question 21 is shown in Figure 20.

Three things you would change

Name	Sources	References	Created On	Created By	Modified On	Modified By
Change present process	1	231	22/07/2013 09:52	RCR	23/04/2016 12:21	RCR
Improve assessment forms	1	18	22/07/2013 09:56	RCR	15/02/2016 14:21	RCR
Improve collaboration	1	129	22/07/2013 14:29	RCR	23/04/2016 12:21	RCR
IT to suport communication with ot	1	9	15/02/2016 13:16	RCR	15/02/2016 14:16	RCR
Joint visits with building profession	1	24	15/02/2016 13:16	RCR	15/02/2016 14:20	RCR
Use of visualisation tools with the	1	96	22/07/2013 10:00	RCR	15/02/2016 14:20	RCR
Improve design simulation and analysi	1	14	22/07/2013 10:04	RCR	15/02/2016 14:21	RCR
Improve knowledge	1	69	15/02/2016 13:13	RCR	23/04/2016 12:21	RCR
Access to up to date product infor	1	33	22/07/2013 10:03	RCR	15/02/2016 14:12	RCR
Knowledge of construction	1	8	22/07/2013 10:02	RCR	01/10/2013 11:31	RCR
Opportunity for training	1	15	22/07/2013 09:58	RCR	15/02/2016 13:49	RCR
Opportuntiy to learn from others an	1	13	22/07/2013 10:10	RCR	15/02/2016 13:48	RCR
Improve resourcess	1	1	15/02/2016 13:14	RCR	15/02/2016 14:14	RCR
Increase funding amounts for modi	1	9	22/07/2013 14:30	RCR	15/02/2016 14:18	RCR
More time to spend on case	1	32	22/07/2013 14:33	RCR	15/02/2016 14:20	RCR
Working well	1	13	22/07/2013 10:36	RCR	01/10/2013 11:31	RCR

Figure 20 Example of nodes created for question 21

This section has provided an account of the research design developed for the first phase of the study. Data collected from question 5 on the questionnaire was analysed to conceptualise the home modification process as an occupational therapy, design, and construction protocol. The following section provides a description of how this was achieved in phase 2 of the study.

4.4 Phase 2 Research Design

The research design for stage 2 of the study needed to be able to assist the researcher to conceptualise the home modification intervention as an occupational therapy, design, and construction process protocol. Data from the on-line questionnaire was analysed and the findings supported the development of the process protocol. As stated earlier in this chapter, the on-line questionnaire had not been designed to generate the data to develop a protocol; therefore, it was not possible to create it from an initial analysis of the data, and

then coherently 'fitting' the findings into a protocol. To provide credibility of protocol developed from the findings, it is necessary to provide a detailed account of the steps taken to develop the protocol.

4.4.1 Step 1

In this step, the data was then analysed using a directed content analysis technique. As a technique, the goal of directed content analysis is 'to validate or extend conceptually a theoretical framework or theory' (Hsieh & Shannon, 2005, p.1281). Given the purpose of this phase of the research, which was to extend conceptually a protocol for describing the occupational therapy, design, and construction process, this type of analysis was an appropriate strategy to use. At step 1 the OTIPM (Fisher, 2009), provided the theoretical frameworks to direct the content analysis of the data. Justification for using this theoretical framework was previously provided in Chapter 2.

To perform the content analysis, the data generated from question 5 of the on-line survey, described previously, was downloaded into NVivo 10 software. In question 5, respondents were asked, 'describe your role in the process of designing a bathroom modification'. Using the software, each statement from individual respondents was read and re-read. Once familiar with the range of statements, the initial coding of the data involved separating the response statements into individual activities or actions performed by the respondents in their role. Following this initial coding, each individual code was read and matched to one of the three phases of the OTIPM (Fisher, 2009). These three phases of the OTIPM (Fisher, 2009) became the separate themes for this step of the data analysis.

When using a directed content analysis, Evans et al. (2011) state it is important to 'remember to stay grounded in the data and remain open to the possibility that, ultimately, the data and the framework may be incompatible' (Evans et al., 2011, p.13). Therefore, codes not matched to one of the three themes were reviewed. The review of these codes established a similarity between the content, indicating a fourth theme and thus an additional phase. The findings from this stage present the specific actions and activities undertaken by respondents during the 3 phases of the OTIPM (Fisher, 2009) and the additional phase not included in the model. The relevance of this additional theme, along with the overall findings of this step of the analysis is presented in Chapter 8.

4.4.2 Step 2

The next step involved conceptualising the activities and actions of the respondents, during the four main phases of the occupational therapy process, as an occupational therapy home modification process. To do this, NVivo10 software was used to produce four separate code books. Each book represented one of the four themes identified from step 1 of the content analysis, and each book contained the actions and activities coded under each theme. Familiarity with the data was achieved through reading and re-reading each book. Once familiar with the content of each book, the GDCPP (Cooper et al., 1998) was used to direct the content analysis. Initially, the analysis began by establishing broad similarities between activities in the four main phases of the GDCPP (Cooper et al., 1998), with the actions and activities coded in each of the four separate OTIPM thematic code books. For instance, the activities in the assessment code book were compared to the activities described in the pre-project phases of GDCPP (Cooper et al., 1998). However, it became evident that the activities and actions in the four main design and construction phases were not congruent with the activities and actions in the four phases of the OTIPM (Fisher, 2009). To overcome this issue, the activities and actions in each code book were matched with similar actions and activities in each of the 10 sub-phases of the GDCPP (Cooper et al., 1998). As with the previous stage of analysis, thematic codes not matched to the sub-phases were reviewed at the end of the process. The outcomes of this analysis are findings that describe the occupational therapy process as a 4 phase 10 sub-phase home modification process used by occupational therapists.

4.4.3 Step 3

The purpose of this step of the analysis was to understand the home modification process as an occupational therapy, design, and construction process. Therefore, it was necessary to address the lack of congruence between the 4 phases of the occupational therapy process and the 4 phases of the design and construction process. To do this, a table was designed to visually compare and contrast where the lack of congruence occurred between the 4 phases of each process. The table was constructed using 4 different colours to differentiate the four phases of design and construction. The 10 sub-phases of the GDCPP (Cooper et al., 1998) were aligned against the 10 sub-phases of the occupational therapy process for home modification. This helped to identity specifically where the lack of

incongruence occurred between the 4 main phases of the occupational therapy and the 4 phases of the design and construction.

Using the literature published by Fisher (2009) on the OTIPM and by Cooper et al. (1998) on the GDCPP (Cooper et al., 1998), the researcher decided which elements of the 10 sub-phases belonged to which of the 4 main phases of the design and construction process. To provide trustworthiness to the decision made by the researcher, supervision with an occupational therapy mentor and with PhD supervisor was used to challenge the decision made by the researcher. The two tables developed during this step of the analysis is presented and the reasoning behind the above changes to the second table to create congruence are discussed in further detail in Chapter 8, along with the overall findings of this step of the analysis.

4.4.4 Step 4

As stated previously in this chapter, the questionnaire had not been designed with the intention of understanding the process used by respondent as a protocol, therefore no specific question had been asked to gain data for this. It was therefore necessary to use an iterative approach to generate the protocol. A brief decription of this process is given below.

A framework was developed. Along the top of the framework the headings were used from the 4 phases and 10 sub-phases of the occupational therapy, design, and construction process. Running down the far left hand side were the following principles taken from the GDCPP (Cooper et al., 1998):

- Description of phase
- Key Question
- Action needed at each phase
- Outcome of Phase
- Tools to assist with Phase

Then began an iterative process, which involved using the responses from question 5 to populate the framework and then gaps in the framework were filled by referring to Ainsworth and de Jonge (2011) 'An occupational therapists guide to home modification practice' and the researcher's knowledge of this field of practice. To challenge any

assumptions made by the researcher and to improve the trustworthiness of the framework, supervision with the PhD supervisor and an occupational therapy mentor was used.

This section has described the four step approach involved in the research design of phase 2 of the study. This approach was necessary to ensure the credibility and trustworthiness of the Home Modifications Protocol based on an occupational therapy, design and construction protocol. As stated throughout this section, the findings from this phase are presented in Chapter 8.

4.5 Phase 3 Research Design

The research design for phase 3 of the study needed to support the examination of using the Home Modification Process Protocol, developed in phase 2, in the context of professional practice. In particular, the research needed to prove the concept that the Home Modification Process Protocol would:

- Enable practitioners to better understand their role in the design and construction of home modifications
- Enable a theory based occupational therapy process to be adopted by practitioners
- Encourage occupation-focused practice, which is practice underpinned by the unique values and professional reasoning skills of the occupational therapy profession.

The research design also needed to encourage a scholarship of practice. As stated earlier in this chapter, developing scholarships of practice provides the opportunity to bridge the gap between research and practice, ensuring the knowledge developed from research has a practical application for therapists (Forsyth et al., 2005). For this study, a partnership between the researcher and a group of practitioners working in the field of home modification would have the specific benefits of generating the necessary data to analyse what support is required for the concept of the protocol to be implemented into occupational therapy practice.

To achieve the requirements stated above, a case study method was adopted for this third phase. Yin (2014 p.16) defines case study research as a way of investigating contemporary issues in depth and in a 'real-world context'. Seale and Barnard (1998, p.21) define the case as the phenomena being studied and can include a person, a community, social group, an

organisation, an event or relationship.' As a method, Bernard and Ryan (2009, p.43) describe case study research as a way of examining 'how things work and why' and it allows for the collection and analysis of different types of data sources. Because this research method allows multiple data sources to be collected, Yin (2013) argues that this supports the researcher to examine situations where the boundary between the phenomena and the context is not evident. For instance, in this phase of the study the boundary between examining the protocol as a tool for supporting practice and the support practitioners need to adopt the protocol into practice was interconnected. In this study the benefits of a case study method are that it permits the research design to incorporate the evaluation of the protocol in context whilst at the same time allowing the examination of the experience of practitioners using the protocol in practice. Thus, the case study method allowed the research objectives to be achieved in a meaningful way.

Whilst Robson (2002) acknowledges the benefits of case study research, Robson recognises one of the limitations of the method as being the difficulty the researcher has in generalising the findings. This is because the case chosen for the study may not represent what occurs elsewhere in practice. To enable the researcher to overcome this issue, Yin (2013) recommends the use of multiple-case design. In this type of research, the researcher is not relying on a single case-study design to generate the data, instead they examine multiple cases, allowing them to be able to compare and contrast data across several cases. Due to financial and time constraints of this study, it was necessary to choose a single case study design. But despite the concerns regarding single case design, Salminen et al. (2005, p.7), argue that a single case study design in occupational therapy research design allows the researcher 'to offer practitioners examples of practice, suggest what [they] could do in a similar situation, and allow comparison of their experiences with the information obtained through case study research'. Therefore, rather than there being an issue with how generalisable the findings are, the researcher is providing practitioners with an opportunity to reflect on how the knowledge and theory created from this case study can be adopted into their practice.

A further way of improving the researcher's ability to generalise the findings, as well as improving the trustworthiness of the results, is to provide a clear description of the research design (Flick, 2014; Yin, 2013). To do this, Yin (2013) recommends the use of a

case study protocol. Yin (2013) explains the protocol is a tool the researcher develops prior to starting the study and it helps to guide the research process. The case study protocol headings, suggested by Yin (2013) are used in the following section in order to provide a clear description of the overall case study process.

4.5.1 Overview of the case

The case study participants were recruited following a presentation at the College of Occupational Therapists Specialist Section for Housing. The content of the presentation had been on the findings from phase 1 and 2 of the study and on the development of the Home Modification Process Protocol. At the end of the presentation, the audience were introduced to the objectives for the final phase of the study and were invited to contact the researcher. Following this request, a manager from an occupational therapy team in London, who was in the process of further integrating the occupational therapy team with the housing team, contacted the researcher and a visit to the occupational therapy team was organised.

At the pre-case study meeting, the researcher was introduced to the four members of the occupational therapy team, which included the manager. A description of each team member is provided in Chapter 9. The researcher introduced the objectives for the case study and the level of commitment required from the team. As the research design was incorporating a scholarship of practice, the team were asked to identify their goals for participating in the study. Their responses were congruent with the objectives set by the researcher, as demonstrated in Table 12. They identified their motivation for participating by asking the following questions:

- Will the Home Modification Process Protocol help us to understand our role in the design and construction process of home mods?
- Will the Home Modification Process Protocol help us to collect the right information, at the right time, and to use the information in the right way?
- What are the challenges of us using the process protocol?
- Will the Home Modification Process Protocol make us more occupation-centred?
- Does it improve what we do?

Motivation the occupational therapy team identified for participating in the case study	Objectives identified by the researcher
Will the Home Modification Process Protocol help us to understand our role in the design and construction process of home mods?	Enable practitioners to understand their role in the design and construction process of a home modification
Will the Home Modification Process Protocol help us to collect the right information, at the right time, and to use the information in the right way?	Encourage a theory based occupational therapy process to be adopted by practitioners
What are the challenges of us using the process protocol?	Analyse what support is required for the concept of the protocol to be implemented into occupational therapy practice
Will the Home Modification Process Protocol make us more occupation-centred	Enable practitioners to work in an occupation-centred way
Does it improve what we do	

Table 12 Demonstrating the congruence between goals and objectives of the occupational therapy team and the researcher

As can be seen from Table 12, the team identified an additional goal of 'does it improve what we do?' The team and the researcher were unable to clarify fully what this goal was attempting to achieve, but in the nature of scholarship of practice, it was included in the reasoning for the team to participate in the case study, with the aim of clarifying the full meaning of this goal further along in the research process.

At the end of the meeting, the team provisionally agreed to participate in the case study. The researcher followed up the meeting with a participant information leaflet, outlining the purpose of the research and the level of commitment required from the team during the period of the case study. The organisation employing the occupational therapy team was approached formally for their consent. To do this the researcher provided an information sheet outlining the goals of the case study and the commitment required from the participants to be involved in this phase of the research. The organisation provided written consent for their employees to be involved in the case study. Informed consent was formally gained from the participants at the first data collection meeting, where they were asked to complete an informed consent form. Ethical approval for the study was granted by the University of Salford ethics committee. Sample copies of the participant and organisation information sheets, and ethical approval documentation can be found in Appendix 6.

4.5.2 Data collection procedures

As discussed earlier in this chapter, a case study allows the researcher to use a number of strategies to collect data. Prior to beginning the case study, the researcher used the goals identified by the participants and the researcher to develop a procedure for collecting the data. The headings of this procedure are used to guide the discussion on strategies used to collect data.

Group Interview – Session 1

An initial group interview was conducted. It could be argued that the researcher could have adopted a group discussion to generate data. However, when using a group discussion, the researcher is interested in both the content of verbal data generated by the group as well as how the group dynamics influenced what data was generated (Flick, 2014). Also, in a group discussion, participants have a greater degree of control over the direction of what data is generated (Robson, 2008). For example, the participants may highlight a particular issue the researcher had not considered and rather than being directed back to the original question, as is done in a group interview, the participants are given opportunity to discuss the issue further. Whilst this approach is good for generating new insights about a phenomenon, it does not support an approach where the researcher requires more control over the questions being asked in order that the necessary data is collected to fulfil the research objectives (Seale & Bernard, 1998; Robson, 2008; Flick, 2014). Given the nature of the research objectives for this study it was not necessary to explore the influence of the group dynamics on the data being generated, but it was important for the researcher to have control over the direction of the data being generated and collected, therefore a group interview was conducted.

To begin to build a scholarship of practice and to begin the interview process, participants were introduced to the process protocol. This introduction included the theoretical underpinning of the protocol, explanation of the purpose of the protocol, and a detailed description of each of the four phases and 10 sub-phases. During this initial stage of the interview, participants had an opportunity to seek further clarification about the content of the process protocol, and it served as an opportunity for the researcher to check the participants had the appropriate level of understanding about the protocol and its potential use in professional practice.

To ensure the researcher collected relevant data, a questionnaire procedure was used to support the second part of the semi-structured group interview. A copy of the questionnaire procedure can be found in Appendix 7. The procedure was designed to ensure the following data was elicited from participants:

1. A description of the current role of the of the participants in the design and construction of a home modification.
2. The individual actions and activities of the participants during each phase of the occupational therapy process.
3. The participants' opinion on the strengths and weaknesses of the current process they were using.
4. What type of support participants would require to implement the process protocol in their practice.

The semi-structured interview took two hours to conduct and it was digitally recorded using a Dictaphone. The audio material was transcribed verbatim using NVivo 10 software. Visual data was also generated during the interview. Mind maps were generated by the researcher during the interview, and these maps captured data about the strengths and weaknesses of the team's current practice. A process map was also produced and this generated data on the individual actions and activities undertaken by participants during the home modification process. The production of this visual data was particularly useful for engaging participants in the interview process as it enabled them not only to verbalise the issues and the process but it helped them to create visual data on the issues and the process. It also allowed the researcher opportunity to member-check understanding of the participants' views.

The data from the interview was analysed using a conventional content analysis, which was defined in an earlier section of this chapter. Using NVivo 10, individual phrases used by participants, when answering the individual questions, were separated and these formed the initial codes. From these codes, a second stage of coding occurred bringing together groups of codes with similar content. From this second tier of coding, the researcher identified a key word from the data within each quote and this was used to name the same. To ensure the trustworthiness and credibility of the keywords used, participants were asked to comment on a feedback sheet provided by the researcher in the week following

the group interview. The sheets identified the key word and alongside this was a definition of the theme generated from their answers to each of the specific questions. This feedback form was sent to the team for them to check, via email and comments.

Training session
Six weeks after the initial group interview, a second session with the team took place. This session was necessary to introduce the tools developed by the researcher in order to support the team to implement the protocol into their professional practice. It was also an opportunity to answer any further questions about the plan of action for implementing the protocol. And finally, at this meeting, the researcher checked the team concurred with the findings of the thematic analysis of the data generated from the answers to the questions in the group interview.

Monthly reflection sheets
The team implemented the use of the Home Modification Process Protocol over a four-month period. During this time, each team member was given the opportunity to complete a monthly reflection sheet. This monthly sheet asked participants to consider the following questions:

1. In the last month how have the changes made to the existing process affected your day-to-day professional practice?
2. In the last month, how have the changes to the existing process affected your interaction with the clients you work with?
3. In the last month, how have the changes to the existing process affected your professional reasoning?
4. In the last month, how have the changes to the existing process affected your interaction with work colleagues?

Group Interview – Session 2

The final group interview was conducted four months after the team implemented the use of the protocol into professional practice. The interview took two hours to conduct and it took place at the case study site. The researcher, again, produced an interview schedule to structure the session. The questions developed for the schedules were based on the goals established at the start of the research process for this third phase of the study, and asked the following:

- Has the protocol helped you to understand your role in the design and construction process of home mods? If so, why and how?
- Has the protocol helped you to collect the right information, at the right time, and to use the information in the right way? If so, why and how?
- Does the protocol improve what you do? If so, why and how?
- What are the challenges of using the process protocol in professional practice?
- Has the protocol made you more occupation-focused? If so, why and how?

The group interview was recorded digitally using a Dictaphone and was transcribed verbatim using NVivo. The same procedure was used for analysing the data from the transcribed recording as was conducted for the first group interview. Again, the team was sent a copy of the themes generated from the interview and each member was given an opportunity to member check the researcher's analysis of the data.

4.6 Chapter Summary

This chapter has described how methodology is the element of research that ensures the process taken by the researcher generates the appropriate knowledge to address the research question or aim. This study has used the Research Onion to ensure congruence between the various layers of the research design alongside the researcher's worldview of how research contributes to knowledge. The Research Onion has also provided a systematic and logical route through the research process, guiding the researcher to make informed decisions about the research design, as articulated in this chapter.

In this chapter, the discussion on the researcher's pragmatic worldview of research, where research should answer real-world problems, aligns with the profession's view that no one ontological or epistemological view is capable of generating the evidence base needed to

address the practice problems and knowledge needs of the occupational therapy profession. This pragmatic worldview of research also provided the rationale for the use of a multi-method research design so that the different aspects of the research objectives could be achieved.

Two methods, a survey and a case study, have been used during the three phases of the research design. This chapter has discussed how the design of a questionnaire generated data to examine the practice of occupational therapists in the field of home modifications in the UK. A description of the iterative process, using the data from the questionnaire with the existing knowledge and theory, was used to develop a process protocol for home modifications. A description of how a scholarship of practice was used in the design of a case study to evaluate the use of the protocol in practice was given.

Finally, this chapter has discussed the importance of trustworthiness in qualitative influenced research. A range of strategies, used in each of the three phases of the research process, has described the way the researcher has attempted to ensure trustworthiness throughout the research process. Chapter 5, 6, and 7 now present the findings from the three phases of this study.

Chapter 5 Evaluation of the current home modification process and practice in the UK (Phase 1)

5.1 Introduction

This chapter presents the findings and discussions from the first phase of the study. The purpose of Phase 1 of the study was to critically evaluate the process used by practitioners in the UK. This was achieved through making occupational therapy practice visible within the field of home modification and this was then used to identify the value of developing a Home Modification Process Protocol. To do this, an on-line questionnaire involving both closed and open questions was developed and it was completed by 135 members of the British Association of Occupational Therapists Specialist Section for Housing. To provide the reader with a coherent description of the outcomes of Phase 1, the findings and accompanying discussion for each of the following headings are presented in turn with a chapter summary that provides an overview of the discussion from all of these sections:

- Who are the respondents?
- Respondents' understanding of occupational therapy practice in home modifications
- Complexity of practice
- Involvement of the person in the home modification process
- Changes required to the process.

5.2 Who are the respondents?

5.2.1 Findings

The first part of the questionnaire considered where respondents practice and the number of years of experience they have within the field of home modifications. Chart 1 shows where respondents practice as occupational therapists. The results indicate that the majority of respondents practice within a social care setting 68.9% (n=93), whilst 11.1% (n=15) of respondents work within the independent sector. The remainder of respondents are practicing across local authority housing departments, the National Health Service (NHS) or Housing Associations (n=27).

Which of the following statements best describes your place of work?

- Social Services: 68.9%
- Independent Practice: 11.1%
- Local Authority Housing Department: 8.1%
- NHS service contracted to Social Services: 4.4%
- Housing Association: 4.4%
- NHS (National Health Service): 3.0%
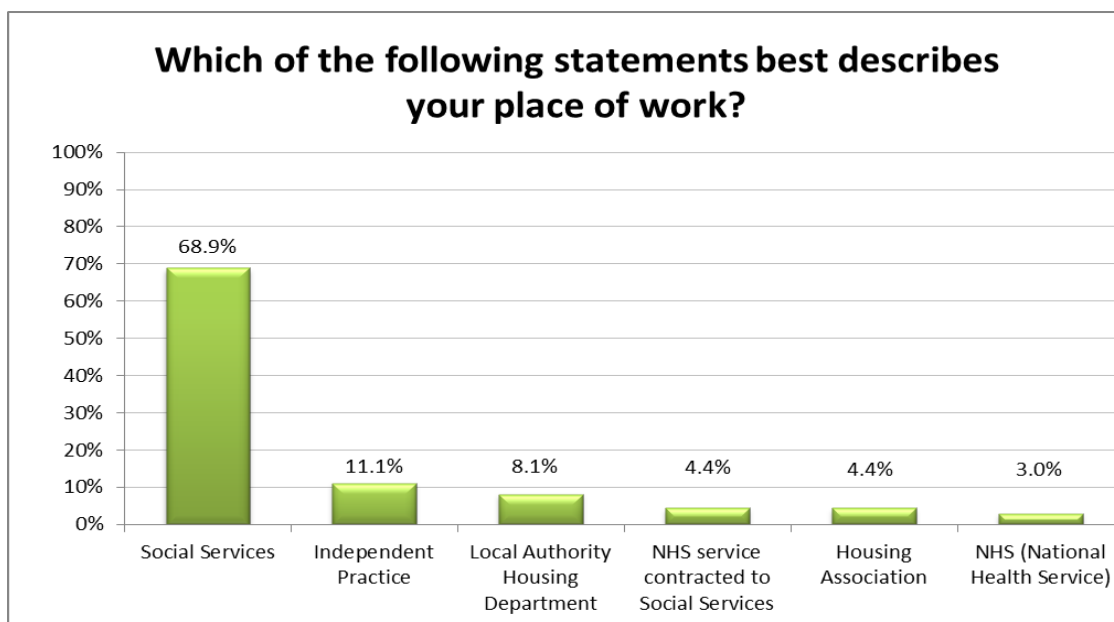
Chart 1 Respondents' place of work

The results in chart 2 show the number of years' experience respondents have in providing home modifications as an intervention. Only 11.9% (n=18) of respondents had 3 or less years of experience of home modifications, whereas over 50% (n=68) had eleven years or more years. This set of results suggests that respondents to the questionnaire were familiar and experienced in this area of practice.

How many years experience do you have in housing modifications?

- 1 - 3 years: 11.9%
- 4 - 7 years: 24.4%
- 8 - 11 years: 13.3%
- 11 + years: 50.4%
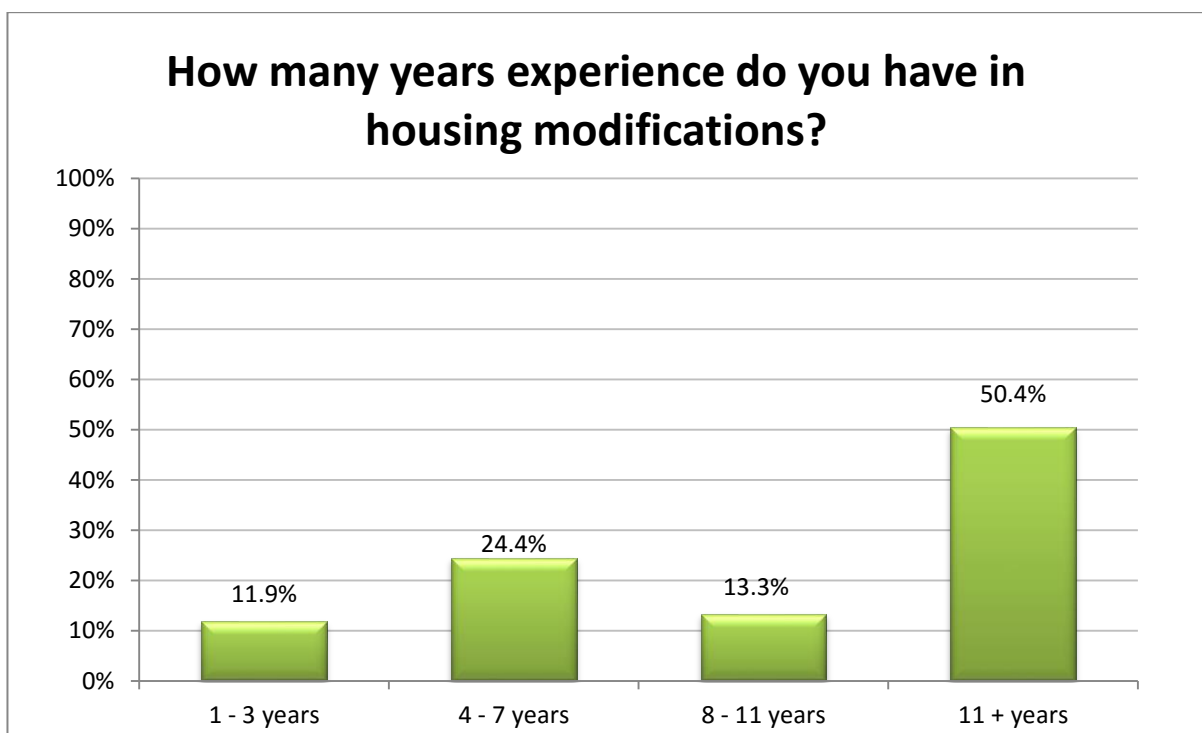
Chart 2 Years of experience of using home modification as an intervention

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5.2.2 Discussion

The finding that the majority of respondents work within a social care setting was expected, given the predominant role occupational therapists have within social care for assessing and recommending home modifications (Riley et al., 2008). What is surprising is that 11% of respondents work within independent practice. This is interesting because the majority of research conducted in the field of home modifications, both as an intervention and the services providing modifications, in the UK, Europe, and Australasia is predominately with occupational therapists who are providing state funded modifications and as part of the formal health and social care system. Therefore, whilst these studies have considered the professional reasoning skills and needs of occupational therapists within these types of setting, it may be the case that the skills and knowledge needs of practitioners in independent practice may be different.

This finding shows that the majority of respondents had over 8 years of experience. In the research on the use of protocols by Kuipers and Grice (2009), novice practitioners were those with 4 or less years' experience of using the particular intervention that was being studied. Whilst there has been no specific research that has considered the question as to what makes an expert practitioner within the field of home modifications, using the above research, it could be tentatively argued that the majority of respondents to this questionnaire were above novice level. If considered above novice level, then it would be assumed that those completing the questionnaire were both familiar and experienced with this field of practice.

5.3 Respondents' understanding of occupational therapy practice in home modifications

Respondents were asked a series of questions to establish their understanding of their role in the home modification process, and were asked to describe the purpose of a home modification, and to comment on their use of theoretical models and assessment tools in practice. The results of these questions are presented in the following sub-sections.

5.3.1 Purpose of a home modification

Findings

To examine respondents' professional understanding of a home modification, they were asked, in an open ended question, to describe the purpose of modifying the home environment. To assist with the thematic analysis of these responses, NVivo 10 was used to identify the 25 most commonly used words by respondents and these words formed the initial codes. The result of this coding is presented in Table 13.

Word	Count	Similar Words
Person	105	individual, individuals, person, personal, persons, somebody, someone, someone's
Independence	104	independence, independent, independence, independently, severe
Enable	75	enable, enables, enabling
Access	61	access, accessibility, accessible, accessing, additional, admission
Living	59	dwelling, existing, experience, inhabitant, inhabitants, lives, living, support, supported, supporting
Carers	52	carer, carers
Disabled	50	disabilities, disability, disabled, disables, impairments
Allow	49	allow, appropriate, provide, providing
Safety	45	safely, safety
Housing	43	families, family, homes, house, houses, housing
Environment	40	environment, environments
Assist	36	assist, assistance, assisting, assists, attending, support, supported, supporting
Possible	34	possible, potential
Improve	33	additional, better, improve, improved, improving
Adaptations	32	accommodation, adapt, adaptation, adaptations, adapting, adapts, alter, alteration, alterations
Reduce	31	reduce, reduced, reducing
Needs	30	demand, involved, needed, needs, require, required, requirements, 'wants'
Facilities	29	facilities, facility
Occupant	26	occupant, occupants, occupation, occupational, occupations, occupier, resident, residents

Remain	26	continuance, continue, remain
Client	25	client, clients, customer
Daily	25	daily, everyday
Activities	24	activities, activity, participate, participating, participation
Increase	23	additional, increase, increased, increasing
Within	22	within

Table 13 Results of initial coding on commonly used words respondents use when describing the purpose of a home modification

Respondents' answers were then re-read to identify the relationships between the ways that the coded words were used. This second tier of analysis identified five themes which represent how respondents understand the purpose of home modifications. The five themes are listed below, followed by brief description of the theme and then examples of responses.

Theme 1: As an intervention, a home modification improves functional health by enabling a person to safely or independently perform everyday activities of daily living (n=85).

In theme 1, respondents discussed the purpose of a modification in terms of improving functional health by maximising the person's safety or independence whilst performing or participating in activities of daily living. For example, respondents indicated they used a modification for improving independence and reducing the risk of injury whilst performing a personal care task. Interestingly, respondents also discussed the benefits of the home modification to the carer.

"To maximise independence and reduce risk in maintaining personal hygiene and/or to assist carers in supporting service users' in maintaining personal hygiene." R10

"To improve a person's ability to carry out everyday activities of daily living where the current environment is stopping them or restricting their abilities." R37

"Enabling a person to maintain their safety and manage any activity of daily living with as much independence as possible." R51

Theme 2: A home modification improves well-being by giving the person opportunity to develop and/or choice and control over the activities they participate in (n=24)

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In theme two, respondents discussed how home modifications provide the opportunity to improve concepts associated with well-being such as choice and control over the occupations they want or need to perform and participate in. For example, R11 discusses the home modification in terms of providing a child with the opportunity to "reach their full potential" in the occupations of their choice, whilst R4 discusses how the modification provides the person with the ability to choose and control where in the home environment they want to go.

"To maximise occupational performance and occupational opportunity for all the inhabitants of the dwelling." R68

"For children there is also the purpose of enabling them to achieve their full potential with a view to being able to sustain their own chosen lifestyle whether this is in the parental home or in their own accommodation." R11

"Modifications can also give more independence / choice and control over what that person can access with their own environment". R4

Theme 3: A home modification improves functional health and wellbeing by either reducing or removing design and construction barriers in the environment, or by improving access to facilities in and around the home environment (n=50).

In this theme, respondents discussed how the design and construction of a modification actually improves functional health and well-being. The responses indicated two ways in which this is achieved, either through removing environmental barriers or by improving the access to the different facilities in the home. For example, in the quotes below from R1 and R33 they discuss how the features of the home which are preventing the person from being independent are changed to provide access to facilities. Likewise, R13 discusses the need to reduce the barrier in the home to enable the person to participate in the activity.

"To change the environment that is preventing a person from being independent." R1

"Reducing environmental barriers to enable individuals to participate in necessary occupations." R33

"To give clients access to essential facilities in their home." R13

Theme 4: A home modification not only benefits the person but also reduces carer strain and health and social care costs to society (n=50).

It was noticeable that respondents not only spoke of the benefit of the home modification for the older or disabled person but also the benefits to the carer. The main benefit appears to be associated with reducing the risk of physical injury or carer strain that might occur when the environment does not support them in their role. However, a number of respondents acknowledge the wider benefits to society of improving the home environment in terms of reducing formal health and social care costs, as can be seen in the response from R121.

"To reduce the level of care needed, to reduce the demand on carers caring for the person and assisting with activities of daily living." R20

"The purpose of a housing modification is to create an environment that enables the service user to achieve functional ADL to the best of their abilities or to assist their carers to look after them in the safest and most effective manner." R42

"To enable people to remain independent and safe within their home environment. The ultimate aim is to reduce the level of external support required, to avoid the need for rehousing or some form of residential care, and to allow the person to regain a degree of independent control over their life." R121

Theme 5: The purpose of a home modification is influenced by the Housing Grants, Construction and Regeneration Act 1996 (n=6)

In a small number of answers, it is possible that the respondents' understanding of the purpose of a home modification was being influenced by the Housing Grants, Construction and Regeneration Act (1996). Within this legislation the words 'essential', 'necessary and appropriate' and 'reasonably practical' are used to describe when a grant can be awarded and these have appeared in a few of the respondents' answers to this question.

"To provide access to / use of required facilities for the individual(s) as far as is reasonably practicable and in relation to relevant legislation and eligibility criteria." R77

"To maximise, re-able, enable, increase safety of the person with a disability and / or their carer(s) to meet essential needs and improve quality of life." R82

"To enable residents to access use of essential facilities such as bathroom, bedroom etc, and / or to provide suitable facilities if basic provision does not meet their need." R97

Discussion

Being able to articulate the purpose of an occupational therapy intervention is a professional and ethical duty (HCPS, 2013; COT, 2015) and an economic necessity when explaining the value of the intervention to those who purchase the services of occupational therapists (Atwal & Caldwell, 2003; Wilding, 2010). To date the purpose of home modifications has largely been defined by academics in this field of practice. The finding from the thematic analysis is important as the five themes potentially provide a definition based on the experience of practitioners who work in the field of practice. The definition which appears from the thematic analysis is:

> 'Home modifications improve functional health by enabling a person to safety and independently perform activities of daily living. Furthermore, a home modification improves well-being by giving the person choice and control over the activities they want, need, or have to participate in. A home modification does this by either reducing or removing architectural barriers in the environment, thus improving access to facilities in and around the home. Home modifications not only benefit the person but can directly benefit the carer or indirectly benefit society by reducing the costs of health and social care.'

Whilst this definition broadly defines the purpose of a home modification, the majority of participants (n=85) associated the purpose of a home modification with independence and safety. Prior studies (Steward, 2000; Heywood, 2004; Aplin, 2013) have shown that where the focus of designing a home modification has been to improve safety and independence, this has resulted in practitioners not considering other important concepts associated with the design and construction of the home modification, such as aesthetics, and how the modification can change the meaning of home. In those prior studies, failure to consider these factors have resulted in dissatisfaction with the modification (Aplin, 2013), and have been a barrier to applying for a home modification in the first instance (Bridges et al., 2007).

Whilst conducting formal cost benefit analysis on home modifications is challenging (Bligh et al., 2016) the following quote demonstrates the cost value this respondent perceives that there is by reducing hospital admission and care costs through the installation of a home modification.

> "…to reduce the risk of increased care packages or having to move into hospital or long-term care provisions such as foster placement, care home, residential setting (including schools). Housing

modifications can also reduce current care packages or allow someone to access their home environment more easily with reduced risks." R89

A surprising finding was the small number of respondents who, when describing the purpose of a home modification, used words associated with the current legislation, specifically the Housing Grants, Construction, and Regeneration Act (1996). It is not possible to confirm a relationship between these respondents' answers and the impact it has on their professional reasoning skills. However, in the review of the literature for this study, Fange et al. (2009) and Sakelleriou (2015b) both raised concerns that legislation was negatively impacting on occupational therapists' ability to perform their role, particularly with regards to compromising the collaborative relationship and professional reasoning that underpins the profession. The following quote from respondent R43 appears to demonstrate this. The quote begins by suggesting that a suitable solution has to be framed in terms of what can be provided under the definition of the legislation. It appears that if the person identifies a solution that is not congruent with the legislation then the respondent labels this as a 'wanted a home modification' rather than a 'needed a home modification'.

> "To provide a suitable housing adaptation to meet the need to the disabled client according to the housing legislation - mandatory access to facilities within the property i.e. washing, kitchen, access, bedroom etc. The word need is very important as clients will often bring in 'wants' into the discussion." R43

If home modifications are labelled by practitioners as 'needed' or 'wanted' in this way, then this might provide one explanation for the findings by Sapey (1995) and Heywood (2005). In both these studies research participants received the modification the occupational therapist had recommended, and not the one that the study participant reasoned was the appropriate solution. This resulted in the study participants being dissatisfied with the modification recommended by the occupational therapist.

5.3.2 Respondents use of and attitudes towards conceptual models in practice

Findings

From a pre-determined list, respondents were asked to indicate which conceptual model of practice influenced their professional practice. These results are shown in Chart 3 and they indicate 58% (n=78) of respondents stated that their professional practice was not

influenced by a specific theoretical model. Where a model of practice is influencing practice, the most frequent are the Canadian Model of Occupational Performance (Townend et al., 1997; 2002) n=16, followed by the Person Environment Occupation Model (Law, 1994) n=15.

As an occupational therapist, which theoretical model influences your practice?

Model	Percentage
Occupational Performance Model: Australia	1.5%
KAWA Model	1.5%
Model of Human Occupation	4.4%
Other Model	5.9%
Person Environment Occupation Performance Model	5.9%
Person Environment Occupation Model	11.1%
Canadian Model of Occupation Performance	11.9%
My practice is not influence by a specific model of occupational therapy	57.8%

Chart 3 Use of theoretical models in practice

When asked about their attitudes towards the use of theoretical models, the majority of respondents (n=98) were either neutral or disagreed with the statement that existing theoretical models met their needs as practitioners (Chart 4). Despite current models not meeting their needs as practitioners, most respondents (n=112) reported having a good or

very good understanding of the theory behind the use of home modifications as an intervention.

Please indicate how you feel about the following statements:

Legend: ■ Strongley Agree ■ Agree ■ neither agree or disagree ■ disagree ■ Stongly disagree
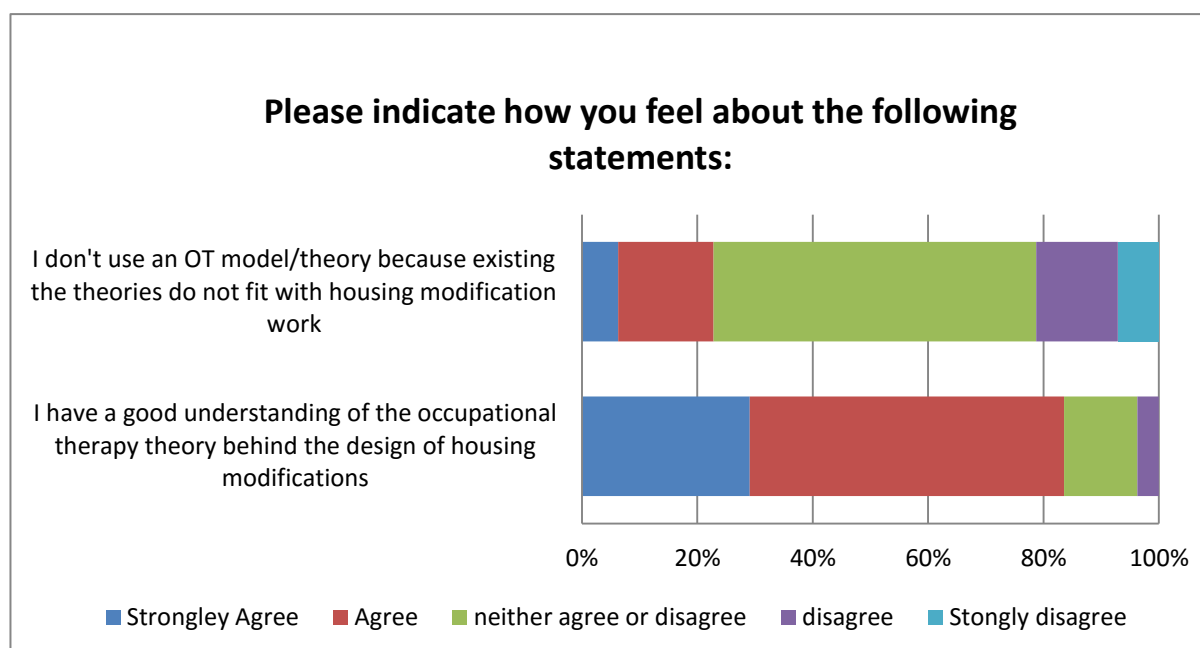
Chart 4 Attitudes towards the use of theoretical models in practice

Discussion

Given conceptual models are important to professional reasoning because they support the occupational therapist to structure and 'make sense' of the different elements of the occupational therapy process (Davis, 2006, p.57), these findings are of concern as they indicate that the majority of occupational therapists are not basing their professional reasoning on a conceptual model of practice. However, these findings are consistent with studies from other areas of occupational therapy (Lee et al., 2009; Ikiugu, 2012) which suggests that respondents do not value or use models within their practice. Despite not using a conceptual model, the majority of respondents in this study agreed (n=73) or strongly agreed (n=39) that they have a good theoretical understanding of why home modifications are used as an intervention approach in occupational therapy. Again, these findings are consistent with the studies by Lee et al. (2009) and Ikiugu (2012) where despite issues with using conceptual models, participants were positive about the role of theory in their practice.

Based on the review of the literature on the use of conceptual models in practice, this finding could be due to the lack of congruence between the model, the structures and tools that support its use with the respondents' practice setting requirements (Rousseau, 2001;

Elliot et al., 2002; Boniface et al., 2008; Lee et al., 2009). Another explanation could be that the majority of the respondents (n=86) have been in practice for 8 years or more, and as O'Neal et al. (2007) found, the value occupational therapists place on conceptual models declined the longer therapists have been practising and Lee et al. (2009) found that practitioners did not use models as they forgot what they had been taught.

5.3.3 Use of assessment tools

Findings

Respondents were asked to comment on their use of assessment tools during the process of modifying home environments. The results, shown in Chart 5, indicate that 51% (n=69) of respondents use no assessment tool. For respondents who do use a tool, 47% (n=64) indicated this was a bespoke tool designed by the department in which they worked. Only 2% (n=2) of respondents reported using a standardised assessment and only one of these respondents indicated the name of the standardised assessment tool being used and this was stated as the Community Dependency Index.

Which of the following statements best describes your use of assessment tools?

- I routinely use a standardised assessment tool as part of the process of designing housing modifications (please indicate below the assessment tool used)
- I routinely use a departmental designed assessment tool as part of the process of designing housing modification
- I do not routinely use an assessment tool as part of the process of designing housing modification

Chart 5 Respondents' use of assessment tools

Discussion

Assessment tools are important as they ensure that the occupational therapist collects appropriate data to be able to guide their professional reasoning when planning and providing interventions (Fawcett, 2002). Assessment tools can also guide and structure the observations the practitioner makes when they try to make sense of how the person's performance and participation is being affected by the built environment (Ainsworth, 2010). Ideally, standardised assessments should be used since they are more likely to reflect the concepts contained in the conceptual model (Fawcett, 2002; Fisher, 2009) and therefore allow for the collection of detailed PEO information required to plan and implement an intervention. Home-grown assessment tools can provide the practitioner with some structure to assessments, however the use of these tools has been associated with studies that have shown some evidence that the home modification was failing to meet the person's occupational needs and requirements (Heywood, 2004; Heywood, 2005; Aplin, 2013). Given previous studies (Fange et al., 2012) it was anticipated that the use of standardised assessment tools would be relatively low and the use of home grown tools higher. However, a surprising finding was that 51% (n=69) of respondents were not using any assessment tool. This finding should be interpreted with caution as some respondents may have misunderstood the question and assumed it related to the intervention phase and not the whole of the modification process, including the initial assessment. However, despite the need to be cautious, Fange et al. (2012) found a similar finding from the analysis of a questionnaire given to Swedish occupational therapists. They concluded that their finding was because practitioners were confused as to what assessment tools were available and when they can be used to support the home modification process.

5.4 Complexity of practice

The questionnaire also examined the complexity of the home modification process. Respondents were asked to indicate the range of individuals and professionals they collaborate with during the process of modifying a person's bathroom, and to provide details of the type of information which they routinely collect and generate during the modification process. Finally, in this section, respondents had the opportunity to identify the range of person, environment, and occupation factors they consider during the process of modifying a bathroom. The results of these questions are reported in this next section.

5.4.1 Collaboration during the home modification process

Finding

From a pre-determined list, respondents were asked to identify the range of professionals and individuals they collaborate with during the process of modifying a bathroom. They were also given opportunity to identify other professional groups or individuals not included in the pre-determined list. The results are presented in Table 14 below. The words in italics are the additional individuals or professionals identified by respondents. The data in column "Number of responses" is the total number of respondents who indicated they collaborate with this professional group or individual.

During the home modification process, the findings indicate that respondents collaborate with a range of individuals and / or professionals. The majority of respondents collaborate with the person (user) needing the modifications (n=132), the relative at the same property (n=131), informal carer (n=129), and/or the Disabled Facilities Grant Officer (n=121).

Collaboration occurs with:	Number of respondents
User	132
Relative of the user - at the same property	131
Informal carer	129
Disabled Facilities Grant Officers	121
Relative of the user - not in same property	108
Builder	103
Supplier / Product Representative	101
Home Care Manager / Worker	99
Clinical Supervisor	99
Social Worker	96
Architect	93
Product manufacturer	82
Physiotherapist	75
GP	62
Care and Repair Service	6
Home Improvement Agency	6
Owner of Property	6
Building Surveyor	4
Nursing Staff	4
Other OT colleagues	3
Wheelchair Services	2
Case Managers (for compensation claimants)	1
Wardens	1

Table 14 Individuals and professionals that respondents collaborate with during the process of modifying the home environment

Discussion

One of the reasons that the home modification process has been defined as complex is due to the number of professionals and services directly, and indirectly, involved in the process (Adams, 1996; Pynoos, 1998; Sanford et al., 2001). The findings from this PhD study suggest that, potentially, practitioners collaborate with 20 professional groups. However, the findings do not indicate when and why the occupational therapist collaborates with these professionals. However, one would assume it is either related to the direct design, procurement, and installation of the modification, which would account for relationship with the building professionals and Housing Agency. Alternatively, it could be because of the need to gain further information as to how other aspects of the person's health and

well-being may influence how the modification is designed to meet the person's requirements.

A number of studies (Klein, 1999; Pynoos, 2001; 2002) have suggested that occupational therapists do not understand their role in the design and construction process and difficulties can then occur when the occupational therapist is not aware of how their role fits into the wider aspects of design and construction. However, respondents in this study do not share this perception. When asked directly to comment on their level of agreement with statements associated with their knowledge of their role in the process (see Chart 10) and their ability to effectively communicate with others involved in the process, the majority of respondents, (n=128) and (n=128) respectively, responded positively to these statements. This finding may not be surprising, given the previous studies were done over 10 years previous to this one, and thus it might reflect improvements made by the profession in this field of practice, or it might be reflective of the style of question asked provoking a positive response. However, whilst the respondents may hold this positive perception about their role, others outside of the profession may be less positive about the involvement of the occupational therapist in the process.

5.4.2 Types of person, environment, and occupation information collected

Findings

Respondents were asked to identify the information they routinely collect about the person, environment, and occupation when designing a bathroom. To help answer this question, respondents were given a pre-determined list of factors to choose from, with an option to add to the list. The results are presented in the following three tables.

Please tick the information you routinely collect about the person when designing bathroom modifications		
Answer Options	Response Percentage	Response Count
Transfer ability (bath/toilet/shower)	97.00%	131
Standing and sitting balance	94.80%	128
Weight of the user	94.10%	127
Cognitive ability	93.30%	126
Prognosis of medical condition	93.30%	126
Prognosis of functional abilities	93.30%	126

Please tick the information you routinely collect about the person when designing bathroom modifications		
Answer Options	Response Percentage	Response Count
Standing and sitting tolerance/stamina	91.90%	124
Dexterity and grasp	90.40%	122
Reach in sitting and standing	88.10%	119
Range of movement in upper and lower limb joints	88.10%	119
Visual ability	86.70%	117
Height of the user	85.90%	116
Width of the user	83.70%	113
Ability to make own decisions	81.50%	110
Pressure care requirements	74.80%	101
Sitting tolerance/stamina	71.90%	97
Range of movement in trunk	70.40%	95
Functional or medical need to maintain body temperature	67.40%	91
Problem solving skills	62.20%	84
Range of movement in neck	51.10%	69
Hearing ability	51.10%	69
Please list any other information you routinely collect about the person	28.10%	38
None of these	0.00%	0

Table 15 Person information collected by respondents

Information collected by respondents but not included in the above list:

- Knee to floor height when in seated position

- Right or left hand dominance

- Continence

Please indicate the information you routinely collect about the bathroom environment		
Answer Options	Response Percentage	Response Count
Door width	97.00%	131
Position of sink	94.80%	128
Position of bath	93.30%	126
Size of shower cubicle	93.30%	126

Please indicate the information you routinely collect about the bathroom environment		
Answer Options	Response Percentage	Response Count
Position of shower cubicle	93.30%	126
Height of shower tray	93.30%	126
Dimensions of room	91.10%	123
Type of taps	88.90%	120
Height of toilet	87.40%	118
Size of bath	85.90%	116
Size of sink	84.40%	114
Structure of the walls	77.00%	104
Ventilation present	73.30%	99
Position of light switch	71.90%	97
Position/entry/exit of soil pipe	68.10%	92
Lighting levels	66.70%	90
Structure of the floor	65.20%	88
Style of toilet flush	63.70%	86
Height of floor to underside of sink	60.70%	82
Existing floor covering	59.30%	80
Window dimension	53.30%	72
Position/entry/exit of waste pipe from sink/bath	50.40%	68
Type of glass in window	14.80%	20
None of the information	1.50%	2

Table 16 Environment information collected by respondents

Information collected by respondents but not included in the above list:

- Type of heating

- Inward or outward facing door

Please tick the information you routinely collect about the user and the occupation they perform when designing bathroom modifications (Please tick all that apply)		
Answer Options	Response Percentage	Response Count
Type of equipment used during occupation (e.g. perching stool mobility aids, shower seat)	97.0%	131
Type of assistance the user requires from a carer	97.0%	131
Circulation space required for mobility aids	96.3%	130

Please tick the information you routinely collect about the user and the occupation they perform when designing bathroom modifications (Please tick all that apply)		
Answer Options	Response Percentage	Response Count
Risk to the user's safety when performing the occupation	96.3%	130
Risk to the carer's safety when performing the occupation	96.3%	130
Circulation space required for moving and handling equipment	94.8%	128
Space the user requires to perform a specific activity	93.3%	126
Space the carer requires to assist with a specific activity	92.6%	125
Needs of other users of the bathroom	92.6%	125
Time and frequency occupation is performed	82.2%	111
Where each aspect of the occupation is performed (i.e. if bath transfer is the issue, do you routinely collect information of where the user gets dressed?)	71.9%	97
How cultural requirements impact on the occupation	71.1%	96
How habits impact on occupation	59.3%	80
Resources or tools needed whilst performing the occupation or activity (i.e. shampoo/creams)	55.6%	75
How rituals impact on the occupation	49.6%	67

Table 17 Occupation information collected by respondents

Information collected by respondents but not included in the above list:

- Person's level of motivation

Collectively, the results from these three tables suggest that the majority of respondents collect a broad range of person, environment, and occupation information. However, whilst the majority of respondents collected person information related to motor capability, fewer respondents collected information about sensory and cognitive capabilities. Whilst the majority of respondents collected dimensions and layout of the bathroom, fewer respondents collected information about more detailed construction elements, such as position of waste pipes and the structure of the walls, windows, and floors. Similarly, under 'factors related to occupation' whilst the majority of collected information about the equipment the person uses during the activity, or the space needed to perform the occupation, fewer respondents collected data about the person's habits and rituals.

Discussion

As stated previously, failing to collect the relevant PEO information during the different aspects of the design and construction of a home has been found to negatively impact on the final design of the home modification (Steward, 2000; Heywood, 2004; Aplin, 2013). The findings from this PhD study are positive because it demonstrates that the majority of respondents are collecting a broad range of information associated with the PEO concepts and the information collected supports the type of information Stark (2015) has found to be relevant to supporting practice. However, it is important to note that fewer participants collect information associated with the meaning of the home and how roles and routines influence the design of the modification, this is potentially a concern because failure to collect this type of information has been shown to be important in achieving a successful home modification design (Heywood, 2005; Aplin, 2013). Collecting relevant technical construction information is important as this can help the surveyor or builder to know whether or not a modification is feasible (Klein, 1999).

5.4.3 Involvement of the person in the home modification process

Findings

A series of questions examined how respondents involve the person during the home modification process. The first result in this section considers the methods respondents use with the person to discuss the proposed modification. The results, shown in Chart 6, suggest that respondents use a combination of methods to communicate with the person, but predominately rely on verbal communication (n=114) and a range of two dimensional visual strategies including 2D CAD drawing (n=67), photographs (n=91) and catalogue pictures (n=106).

Routinely, how do you discuss the proposed housing modification with the user? (Please tick all that apply)

Method	Percentage
None of the above	
Show a 3D CAD drawing	8.1%
This is done by another professional/agency	13.3%
Take them to look at a completed bathroom modification (i.e. to a Disability Living Centre)	17.0%
Other: Please indicate what other methods you use	20.7%
Show a 2D CAD drawings	49.6%
Joint visit with a design/constuction professional to give information	50.4%
Show them pictures/photographs of other housing modifications	67.4%
Show them catalogue pictures of products	78.5%
Give a verbal description of the modification	84.4%

Chart 6 Communication methods used to discuss the proposed home modification

Respondents were asked how they analysed whether the proposed design of the modification would provide the required solution. The majority of respondents (n=112) actively involve the person when analysing the fit between the proposed design and what will improve the person's functional health and sense of well-being. However, this also shows that a small number of respondents (n=23) do not involve the person during this

element of the process. The majority of respondents (n=115) also use their professional experience to support the analysis of the proposed design. The results also suggest that a small number of respondents (n=8) do not consider analysing the proposed design of a modification as part of their professional role (Chart 7).

How do you evaluate / analyse the proposed design of the bathroom modification?
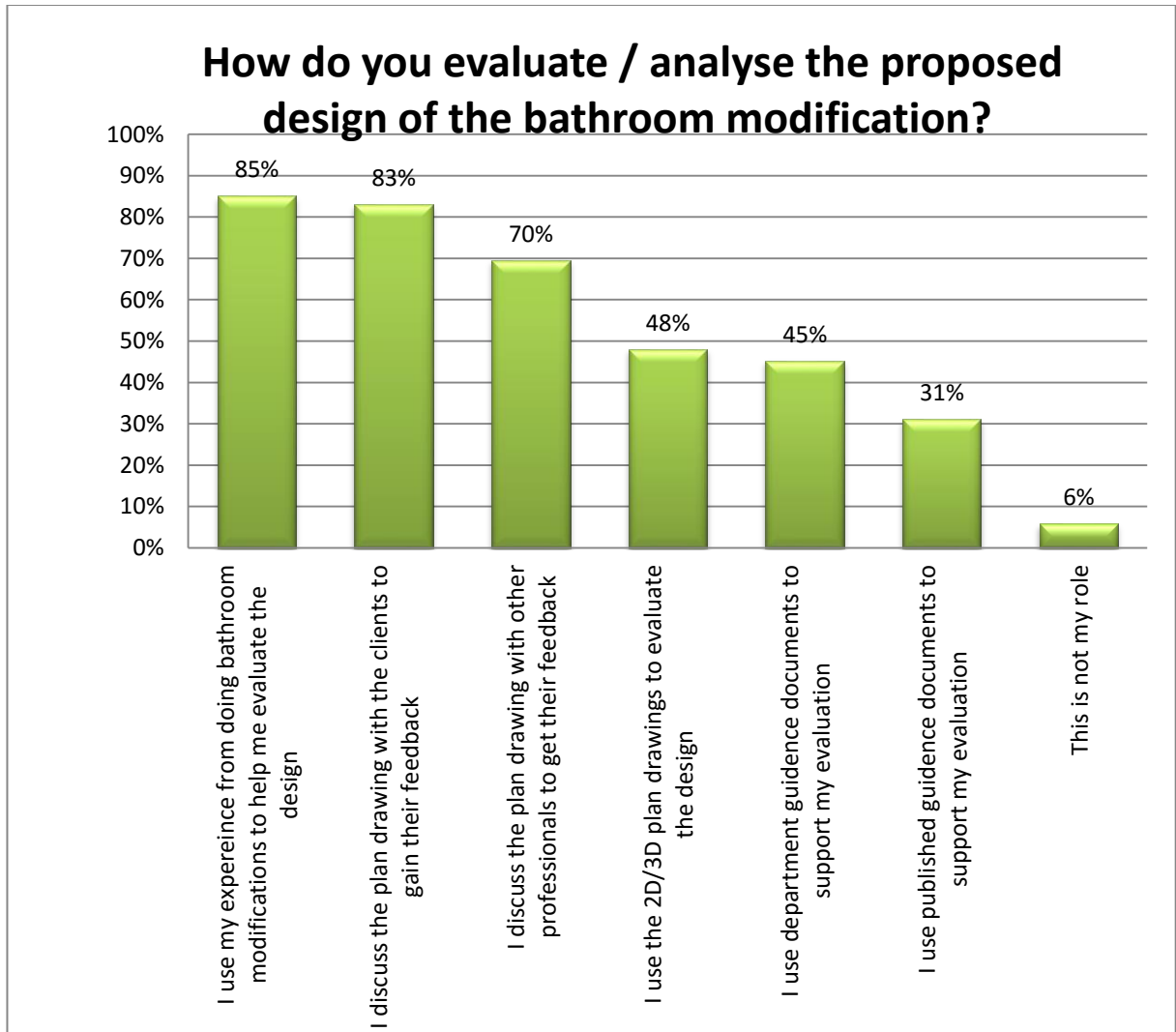
Chart 7 How respondents analyse the 'fit' between the proposed design of the modification and the needs of the person

In another question, respondents were asked as to whether the person requiring the modification is routinely given more than one design option to consider. The results to this question are presented in Chart 8, and they show that when technically feasible, nearly two-thirds of respondents (n=82) provide the person with more than one option to consider. Interestingly, the remaining respondents (n=53) do not give the person other options to consider even when it is technically feasible to do so. Those respondents were asked to comment on the reason for not giving more than one option and an analysis of

their responses identified the following four themes (see Table 18 for examples of respondent replies).

- Only the most cost effective solution given to the person to consider

- All design options have been discussed in the early stages of the process

- There is a departmental standard design and specification for the bathroom modification

- To reduce confusion for the person
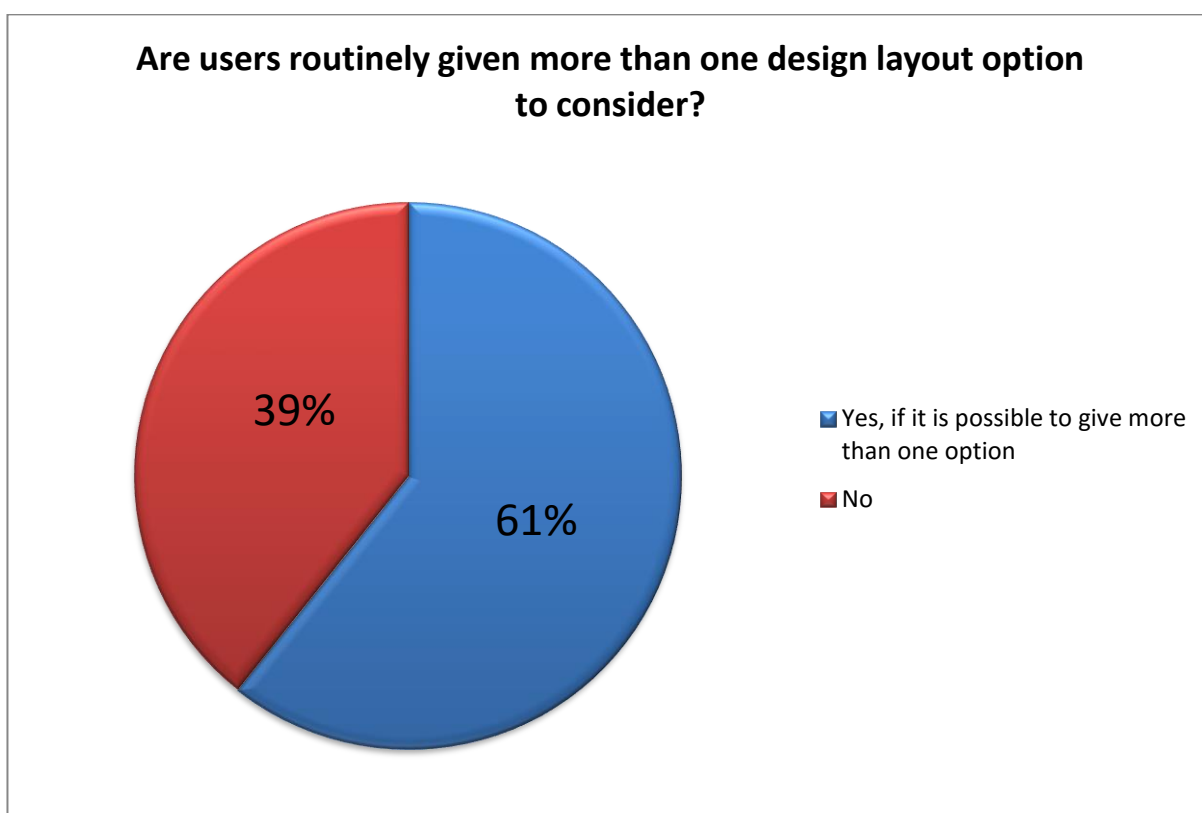
Chart 8 Are users routinely given more than one design layout option to consider?

Reason for only giving one option	Example responses
Only the most cost effective solution is chosen (n=4)	R19: *Grant department will go for cheapest option that meets needs -i.e. use existing bath space to replace with shower. It is their decision and we are encouraged to specify what is required only and they will decide how to do it. However, in complex cases, we can have more input and this might involve a case conference.* R30: *The most cost effective method is usually the only option user is offered.* R34: *User was given the most feasible option to meet need, according to organisation.*

Reason for only giving one option	Example responses
All design options have been discussed as part of the Early stages of the process (n=4)	R15: *Tend to eliminate other options on the initial visit, but where there are other options and the individual would like an alternative layout, I try to accommodate this by sending drawings of these options initially to get to a point of agreeing the final layout before the final OT recs are drawn up*
There is a departmental standard design and specification for the bathroom modification (n=2)	R17: *Council has standard specification which is used unless there are complex issues. At this time it may be that more than one option is considered.* R46: *Clients are routinely given the mandatory scheme to consider, if they wish to consider an alternative, this can be drawn up as a preferred scheme.*
To reduce confusion for the person (n=1)	R18: *It can often confuse them as to which may be the better option and why. Also, it can cause conflict between users of the proposed room. We will give them more than one option if we feel that it is beneficial to do so*.

Table 18 Themes from open responses to why only one design option is given to the person

Finally, under this section, respondents were asked to comment on those instances where the person, or their carer, had been unhappy with the modification and to identify the reasons for this. Respondents were given a pre-determined list of responses with opportunity to input additional causes of dissatisfaction. The results to this question are shown in Chart 9 When a user or their carer has not been happy with a completed bathroom modification you have been involved with, can you identity the cause of this? Workmanship was identified as the main cause of dissatisfaction (n=84). However, other significant causes of dissatisfaction included builders failing to follow specifications (n=71) and the person or carer not fully understanding what the modification would look like once completed (n=26).

When a user or their carer have not been happy with a completed bathroom modification you have been involved with, can you identify the cause of this?

- The workmanship — 63%
- Specifications were not followed by the builder — 53%
- The look/aesthetics of the modification — 43%
- The modification was not what the user/carer was expecting — 19%
- My recommendations/specification were not followed by other professional involved in the process — 16%
- I rarely get feedback after I am involved in a bathroom modification — 11%
- The modification did not meet the users/clients needs — 10%
- Rarely get a complaint — 5%

Chart 9 When a user or their carer has not been happy with a completed bathroom modification you have been involved with, can you identity the cause of this?

The free text responses were analysed and where responses did not fit into the categories provided, these answers were analysed to identify common themes from which two themes emerged. The first theme relates to the adaptation not meeting the person's needs, either because the needs had changed from the original assessment or potential changes in the person's needs were not foreseen in the original assessment. The second

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theme relates to respondents having rarely received negative feedback from the person or carer.

Discussion

Involvement of the person during all aspects of the home modification process is a professional and ethical requirement of practitioners (COT, 2015; HCPC, 2016), and in research conducted in the field of home modifications, a supportive collaborative relationship between the person and practitioner has been associated with the modification process being a positive experience by the person (Horowitz, 2002; Johansson, 2009). Whilst the questionnaire did not specifically ask respondents to identify when and how they involve the person in the process, the findings do provide some limited evidence that respondents are actively involving the person in the process. For example, discussing with the person the proposed design of the modification, and involving the person in analysing if a proposed modification will meet the occupational needs and requirements of the person. However, the methods the respondents use to communicate with the person, through verbal description and the use of two dimensional computer aided design (2D CAD) has been associated with the person not fully understanding what type of modification is being installed (Nord et al., 2009). This finding has potential implications for ethical practice, as practitioners have an obligation to ensure that the person has a full understanding of the implications of any intervention being provided. When applied to home modifications, this means the person having a full understanding of how the modification will look and function once installed. Without fully understanding how the modification will both look and function, it could be argued that the practitioner is providing an intervention that the person does not fully understand.

Interestingly, a small number of respondents (n=8) do not identify analysing the design of the home modification to ensure it meets the person's requirements as an aspect of their role. Similarly, when discussing the design options, a small number of respondents (n=8) indicate that this role is performed by another professional. Whilst it is not possible from the findings to establish the reasons for these responses, it does appear that there is inconsistency amongst the respondents as to what aspects of the design and construction process they see as their responsibility to be involved in.

Ethical practice encourages a collaborative relationship between practitioner and the person to ensure the person has choice and control over the decisions being made during the therapy process (COT, 2015). Good practice in the delivery of the Disabled Facilities Grant has identified the need for the person to have choice and control over the process (DCLG, 2006; Housing Adaptations Consortium, 2013). Providing the person with a range of options in the design of a modification is one way that the person can be provided with choice and control over the process, and the findings indicate that where feasible, people are given the choice as to the different options of modifying the home environment. Where the person does not get an option, it is positive to note that for a number of the respondents (n=4) identified this was because all options had been considered in the earlier phases of the design process. However, this could again suggest that there is not a consistent approach in the process being used by practitioners in this field of practice.

A number of studies have indicated that the practice of occupational therapists is being negatively influenced by structures developed within departments to manage the eligibility criteria for the funding of home modifications (Heywood, 2004; Sakellariou, 2015a; 2015b). When analysing the results from practitioners who do not provide the person with an option, it does appear that for a small number of respondents (n=4) that the financial limitations impact on what the person is offered in the way of design options. Furthermore, one of the respondent responses *(R 18)* supports the findings from Nocon and Pleace (1998), where the respondent seems to suggest the need to take over the process to reduce confusion for the person, as well as to reduce conflict with other people living in the home environment.

From the respondents' experience, the main cause of a person being dissatisfied with the home modification was due to the standard of the workmanship. Again, given previous research (Nord et al., 2009) which has indicated people find the design information they are shown during the modification process complex and difficult to understand, it was anticipated that the 'look' of the modification coupled with it not being what the person had expected, to be other major causes of dissatisfaction. Once more, given the previous discussion on informed consent and the emphasis the profession places upon developing a collaborative relationship that fosters choice and control, this finding appears to raise questions as whether occupational therapists are using the appropriate tools to show and

demonstrate how the intervention will look and perform, in order to gain consent. In the design and construction industry, gaming technology is being used with computer aided design software to support architects and others including clients to provide a visual demonstration on a range of proposed construction elements including aesthetics and functionality. It is clear from the findings from this PhD study that few respondents take advantage of three dimensional computer aided design technology which may help a person to better visualise the proposed modification.

In an earlier question, respondents indicated their agreement (n=99) that other professionals involved in the process have a good understanding of the role of the occupational therapist in home modifications. Therefore, it is interesting to find that when the person has not been satisfied with the modification, one of the causes has been due to the builder or other professionals involved in the process not following the occupational therapist's recommendation or specifications. Cowell et al. (2007) also found that builders were not following the recommendations made by the occupational therapist resulting in the modification not meeting the person needs and also requiring additional expense to remedy the building work to correct the problem. There are several possible reasons for this finding. Firstly, the builder may be a contractor for a housing department and whilst the occupational therapist passes the specific design information to the housing department this information fails to get subsequently passed on to the builder. Secondly, if the information is passed to the builder, the builder may not appreciate the relevance of why the occupational therapist wants an item installing in a particular position, whereas the occupational therapist has precise reasons for this, which can often be critical. Another reason may be because the builder, for construction or technical reasons has been unable to install the item in the preferred location. Whilst it is difficult to know the cause of the problem, improving the flow of information, and professionals having a greater understanding of the role each other does would potentially reduce this problem.

5.5 Changes to the process

To examine what changes respondents would make to the current home modification process, respondents were initially asked to rate their agreement levels, from strongly agree to strongly disagree, to a series of questions. Then, in a later question, they were

given the opportunity to list three things they would change about the process. The results of these questions are presented in the next section.

The results to the first series of questions are shown in Chart 10. The results suggest that the majority of respondents (n=128) are confident at both doing and explaining their role in the home modification process. In respect of how others perceive and understand the practitioner's role, again, the majority of respondents indicated that other professionals involved in the home modification process (n=99), or the person needing the modification (n=94), have a good understanding of the practitioner's role. These results also indicate that the majority of respondents (n=126) are confident with the current process they use when modifying the home environment, and that they have a good understanding (n=111) of how the construction of the existing bathroom would impact on the design options.
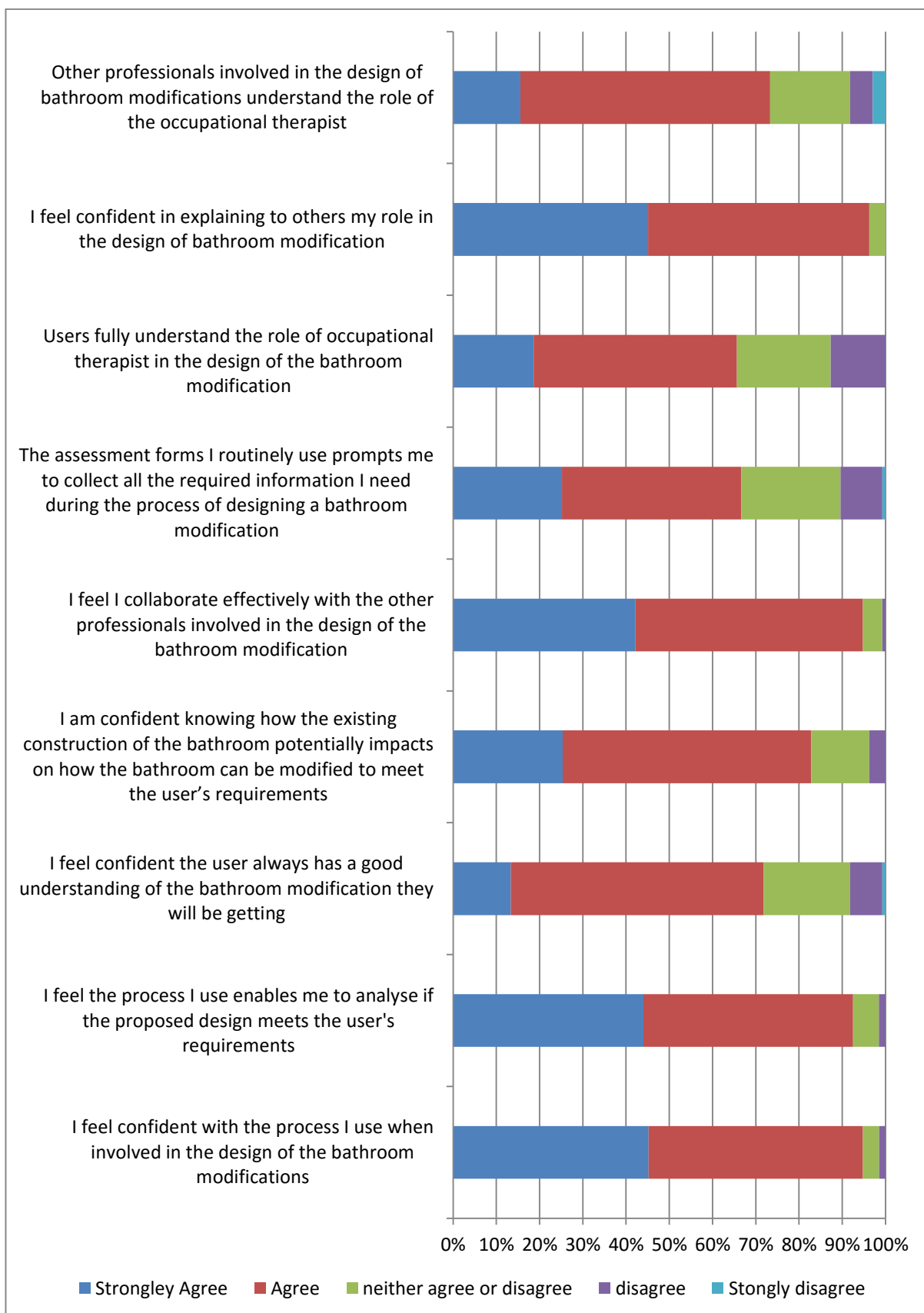
Chart 10 Perception of the role in the home modification

Despite the positive results presented above, when respondents were given an opportunity to name three things they would change about the process, only a small number (n=12) indicated that they would not change the process. From the remaining responses, 5 general themes and 10 sub themes emerged from the thematic content analysis of the replies. NVivo 10 was used to generate a thematic map of the relationship between these main themes and subthemes and this is shown in Figure 21. A discussion of each main theme (shown in the blue spheres in Figure 21) and subtheme (shown in green the spheres in Figure 21) now follows.
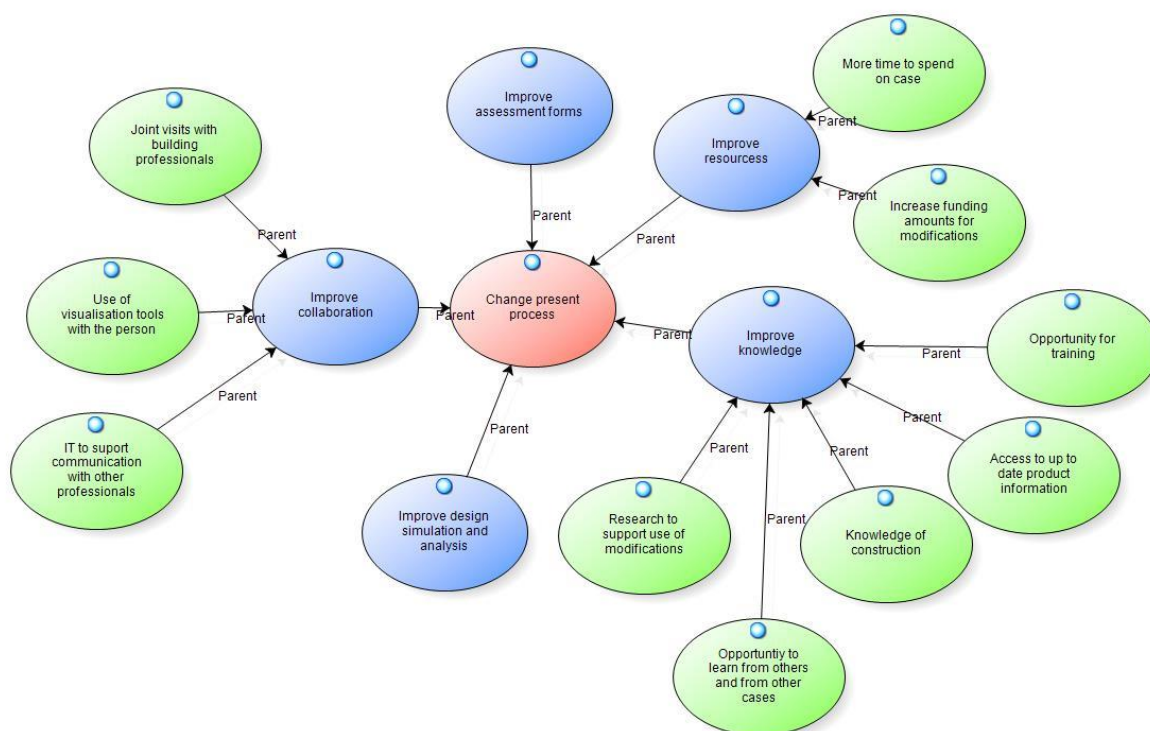
Figure 21 Thematic map from content analysis generated in Nvivo 10

5.5.1 Improved assessment forms or checklists

Findings

Under this theme, a number of respondents (n=18) indicated the need to have an assessment form or checklist that supports them to collect the relevant information. This indicates that the current forms being used in practice do not support respondents to collect the right type of information. R14 respondent indicated the need for an assessment tool to help guide the professional reasoning made during the process but does not specify at what part of the process this tool is required to support their thinking processes. Examples of responses are cited below:

"I would have a more specific assessment tool to help guide my thinking." R14

"Better assessment forms." R56

"Improve our assessment paperwork so that it prompts other OT's to collect pertinent information." R63

"Prompt/list of parameters would be useful to ensure all factors are recorded." R128

Discussion

The importance of assessment and assessments tools was discussed earlier. Thus, it is encouraging that a small number (n=18) of respondents recognise there is a need to improve their use of assessment tools. The findings are also encouraging because they indicate that respondents have awareness that the type of information they collect has an influence on their professional reasoning and the decisions they make regarding the design and construction of the modification. The responses also indicate that respondents need support to be prompted to collect the relevant information and that assessment tools are an important way this can be achieved.

Although respondents were asked about their use of assessment tools, they were not questioned as to their awareness of the tools that have been developed to use in this field of practice. Therefore, these findings may indicate that practitioners do not have an awareness of what tools are currently available and which element of the process they are designed to support. This finding may also support the conclusion drawn from Fange et al. (2012) where respondents did not use assessment tools because they were not congruent with the practice setting.

5.5.2 Improved collaboration

Finding

The broad theme of improving collaboration was identified by a significant number of respondents (n=129). This finding supports previous literature that has identified the need for occupational therapists to improve collaboration with the person needing the modification (Sapey, 1995) and with professionals involved in the process (Klein, 1999; Pynoos, 2002). Further thematic analysis of these responses identified three sub-themes suggesting how collaboration could be improved. For example, sub-theme 1 (n=9)

identified the use of information technology to support communication between respondents and other professionals involved in the whole modification process. Subtheme 2 (n =96) supported the use of computer-aided design tools to help improve collaboration between the respondent and person needing the modification. This finding appears to support the work of Nord et al. (2009) who recognised the limited range of computer aided design software available in this area of practice. These responses indicated that this type of technology would improve the person's visualisation of the proposed modification. Subtheme 3 responses (n=24) identified the need to work more closely with the building professional involved in the process. However, when analysing the results, it was difficult to establish the benefits respondents would gain from this closer working relationship. Examples of responses are presented in Table 19.

Subtheme heading	Example responses
Use of information technology to improve collaboration between respondents and other professionals involved in the process (n=9)	"A secure email protocol so I could liaise swiftly and efficiently with technical staff and exchange sensitive info containing…." R32
	"More efficient electronic communications to assist multidisciplinary/ agency working." R34
	"Effective communication line." R80
Use tools to aid the person's visualisation of the home modification (n=96)	"More visual examples to show clients." R5
	"If it could be 3D would help tenants visualise how it would look." R66
	"More 3d tools to assist client/carer visualisation." R34
Need to work more closely with building professionals involved in the process (n=24)	"More joint visits/working with other professionals involved in design process." R28
	"Closer working with project officers on the more routine adaptations." R56
	"More opportunity to meet with architect." R50
	"Closer links between Social Services and technical officers as each has their own area of expertise." R71

Table 19 Sub-themes associated with improved collaboration

Discussion

A small number of respondents (n=9) identified the use of effective and efficient information technology methods as one of the ways to improving their current home modification process. It appears that this technology is required to improve methods currently used to communicate with other professionals involved in the process. Although the respondents did not provide specific reasons for suggesting this improvement, one

potential reason could be the Data Protection Act (1998) which controls the movement of sensitive information. Often, the home modification process captures sensitive data that would be inappropriate to send through non-secure channels. Another reason for this finding could be the incompatibility of departmental databases, which makes the sharing of information impossible. However, there appears to be a paucity of research that has specifically investigated the communication and information technology requirements in the field of home modifications.

A home modification requires both occupational therapy and design and construction knowledge to provide an effective intervention (Bridges, 2010; Stark, 2015). Therefore, it is an expected finding that a number of respondents identified direct collaboration with the building professional as a way of improving the process. The respondents did not identify why these visits were necessary. However, given the previous comments on the complexity of the process (Pynoos, 1998; 2002) and the need to simplify it, it is important that practitioners do not conduct unnecessary visits. Therefore, whilst respondents may feel joint visits are necessary to ensure the appropriate modification is installed, it is important to establish if other solutions, such as the use of guidance, protocols, or education, and improved visualisation tools would help reduce the need for further visits.

5.5.3 Improved tools for analysing the proposed home modification

Findings

This theme captures a small number of the responses (n=14) which identified the potential use of computer-aided design to support with analysis and professional decision-making. Specifically, these responses identified using this type of technology to simulate how the person would use the modification, thus being able to identify if the proposed design provided an appropriate solution. Examples of responses are presented:

> *"an effective way to mock-up designs for complex cases to be sure they will work."*
> *R8*

> *"I would like to be able to use CAD systems to assess the suitability of proposed designs. "Would [be nice to] have greater access to equipment and layouts on the design tool I use." R42*

> *"Using a computer programme to plan layout." R106*

Discussion

This finding appears to suggest that a number of respondents (n=14) see the potential role of computer aided design software to not only improve the person's ability to visualise the modification, but to assist the practitioner in analysing the person-environment fit of the proposed design. This is an important finding because practitioners have a professional and ethical duty (COT, 2015; HCPC, 2016) to ensure that the intervention (which they recommend and provide) is the most effective solution to address the person's occupational needs and requirements. Within the field of home modification, this is difficult to achieve because knowing how the person will interact with the modification before the modification is installed is difficult to establish (Nord et al., 2009), and to rectify problems after the modification is installed is costly (Heywood, 2004). Whilst there are showrooms where the person can visit mock-up modifications, these have often been designed to the optimum standards and therefore they do not reflect the reality of mainstream housing (Ainsworth, 2010). Also, whilst there are a number of computer software packages which have been developed for occupational therapists, for example Idapt-planning, currently there is a paucity of research which has explored how the software can be used to conduct a person-environment fit analysis on the proposed home modifications.

5.5.4 Access to knowledge and information

Findings

Improved access to knowledge and information was the fourth broad theme discussed by respondents. Under this heading, four sub themes were identified in the thematic analysis. In the first sub-theme, respondents (n=69) identified the need to have improved access to up-to-date information on new products or available equipment. This suggests that respondents currently have difficulty in keeping up-to-date with the latest products and equipment being developed for the use within home modifications.

The second subtheme under this section relates to improved knowledge of construction. Despite the response to an earlier question indicating that the majority of respondents (n=111) were satisfied with their level of construction knowledge, a small number of respondents (n=8) identified this as an area of knowledge they needed to improve.

Specifically, respondents indicated a need to understand more about the impact of structural elements on the design of the modification.

Under the third sub-theme, respondents (n=15) identified the need for specific home modification training and education, specifically on the theory of using construction and design as an occupational therapy intervention. The responses suggest that current pre-registration training does not sufficiently prepare occupational therapists for this area of practice.

Learning from peers is the fourth sub-theme in this section, in which respondents (n=13) identified the need to improve opportunity to learn through reflection. Respondents suggested two ways in which learning through reflection could be achieved, either through peer support as one way of reflecting on practice and learning through their mistakes and successes, or the opportunity to evaluate the outcomes of completed home modifications. Examples of responses are presented in Table 20, with each quote being from an individual respondent.

Subtheme heading	Example responses
Improve access to product information and knowledge (n=69)	"To keep ahead of new products and research." R23 "Regular updates on changes to products or new products available." R24 "Improve network for receiving information of new products on market etc." R25
Improve construction knowledge (n=8)	"Information regarding the fabric of the bathroom eg if raft foundation, supporting walls, etc." R7 "Better understanding of technical aspects (plumbing, structural issues etc.)" R8 "More knowledge about soil pipes etc. so that I can give more accurate information to tenant on my initial visit." R24
Improve access to home modification training (n=15)	"Case Study Training to look at different scenarios." R69 "I would like to access a course to update my skills." R112 "Training in design to underpin knowledge." R131
Improve the opportunity to reflect on practice or to learn from others in this field of practice (n=13)	"More case reviews/CPD to share ideas with peers." R26 "More colleague case discussion. Time and team restrictions mean often work in isolation." R33 "I would like to be able to see what other OTs do to compare with my own work." R42

Table 20 Example of responses from the sub-themes associated with access to knowledge

Discussion

These findings are consistent with research from Cowell et al. (2007) where participants in their research identified the need to be able to keep up to date with the products used in home modifications, and to have a greater understanding of the construction practices that are used when installing a home modification. Cowell et al. (2007) and Dubroc and Winters (2015) from their studies both identify the need for practitioners to have better access to training. They also recognised the importance of practitioners having opportunity to reflect on their practice or to have opportunity to learn from other practitioners involved in home modifications. In response to their findings, Bridges has subsequently developed the Home Modification Clearing House, an Australian website developed for both occupational therapists and building professionals. The website serves several purposes: firstly, it conducts and publishes evidence based research on home modifications; secondly, it has a database of product information and relevant housing and building legislation and regulations that apply to Australia; and thirdly it provides a platform to allow practitioners to share case studies giving them opportunity to share what they have learnt. Currently, the only online resource in the UK is the Housing Learning Information Network (Housing LIN). However, the Housing (LIN) has a broad remit as it is concerned with sharing information about all aspects of housing and has a focus on older people.

5.5.5 Improved access to financial and time resources

Findings

The final broad theme identified by respondents (n=41) related to funding issues and constraints on respondents' time. Financial restraints were raised (n=9) in terms of the impact of limited financial resources from statutory services in achieving the optimum design solution for the person. Similarly, respondents (n=32) identified limitations on their time due to departmental pressures. From the responses, these pressures suggest some respondents are unable to spend the time they think is necessary to design and construct a home modification. Examples of respondent statements are illustrated below.

Subtheme heading	Example responses
Increase funding for home modifications (n=9)	"Less limitations imposed by authorities limiting the options which I can consider." R121 "More budget to enable longer term thinking and provision." R12
More time to spend on the case	"More time to spend on each project." R45 "More time/resources to do this work (high pressure on caseload quantity therefore don't have much thinking time)." R52

Table 21 Examples of responses from thematic analysis of the theme of resources

Discussion

Improving the process by increasing the time and financial resources available to respondents was an expected finding and is consistent with Cowell et al. (2007), and Fange et al. (2012), who reported similar frustrations being expressed by research participants. However, these PhD findings also seem to support Heywood's (2005) and Sakellariou's (2015b) suggestion that departmental policies and the availability of resources is potentially having a negative influence on professional practice as respondents appear to indicate they do not have sufficient time to plan and conduct effective interventions; or their professional reasoning is being influenced by those policies. Potentially this problem is being exacerbated by the lack of guidance which in other areas of occupational therapy practice, for example, the Occupational Therapy Guidance on Parkinson's disease (College of Occupational Therapists 2010) assists practitioners to articulate to those who commission their services what constitutes a 'good' occupational therapy intervention. In this field of practice, there is a lack of guidance as to what constitutes a 'good' occupational therapy process for home modifications.

5.6 Chapter Summary

The purpose of Phase 1 of the study was to critically evaluate the process used by practitioners in the UK by making visible occupational therapy practice in the field of home modifications, as well as to identify the value of developing a Home Modification Process Protocol.

The findings from this phase have helped to articulate what questionnaire respondents define as the purpose of a home modification and this is closely linked to legislative requirements within the practice setting. Critical to this definition are the benefits that a home modification brings to a person's health and well-being and the potential benefits to

a carer through reducing carer strain, and to wider society by reducing health and social care costs, and this is clearly enabled by removing barriers and improving access in and around the home.

Conceptual models of practice are important for supporting practitioners to deliver effective and appropriate interventions. However, whilst respondents have indicated that they have a good theoretical understanding of how home modifications can improve health and well-being, they typically are not using specific conceptual models to guide their practice. This finding could be explained by the previous suggestion of Rousseau et al. (2001) that conceptual models of practice may be inadequate for supporting practitioners within this field of practice. This is potentially because home modification practice has been described by Pynoos et al. (1998) as a complex intervention and the findings from this PhD study support this assertion. For example, the questionnaire respondents collaborate with a wide range of professionals during the process, collect, and use a wide range of data when planning the intervention. However, despite the complexity of the process, questionnaire respondents reported being confident with the processes they use. However, from analysis of the questionnaire, it is evident that there is inconsistency as to part of the process practitioners should involve the person with, with some respondents being involved in analysing if the design of the modification will address the person's needs and discussing the modification plans with the person, whilst others respondents are not.

The findings from this PhD study show that typically practitioners involve the person in the modifications process, for example when analysing if the design of the modification will meet the person's requirements. This is a positive finding as it suggests that questionnaire respondents are demonstrating ethical and appropriate professional practice in their everyday work. However, the tools they are potentially associated with difficulties in the recipient of a modification understanding what modification will look like, and how it will function. There was also evidence of questionnaire respondents not providing the person with control and choice over the design of the modification and again this has been associated with dissatisfaction with the installed facilities. Person-centred practice, which is underpinned by providing the person with choice and control, improves with the use of guidance and protocols as it helps a practitioner better articulate the intervention. It has

also been argued that with clearer guidance on the modifications process, practitioners would be able to identify where the person's involvement is required.

Additionally, the findings of the questionnaire identified a broad range of person, environment, and occupation data collected by respondents but it was noted that less data is collected about those concepts associated with the social impact of having a modification installed and the difference it makes to the value and meaning the person places on the home. Again, these factors have been associated with dissatisfaction with having the home modified. Whilst a process protocol does not potentially resolve this problem, if it is based on OTIPM (Fisher, 2009) it may potentially encourage the practitioner to consider the necessary concepts for the design and construction of an effective home modification because it incorporates concepts associated with designing for example space and tools required to perform the task.

Finally, when asked directly what changes they would make to the home modification process, questionnaire respondents did not identify the need for a more systematic approach to their practice. However, given the overall discussion within this chapter, there appears to be sufficient evidence as to the value of developing a process protocol based on the GDCPP (Cooper et al., 1998) and informed by the OTIPM (Fisher, 2009). Whilst OTIPM (Fisher, 2009) is a relatively new model, it does share concepts associated with design and construction, thus it appears to have the potential to help develop the structures to support practitioners in adopting a conceptual model to support their practice. If these structures and tools were based on the GDCPP (Cooper el al., 1998), it would enable the structure to be a protocol based on the principles of the design and construction process, thus providing a systematic approach to interventions involving home modifications. Furthermore, a combined GDCPP (Cooper et al., 1998) and OTIPM (Fisher, 2009) would ensure that the person is involved in all stages of the design and construction of the modification. It would also encourage practitioners from the start, and then during subsequent phases of the process to discuss the most effective way to use the limited resources available in the practice setting in the design and installation of the modification. The following chapter presents the findings of how the researcher used data from the questionnaire to develop a combined occupational therapy, design and construction protocol for home modifications.

Chapter 6 Development of the Home Modification Process Protocol (Phase 2)

6.1 Introduction

This chapter presents the findings and discussion from phase 2 of the study. The purpose of phase 2 of the study was to develop a home modification process protocol by conceptualising the occupational therapy practice involving home modifications as a design and construction process. The data for this element of the study came mainly from the on-line questionnaire, used in phase 1 of the study. In the questionnaire, the 135 respondents were asked to "describe your role in the process of designing a bathroom modification". This chapter presents the findings together with analysis of the responses to this question. The following headings, which represent the three stepped approach to analysing the data, are used to structure the chapter.

- Understanding home modification practice as an occupational therapy process
- Understanding the occupational therapy practice as a design and construction process
- Understanding home modification practice as a design an occupational therapy, design, and construction process protocol for home modifications.

6.2 Understanding home modification practice as an occupational therapy process for home modification

6.2.1 Findings

To understand the occupational therapy process used in home modification practice, respondents were asked, in an open ended question, to describe their role in the process of designing a bathroom modification. The majority of respondents provided a detailed account of their role whilst other responses were briefer. To illustrate this difference, two examples of responses are provided below.

"Thorough assessment of person's abilities and limitations including understanding of any possible prognosis of condition / progression of disability. A thorough understanding of person's aspirations and their needs / wishes. Working alongside client / family / carers / architect / contractors / liaison with other pertinent professionals involved to ensure that the correct plans are drawn up, looking for funding incl DFG where applicable, investigation

of what is available on the market that will meet client's disability needs and aspirations re: equipment and appropriate sanitary ware / tiles etc. and to ensure modification will meet ongoing needs. Remaining available through alterations, for site visits and answering questions as and when they arise. When work completed to ensure modifications are safe for client, that the work specified has been completed to a high standard and to ensure client completely happy. If not, to assist client to ensure all changes are made to ensure clients safety and ability to enjoy their new facility." R6

"To assess and recommend options to the user which will meet their needs   to advise the builder of the requirements of the adaptation." R76

Using NVivo10 software, each response statement was initially read and re-read. Once familiar with the statement, the content was coded by separating out each individual activity described by the respondent. Thematic analysis was guided by the OTIPM (Fisher, 2009). Each code was read and matched to one of the three main phases of the OTIPM (Fisher, 2009). Therefore, assessment and goal setting; intervention; and re-evaluation became the three themes for this initial part of the analysis.

During the thematic analysis, it became evident that an additional phase not captured by the OTIPM (Fisher, 2009) existed within the codes. This additional phase occurred between the assessment and goal setting phase and the intervention phase. In this additional phase respondents indicated a number of actions or tasks performed that were not associated with the initial assessment of occupational need and the setting of goals for the intervention, nor were they related to the intervention. Instead, respondents indicated a series of activities associated with planning the intervention, thus the term *Intervention Planning phase* was developed to code these responses into a theme.

Following peer review, the intervention theme was renamed *Intervention Implementation* phase. This change was made for three reasons. Firstly, as an intervention, the home modification is not installed by the occupational therapist, however from the responses it was evident that a number of practitioners were involved in supporting the installation of the modification. This support appeared to be essential for ensuring the health and safety of the person, for example making the builder aware of any medical conditions which could be exacerbated by the construction methods being used to install the modification, for instance dust exacerbating the person's respiratory condition. Secondly, some of the respondents indicated they were involved in the final phases of installing the modification, where their advice was required on the position of equipment or in purchasing specialist

equipment to be installed as part of the modification. Thirdly, a number of respondents indicated they had a role in providing the person with emotional support during the installation or acted as an intermediary if issues arose between the person and the builder. Therefore, using the term 'Intervention Implementation' makes distinct that the invention is not the final installed modification alone, it involves a series of activities the occupational therapists is involved with during the phase of installing the intervention. Examples of direct quotes are provided for each of the four phases in Table 22.

Main phase of the OTIPM (Fisher 2009)	Direct quote taken for different respondent
Assessment and goal setting	"Assessing with the person what their needs are in relation to home environment." R2
	"My role firstly involves an OT assessment which takes into account the goals of the individual as regards achieving the best bathroom facility for them and or their care requirements." R48
	"Carry out an assessment of need, and if the assessed need results in the provision of a bathroom adaptation, would proceed to the next phase of the adaptation process." R63
Intervention Planning	"I work with the client and technician to agree on the best possible layout to meet a person's long term needs. This is a joint agreement with client OT, technician and builders all giving input. However, it is my role to advice on installations that may be beneficial and that the client is not aware of existing." R3
	"Following a functional assessment of needs, my role is to design and plan the layout and facilities in the bathroom to meet the individual's current to long term needs." R14
	"Using a plan see if intended adaptation fits exploring options i.e. shape dimensions how the client intends to use it." R42
Intervention Implementation	"Remaining available through alterations, for site visits and answering questions as and when they arise." R10
	"Communicating any special needs (e.g. re dust inhalation) to surveyor/contractor." R56
	"Availability for consultation during the building work." R72
Re-evaluation	"When work completed to ensure modifications are safe for client, that the work specified has been completed to a high standard and to ensure client

	completely happy. If not, to assist client to ensure all changes are made to ensure clients safety and ability to enjoy their new facility. Finally, there is a key role in evaluating the provision with the client and or care staff." R6 "Visiting tenant once work completed to check suitability, demonstrate use of shower and other equipment and to check the adaptations meet the need." R24

Table 22 Example of responses for the main phases of the OTIPM

6.2.2 Discussion

As a problem solving profession, the occupational therapy process provides the logical route the practitioner needs to follow in order to identify and provide effective intervention (Duncan, 2011). Iwama and Turpin (2011) describe the process as a way for practitioners to operationalise their professional practice, and from the findings from step 1 of the data analysis, it appeared that the occupational process was assisting respondents to articulate their role in this field of practice. For example, the quotes from R6 and R76, presented at the beginning of this section, although their answers differed considerably in terms of the detail provided by each respondent, still showed evidence of an assessment, goal setting, intervention, and in the case of R6 an evaluation phase.

The thematic analysis also raised theoretical challenges to the researcher about what constitutes the intervention in this field of occupational therapy practice. The intervention has been traditionally viewed as the home modification once installed (Bridges, 2010; Sanford, 2013). However, in the field of home modifications, it is the skills and knowledge of the occupational therapists during all aspects of the occupational therapy process that is essential in the final design and performance of the modification. For the researcher, this raises the question as to whether the profession should place greater emphasis on the process being the intervention. Thus, the intervention becomes the home modification process, and not the final facilities that are installed. If the process becomes the intervention, then it could become clear as to what the intervention is; what training is required to gain the skills to carry out this intervention; and researchers have a better understanding of which element of the intervention they are examining. This then focuses the final evaluation as not the modification, but how the process used by the therapist has contributed to the improvements in the person's functional health and well-being. By

developing outcome measures that evaluate the process as the intervention it allows practitioners to identify which phases of the intervention were less or more effective.

6.3 Understanding the occupational therapy process for home modification as a design and construction process

6.3.1 Findings

This section describes the findings from the second step of analysis. Nvivo10 was used to produce four separate code books. Each book represented one of the themes identified from the analysis described in the previous section, and contained responses coded under each theme. Each code book was read and re-read. A copy of the *assessment* code book can be seen in Appendix 8. Once familiar with the content of each book, thematic analysis was initially attempted by looking for similarities between activities in the four main phases of the GDCPP (Cooper et al., 1998), with the responses in the four separate code books. For instance, the activities in the assessment code book were compared to the activities described in the pre-project phases of GDCPP. It became evident, however, that the activities within the four main design and construction phases were not congruent with the activities within the four main phases of the OTIPM (Fisher, 2009). To overcome this issue, the activities were coded using the descriptions of the sub-phase of the GDCPP (Cooper et al., 1998) and looking for similarities in the responses in each of the four codes. A description of the sub-phases can be found in Chapter 2, Table 3.

Using the above approach to the analysis, it became evident that two additional phases, not captured by the GDCPP (Cooper et al., 1998), existed in the responses. These two sub-phases occurred between sub-phases 1 and 2 of the GDCPP (Cooper et al., 1998). In these phases, respondents indicated a number of actions or tasks involved in analysing how the person was performing the activity in the existing environment as well as professionally reasoning what the person requires in the final design. The themes "Conduct an occupational performance analysis to identify the person(s) PET requirements" and "Develop occupational focused home modification goals and PET based on the person's PET requirements" were developed to capture these codes. There were three activities described in the GDCPP (Cooper et al., 1998) where no similar activity could be found in the codes books, thus no data was coded under the following themes:

- Outline feasibility

- Outline conceptual design
- Production information

The findings of this analysis resulted in the researcher generating a brief description of each of the sub-phases of the home modification process. The description of each sub-phase is presented below:

Demonstrate an occupational need within the person centred performance context

At this phase, initial information about the person is received in the form of a referral. This referral information indicates the nature of the person's disability or health issue, the activity of daily living being affected, and the social situation. It is at this phase that a decision is made as to whether, given this initial information, a home modification is likely to be of benefit to the individual or whether a different type of intervention approach, such as rehabilitation, is more appropriate.

Conceptualise the need as identify by the person

At this phase, direct contact is made with the person. Through this contact, the person and occupational therapist identify the occupations being affected by the home environment.

Conduct and occupational performance analysis to identify the person(s) PET requirements

At this phase, the occupational therapist observes the person doing the task they have difficulty performing. If the person is unable to perform the activity the practitioner will collect relevant data about the problems being experienced by the person. Through this observation, the occupational therapist identifies how the interaction of the person, in the environment, doing the occupation impacts on the person's performance. At this sub-phase, the aspect(s) of the built environment impacting on the person's performance is identified.

Develop collaborative goal(s) by identify the detailed PET design requirement for the home modification

Having identified the performance issues, along with the aspect of the built environment causing the problem, this sub-phase involves the occupational therapists and person

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collaborating on how a home modification can restore, maintain, or acquire the occupation. PET requirements involves identifying what features will need to be included in the design of the modification, specifically how much space is required to perform the activity; the tools and the characteristics those the tools need to provide for the person to perform the task; and the arrangement of those of facilities within the space.

Conduct substantive feasibility study for achieving the PET specification (including funding route)

At this phase, the occupational therapist conducts a feasibility study. The study involves identifying the options of how the built environment can be modified to address the performance issue identified in the earlier phases of the process. The feasibility study includes establishing how any funding options will impact on how the modification can be designed. The emotional and psycho-social impact of modifying the home environment on the person and/or other members of the household should also be considered as part of the feasibility study. If the home environment or the person's disability or health issues are complex, the therapist will need to involve a built environment or health professional to gain further information and advice on suitable options.

Obtain agreement on the full detailed design of the home modifications

This phase involves providing the person with all the information they need to be able to agree on the final proposed design. By providing this information, the person is able to give informed consent for the intervention to be installed.

Co-ordinate and support procurement of the occupation-focused home modification

At this phase, the occupational therapist offers the person advice and/or support to procure the home modification. This support could include applying for any statutory funding for the modification. As part of the procurement process, the occupational therapist should ensure the building professional has the necessary requirements for the layout, construction detail, and products needed to begin and complete the first fit of the modification.

Construct the home occupation focused home modification

During this construction phase, the occupational therapists may be required to provide emotional and practical support to the person and/or building professional, including identifying any health and safety issues around the installation of the modification. The occupational therapists may also be expected to arrange the delivery and/or procurement of any home modification equipment not being provided by the building professional. Towards the end of the construction process, the occupational therapist may be required to offer advice to the person and/or building professional on the precise positioning of the fixtures and fittings, particularly those items essential for enhancing the person's performance.

Conduct site visit to check the operation and maintenance of the occupational focused home modification

At this final phase, the occupational therapist ensures the home modification is working and is allowing the person to perform the occupation. The therapist ensures the person is aware how the modification operates and how to maintain it. At this sub-phase, the occupational therapist may need to offer a rehabilitative intervention to maximise the person's performance in the home environment. Finally, the original goals for the home modification are reviewed with the person. The review of goals is an opportunity for the occupational therapist to reflect on what they have learnt from the process, which can be taken forward to the next home modification project. Example of responses for each of the sub-phases is presented in Table 23.

Sub-phase	Example of responses
Demonstrate an occupational need within the person-centred performance context	"Identifying what problems exist and either what the relevant parties wish to achieve or providing information of what can be achieved (within public funding but with acknowledgement of what is available outside of public funding,)" R83
Conceptualise the occupation need as identified by the person	"A thorough understanding of persons aspirations and their needs / wishes" R6
Conduct and occupational performance analysis to identify the person(s) PET requirements	"Do an initial assessment of the person and their environment looking at their functional ability and/or the needs of their carer." R46
Develop collaborative goal(s) and identify Person, Environment, and Task (PET) requirements for the home modification	"Following the assessment OT recommendations discussed with the person" R72

Sub-phase	Example of responses
Conduct substantive feasibility study for achieving the PET requirement (including funding route)	"I work with the client and technician to agree on the best possible layout to meet a person's long term needs. This is a joint agreement with client OT, technician and builders all giving input. However, it is my role to advice on installations that may be beneficial and that the client is not aware of existing." R3
Obtain agreement on the full detailed design of the home modifications	"Approval from service user then written options proposal, specification and CAD diagrams." R8
Co-ordinate and support procurement of the occupation-focused home modification	"Referral to District Council or RSL for DFG/minor works funding." R100
Construct the home occupation focused home modification	"Once work is on site, deal with any queries regarding change of layout due to unforeseen problems" R57
Conduct site visit to check the operation and maintenance of the occupational focused home modification	"When work completed to ensure modifications are safe for client, that the work specified has been completed to a high standard and to ensure client completely happy. If not, to assist client to ensure all changes are made to ensure clients safety and ability to enjoy their new facility" R6.

Table 23 Example of responses for each of the sub-phases of the home modification process

To be able to compare the sub-phases of the GDCPP (Cooper et al., 1998) and the sub-phases of the home modification process, the results were displayed in a table (see Table 24). The four main phases of the GDCPP (Cooper et al., 1998) were differentiated by colour. By doing this, it became evident where the lack of congruence occurs between the four main phases of the GDCPP (Cooper et al., 1998) and the four main phases of the Home Modification process. For example, the lack of congruence is evident by the 'Intervention implementation phase' having both the colours of 'pre-project' and 'pre-construction' phase within it. Likewise, the 'Intervention Implementation' main phase has the main phases of 'pre-construction' and 'construction' colours within it. The additional themes generated from the analysis are shown in italics in the column 'Activity themes generated by coding' and those sub-phases of GDCPP (Cooper et al., 1998) where data was not coded have been blanked out.

As the aim of this step of the analysis was to conceptualise the occupational therapy practice as a design and construction process, it was necessary to resolve the issue with the lack of congruence between the four main phases so that parallels between the four main phases of GDCPP (Cooper et al., 1998) and the OTIPM (Fisher, 2009) could be visualised. To do this, the researcher used her previous experience in the field of home modifications to

make an informed decision as to where the realignment of the sub-phases should occur. The outcome of this decision is shown in Table 25.

Main Phase GDCPP (Cooper et al., 1998)	Sub-Phase	Terms used in the GDCPP (Cooper et al., 1998)	Activity themes generated from coding	Main phase of OTIPM (Fisher, 2009)
Pre-Project	0	Demonstrate the need	Demonstrate an occupational need within the person centred performance context	Evaluation
	1	Conception of the need	Conceptualise the need as identify by the person	
			Conduct an occupational performance analysis to identify the person(s) PET requirements	
			Develop collaborative goal(s) by identify the detailed PET design requirement for the home modification	
	2	Outline feasibility		
	3	Substantive feasibility study	Conduct substantive feasibility study for achieving the PET specification (including funding route)	Intervention Planning
	4	Outline conception design		
Pre-construction	5	Full Conception design	Obtain agreement on the full detailed design of the home modifications	
	6	Co-ordinating design procurement	Co-ordinate and support procurement of the occupation-focused home modification	Intervention implementation
Construction	7	Production information		
	8	Construction	Construct the home occupation focused home modification	
Post-construction	9	Operation and maintenance	Conduct site visit to check the operation and maintenance of the occupational focused home modification	Re-evaluation

Table 24 Conceptualising the occupational therapy home modification process as a design and construction process

Main Phase of the GDCPP (Cooper et al., 1998)	Sub-Phase	Terms used in the GDCPP (Cooper et al., 1998)	Activity themes generated from coding	Sub-phase of the Home Modification Process	Main phase of OTIPM (Fisher, 2009)
Pre-Project	0	Demonstrate the need	Demonstrate an occupational need within the person centred performance context	0	Evaluation
	1	Conception of the need	Conceptualise the need as identify by the person	1	
	2	Outline feasibility	Conduct an occupational performance analysis to identify the person(s) PET requirements	2	
	3	Substantive feasibility study	Develop collaborative goal(s) by identify the detailed PET design requirement for the home modification	3	Modification Planning
	4	Outline conception design	Conduct substantive feasibility study for achieving the PET specification (including funding route)	4	
Pre-construction	5	Full Conception design	Obtain agreement on the full detailed design of the home modifications	5	
	6	Co-ordinating design procurement	Co-ordinate and support procurement of the occupation-focused home modification	6	Modification implementation
Construction	7	Production information			
	8	Construction	Construct the home occupation focused home modification	7	
Post-construction	9	Operation and maintenance	Conduct site visit to check the operation and maintenance of the occupational focused home modification	8	Re-evaluation

Table 25 Conceptualising the occupational process as a design and construction process - following alignment of the two processes

6.3.2 Discussion

Given similarities between the intentions of each of the four main phases of the GDCPP (Cooper et al., 1998) and the OTIPM (Fisher, 2009), it was surprising to find a lack of congruence between the two processes. A possible explanation could be associated with the size of construction project. The GDCPP (Cooper et al., 1998) was developed for large construction projects where more sub-phases may be required to manage the process, when compared to home modifications which are smaller construction projects (Douglas, 2006). Another explanation could be that home modifications require more action be untaken during the main planning phase, compared to the design and construction project, where the pre-project phase requires the greater number of tasks to be completed.

Despite the lack of congruence, it has been possible to use the OTIPM (Fisher, 2009) and GDCPP (Cooper et al., 1998) to describe the occupational therapy process used by respondents in this area of practice. However, the researcher is aware that the outcome of this analysis, Table 25, does not reflect the actual practice described by respondents; and it appears to differ in one important way, which is the way respondents combine departmental processes with the occupational therapy process. Using the quote below, we can see R29 using phrases that are associated with both the occupational therapy process (words in red) as well as the phrases that seem to suggest the influence of the systems, structures, and policies within respondents practice setting (words in blue). The actions of the respondent may not directly lead to a poorly designed modification but previous findings have noted how departmental policies, enacted by therapist, have been associated with dissatisfaction with the modification (Heywood, 2004; Sakellariou, 2015a; 2015b). Thus, this finding raises the question as to how aware practitioners are of the influence departmental structures and guidance is having on their professional practice and on the design options presented to the person. Again, this is an important question to answer given the professional and ethical responsibility professionals have in ensuring the intervention they provide has been fully explained and explored with the person so the therapist needs to be able to describe to the person how the intervention they are providing is being influenced by the practice setting.

> "As an OT I complete an Overview Assessment with the service user in their home environment to identify their needs. To address these assessed needs (according to the FACS criteria) I may be required to provide adaptive equipment and in some

cases recommend adaptations. If adaptations are required, I complete a referral for DFG for adaptations which, following my Manager's approval is forwarded to the District Council & HIA or Housing Association to begin the DFG process. I provide technical diagrams and guidelines for the adaptations to ensure they can best meet the client's needs as well as completing joint site visits with Technical Officers if required. Once the modification is complete, I am involved with signing off the work. I am also responsible if relevant to obtain quotes e.g. for toilet with wash/dry function (i.e. Closomat/Geberit) with company rep via a joint site visit, modifications." R29

Another important finding from this step of the analysis was the use of the term "assessment of need". Examples of quotes have been provided below. Respondents appeared to use this term to label the professional reasoning skills used to identify occupations the person is having difficulty performing or participating in; identifying and analysing why the person is having difficulty doing the occupation; and analysing and identifying if a modification will address the occupational need. From the data collected, it is not possible to establish if in practice respondents make a distinction between the different types of professional reasoning needed to support each aspects involved in the "assessment of need" and what the consequence might be if they do not make the distinction. However, given the principle of the GDCPP (Cooper et al., 1998) is to ensure, where possible, a sub-phase does not progress to the next phase until the outcome of the previous phase is achieved, it suggests respondents are prematurely progressing through the process without all relevant data being collected and analysing as to how it might impact on the subsequent phases. If this is the case, then a process protocol for home modifications potentially reduces the risk of this occurring.

"Assessment of need is carried out. Report written. DFG documentation is completed and sent to local authority. Chasing the authority for work to begin. Work with the architect to design the bathroom according to level of equipment required, ensuring future proofing for conditions such as Duchenne. Negotiate funds with local authority. Work with the builder to ensure dimensions are correct and build is as schedule. Order equipment and arrange for fitting of equipment not covered in DFG. Assess service user in completed bathroom to ensure all needs identified are now addressed." R19

"Assessment of need. Discussion with applicant regarding options available to meet need. Compiling list of required features for surveying team. Site survey with surveyor. Approving plans and schedules of work. Visiting tenant with surveyor to resolve any issues whilst contractor on site. Visiting tenant once work completed to check suitability, demonstrate use of shower and other equipment and to check the adaptations meet the need." R24

"I will be responsible for assessing the needs of the user, drawing up the recommendations, and liaising with all involved parties throughout the process. I will check plans agree them or suggest alterations and check the adaptation meets the client's needs on completion." R66

6.4 Understanding home modification practice as an occupational therapy, design and construction process protocol

6.4.1 Findings

This section describes the findings from the third step of the data analysis. The purpose of this phase of analysis was to develop a design and construction process protocol for home modifications. As discussed in the methodology section, the questionnaire had not been designed with the intention of understanding the process used by respondents as a protocol, therefore no specific question had been asked to gain data for this. It was therefore necessary to use an iterative approach to generate and analyse the data. A brief description of this process is given below.

A framework was developed, based on the GDCPP (Cooper et al., 1998) and the OTIPM (Fisher, 2009). Across the top of the framework, the 9 sub-phases developed from step 2 of the analysis of the data were used to label the headings of individual columns. Down the left side of the framework, the following headings were used to label individual rows.

- Description of the sub-phase

- Key questions needed to be asked at each sub-phase

- Action needed at each sub-phase

- Outcome of each sub-phase

- Tools to assist with sub-phase

As stated above, populating the framework with content was an iterative process. NVivo10 software was used to create a code book for each individual sub-phase of the home modification process; with each book containing the written responses coded under each of the sub phases. An example of the code book for sub-phase 8 can be found in Appendix 9. These code books acted as a reminder to the researcher as to the specific tasks undertaken by respondents at each sub-phase. The OTIPM manual (Fisher, 2009) and the GDCPP book (Cooper et al., 2008) then guided the development of the content for the description of each phase; key questions needed to be asked at each sub-phase; and the outcome of each sub-phase. Ainsworth and de Jonge's (2011) book 'An occupational

therapists guide to home modification practice' was used to populate the content for 'Tools used to assist with sub-phase' for elements of populating the framework, but in particular the tools to assist with each sub-phase. Finally, the researcher's prior knowledge of this field of practice was used to inform the style of writing of the content. The overall findings from this step of the analysis are presented in Table 35; however, each individual sub-phase will now be discussed separately.

6.4.2 Discussion

Sub-Phase 0

Table 26 illustrates sub-phase 0 of the process protocol for home modifications. This sub-phase occurs in the main assessment phase.

	Sub-phase 0
Description of phase	Demonstrate an occupational need within the person-centred performance context
Key Question	What is the situation that has prompted contact with the occupational therapist/service? Is an occupation-focused home modification intervention appropriate for the situation? Is the person aware of the limitation in this practice setting?
	Should a Home Modification Approach be taken?
Action needed at each sub-phase	Identity the context of the situation Identify who (persons) is involved in the situation Identify the tasks involved in the situation Identify how resources and other limitations within the practice setting may affect the situation Identify how a collaborative relationship with the occupational therapist/service could impact on the situation
Outcome of sub-phase	Referral accepted/declined Key referral (situational) information documented Person(s) aware of limitations within the OT's field of practice i.e. funding criteria for home modification Consent to assessment documented
Tools to assist with phase	

Table 26 Sub-phase 0

Sub-phase 0 has used the GDCPP principle that a prospective client may not want to proceed with a project following an initial discussion of their need with the building professional. Based on the researcher's knowledge, a similar situation can arise in occupational therapy where a person may contact the occupation therapy service and after initially discussing their situation the person, or practitioner, does not feel involvement from an occupational therapist is appropriate or necessary. Therefore, the purpose of this sub-phase is to gather data on what has prompted the person to contact the service and whether involvement from an occupational therapist will improve the person's health and well-being.

One of the principles of the GDCPP (Cooper et al., 1998) is that the project manager is aware of which professionals need to be involved in the process and when, making the process more efficient as time is not wasted later trying to identity who needs to be involved (Cooper et al., 2008). Thus, taking this concept and the OTIPM (Fisher, 2009) concept of identifying whom else is involved in the person's situation, this sub-phase gathers data on who the practitioner may need to involve in later sub-phases of the process. For example, at this sub-phase the practitioner would document if they needed to contact the care agency who provide carers to assist the person with the occupation, as the design of the modification will influence how they support the person.

This sub-phase has also captured Fisher's (2009) concept of making the person aware of the limitations within the practitioner's field of practice. It appeared to be important to ask this question at this phase given the theme in the literature, and the data gathered from respondents, on the influence departmental policies and resources have on the role of the practitioner. Also, asking this question early in the home modification process is supported in the latest guidance on the delivery of the DFG (Housing Adaptation Consortium, 2013). This is because the authors of the guidance provide anecdotal evidence of people needlessly waiting for a state funded modification only to find that due to the nature of the means test involved in the DFG process it would have been quicker if person had procured the modification privately.

As the GDCPP (Cooper et al., 1998) is concerned with ensuring all information is available to support the next phase of the process, the outcome of this phase ensures that the practitioner has all relevant information for the next phase, in particular that the person

has given consent. As consent to an assessment is an ethical and professional requirement, it appeared appropriate to include it in this phase so that when the person is first visited they have already consented to a visit and the start of the assessment process.

Sub-phase 1

Table 27 illustrates phase 1 of the process protocol for home modifications. This sub-phase occurs in the main assessment phase.

	Sub-phase 1
Description of Sub-phase	Conceptualise the occupational need as identified by the person(s)
Key Question	What are the reported occupation(s) the person(s) needs/wants to address through an occupation-focused home modification?
	Should a Home Modification Approach be taken?
Action needed at each sub-phase	Identify the specific occupation(s) the person(s) wants/needs/has to do
	Identify the person(s) occupational priorities
	Identify occupations that cannot be addressed through occupation-focused home modification intervention
Outcome of sub-Phase	Identify the person(s) occupational priorities
	Or provide advice including referral to alternative services
Tools to assist with sub-Phase	COPM

Table 27 Sub-phase 1

This sub-phase, as with the other sub-phases, captures the values the OTIPM (Fisher, 2009) places on collaborative practice through the occupational therapy process. Therefore, this sub-phase has the person in collaboration with the practitioner identifying the occupation(s) impacting on their health and wellbeing.

Based on the literature that was critical of occupational therapists focusing on safety and function and identifying need based on eligibility criteria, the outcome of this sub-phase assists the practitioner to identify what occupation they need to observe in the next sub-phase of the process. This reflects ethical practice, as the person is not arbitrarily made to perform unnecessary activities based on home grown assessments designed to focus safety and independence or what can or cannot be funded by the practice setting. Instead, the

influence of funding arrangements is considered in sub-phase 4 and the feasibly study. This approach seemed appropriate as it supports ethical practice where the provision of unnecessary interventions or procedures should be avoided (COT, 2015).

Based on the researcher's knowledge, and following peer review of the protocol as it was developing, it was decided during sub-phases 0 to 6 modification the protocol needed to provide a reminder to practitioners and the person as to whether continuing with the process is appropriate. Thus, as the practitioner builds a collaborative relationship with the person and new data provides insights into the person's situation; this question ensures consideration is given as to the appropriateness of the intervention in providing the person with the solution the need to improve their health and well-being. For example, during the feasibility study, the person may not want to proceed with the modification once they are aware of how the modification will look.

Sub-phase 2

Table 28 illustrates sub-phase 2 of the process protocol for home modifications. This sub-phase occurs in the main assessment phase.

	Sub-phase 2
Description of sub-phase	Conduct an analysis to identify the Person, Environment and Task elements impacting on occupational performance
Key Question	How does the transaction between the Person, Environment and Task (PET) factors impact on occupational performance?
	Should a Home Modification Approach be taken?
Action needed at each sub-phase	Identify the actions, within the occupation(s), the person(s) does not perform effectively
	Identify actions, within the occupation(s), the person(s) does performs effectively
	Identify the elements of the Person/Environment/Task (PET) (Fisher 2009) that is affecting the person(s) occupational performance
Outcome of Sub-phase	Occupational Performance Analysis completed and effective and ineffective elements of performance documented
	PET element(s) causing effective or ineffective occupational performance documented
	PET information needed to support sub-phase 4 documented
	Or provide advice including referral to alternative services
Tools to assist with Sub-phase (See Appendix 4)	Canadian Occupational Performance Measure Occupational Circumstances Assessment – Interview and Rating Scale (OCAIRS) Occupational Self-Assessment Occupational Performance History Interview II (OPHI)

Table 28 Sub-Phase 2

This sub-phase has been influenced by Fisher's (2009) description of how practitioners should analyse occupational performance and participation. Fisher (2009) recommends the practitioner should initially observe the person performing or participating in the occupation, identifying the strengths and weaknesses in the person's performance. Once the practitioner has this data, Fisher (2009) describes how the practitioner can then analyse the cause of the problem based on the transaction of the person, environment, and task. Fisher (2009) recommends this two-pronged approach to analysing performance and participation because it prevents the therapist making assumptions about the cause of the problem. The conceptual model developed as part of the OTIPM (Fisher, 2009) guides the type of person, environment, and occupation data the practitioner needs to collect. It

should be noted that Fisher uses the term 'task' and not occupation in the conceptual model. In using the term 'task', Fisher (2009) is acknowledging that a practitioner does not objectively observe an occupation; they observe the task part of the transaction between the person and the environment. This is because only the person can experience an occupation, because it only has meaning and value to them.

Based on the principles of the GDCPP (Cooper et al., 1998) where the flow of information improves the efficiency of the process, this sub-phase, as well as the other sub-phases, encourages the flow of information. For example, at this sub-phase, respondents collect data about the environment, the layout of rooms/heights of facilities. This data will assist with the design of the modification at sub-phase 4. Thus, by capturing the data at this sub-phase, as well as being aware of what data is needed at sub-phase 4, it potentially prevents a visit at this later sub-phase as it is not necessary to revisit collect or re-collect this information. This suggests another value of developing the protocol. It not only identifies what data is necessary at each sub-phase but it can be used to understand what data could be captured earlier in the process, thus reducing the complexity of the process through unnecessary visits and providing a more systematic approach to the process as advocated by the literature.

Sub-phase 3

Table 29 illustrates sub-phase 3 of the process protocol for home modifications. This sub-phase occurs in the main intervention planning phase.

	Sub-phase 3
Description of sub-phase	Develop collaborative goal(s) by identify the detailed PET design requirement for the home modification
Key Question	Is the person(s) goal(s) for the modification to: • Restore their occupational performance/participation • Maintain their occupational performance/participation • Develop their skills or role to perform or participate in a new occupation What are the detailed PET design requirements for achieving the collaborative goals? **Should a Home Modification Approach be taken?**

Action needed at each sub-phase	Identify, with the person(s) if the goals for the home modification are
	
	    • Restoring their occupational performance/participation
	    • Maintaining their occupational performance/participation
	    • Developing their skills or role to perform or participate in a new occupation
	
	Identify, with the person(s), how the above approach will the impact on the evaluation phases
	
	Identify the specific "person factors/body functions" design requirement s
	
	Identify the specific "environmental" design requirement s
	
	Identify the specific "task" design requirements
	
	Identify any occupations(s) that cannot be addressed through an occupation-focused home modification

Outcome of Sub-phase	Person(s) has collaborated on the goals of the home modification Goals for home modification documented The PET design requirements to achieve the goal(s) documented Re-ablement, rehabilitation and/or training requirements following the completion of the home modification documented
Tools to assist with Sub-phase (See Appendix 4 for references)	Comprehensive Assessment and Solutions Process for Ageing Residents (CASPER) The Home Environment Assessment Protocol (HEAP) HOME FAST Housing Enabler I-HOPE Usability in my Home (UIMH) Residential Environment Impact Scale (REIS) SAFER SAFER-HOME v.2 The Home Occupational Environment Assessment (HOEA) Wesha

Table 29 Sub-phase 3

Goals are an important part of the occupational therapy process, as they provide the benchmark on which the therapist and person establishes if the intervention has been successful (Duncan, 2011). Thus, the purpose of this sub-phase is to identify those goals. Given one of the principles of the GDCPP (Cooper et al., 1998) is to collect data relevant for the success of later sub-phases, the researcher felt it important to make the distinction at this sub-phase as to how the modification is improving health and well-being; and whether it is being designed to restore, maintain, or acquire performance / participation in the person's occupation. Thus, this question prompts the practitioner to consider what impact this decision would have on the final sub-phase of the process, for example identifying if rehabilitation is needed to support the person to gain the skills required to perform the occupation.

An important feature of the GDCPP (Cooper et al., 1998) is the identification of what the end-users design requirements are for the building. This relates specifically to what features will enhance the performance of the building for end users. What was evident from a number of the responses from the questionnaire was the skill and role respondents have in identifying the detailed design requirements that will enhance the performance of the modification for the person. For example, the practitioner may identify the person has skin integrity requirements, therefore when recommending a shower seat the practitioner ensures this requirements is considered by recommending an appropriate pressure relieving shower seat is included in the design of the modification. Thus, as well as identifying the goal, the practitioner is prompted in this sub-phase to consider how the goals will be achieved by identifying the detailed design requirement the person has.

Sub-phase 4

Table 30 illustrates sub-phase 4 of the process protocol for home modifications. This sub-phase occurs in the main intervention planning phase.

	Sub-phase 4
Description of sub-phase	Conduct a substantive feasibility study for achieving the PET Requirements (including funding route)
Key Question	What design options are there for meeting the PET Requirements?
	What other factors in the person's occupational context will affect choice of design solutions
	Does the design proposal meet the PET requirements, outlined in sub-phase 3
	Should a home modification approach be taken?
Action needed at each sub-phase	Identify that the design has addressed all the requirements identified in sub-phase 3
	Identify the design meets any other occupational performance context requirements
	Identify any practice setting contextual issues that will influence the person(s) choice of design solution
	Identify any potential built environment issues, in the existing space, that will impact on the PET requirements being accommodated
	Identify funding requirements for the home modification
Outcome of Sub-phase	Professional reasoning on the modification design solution process documented
	Issues the practice setting contextual issues and/or built environment that prevents optimum design solution being provided, documented
	The specification related to space, space layout and tools documented
Tools to assist with Sub-phase	

Table 30 Sub-phase 4

The purpose of sub-phase 4 is to conduct a feasibly study to identify how the home can be modified to improve the person's performance or participation in the occupation. Given the importance of choice and control, the person is again actively involved in this sub-phase. In writing the protocol, the researcher was mindful of the comments from Iwarsson (2015) who argued it was not possible to standardise occupational therapy practice for home modifications due to regional differences. Therefore, it was necessary to ensure that

the protocol could accommodate a range of regional, policy, and regulatory difference between practice settings. To achieve this, the principles of the GDCPP (Cooper et al., 1998) were used and the researcher developed the question of how contextual issues within the practice setting will influence the choice of design. Given indications in the literature that people are not always aware of why the therapist has made certain design decision (Sapey, 1995), this sub-phase has been written so that these decisions are made explicit to the person and are also documented.

Sub-phase 5

Table 31 illustrates sub-phase 5 of the process protocol for home modifications. This sub-phase occurs in the main intervention planning phase.

	Sub-phase 5
Description of sub-phase	Obtain agreement on the full detailed design and specification of the home modification
Key Question	Does the full detailed design provide the solution to address the occupational performance requirements of the person?
	Do the detailed design plans and specifications provide the person with the information they need to give informed consent?
	Should a home modification approach be taken?
Action needed at each sub-phase	Identify the person(s) understands how the design solution addresses their occupational performance requirements
	Identify how any unmet requirement will impact on the occupational performance of the modification
	Identify the person(s) agrees to proceed with the design solution
Outcome of Sub-phase	Informed consent documented
Tools to assist with Sub-phase	

Table 31 Sub-phase 5

The development of the content from sub-phase 5 arose from the professional and ethical requirement of practitioners needing to ensure the person has a full understanding of the intervention so that they are able to give informed consent to proceed with the intervention. There was evidence from reviewing the literature, that this was not happening because people had had difficulty understanding the design information, thus

they had been unclear, until the modification had been installed, what was being provided (Nord, 2009). Also, respondents in this study had identified the dissatisfaction with the modification was due to the modification not being what the person had expected. Therefore, the questions in this sub-phase make overt the need for the person to have a full understanding of the design before giving informed consent to proceed with the intervention.

This sub-phase also ensures the proposed modification meets the goals identified in the earlier sub-phases. In particular, it enables the practitioner to document any design compromises made, by the practitioner to enable the person to have choice and control over the final design. This question was included based on the researcher's experience of practitioners' 'nervousness' at allowing a person to make reasonable decisions in a design that in the practitioner view does not provide the optimum solution but still meets the person's requirement. For example, the practitioner suggests the ramp be a 1:20, however due to the aesthetics of the design; the person prefers a 1:12 ramp. As the person uses a power wheelchair for mobility and will, for the majority of the time, be the only one using the ramp, this still provide an adequate solution; and for the person it gives them the choice and control over making an informed decision about the design of the modification. One of the principles of the GDCPP (Cooper et al., 1998) is that it provides an audit trail of the reason why decisions were made at particular sub-phases of the process. Cooper et al. (2008) designed the process this way to ensure accountability amongst professionals involved in the process and the reasons for specific design and construction decisions could be made readily available in the event of a dispute. Thus, the protocol enables the therapist and person to be accountable for the decisions made during the process, and it makes the information readily available if the outcomes of this sub-phase, or other sub-phases, are called into question. For example, if a person makes a complaint about the way a modification has been designed, it the practitioner has used the protocol they should be able to identity when the decision was made and who was involved in this. Thus by documenting this decision making process, the researcher is assuming that it reduces the practitioner's anxiety by allowing them to evidence the systematic decision making process. However, it is still important that a modification achieves the agreed goal.

Sub-phase 6

Table 32 illustrates sub-phase 6 of the process protocol for home modifications. This sub-phase occurs in the main intervention implementation sub-phase.

	Sub-phase 6
Description of sub-phase	Co-ordinate and support procurement of the occupation-focused home modification
Key Question	What information and action is required to procure the home modification? Has all the information been obtained for the builder/contractor/other to construct the home modification?
Action needed at each sub-phase	Identify and communicate information required for the procurement of the home modification Identity and communicate the information required for the builder/contractor/other to proceed with the construction of the home modification Identify and communicate what on-going support will be required of the occupational therapist/service during construction phase
Outcome of Sub-phase	Funding application/support completed Plans, specifications, product information, and health and safety information provided to builder and/ or those involved in construction of the modification Agree with person and builder support being provided by occupational therapist during construction
Tools to assist with Sub-phase	

Table 32 Sub-phase 6

As with sub-phase 5, it was necessary to allow the questions to reflect the different ways modifications are funded. It was also clear from the literature, and from the answers from respondents, that the building professionals need information from the practitioner that helps them to understand why the specific layout and requirement contained in the design plan are important in achieving the person's goals. Therefore, this sub-phase places this duty on the practitioners to provide this information and not to expect the builder to automatically understand why the modification has been designed in a certain way. By doing this, the intention is to improve the communication between the building professional and practitioner as advocated by Klein (1999) and Pynoos et al. (2001). At sub-phase 6 the practitioner is no longer given the option to consider if a home modification

approach should be taken because issues that could make a home modification inappropriate would have been identified by the person and practitioner in an earlier sub-phase.

Sub-phase 7

Table 33 illustrates sub-phase 7 of the process protocol for home modifications. This sub-phase occurs in the main intervention implementation phase.

	Sub-phase 7
Description of sub-phase	Construct the home modification
Key Question	Is the appropriate support being provided to the person (s) and building professional during the construction phase of the home modification?
Action needed at each sub-phase	Provide on-going support during the construction of the home modification Provide and/or supply tools not part of the construction process Provide advice on final positioning of tools
Outcome of Sub-phase	Modification completed
Tools to assist with Sub-phase	

Table 33 Sub-phase 7

This sub-phase reflects the tasks identified by respondents in the questionnaire, where their involvement was required to ensure the person and builder were both supported during the physical construction phase of the modification. By using the principles of the GDCPP (Cooper et al., 1998), both the person and builder will have been provided with the information prior to work commencing on the home modification as to the type of support the occupational therapist would be providing; furthermore, how the therapist can be contacted. In the previous phase, it was identified what support would be required.

This sub-phase also ensures the practitioner provides any specialist equipment that is required once the modification is installed, and which could prevent the final modification being used immediately by the person. For example, if a wet area shower is being installed with the intention the person will access it using a mobile shower chair then this is the sub-phase the practitioner ensures it has been purchased or supplied.

Sub-phase 8

Table 34 illustrates sub-phase 8 of the process protocol for home modifications. This sub-phase occurs in the main evaluation phase.

	Sub-phase 8
Description of sub-phase	Conduct site visit to check the operation and maintenance of the occupation focused home modification
Key Question	Is the home modification operating in the way it is intended to? Does the home modification perform in the way that achieves the goals and requirements identified in sub-phase 3? What can we learn from the process?
Action needed at each sub-phase	Provide re-ablement, rehabilitation, and/or training needed to enable the use of the modification Conduct re-evaluation following completion of the home modification and compare with sub-phase 2 Provide training around maintenance of the home modification Complete professional evaluation of the intervention and what can be learned
Outcome of Sub-phase	Complete and document the re-ablement, rehabilitation, and/or training provided Person(s) provided with information and documentation needed to manage the home modification Person(s) satisfied with the performance of the modification. Feedback documented Occupational therapist satisfied with performance of the modification completed. Outcome documented Modification resolves the Occupational Need identified in sub-phase 3. Case closed
Tools to assist with Sub-phase	COPM I-Hope AMPS Housing Enabler

Table 34 Sub-phase 8

The evaluation sub-phase is an important part of the occupational therapy and design and construction process. The content of this sub-phase was influenced by the requirement a number of respondents identified in ensuring the standard of workmanship met the standards expected from the housing authority. In the GDCPP (Cooper et al., 1998), the final sub-phase ensures the building is handed over ensuring the end-users have an understanding of how the building operates and needs to be maintained, thus this section

ensures the person has a similar understanding in terms of the modification. To capture concepts associated with the OTIPM process and the occupational therapy process in general, the questions and outcomes of this sub-phase reflect the need to evaluate whether through installing modification has archived the goals identified in the earlier sub-phase of the protocol. Furthermore, what the practitioner can learn that will improve his or her professional practice.

6.5 Chapter Summary

The purpose of sub-phase 2 of the study was to develop a home modification process protocol by conceptualising the occupational therapy practice involving home modifications as a design and construction process. To achieve this, it was necessary to use a 3-step approach to analyse and generate the data necessary to understand the process and then to develop the protocol.

It was possible to use data from the questionnaire to describe the role of occupational therapy in this field of practice during the three main phases of the occupational therapy process described in the OTIP. In defining their role, respondents identify a series of actions involved in planning the modification, thus, an additional sub-phase was added to the OTIPM (Fisher, 2009) to acknowledge this role. Also, the main intervention phase was renamed *intervention implementation* which acknowledges that installing a home modification is a dynamic process, one which the therapist works with building professionals to achieve.

In the second step, the researcher used the GDCPP (Cooper et al., 1998) to conceptualise the occupational therapy process as a series of sub-phases. By using the GDCPP (Cooper et al., 1998) the researcher was able to combine the concepts of occupational therapy practice with the principles of the design and construction process. This step of the analysis generated a process with four main phases and 9 sub-phases. By using the approach, it is the first time, as far as the researcher is aware, that what occupational therapists do in this field of practice has been described using the concepts from the design and construction process. This finding is significant as it could address the issue identified in the literature where there is a need for occupational therapists to better understand and express their role in the design and construction process of a home modification.

In the final step of the data analysis, the finding generated a Home Modification Process Protocol. The principles of the GDCPP (Cooper et al., 1998) acted as a guide to develop the framework for the protocol. Then it was necessary to use an iterative process to populate the content of the framework. However, this iterative process allowed the researcher to develop the content based on a conceptual model of practice; what respondents described their role being in practice; and addressing issues identified in the literature about occupational therapy practice in the field of home modifications. Thus, the Home Modification Process Protocol potentially:

- Provides a systematic approach to the process of modifying the home of older and disabled people.

- Ensures ethical and professional practice by enabling occupational therapists to verbalise and visualise their role in the process of modifying the home.

- Reduces the complexity of the process by identifying the key questions, actions, and outcome of each sub-phase, as well as the tools to support each sub-phase.

- Ensures the person has choice and control through their involvement in all sub-phases of the process.

- Guides professional reasoning based on a conceptual model of practice.

- Ensures consistency of occupational therapy practice by accommodating regional, legislative, and regulatory differences between practice settings.

- Improves the effectiveness and efficiency of practice by ensuring practitioners collect the right information, at the right time.

- Identifies tools that support each sub-phase.

- Financial constraints, and other practice contextual issues, become a design consideration and not a barrier for accessing funding for a modification.

This phase of the study has raised the question as to what the 'intervention' in home modification practice is. Whilst in the literature the importance of designing the home modification is described, the intervention appears to be the installed modification and outcome measures designed to evaluate the intervention tend to be focused on how the modification has improved the person's performance in the occupation. However, the findings from this stage of the study have shown that each element of the protocol is important because the outcome of each sub-phase can ultimately influence the final

performance of, and, satisfaction with, the modification. Therefore, should the home modification process used by the practitioner be defined as the intervention? The researcher has identified several possible advantages:

- The intervention is evaluated in terms of how the process has improved the person's health and well-being.
- The practitioner has responsibility to be involved in all phases of the process, not just elements of the four main phases of the home modification process.
- If the intervention fails, then an audit of the process enables the issue to be identified.
- Researchers are able to define which aspects of the intervention they are investigating.

Developing the Home Modification Process Protocol has raised an interesting question about the interventions provided by practitioners in this field of practice and the discussion of the findings have identified the potential benefits of using the protocol in practice. The next phase of the study investigated the use of the Home Modification Process Protocols, through a scholarship of practice. The findings from this third phase of the study are presented and discussed in the following chapter.

Home Modification Process Protocol

	Assessment			Intervention Planning			Intervention implementation		Evaluation
Main phase	**Assessment**			**Intervention Planning**			**Intervention implementation**		**Evaluation**
Sub-phase	0	1	2	3	4	5	6	7	8
Description of sub-phase:	Demonstrate an occupational need within the person-centred performance context	Conceptualise the occupational need as identified by the person(s)	Conduct an analysis to identify the Person, Environment and Task elements impacting on occupational performance	Develop collaborative occupational performance goal(s) and PET requirement for the occupational-focused home modification	Conduct a substantive feasibility study for achieving the PET Requirements (including funding route)	Obtain agreement on the full detailed design and specification of the home modification	Co-ordinate and support procurement of the occupation-focused home modification	Construct the occupation focused home modification	Conduct site visit to check the operation and maintenance of the occupation focused home modification
Key Question:	What is the situation that has prompted contact with the occupational therapist/service Is an occupation-focused home modification intervention appropriate for the situation	What are the reported occupation(s) the person(s) needs/wants to address through an occupation-focused home modification	How does the transaction between the Person, Environment and Task (PET) factors impact on occupational performance	Is the person(s) goal(s) for the modification to: • Restore their occupational performance/participation • Maintain their occupational performance/participation • Develop their skills or role to perform or participate in a new occupation What are the detailed PET design requirements for achieving the collaborative goals	What design options are there for meeting the PET Requirements What other factors in the persons occupational context will effect choice of design solutions Does the design proposal meet the PET requirements, outlined in phase 3	Does the full detailed design provide the solution to address the occupational performance requirements of the person Do the detailed design plans and specifications provide the person with the information they need to give informed consent.	What information and action is required to procure the home modification Has all the information been obtained for the builder/contractor/other to construct the home modification	Is the appropriate support being provided to the person (s) during the construction phase of the home modification	Is the home modification operating in the way it is intended to. Does the home modification perform in the way that achieve the goals and requirements identified in sub-phase 3 What can we learn from the process
				Should a Home Modification Approach be taken?					
Action needed at each sub-phase:	Identify the context of the situation Identify who (persons) is involved in the situation Identify the tasks involved in the situation Identify Resources and Limitations within the person-centred context Identify how a collaborative relationship with the occupational therapist/service could impact on the situation	Identify the specific occupation(s) the person(s) wants/needs to do Identify the person(s) occupational priorities Identify occupations that cannot be addressed through occupation-focused home modification intervention	Identify the actions, within the occupation(s), the person(s) does not perform effectively Identify actions, within the occupation(s), the person(s) does perform effectively Identify the elements of the Person/Environment/Task (PET) that is affecting the person(s) occupational performance	Identify, with the person(s) if the goal for the home modification are • Restoring their occupational performance/participation • Maintaining their occupational performance/participation • Developing their skills or role to perform or participate in a new occupation Identify, with the person(s), how the above approach will the impact on the evaluation phase Identify the specific "person factors/body functions" design requirements Identify the specific "environmental" design requirements Identify the specific "task" design requirements Identify any occupation(s) that cannot be addressed through an occupation-focused home modification	Identify that the design has addressed all the requirements identified in sub-phase 3 Identify the design meets any other occupational performance context requirements Identify any person-centred performance context issues that will influence the person(s) choice of design solution Identify any potential built environment issues, in the existing space, that will impact on the PET requirements being accommodated Identify funding requirements for the home modification	Identify any occupational performance context issues that will influence the person(s) choice of design solution Identify the person(s) understands how the design solution addresses their occupational performance requirements Identify how any unmet requirement will impact on the occupational performance of the modification Identify the person(s) agrees to proceed with the design solution	Identify information required to be submitted for procurement of the home modification Identify the information required to proceed with the construction of the home modification Communicate the information required to proceed with the funding of the home modification Communicate the information required for the person(s) to proceed with the construction of the home modification Communicate the information required for the builder/contractor/other to proceed with the construction of the home modification Identify what on-going support will be required of the occupational therapist/service during construction phase	Provide on-going support during the construction of the home modification Provide and/or supply tools not part of the construction process Provide advice on final positioning of tools	Provide re-ablement, rehabilitation, and/or training needed to enable the use of the modification Conduct re-evaluation following completion of the home modification and compare with sub-phase 2 Provide training around maintenance of the home modification Complete professional evaluation of the intervention and what can be learned
Outcome of Sub-phase	Referral accepted/declined Key referral (situational) information documented Person(s) aware of limitations within the OT's field of practice i.e. funding criteria for home modification Consent to assessment documented	Occupational Need(s) documented Or advice including referral on to other services	Occupational Performance Analysis completed and effective and ineffective elements of performance documented PET element(s) causing effective or ineffective occupational performance documented PET information needed to support sub-phase 4 documented	Person(s) has collaborated on the goals of the home modification Goals for home modification documented The PET design requirements documented Re-ablement, rehabilitation and/or training requirements following the completion of the home modification documented	Clinical reasoning on the modification design solution process documented Issues within the person-centred performance context and/or built environment that prevents optimum design solution being provided, documented The specification related to space, space layout and tools documented	Informed consent documented	Funding application/support completed Plans, specifications, product information, and health and safety information provided to builder and/or those involved in construction of the modification	Modification completed	Complete and document the re-ablement, rehabilitation, and/or training provided Person(s) provided with information and documentation needed to manage the home modification Person(s) satisfied with the performance of the modification. Feedback documented Occupational therapist satisfied with performance of the modification completed. Outcome documented Modification resolves the Occupational Need identified in sub-phase 3. Case closed
Tools to assist with Sub-phase		COPM	AMPS Housing Enabler i-Hope	COPM	Consumer Global Design software Good practice guidance documents e.g. • Lifetime Home Standards • BS5000 Inclusive Design Principles				COPM i-Hope AMPS Housing Enabler

Table X Home Modification Process Protocol

Table 35 Illustration of the Home Modification Process Protocol - See Appendix 10 for full illustration

Chapter 7 Proof of Concept (Phase 3)

7.1 Introduction

This chapter presents the findings and discussions from the third and final phase of the research study. The purpose of this phase was to establish a proof of concept for using the Home Modification Process Protocol in Practice, with the specific objectives of establishing if the protocol would:

- Enable practitioners to better understand their role in the design and construction of a home modification.
- Enable a theory based occupational therapy process to be adopted by practitioners.
- Encourage occupation-centred practice, which is practice underpinned by the unique values and professional reasoning skills of the occupational therapy profession.

To ensure the findings would have meaning and value to practitioners involved in this phase of study, the case study was designed around a scholarship of practice. To structure the presentation of the findings, the following headings have been used:

- The practice setting
- Role of the practitioners in the practice setting
- Critique of the process being in practice setting
- Tools develop to implement the Home Modification Process Protocol
- Outcome from using Home Modification Process Protocol
- Reflection on the scholarship of practice

7.2 The practice setting

7.2.1 Findings

The case study involved 4 practitioners based in a local authority housing team in England. The primary function of the housing team is the delivery of home modification funded primarily through the Disabled Facilities Grant or through the home modifications budgets for council owned housing. The team also manages the redevelopment and refurbishment of council owned sheltered and extra care living schemes.

The four practitioners are managed by the housing team manager, who is a housing professional. However, one of the practitioners provides professional leadership to the three other practitioners, and she has been a member of the housing team for four years prior to this study. The three other occupational therapists were relatively new to the organisation, but had been practicing as therapists for a number of years. The practitioners' level of experience is presented in Table 36.

Practitioner	Experience
Practitioner 1 (P1)	Team Lead. Qualified in 2000 and has worked in the practice setting since 2009.
Practitioner 2 (P2)	Community Occupational Therapist. Qualified in 1997 and has worked in the practice setting since 2012.
Practitioner 3 (P3)	Community Occupational Therapist. Qualified in 2012 and has worked in the practice setting since 2013.
Practitioner 4 (P4)	Community Occupational Therapist. Qualified in 2006 and has worked in the practice setting in 2013. Due to sick leave for a prolonged period, P4 was unable to take part in the final group interview.

Table 36 Case Study participants' level of experience

To ensure a scholarship of practice was developed, the practitioners were asked at the start of the study their motivations for participating in the study, which were:

- Will the Home Modification Process Protocol help us to understand our role in the design and construction process of home mods?
- Will the Home Modification Process Protocol help us to collect the right information, at the right time, and to use the information in the right way?
- What are the challenges of us using the process protocol?
- Will the Home Modification Process Protocol make us more occupation-centred?
- Does it improve what we do?

7.2.2 Discussion

The practitioners involved in the case study, unlike the majority of the respondents in the survey, are based within the local authority housing team. Therefore, they work alongside the local authority housing surveyors. However, the practitioners work closely with the social services occupational therapists and they work under the same DFG criteria for the

funding of home modifications. The practitioners also had a range of experience from P3 who had less than 1 years' experience at the time of the study, to P2 who had 17 years of experience. This range of experience would be useful for gaining a different perspective of using the Home Modification Process Protocol in practice. The researcher also acknowledges that the practitioners self-selected themselves to be the case study. Therefore, in interpreting the findings from the data collected the researcher was mindful of this.

7.3 Role of the practitioners in the practice setting

7.3.1 Findings

During the first group interview, the practitioners were asked to discuss, through a brainstorm, their role in the practice setting. The analysis of the interview transcript and the written material, see Figure 22, identified 7 aspects to the role of the practitioners in the practice setting. These 7 aspects are discussed below:
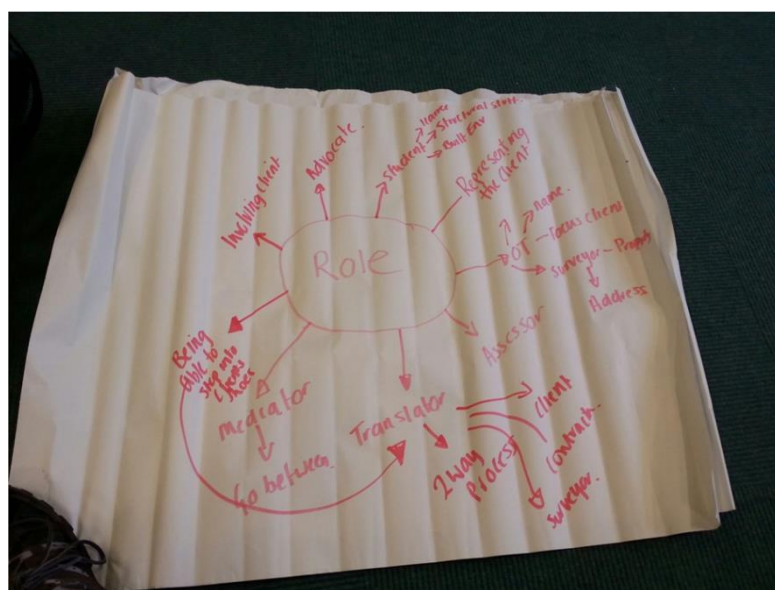
Figure 22 Photograph of brainstorm of the role of the practitioners in the practice setting

Assessor

When describing their role, the practitioners identified themselves as having a key responsibility in assessing the person's needs. On further prompting they identified that this assessment of need was multidimensional and included meeting the person and identifying what difficulties the person is having in their everyday activities of daily living. Following this layer of assessment, the practitioners are involved in assessing the

transaction between the person, environment, and/or task factors; this then enables them to identify what the cause of the difficulty with the performance or participation is. The final layer of assessment involves identifying the most appropriate modification to overcome the problem.

Translator

Related to their assessment role, the practitioners described having the responsibility for being the 'translator' in the process. By the term translator, the practitioners were describing their responsibility of taking the requirements identified in the assessment process and matching this with a home modification that can be technically achieved within the property.

Mediator

The practitioners also referred to themselves as having a mediatory role. In this role they report acting as a 'go between' the person and the surveyor. In this role, they help the person to understand the technical design and construction information the surveyor is trying to communicate. The practitioners also support the surveyors to understand what the person may be having difficulty expressing, for example due to the person's anxiety causing barrier to their effective communication.

Advocate

The practitioners reported having an advocate role. They believed this advocacy role was particularly important if decisions about the design detail were being made in the person's absences. For example, a surveyor may make detailed plan drawing and ask the practitioners advice about the position of facilities; at this point, the discussion occurs within the office where the person is not present. As the person is not present, the practitioner acts as the advocate ensuring the decisions taken about the design of the modification is in the person's best interest.

Co-ordinator

The role of co-ordinator was an important aspect of the role of the practitioners in this practice setting. This role appeared to be important immediately prior to installation of the

modification and when the builders were onsite and the person had concerns or questions about the technical aspects of the modification.

Educator

The practitioners report a role in educating the person about how the modification will work, look, and operate. They also reported this role extended to other team members in the department, for example explaining why the person needed a particular design layout or how a particular condition impacts on how the person can use the environment. The practitioners discussed the other team members having a property-centred approach to their practice, where they would refer to the case by the address. However, the practitioners saw themselves as person-centred referring to the case by the person's name. Thus, through their educatory role they could help their housing professional colleagues gain an insight into the needs of the person, rather than the needs of the built aspects of the home environment.

Student

The practitioners also described a role of being the student as they were constantly learning about construction processes and other aspects of building and design practice. They reported that this was an important role as it helped them to understand the type of information the person, who is usually a novice to design and construction, will need to be able to understand the modification process.

7.3.2 Discussion

The findings from understanding the role of the practitioners in this setting appears to support the findings from phase 2, where respondents identified a key purpose of their role was in the assessment of need. However, when exploring this with the practitioners, it appears the term assessment is being used to describe the unique reasoning skills identified by Alsop and Turner (2015).

The role of advocate, mediator, and translator were skills recognised in the research by Nord et al. (2009), where they investigated the collaborative relationship between the person, building professional, and occupational therapist. Nord et al. (2009) argued it was these skills that enable the occupational therapist to act in the best interests of the person,

despite the concerns others have raised when occupational therapists do not involve the person in elements of the decision making process (Sapey, 1995; Nocon & Pleace, 1998).

The practitioners involved in this study recognised that their graduate training had not provided them with the necessary skills to understand the design and construction principles involved installing a home modification. Whilst a number of authors (Klein, 1999; duBroc, 2015) have discussed the need for better education for practitioners working in this field, it appears for these practitioners it is this learning process that helps them to better articulate to the person what the person needs to know and in a way the person is able to understand.

7.4 Critique of the pre-study home modification process being used in the practice setting

The pre-study home modification process was critiqued from three perspectives, the practitioners; observations made by the researcher through conducting a process mapping exercise; and critiquing the role of the practitioners in the pre-study process against the Home Modification Process Protocol.

7.4.1 Findings

Perception of the practitioners

The practitioners' perceptions of the process were captured in a brainstorm session during the first meeting. As with the questionnaire findings, the practitioners identified a number of positive factors, see Figure 23. One of the main strengths of the process was the outcome. Whilst the practitioners were aware of the financial impact of the eligibility criteria for the provision of home modifications, they reported the focus for the manager of the housing team was achieving a home modification that provided the person with the right solution, even if this involved the manager looking at different ways to find the funding for the modification. Also, the practitioners believed that across the team, there was good collaboration and communication and they recognised that over time, the surveyors had come to respect the skills and knowledge the occupational therapy profession brought to the team as a whole. Because of this collaborative relationship with the surveyors, and the focus of the manager on funding the right solution for the person, the practitioners reported the process engendered a person-centred 'can do' attitude amongst the staff.

Figure 23 Photograph of brainstorm of the positive aspects of the pre-study process

As with the respondents of the questionnaire, the practitioners were able to highlight a number of issues with the process and these are captured in Figure 24 below.
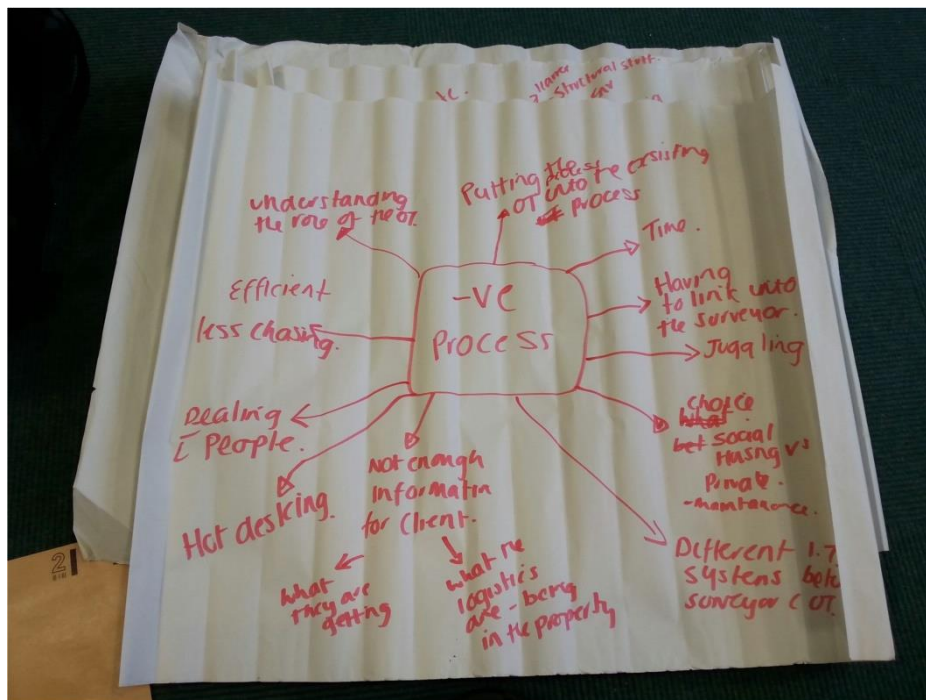

Figure 24 Photograph of brainstorm of negative aspects of the pre-study process

The practitioners expressed a sense that they were fitting their "therapeutic process" into the existing surveyor's process. This was a concern for the practitioners because their involvement in the process was based on what the surveyors thought occupational therapy

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was and what the practitioners could contribute to their process. The practitioners believed that they did not have the language to be able to articulate how their knowledge and skills could fully contribute to the process and they believed that having a written process may help the surveyors understand their knowledge and role better.

The practitioners reported that whilst there was a generic process being used, there was no specific written instruction as to how they, as occupational therapists, could contribute to the process. This was a concern for the practitioners because they were aware that amongst the four of them there was not always consistency in the way they performed their role within the existing process. Therefore, they argued that having a written process might ensure consistency of practice across the four practitioners.

One of the concerns raised by the practitioners was whether the person always had a full understanding of what the home modification would look like once installed. This had become a particular concern since they had stopped doing visits to show people the proposed plans, and instead these were being mailed out to the person instead. The decision to stop this visit had been done in an attempt to simplify the process for the person. However, the practitioners expressed anxiety that, whilst the majority of modifications were simple and the person had a good understanding of what was being installed, there was a minority of people where a visit was essential to reduce the likelihood of dissatisfaction and anxiety.

The practitioners identified that they were not always sending the surveyor all the information that was needed to help the design and construction of the modification, and this led to delays in the process because the surveyor had to delay an aspect of the process until they had contacted the practitioner to gain the relevant. The practitioners were also concerned about passing on sensitive confidential information, when it was not necessary to do so. Therefore, one of the issues with the pre-study process is that it did not support the practitioners to collect the right type of information and to then use this information at the right time to support the overall home modification process.

The final issue the practitioners reported about the process was in regards to the lack of compatibility between the housing information technology (IT) system and the social care IT platform. Whilst the practitioners were employed by the housing department, and the IT system used to manage the modification system was hosted by the housing department,

and the referral information on the person, and why a modification was being requested, being hosted on social care department IT system. These two systems are not compatible and the practitioners have to work across the two platforms, getting referral information and keeping their clinical notes on the social services platform, whilst recording or gaining information on the progression of the housing modification on the housing IT system.

Mapping the pre-study process

As part of the first meeting, the researcher worked with the practitioners to map the pre-study process. The map produced from this exercise is illustrated in Figure 25. The number of steps in the process differs depending on the funding route for the modification. The first routes are for requests for home modifications for a person who is referred by an occupational therapy colleague from the local social services department, who has visited the person as part of a social care assessment. From this assessment, the need for a home modification, via a Disabled Facilities Grant (DFG), has been identified by the social services occupational therapists, including the general type of modification required. The role of the practitioners in this scenario is to support the detailed design and installation of the modification. The second route involves referrals to the housing team for modifications being funded for local authority housing tenants. In this situation, the person has not, usually, had a prior assessment from an occupational therapist and thus in this situation the practitioner completes an assessment to ensure a modification is appropriate before then assisting with the detailed design and installation of the modification.

This mapping exercise identified that the DFG route involves 16 separate activities the housing team performs as part of the home modification process, whereas 14 steps are involved for the local authority funded modifications. The additional steps in the DFG route appear to be associated with administrative tasks involved in the grant application. Thus, practitioners in the DFG route become involved in the case after an initial means test has been conducted and the person agrees with any financial contribution they might have to make towards the installation of the modification. After this initial grant application, the case is put on a waiting list until it is allocated to one of the practitioners. This waiting list appears to exist to control and manage the DFG budget. If the modification is being funded through the housing department budget, the practitioners becomes involved with the case at the beginning of the process and conducts an initial visit, where the person is assessed to

establish what person, environment, occupation factors are impacting on performance and participation in activities of daily and if a home modification is an appropriate. Following this visit, they re-visit the person to conduct a joint site visit with the surveyor. If the person has been previously assessed by the social services occupational therapist, then the practitioner does not conduct a separate visit, instead they arrange the joint site visit with the surveyor. The purpose of this visit is to begin the discussion with the person around the design detail of the modification. An explanation of how the modification will look once installed is also discussed on this visit. Following the joint site visit, the practitioner completes a dimensions sheet, which provides information the surveyor need to complete the detailed design of the modification. This detailed design, a two dimensional computer aided design drawing of the modification and design specifications, is sent to the practitioner for comment and approval. If the practitioner is concerned that the detailed design will not provide a modification that will meet the person's requirements, they discuss these concerns with the surveyor and amendments to the plans are accordingly made. Once the detailed plans have been approved by the surveyor and practitioner a copy is sent to the person. If the person has concerns regarding the plans, the practitioners reported this would be picked up at the pre-installation visit, which involves the surveyor and contractor. The final steps of the pre-study process involve the practitioner visiting the person to evaluate the installed modification.

The researcher collected the documents used by the practitioners. The practitioners use two types of assessment form, depending on the route of the referral. Where an initial assessment has been conducted by the social services occupational therapists it was not believed appropriate, or necessary, to conduct a full assessment, therefore the practitioners use a shortened assessment form enabling them to capture additional information they believe is necessary as part of their first visit to the person. For those cases where the person has not been visited by a social services occupational therapist, the practitioners have developed a detailed assessment tool. Both of these tools have been developed by the practitioners and both of these assessment tools collect information about the person's medical condition, social situation, type and the general layouts of the property. The detailed assessment also includes an assessment of the person's functional performance, for example ability to perform personal care tasks and ability to transfer in and out of the bath. Copies of the assessment tools used by the practitioners can be found

in Appendix 11. Practitioners have also developed an evaluation form. This form asks questions to check the modification has been installed correctly, that the person is satisfied with the adaptation, and are able to use the facilities as identified during the joint site visit with the surveyor, earlier in the process. This evaluation form also ensures the practitioner had checked the person is aware of any ongoing maintenance issues. A copy of the evaluation form can also be found in Appendix 11.
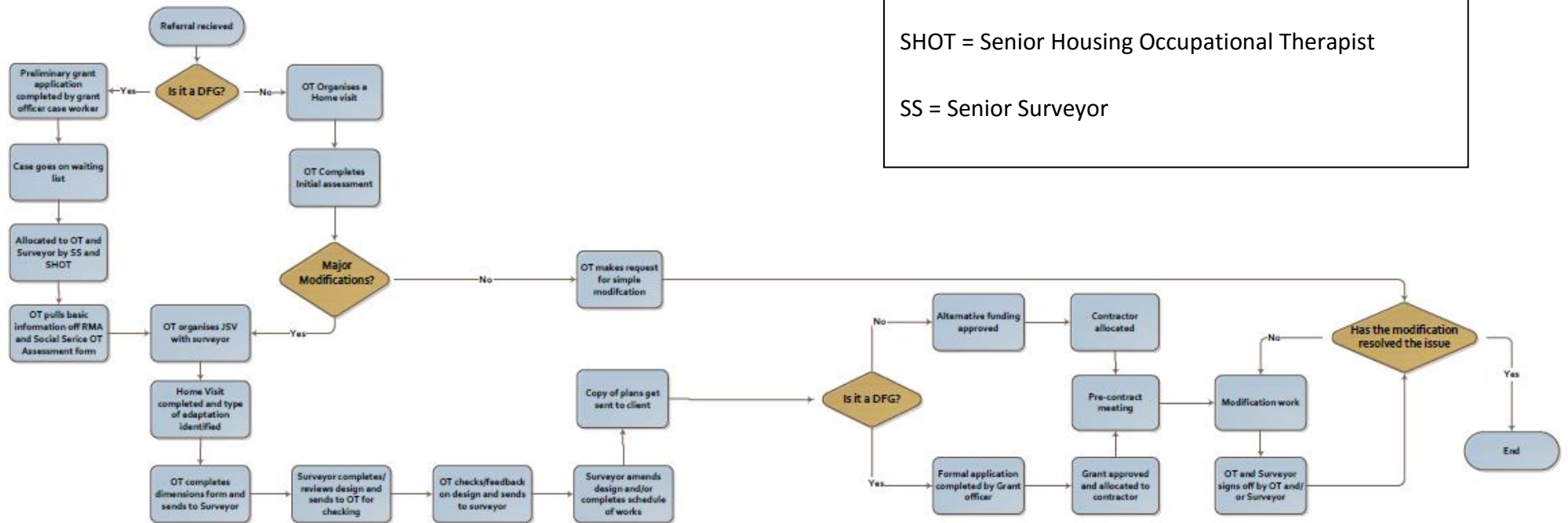
Figure 25 Pre-study process map

Mapping the pre-study process against the Home Modification Process Protocol

To critique the role of the practitioners in the pre-study process against the Home Modification Process Protocol, the protocol was mapped on top of the pre-study process. To differentiate between sub-phases of the protocol different colours were used. The finding from this mapping process is shown in Figure 26. In addition, the researcher provided a training session on the Home Modification Process Protocol. This training included, understanding the conceptual model and process framework OTIPM (Fisher, 2009); how the GDCPP (Cooper et al., 1998) informed the design of the Home Modification Process Protocol; an explanation of the content for each phase of the Home Modification Process Protocol. Following this training session, the practitioners were questioned as to what elements of the protocol were missing from the pre-study process.
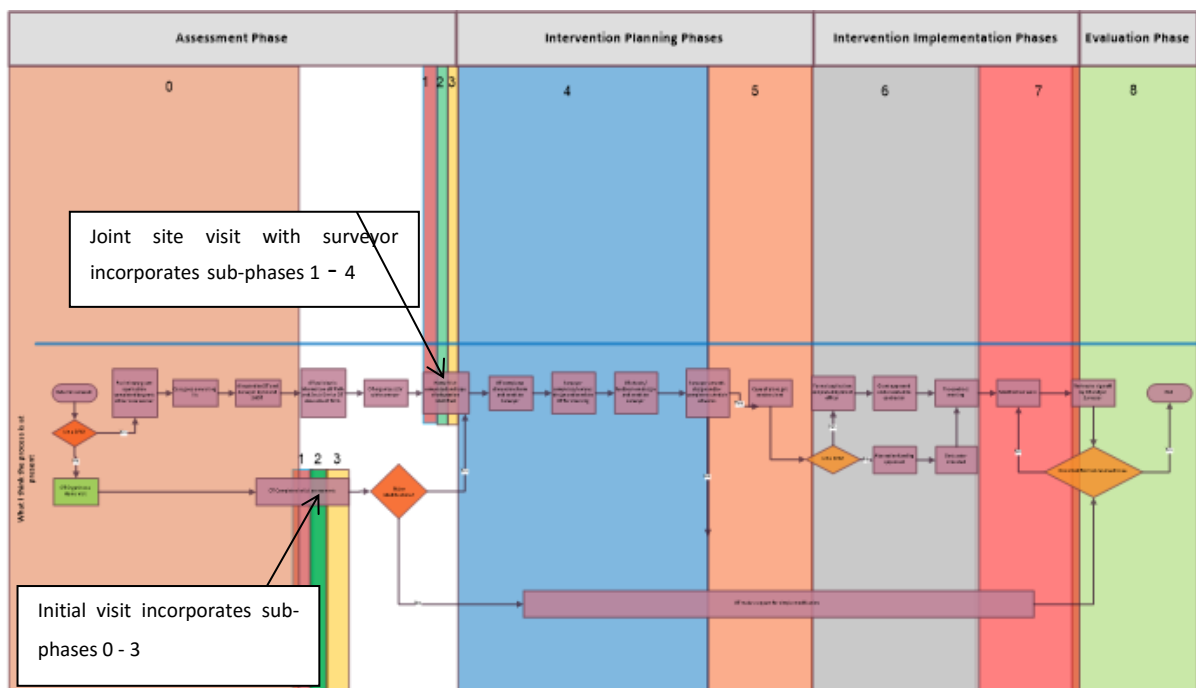
Figure 26 Mapping the pre-study process on top of the Home Modification Process Protocol

7.4.2 Discussion

The practitioners identified a number of positive aspects to the home modification process, in particular the mutual respect between themselves and the surveyors. Unlike the majority of respondents to the questionnaire who work for social services, and therefore are unlikely to be based with the housing surveyors, the participants are based with the surveyors giving the practitioners and surveyors the opportunity and time to build these relationships. Also,

unlike other research studies that have identified the negative influence departmental policies have on the provision of modifications, overall focus of the case studies site appeared to have a funding policy where finding the right solution for the person rather than meeting financial targets was the priority. However, given the researcher did not interview those using the service, it is not possible to state whether this is a view shared by the people having their homes modified.

Despite the positive views held by the practitioners, they shared similar concerns to those of Grisbrooke and Scott (2009), whereby they were welcomed and valued as a key member of the housing team, however they sensed they were still having to fit their occupational therapy process into the surveyors home modification process. Furthermore, the practitioner's value to the team was based on the surveyor's perception of what the occupational therapists can contribute to the process.

As with the respondents to the questionnaire, the practitioners did not use a conceptual model of practice to support the professional reasoning. The assessments tools used focused on a narrow range of concepts associated with the OTIPM (Fisher, 2009). Those concepts were associated with basic social environment information, and person factors related to independence and safety. When evaluating the modification, once installed, the practitioners used a form that covered a broader range of concepts (see Appendix 11), including the person satisfaction levels with the modification. This form appears to include the information recommended by Fishpool and Bridges (2012) when evaluating the outcome of a home modification. Interestingly, the evaluation form asks a question to prompt the practitioner to consider whether the modification had resolved the issue identified by the person, in other words the person's goals identified at the goal setting phase of the occupational therapy process. However, on comparing their practice with the Home Modification Process Protocol the practitioners realised that they did not formally document the goals the person wanted to achieve from having their home modified.

Interestingly, in attempt to simplify the process, the practitioners had stopped routinely visiting the person to discuss the plan, instead it was hoped that any concerns would be discussed at the pre-installation meeting between the surveyor and builder. As stated earlier, the practitioners were now concerned, that despite the pre-installation meeting,

some of the people they had worked with had not been provided with the necessary information to understand what the modification would look like once installed. This concern seems reasonable given previous studies where the skills of the occupational therapists in assisting the person understand technical design and construction information was identified as an important factor in the successful installation of a modification (Nord et al., 2009). This was causing a degree of anxiety for the practitioners, because whilst for the majority of people a visit to review the plans was not necessary, as they had been given sufficient information to give informed consent, there were a small number of cases where the practitioners believed they were professionally vulnerable. This sense of vulnerability appeared to be associated with their professional and ethical duty in ensure the person has a full understanding of the intervention they were to receive.

From this overall map of the home modification process, it was difficult to immediately identify the specific role of the practitioners and to locate the occupational therapy process because they were captured in the other activities involved in the process. Whilst the number of steps associated with the home modification process on the case study site is not indicative the process is unsystematic, it does add support to the argument that the home modification process is complex (Pynoos, 1998; Adams, 1999).

The purpose of the study was not to change the process being used by the surveyors and other members of the housing team; instead, the study was informing the practitioners how the occupational therapy process, through the Home Modification Process Protocol, could better support their professional role through the existing process. By mapping the Home Modification Process Protocol on top of the pre-study process, the practitioners were able to visualise their occupational therapy role and process. For example, what the practitioners and the respondent in the questionnaire had termed the assessment need, when this was mapped on top of the Home Modification Process Protocol it became evident on the assessment visit, or joint visit with the surveyor, this is when they were undertaking sub-phase 1 to 3. This mapping of the of the pre-study process on to the Home Modification Process Protocol acted as an audit tool so that the researcher with the practitioners were able to identity the elements of Home Modification Process Protocol missing from their pre-study practice.

7.5 Implementing the Home Modification Process Protocol

7.5.1 Findings

To implement the use of the Home Modification Process Protocol in practice, the researcher assisted the practitioners to identity the elements of the Home Modification Process Protocol missing from their pre-study practice. To do this the researcher used the sections of each of the sub-phase to discuss with the practitioners the elements missing from their current process and these were documented. From this list of missing elements, the researcher facilitated the practitioners to identify a number of recommendations for them to consider adopting into practice. 19 recommendations were made and they have been presented in Table 37, this table also includes the elements missing from the process.

Action required at each sub-phase	Element missing from current process	List of recommendations suggested by participant
Sub-phase 0 Identity the context of the situation Identify who (persons) is involved in the situation Identify the tasks involved in the situation Identify Resources and Limitations within the person-centred context Identify how a collaborative relationship with the occupational therapist/service could impact on the situation Identify if person needs to be referred to an alternative service	None	No specific recommendations necessary as practitioners report their current practice meets the requirements in this sub-phase of the Home Modification Process Protocol
Sub-phase 1 Identify the specific occupation(s) the person(s) wants/needs to do Identify the person(s) occupational priorities Identify occupations that cannot be addressed through occupation-focused home modification intervention	During the initial visit, practitioners are not clearly defining, and then documenting, what occupations the person is wanting/needing/having to do.	1. If visiting the person with the surveyor for the first time, arrive 30-45 minutes before the surveyor, so that the practitioners completes sub-phases 1 to 3 before moving on to phase 4. 2. Practitioner to consider using the Canadian Occupational Performance Measure or develop a professional reasoning tool that helps practitioner to ask the right type of question.
Sub-phase 2 Identify the actions, within the occupation(s), the person(s) does not	Practitioners are not documenting the performance issue they observe. Practitioners are not documenting the element of the PET causing the	3. When reviewing a person, or assessing the person if they have not already had an occupational therapy assessment, ensure we document the reason for the performance deficit.

Action required at each sub-phase	Element missing from current process	List of recommendations suggested by participant
perform effectively Identify actions, within the occupation(s), the person(s) does performs effectively Identify the elements of the Person/Environment/Task (PET) that is affecting the person(s) occupational performance	performance issue.	4. Consider using a standardised assessment tool for analysing occupational performance or develop a professional reasoning tool to support with analysing performance. 5. Agree on the information we should be including in the notes when documenting the answers to key question at stage sub-phase 2.
Sub-phase 3 Identify, with the person(s), the occupational performance goals for the home modification Identify, with the person(s), the approach to be used for achieving the home modification goals and the impact this has on the construction and re-evaluation phases • Restoring • Acquiring • Compensating • Preventing Identify specific "person factors/body functions" requirement Identify specific "environmental"	Practitioners are not explicitly identifying with the person the goals for the home modification, thus the goals are not being documented	6. Write specific occupation focused goals with the person during your initial visit; or be clear that we have stated the goals before discussing solutions. 7. Include a goals section on our assessment form? 8. Attend the first visit to persons 30-45 minutes before the surveyor, so that we have completed sub-phases 1 to 3 before moving on to sub-phase 4.

Action required at each sub-phase	Element missing from current process	List of recommendations suggested by participant
requirement Identify specific "task" requirement Identify any occupations(s) that cannot be addressed through an occupation-focused home modification.		
Sub-phase 4 Identify that the design has addressed all the requirements identified in phase 3. Identify the design meets any other occupational performance context requirements. Identify any person-centred performance context issues that will influence the person(s) choice of design solution. Identify any potential built environment issues, in the existing space, that will impact on the PET requirements being accommodated. Identify funding requirements for the home modification.	The practitioners have different approaches to the way they analyse if the design of the modification will provide an effective solution.	9. Use a checklist of questions, based on the OTIPM (Fisher 2009), to ask yourself to ensure that you have considered all relevant concepts associated with designing a home modification that will improve the person's performance and participation in an occupation.
Sub-phase 5 Identify any occupational performance context issues that will influence the person(s) choice of design solution	Practitioners report they are not consistent as to what they discuss with the person when describing the home modifications.	10. For simple cases, agree with the surveyors the type of information that the person will need to know about the design of the modification by the time you leave the JSV e.g.

Action required at each sub-phase	Element missing from current process	List of recommendations suggested by participant
Identify the person(s) understands how the design solution addresses their occupational performance requirements. Identify how any unmet requirement will impact on the occupational performance of the modification. Identify the person(s) agrees to proceed with the design solution.	Practitioners are concerned that there are cases where a revisit is necessary to ensure the person has an understanding of the design intent, including aesthetics, and is able to give consent.	a. How long the adaptations will take to install b. What it will look like c. What choice of décor they have 11. Develop, with the surveyors a catalogue of adaptations for the person to look at? 12. Develop a set of criteria that will help you identify those persons where you think you need to go back and ensure that they fully understand what the modification includes/involves. 13. Have an in-service training on the best way of communicating design information to persons so that we do this phase consistently and learn from each other?
Sub-phase 6 Identify information required to be submitted for procurement of the home modification. Identify the Information required to proceed with the construction of the home modification. Communicate the information required to proceed with the funding of the home modification.	Practitioners identified inconsistency amongst themselves as to what additional information they provide the surveyor which might facilitate the construction of the modification, for example, health and safety concerns for the person during the installation of the modification. Practitioners identified inconsistency amongst themselves as if they attend the pre-installation visit.	14. Practitioners to consider developing a health and safety form, that can be completed with the client, and which would highlight any issues there might be when the modification is being installed. This could also include what on-going support the client needs during the process? 15. Practitioners to consider discussing with the surveyors any additional standard information they might need from them prior to the work being started? If there is, then to add this on the measurement sheet.

Action required at each sub-phase	Element missing from current process	List of recommendations suggested by participant
Communicate the information required for the person(s) to proceed with the construction of the home modification. Communicate the information required for the builder/contractor/other to proceed with the construction of the home modification. Identify what on-going support will be required of the occupational therapist/service during construction phase.		16. Practitioners to ensure the person and contractor have got their contact details should this be needed in sub-phase 7. 17. Develop reasoning tool for when the OT needs to attend the onsite pre-installation meeting?
Sub-phase 7 Provide on-going support during the construction of the home modification. Provide and/or supply tools not part of the construction process. Provide advice on final positioning of tools.		No specific recommendations necessary as practitioners report their current practice meets the requirements in this sub-phase of the Home Modification Process Protocol.
Sub-phase 8 Provide re-ablement, rehabilitation, and/or training needed to enable the use of the modification. Conduct re-evaluation following completion	Practitioners identified that because they do not record the person's goals earlier in the process, they do not review them to see if these have been achieved.	18. Supplement your existing paper procedure with to include a review the goals. 19. Arrange regular in-service training, where you share what you have learnt during a particular case?

Action required at each sub-phase	Element missing from current process	List of recommendations suggested by participant
of the home modification and compare with stage 2. Provide training around maintenance of the home modification. Complete professional evaluation of the intervention and what can be learned.	Practitioners report they are good at giving each other daily peer support but they do not spend time sharing case studies and examples of what they have learnt from specific cases.	

Table 37 Recommendation made for implementing the Home Modification Process Protocol

Professional Reasoning tools develop to implementing the protocol

From the recommendations, see Table 37 (recommendations column), the researcher identified a number of professional reasoning tools that needed to be developed to support recommendations numbers 2, 4, 9,12, and 14. These tools are now discussed in detail.

Professional reasoning tool for 1 Recommendation 2 (sub-phase 1)

Initially, the researcher recommended the use the Canadian Occupational Performance Measure (COPM) into practice. However, due to the time available to implement the recommendation, 4 months, the practitioner did not feel they had the time to develop the skills needed to implement the use of the tool. To overcome this issue the researcher developed the professional reasoning tool in Table 38 to assist the practitioners. The design of the questions is based on information from the OTIPM (Fisher, 2009) manual.

Sub-phase 1: This sheet is to be used to capture what the occupation and individual tasks the home modification is targeting. It also gets you to justify why a home modification is the right solution.
What occupations(s) does the person(s) need and want to do?
What tasks are involved in the occupation?
Why is a home modification the right solution?
What difference will the home modification make to the person(s) and their situation?

Table 38 Sub-phase 1 Professional Reasoning Tool - Recommendation 2

Professional Reasoning tool for recommendation 4 (sub-phase 2)

In recommendation 4, practitioners were asked to consider the use of a standardised assessment for measuring occupational performance. Again, the limited time available to implement the recommendation resulted in the practitioners not adopting a standardised assessment into their practice. To overcome this, the researcher developed the following professional reasoning tool in Table 39. It was agreed the practitioners would use the tools as a prompt of the different concepts they needed to consider when identifying how performance is being influenced by the transaction of the person, environment, and occupation. The concepts in the sheet were developed from the OTIPM manual, specifically information about the assessment of occupational performance and the terms used were influenced by the conceptual model (Fisher, 2009).

Sub-phase 2: This sheet is to be used to help you understand why the task may be a problem, and to help you answer the questions at phase 2.	
Issues Motor skills?	**What aspects of the Person, Environment, Task is influencing:**
Moving self	
Body positions task is performed in	
Obtaining and holding/manipulating tools, tool interfaces used in the task	
Moving tools and objects used in the task	
Sustaining performance (This has elements of a motor and process skill)	
Issues with process skills?	
Organising space and objects	
Temporal organisation	
Applying knowledge	

Adapting performance	

Issues with other Person Factors and Body Function?

Features of condition or ageing process	
Prognosis	
Sensory deficits	
Continence	
Tissue viability	
Falls risk	
Maintaining body temperature	
Motivation	
Communication skills	

Issues with the person(s) routine?

Timing of tasks	
Ordering of task actions and steps within the occupation	
Impact of the person's routine on carers	
Impact of the person's routine on the constellation of people involved in the situation	

Issues related to persons beliefs regarding space, tools and other materials?

Person's beliefs regarding space, tools and tool interface	

Issues related to other users of the home environment?

Impact of issues related to other users of the home environment	

Issues with the built environment?

Construction of supporting structures	
Position of pipe work	

Position of windows/door	
Drainage	
Access to power source	
Flooring/floor	
Ventilation (natural/artificial)	
Heating (natural artificial)	
Lighting	
Property type/tenure	
SPECIFIC ANTHROPOMETIRC DATA	
Floor to seat height	
Reach ability (low and high)	
Height	
Weight	
Bi-lateral muscle strength	
Size of person(s) in space	

Table 39 Sub-phase 2 Professional Reasoning Tool – Recommendation 4

Professional reasoning tool for recommendation 9 (sub-phase 4)

In sub-phase 4 and recommendation 9, practitioners wanted to have a more consistent approach when analysing if the proposed plan would resolve the issue identified in the earlier part of the protocol. The researcher developed this professional reasoning tool designed to have the practitioners answer a range of questions whilst reviewing the specifications and the two dimensional computer aided design drawings sent by the surveyor (see Table 40). Again, the development of the content of the tool was influenced by the OTIPM manual (Fisher, 2009) and from the practitioners who identified what they currently did when doing this aspect of sub-phase 4.

Sub-phase 4: This sheet is to be as a prompt for your professional reasoning when deciding if the proposed modification is providing you with the right design solution.

Analysing the design has the right fit between the person(s) and the space(s) used for the task(s) in the occupation

Is there the required space to move in the space	
Is there the required space to perform task actions involved in the occupation	
Is there the required features to move from one space to another (if tasks actions are performed in more than one space)	
Is there the space to fit the fixed tools to be used in the task	

Analysing the design have the right fit between the person(s) and position of fixed tools

Does the position of the fixed tools enhance or support the person(s)ability to operate the tools	
Does the position of fixed tools enhance or support the person(s) ability to organise the space, and the tools and objects used in the task	
Does the position of fixed tools enhance or support the person(s) ability to achieve body positions necessary to complete the task	
Does the position of the fixed tools enhance or support the person(s) ability to move self, tools and objects	
Does the overall layout of the fixed tools used in the task reduce the demands of the task	

Analysing the design has the right between the person(s) and the characteristics of the tools, tool interface, and space

Do the tools, tool interfaces, and space have the characteristics to enhance or support the person(s) motor and process skills	
Do the tools, tool interfaces, and space have the characteristics to enhance or support the person(s) factors, body functions, and other factors influencing performance	
Do the tools, tool interfaces, and space have the characteristics to flexibly respond to changes to person factors, body functions, and other factors influencing performance	
Do the tools, tool interfaces, and space have the characteristics to enhance or support safety	
Do the tools, tool interfaces, and space have the characteristics to accommodate the person(s) preferences and values	
Are there any compatibility issues between the tools used by the person(s) to perform the task	

Analysing if the existing built environment will accommodate the design requirements

Construction of supporting structures	
Position of pipe work	
Position of windows/windows	

Drainage	
Access to power source	
Available space	
Flooring/floor	
Ventilation (natural/artificial)	
Heating	
Lighting (natural/artificial)	
Impact of installing tools	
Property type/tenure/funding	

<div align="center">Table 40 Sub-phase 4 Professional Reasoning Tool – Recommendation 9</div>

Professional Reasoning tool for recommendation 12 (sub-phase 5)

For sub-phase 5 and recommendation 12, the following professional reasoning tool in Table 41 was developed. The purpose of the tool was to provide the practitioners with a method of documenting the informed and reasoned decision they make as to when they may or may not need to visit the person to ensure they have a full understanding of the plans. Thus, this tool ensure the process remains simple for those situations where it is not necessary to overcomplicate the process with an additional visit, whilst ensuring the practitioners identity the situations where a visit is recommended to ensure the person has adequate information to give informed consent.

Sub-phase 5: This checklist is to be used to support your professional reasoning when deciding if a follow-up visit is required to discuss the proposed plans.	
Follow-up visit to review plans	**Yes/No**
As part of the professional reasoning process at phase 4, there is a need to discuss, with the person(s) if the proposed design will meet their goals and requirements	
Person(s) has requested a visit to discuss the proposed plan	
Concerns raised by person(s)/carer/family member regarding the design of the home modification	
Significant change in health status or other circumstances since the sub-phase 3 or 4	
Concern raised by surveyor	
There has been a significant delay between initial visit and development of	

plans	
Modification includes an extension or more than 1 major modification	
Plans are significantly different from those proposed on the original visit with surveyor	
If answer is Yes to any of the above questions, then a visit to discuss plans is recommended.	

Table 41 Phase 5 Professional Reasoning Tool – Recommendation 12

Professional reasoning tool for recommendation 17 (sub-phase 6)

The final professional reasoning tool developed, see Table 42, was a document to support the practitioners to identify if they needed to attend the pre-installation visit conducted by surveyor and attended by the builder. The pre-installation visit provided the surveyor and builder an opportunity to discuss with the person the installation schedule but it also helps to identity what support the person may require during the building works. The practitioners recognise that their role as advocate is sometimes needed at this visit but they did not have a formal way of identifying those situations where their presence would be of value to the person as well as to their housing colleagues. The tool was developed by the practitioner and the questions were based upon what each of them considered being important when deciding on whether to attend this pre-installation visit.

Sub-phase 6 This checklist is to be used to support your professional reasoning when deciding if you need to be present at the builders meeting with the surveyor and technical officer	
Question	**Yes/No**
Does the person(s) need you to act as an advocate?	
Are there complex health and safety issues for the person related to the installation of the home modification?	
Is there any information that you need to discuss with the builder that needs face to face discussion?	
Do you need to discuss specific placing of tools?	
Is it an extension or involving more than two areas of the home?	
If the answer to any of the above questions is yes, then it is recommended you attend the pre-installation visit.	

Table 42 Phase 6 Professional Reasoning Tool - Recommendation 17

7.5.2 Discussion

It was possible to use the Home Modifications Process Protocol to audit the pre-study occupational therapy process. Through this audit, the researcher was able to use the

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scholarship of practice to facilitate the practitioners to identity elements of the Home Modification Process Protocol missing from their pre-study process. From these discussions, the researcher was able to identify a list of 19 recommendations that would help the practitioners adopt the Home Modification Process Protocol into their practice.

From the list of 19 recommendations, the researcher and practitioners identified the need to develop five tools to assist with professional reasoning at number of the sub-phases 1, 2, 4, 5, and 6. In the review of the literature in chapter 3, a number of authors identified the need to develop practice structures and tools to support the use of conceptual models. Thus, it was important that when designing three of the professional reasoning tools the OTIPM (Fisher, 2009) be used to inform the nature and style of the questions incorporated into the tools. The fourth and fifth tools, checklists to identify if the practitioners needed to do a follow up visit to the person with the plans or to attend the pre-installation meeting with builder and surveyor, were designed by combining the questions each of the practitioners' asked.

When designing the Home Modification Process Protocol the researcher had thought that the section of the protocol labelled 'tools to assist at each sub-phase' would identity which standardised assessment tools could be used at a particular sub-phase. However, the outcome of needing to develop professional reasoning tools was the researcher's realisations that the development of the Home Modifications Process Protocol was identifying not only the assessment tools, but also tools needed to assist with the thought processes involved in professional reasoning at particular sub-phases.

7.6 Outcome from using the Home Modification Process Protocol

7.6.1 Findings

Following the first meeting, the practitioners spent a month putting in place the recommendations needed to implement the use of the Home Modification Process Protocol in practice. During this month period, the researcher visited the practitioners to discuss the five professional reasoning tools developed to support the implementation of the recommendations. Once the majority of recommendations were implemented, the practitioners had a four month period where their practice was guided by the Home Modification Process Protocol. During this four month period, the researcher sent a weekly e-mail offering support or answering questions/queries the practitioners had. The only

support requested occurred a month into the four month period. The practitioners requested a glossary on the terminology used in the professional reasoning tools developed for recommendation 4 and 9. Thus, the researcher developed a manual for these two tools, which can be found in 12. The practitioners also had opportunity to complete a monthly reflection sheet, which was designed to help them to capture thoughts and opinions of their experience of using the protocol. However, despite prompting, none of the practitioners completed this form.

After the 4 month period, the researcher and practitioners completed a second group interview. The purpose of this meeting was to discuss the outcome of using the Home Modification Process Protocol. The findings from this group interview are presented under the following headings:

- Researcher's observation of the outcome from the recommendations made;
- Practitioners' perceptions of using the Home Modification Process Protocol.

Researcher's observation of the outcome from the recommendations made

The outcome of each recommendation has been described in Table 43; it provides an outline of the outcome of implementing each recommendation. The recommendations not achieved or only partially achieved are written in red. Of the 19 recommendations made, only 7 of them had not been achieved or only partially achieved, those being recommendations 2, 4, 11, 12, 13, 17. and 19 and the reasons for this will be discussed in the next section.

Element missing from current process	List of recommendations suggested by participant	Outcome of recommendation (numbers correspond with recommendations)
Sub-phase 1 During the initial visit, practitioners are not clearly defining, and then documenting, what occupations the person is wanting/needing/having to do.	1. If visiting the person with the surveyor for the first time, arrive 30-45 minutes before the surveyor, so that the practitioners completes sub-phases 1 to 3 before moving on to phase 4. 2. Practitioner to consider using the Canadian Occupational Performance Measure or develop a professional reasoning tool that helps practitioner to ask the right type of question	1. Practitioners were attending visit 30 – 45 minutes before the surveyor arrived. Practitioners now recording the occupation need in their electronic notes 2. As stated in the previous section, the practitioners did not feel they had time to learn to use the COPM. The practitioners attempted to use the professional reasoning tool for phase 1 but without success– see next section for details.
Sub-phase 2 Practitioners are not documenting the performance issue they observe. Practitioners are not documenting the element of the PET causing the performance issue.	3. When reviewing a person, or assessing the person if they have not already had an occupational therapy assessment, ensure we document the reason for the performance deficit. 4. Consider using a standardised assessment tool for analysing occupational performance or develop a professional reasoning tool to support with analysing performance. 5. Agree on the information we should be including in the notes when documenting the answers to key question at stage sub-phase 2.	3. Practitioners now documenting occupational performance deficits in electronic notes. 4. The practitioners attempted to use the professional reasoning tool for phase 2 but with limited success – see next section for details. 5. The practitioners have their own style of notes writing but all are capturing the same type of information when writing about the performance deficit.
Sub-phase 3 Practitioners are not explicitly identifying with the person the goals for the home modification, thus the goals are not being documented.	6. Write specific occupation focused goals with the person during your initial visit; or be clear that we have stated the goals before discussing solutions. 7. Include a goals section on our assessment form?	6. Practitioners are now writing in the electronic notes the goals and this is done with the person before the surveyor attends the visit. 7. Goal section had not been included by the practitioners.

Element missing from current process	List of recommendations suggested by participant	Outcome of recommendation (numbers correspond with recommendations)
	8. Attend the first visit to persons 30-45 minutes before the surveyor, so that we have completed sub-phases 1 to 3 before moving on to phase 4.	8. See number 6
Sub-phase 4 The practitioners have different approaches to the way they analyse if the design of the modification will provide an effective solution.	9. Use a checklist of questions, based on the OTIPM (Fisher 2009), to ask yourself to ensure that you have considered all relevant concepts associated with designing a home modification that will improve the person's performance and participation in an occupation.	9. All practitioners reported they were using the professional reasoning tool for phase 4.

Sub-phase 5
 	
Practitioners report they are not consistent as to what they discuss with the person when describing the home modifications
 	
Practitioners are concerned that there are cases where a revisit is necessary to ensure the person has an understanding of the design intent, including aesthetics, and is able to give consent.
	10. For simple cases, agree with the surveyors the type of information that the person will need to know about the design of the modification by the time you leave the JSV e.g.
	
	   a. How long the adaptations will take to install
	
	   b. What it will look like
	
	   c. What choice of décor they have
	
	11. Develop, with the surveyors a catalogue of adaptations for the person to look at?
	
	12. Develop a set of criteria that will help you identify those persons where you think you need to go back and ensure that they fully understand what the modification includes/involves.
	
	13. Have an in-service training on the best way of
		10. The practitioners reported they now checks with the person if they have an understanding of what the modifications will look like.
		
		11. The surveyors have agreed to jointly develop a catalogue but there has not been opportunity to develop this.
		
		12. The practitioners had not had opportunity to use the professional reasoning tool developed for this recommendation.
		
		13. At the second group interview the practitioners were in the process of arranging their first session with surveyors – see next section for details

Element missing from current process	List of recommendations suggested by participant	Outcome of recommendation (numbers correspond with recommendations)
	communicating design information to persons so that we do this phase consistently and learn from each other?	
Sub-phase 6 Practitioners identified inconsistency amongst themselves as to what additional information they provide the surveyor which might facilitate the construction of the modification, for example, health and safety concerns for the person during the installation of the modification. Practitioners identified inconsistency amongst themselves as if they attend the pre-installation visit.	14. Practitioners to consider developing a health and safety form, that can be completed with the client, and which would highlight any issues there might be when the modification is being installed. This could also include what on-going support the client needs during the process? 15. Practitioners to consider discussing with the surveyors any additional standard information they might need from them prior to the work being started? If there is, then to add this on the measurement sheet. 16. Practitioners to ensure the person and contractor have got their contact details should this be needed in sub-phase 7. 17. Develop reasoning tool for when the OT needs to attend the onsite pre-installation meeting?	14. Practitioners were using the health and safety form and additional information that the surveyor or builder might need to know was being included on the measurement sheet the practitioners send to the surveyor following the first visit. 15. Practitioners had a discussion with the surveyors who believed that they were being provided with sufficient information. 16. Practitioners now ensure their contact details are included on the measurement sheet (which the builder always receives) 17. The practitioners had not had opportunity to use the professional reasoning tool developed for this recommendation.
Sub-phase 8 Practitioners identified that because they do not record the person's goals earlier in the process, they do not review them to see if these have been achieved.	18. Supplement your existing paper procedure with to include a review the goals. 19. Arrange regular in-service training, where you share what you have learnt during a particular case?	18. The practitioners have now included this question on the relevant paperwork. 19. The practitioners had arranged their first meeting to share case studies with each other - see next section for details.

Element missing from current process	List of recommendations suggested by participant	Outcome of recommendation (numbers correspond with recommendations)
Practitioners report they are good at giving each other daily peer support but they do not spend time sharing case studies and examples of what they have learnt from specific cases.		

Table 43 Table showing outcome from recommendations

Practitioners' perceptions of using the Home Modification Process Protocol

The practitioners highlighted that their perception of using the Home Modification Process Protocol, through adopting the recommendations, had been influenced by the limited time available to implement the changes. They reported that the limited time available meant they had not had the opportunity to work with an individual person through all the stages of the protocol, thus they had not had the opportunity to compare the difference the Home Modification Process Protocol has on an individual case, nor had they trialled the professional reasoning tools developed for recommendations 12 and 17. Furthermore, the limited time had restricted their ability to complete recommendations 11, 13, and 19, for example, they were in the process of arranging meetings with the surveyor to develop the catalogue of adaptations and to discuss with them the best approach to discuss home modification information with the person. They had also just set up to meet to have a peer session discussing case studies. Despite the time limitation, the practitioners were able to discuss the questions they had identified at the beginning of the research study and these will now be considered individually.

Has it helped us to understand our role in the design and construction process of home modifications?

As a group of practitioners, they reported that the Home Modification Process Protocol had improved their understanding of their role, as occupational therapists, in the design and construction of a home modification. In particular, P3 reported greater confidence in asking surveyors for advice or asking surveyors questions about the plans. P3 concluded that this was because she had a better understanding of why she needed to ask questions and she could now see that asking these questions were an important part of her role in ensuring that the person received the right modification. Being new to the team, P3 also reported how the protocol had given her a greater appreciation of her role in improving the people's health and well-being by being involved in the design of the modification. When P3 was asked if she perceived that the surveyors had noticed a difference in her approach, P3 did not feel they had but P2 believed they had because the practitioners were much more articulate about their role and in asking appropriate questions.

P1, as the professional lead for the practitioners, reported that the Home Modification Process Protocol had made her much more aware of the distinct role of occupational

therapists in this field of practice. She reported an incident where she had attended a meeting regarding the integration of occupational therapists in Adult Social Care with National Health Service (NHS) based occupational therapists. She had attended this meeting because the occupational therapists in the NHS were going to be recommending the provision home modifications. P1 had used the Home Modification Process Protocol to help her to articulate the skills and knowledge required when recommending home modifications, and she was now planning, with the occupational therapy manager for the NHS team, training around the first stages of the Home Modification Process Protocol.

Has it help us to collect the right information, at the right time, and to use the information in the right way?

For those visits that were being conducted with the surveyors they believed that their visits had become more productive because they were separately performing sub-phase 2 and 3 before involving the surveyor at sub-phase 4. On reflecting on the pre-study process, they had realised they were designing the modification without fully understanding what the person's performance issues were and what the person's goals were for the modification. By dividing the visit into the separate sub-phases, the practitioners reported when the surveyor arrived, they were able to fully focus on the design of the modification rather than having to clarify performance issues whilst in the middle of discussing the design. P1 and P2 were attending the visit 30 minutes before the surveyor arrived. However, P3 was still arriving with the surveyor but that the surveyor was sent to look around the house whilst she went through 1 – 3 sub phases with the person.

The practitioners had been provided with a glossary of terms used in the professional reasoning tools 2 and 4, yet there had been mixed opinion of how these tools had supported the collection and use of information during the process. P3 had found the professional reasoning tool had been useful for capturing what she observed the person doing when on the visit. She found this tool, in combination with the departmental assessment tool, saved her time when she got back to the office because she scanned in the sheets and then wrote a brief entry into the clinical notes. P1 had also found the tool a useful guide to what she should be documenting when observing a person's performance, so whilst she was not doing anything different, the tool was getting her to write down her observations, which she did not do prior to the study.

P1 and P3 found the professional reason designed for sub-phase 4 was particularly useful in providing a systematic approach to evaluating the plans sent to them by the surveyor. Although they did not use the form to document their professional reasoning, they reported that it was a useful checklist to ensure that they had considered the important aspects when reviewing the plans and another way of ensuring the design would meet the person's requirements. P3 reported that when writing her notes, she would document that she had used the tool to check her professional reasoning. P2 reported that she was not consistently using the tool but she was trying to get into the habit of using it.

P3 reported how being relative novice to this field of practice, she had found the sub-phase 2 and 4 professional reasoning tools, as well as the protocol in general, useful for checking that her professional reasoning was appropriate. She reported how she believed that this was helping her to build her confidence with working in this field of practice.

All the practitioners believed that they had become more effective at articulating the relevant information to the surveyors and because they were more aware of how the information from them impacts on the surveyor's role, they were now ensuring that the measurements sheets were fully completed, including adding their telephone numbers to this sheet, which eventually goes to the builders. Due to the time constraints of the study, it was difficult to establish what difference to the process this action had made.

Will it make us more occupation-centred?

P3 reported that for her one of the key benefits of using the Home Modification Process Protocol was that it was based on a conceptual model of practice. She reported since leaving college she was concerned that she was slowly losing her theoretical knowledge about what she did as an occupational therapist. For P2, the role of a conceptual model in her practice was not as important as she did not believe it make a significant difference to her role and the service she provided.

P1, P2, and P3 all reported that the Home Modification Process Protocol had placed the person at the centre of what they did. Although they had always thought of themselves as being person-centred, through the realisation that they did not ask the person the direct question as to what their goal for the home modification was, was a clear indication to them that they were not practicing in an occupation-centred way. Although none of the

practitioners had used the process fully with a person, P3 reported how she had started asking people on the evaluation visit, after the modification has been installed, if the modification had achieved the outcome they had wanted. One response from a relative had been very powerful. Although P3 had known the relative for a long period, it was the first time the relative had expressed how difficult their role had been prior to the installation of the modification and how the modification had improved their quality of life. P3 explained how "I felt like a human-being asking a question rather than just professional."

In general, the practitioner recognised that the Home Modification Process Protocol had supported them to be occupation-centred in their practice. However, they also identified that some of their desire to be occupation focused was outside of their control as they were working alongside colleagues and with information technology systems that did not appreciate the practitioner's professional and ethical need to practice in a more occupation-centred way.

Has it improved what we do?

The practitioners had difficulty answering this question because of the time limitation of the study which restricted the practitioners' ability to evaluate the Home Modification Process Protocol over a number of cases. The practitioners recognised that they were probably repeating elements of the assessment conducted previously by the social service occupational therapist. However, there was general agreement that the initial visit, with or without the surveyor, had gained more structure. They were no longer doing an 'assessment of need' but they were gaining a better insight into the person's occupational need, gaining a better understanding of what was impacting on the person's occupational performance, and identifying how the person wanted to use a home modification to achieve their goals and aspirations.

The practitioners also believed that, as a team of occupational therapists, they had a shared foundation, through the Home Modification Process Protocol, upon which their practice was now based. Interestingly, whilst P1, as the team leader, had wanted a process that all the practitioners would be content to work with, she had also been worried about it not accommodating the different practice styles of each practitioner. However, she reported

that the Home Modification Process Protocol provided a shared foundation for the team's practice as well as accommodating individual styles of practice.

What are the challenges of using the process protocol?

The practitioners identified a number of challenges of using the Home Modification Process Protocol in Practice.

Training: The practitioners felt that whilst the Home Modification Process Protocol was beneficial to their practice, training or a manual would likely be required to support other practitioners to audit their current practice and to identity the gaps in this practice. If the professional reasoning tool were a part of the process, again, training would be required to understand the OTIPM (Fisher, 2009) and the concepts contained within it.

Time: To have been able to fully evaluate all aspects of the Home Modification Process Protocol, the practitioners felt more time was needed to be able to embed the changes in to their practice. The practitioners identified how they went back to their old ways of working during busy periods as it was quicker not to have to think about the new ways of working.

Terminology: This relates to training but the practitioners found the language taken from conceptual models difficult to understand at first. However, once they became familiar with the terms and concepts they reported this became easier and the provision of the glossary assisted with this process. P1 raised the point that whilst on one hand the practitioners were trying to be more occupation-centred; by doing so they were potentially becoming less person-centred by the language used in their notes.

Information Technology System (IT): One of the major issues was the information technology system available to the practitioners. The main issue was the professional reasoning tools as these had to be scanned in to the person's file once completed. In other words, the tools could not be filled in through the IT platform used by housing. In the practitioners' opinion if the tools were available through the IT system this would make them more accessible to use.

7.6.2 Discussion

Through reviewing the use of the Home Modification Process Protocol over a four month period, there were mixed findings as to the success of its use in practice. Out of the 19

recommendations made, most of them were adopted into practice, with relatively little change to practice. Of the six recommendations that were partially adopted or not adopted, the issues for this appeared to have been due to the limited time available to embed the protocol into practice. This finding appears to support Boniface et al. (2012) who identified having the time to embed models into practice as being an important factor in the successful adoption of them into practice. Another issue was with the IT system, which highlights the issue of occupational therapists having to fit their occupational therapy process into a larger organisation's systems.

The most experienced practitioner had seen limited value of the process being based on a conceptual model and she had been challenged the most in terms of adopting the professional reasoning tools into practice; whereas the most novice practitioner had valued the use of a conceptual model and she described the confidence she gained from using the professional reasoning tools as they acted to affirm her decision making process. This finding again supports the literature that has identified novice practitioners gaining confidence when using a structured approach to their practice (DeBroc & Picken, 2015), whilst more experienced practitioners report less value in using the conceptual models in practice (O'Neal et al., 2007).

Through the scholarship of practice, the practitioners became familiar with the OTIPM (Fisher, 2009) and Home Modification Process Protocol. Through this relationship the practitioners reported they had gained an understanding of their role in the design and construction of home modifications, and the OTIPM (Fisher, 2009) and Home Modification Process Protocol had helped them to take on the values of the occupation-centred practice. Whilst at the same time, the relationship had enabled the researcher to identify what is required for the Home Modification Process Protocol to be adopted into practice.

7.7 Chapter Summary

The purpose of this third phase of the study was a proof of concept. The focus of the proof of concept was to establish if the Home Modification Process Protocol would enable the case study practitioners to better understand their role in the design and construction of a home modification. Additionally, to establish if the Protocol would enable a theory based occupational therapy process to be adopted in a practice setting. Finally, to establish if the

Protocol would encourage occupation-centred practice through the adaptation of the Home Modification Process Protocol.

From the findings, the case study practitioners reported they had a better understanding of their role in the home modification process. The practitioners' better understanding of their role was gained from them being supported to map their previous process on top of the Home Modification Process Protocol, as this gave them an awareness of how the occupational therapy process fitted in with the overall process being used within the department. For one of the practitioners, this better understanding of the occupational therapist's role in the design and construction of a modification had increased her confidence when working with the surveyors.

From the mapping process, 19 recommendations needed to be made so that the Home Modification Process Protocol could be adopted in practice. The majority of recommendations only required minor changes to practice. For example, the practitioners ensured that they completed the sub-phases to identify the occupational need, issues with occupational performance, and identified the goals for the modification before discussing the design of the modification with the person and surveyor. For five sub-phases, it was necessary to develop professional reasoning tools. The OTIPM (Fisher, 2009) was useful in developing these tools because it provided the concepts for structuring the professional reasoning tools. However, the successes in using these tools amongst the practitioners were mixed, which highlights that the adoption of the protocol requires time to embed the Protocol, and training for practitioners to become familiar with principles of the OTIPM (Fisher, 2009) and the concept of the Generic Design and Construction Process Protocol.

During the four month period, none of the practitioners had the opportunity to follow an individual case through the whole of the Home Modification Process, therefore establishing if they were more occupation-centred or if their practice was more challenging. Despite this, the practitioners indicted that the Protocol was encouraging them to conduct their professional practice differently in order that the older or disabled person remained at the centre of what the practitioner did during the process of modifying that person's home environment.

Chapter 8: Conclusions

8.1 Introduction

This chapter presents the conclusions from this PhD study. The chapter starts by presenting the main conclusions based on the aim and objectives of the research. Then the contribution to knowledge that the study has made to theory, methodology, and practice are reported. The challenges and limitations experienced during the research process are also stated. Finally, the opportunities for future research are provided.

8.2 Main Conclusion

Home modifications are a traditional area of practice for occupational therapists and a number of research studies, for example, Stark et al. (2010) and Hwang et al. (2011), have demonstrated the effectiveness of occupational therapists in providing this type of intervention. Furthermore, in England, the profession has played, and continues to play, an important role in the assessment and delivery of statutory funded home modifications through the health and social care system. However, despite the positive perception of the contribution which occupational therapists make to the process of delivering home modification services, a number of studies (Sapey, 1995; Pynoos et al., 1998; Heywood 2001; Sakellariou, 2015a & 2015b) have challenged this perception and raised concerns that an ineffective occupational therapy process and practice is contributing to inadequately designed home modifications.

When the design and construction industry in the UK was faced with similar criticisms of their practice in the 1980s and 1990s (Egan, 1998) the researchers from this industry responded by developing a design and construction process which made visible the practice involved in designing and constructing a building project. The processes did this by identifying the roles and responsibilities of professionals during the different phases of the design and construction of a building. Furthermore, the focus of the process ensured that the requirements of the end-users of the building remained central to all aspects of the design and construction process.

Literature has been published on the generic occupational therapy process, for example Fisher (2009) and Duncan (2011) have described the process and how it guides practitioners through the process of identifying, implementing, and measuring the

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effectiveness of interventions. However, this generic occupational therapy process applies to all aspects of practice, including the wide range of interventions practitioners provide. By contrast, the review of the literature for this PhD study has shown that very little research has been conducted to make visible the occupational therapy process and practice involved in delivering home modifications. Thus, given that occupational therapists use the principles of design and construction in interventions involving modifying the home environment in their everyday practice, although not explicit, and knowing that the design and construction industry has benefitted from making their processes more visible, the aim of this study was to develop an occupational therapy design and construction protocol for modifying home environments with the specific objectives being:

- To evaluate how the health and wellbeing of older people is affected by the process used to design and construct home modifications;

- To appraise the existing design and construction processes used by occupational therapists to determine the reasons for, and importance of, developing a new process model to improve professional practice;

- To develop an occupational therapy, design and construction process protocol specifically for home modifications;

- To test the proposed protocol in practice, and to critically evaluate the potential for the new process protocol to improve professional practice within the context of home modification.

8.2.1 To identify the factors that influence the current process used by occupational therapists when modifying the home environments of older and disabled people

This objective was achieved by reviewing the theoretical and research literature on home modification. The theoretical literature showed that the health and well-being of older and disabled people is affected by the design of the built environment. This is because when a person experiences changes in their *competence,* through the process of ageing or disability, the physical aspects of the home environment can be a barrier to the person participating or performing activities of daily living. The design and construction process can be used to improve the person's health and sense of well-being by removing or reducing the physical barriers and by doing this, the congruence between the person and their home environment is restored.

The process of designing and constructing a home modification is complex. This is because the issues that should be considered in the design of the modification are multifactorial, and the approach taken by the professionals during the process should ensure that the person is actively involved in all aspects of design and construction. The literature, for example, Tse (2005), Chase et al. (2012), Nord et al. (2009) and Pighill et al. (2011) clearly demonstrates that the occupational therapy profession is well placed to improve the health and well-being of older and disabled people by supporting the implementation of effective home modifications. Firstly, the profession has a belief (McColl, 2003; WFOT, 2016) that health and well-being is achieved through the doing of everyday activities. Secondly, the Person, Environment, Occupation conceptual models provide an effective and systematic way of evaluating the concepts that should be considered when assessing the transaction between the person in their environment performing activities of daily living and then when designing a home modification (Law, 1991). Finally, occupational therapy practice is based on the premise (Fisher, 2009) that it is only through working with a person (client), through a collaborative relationship, that interventions are effective.

However, a synthesis of the literature suggests that the home modifications process does not always deliver home modifications that improve health and well-being, and the issue appears to be the failure of practitioners to fully involve the person in the design and construction process (Sapey, 1995; Nocon & Pleace, 1998; Heywood, 2001 & 2005; Sakellariou, 2015a & 2015b). Furthermore, the design of modifications is often focused on improving safety and independence (Steward, 2000; Heywood, 2004) rather than other important factors, such as the value the person places on their home and the impact the modification will have on this, and the impact on other people living in the home environment (Heywood, 2004; Aplin, 2013).

The literature also suggests that improving health and well-being of older and disabled people is being impeded by the complexity and unsystematic nature of the design and construction of a modification (Adams, 1996; Pynoos et al., 1998), and that occupational therapists do not fully understand their role within the process (Klein, 1999; Pynoos et al., 2002). This problem appears to be compounded further by the regulatory, policy and funding influences on the practice of occupational therapists (Heywood, 2004; Bridges et al., 2007; Fange et al., 2012; Sakellariou, 2015a & 2015b).

Whilst the literature is critical of occupational therapy practice, individual practitioners cannot be held responsible for modifications that have failed to meet expectations because of the complexity of departmental processes and local policy decisions of what facilities can and cannot be provided. In other areas of occupational therapy practice, the profession has overcome this issue through the development of tools to support effective professional practice. These tools have included standardised assessments which support the use of conceptual models, (for example the Assessment of Motor Process Skills - Fisher and Bray 1999), and the development of practice guidance or protocols (for example, Upper Limb Treatment Protocol – Kuipers and Grice 2009), which guide how the intervention should be delivered. Therefore, it can be seen that the development of a Process Protocol is justifiable in order to support effective professional practice for interventions involving home modifications.

8.2.2 To appraise the existing design and construction processes used by occupational therapists to determine the reasons for, and importance of, developing a new process model to improve professional practice

This objective was achieved through Phase 1 of this PhD study by the analysis of an on-line questionnaire which was completed by 135 occupational therapists. The purpose of the questionnaire was to critically evaluate the process used by practitioners in the UK by making visible occupational therapy practice in the field of home modifications as well as to identify the value of developing a Home Modification Process Protocol. The findings from the questionnaire identified five key issues:

1. Despite the importance of conceptual models (Davis, 2006; Boniface, 2012) in supporting practitioners to understand why a person may have difficulty in performing an activity, and then using the concepts to assist in the design of the modification, the findings identified that the majority of respondents were not using a specific conceptual model to inform their practice.

2. In the literature, two references (Adams, 1996; Pynoos et al., 1998) were made to the complexity of the process and the findings from the questionnaire supported this. For example, the respondents collaborated with a wide range of professionals during the process and they collect and use a wide range of information when planning the intervention. However, no specific guidance has been developed on

the occupational therapist's role based on the concepts of the design and construction process.

3. The literature has also identified an issue with the unsystematic nature of the home modification process (Pynoos et al., 1998; Pynoos et al., 2002). Whilst it was not possible to establish if the process used by the practitioners was unsystematic, there was evidence of inconsistency as to the nature of the role of occupational therapists within the field of home modifications. A good example is that some respondents were involved in analysing if the design of the modification would address the person's needs and then discussing the modification plans with the person, however, other respondents were not involved in these elements of the process.

4. A criticism of occupational therapists in this field of practice has been their failure to involve the person in the design and construction process (Sapey, 1995; Pynoos et al., 1998; Heywood, 2001; Sakellariou, 2015a & 2015b) which potentially leads to the installation of modifications that have not addressed the person's health and well-being needs (Heywood, 2005; Iwarsson & Stahl, 2003; Bridges et al., 2007). From the findings of the questionnaire, it was evident that a minority of respondents were not involving the person in the control and choice over the final design of the modification.

5. The literature indicates that when designing a modification, the practitioner should consider a broad range of conceptual factors (Steward & Heywood, 2004; Aplin 2013; Stark et al., 2015). Whilst most respondents collected a broad range of data, it was noted that less data was collected about those concepts associated with the social impact of having a modification installed, as well as understanding the value and meaning the person places on their home. It was also evident that the majority of respondents were not using any standardised assessment or were using departmental designed tools, which tend to fit with the needs of the practice setting and not the needs of the occupational therapists delivering occupation-centred practice.

From the overall findings of the questionnaire, the need for a Home Modification Process Protocol was justified because protocols have been shown to improve the delivery of occupational therapy interventions for both novice and experienced practitioners (Kuipers & Grice, 2009). Additionally, if the protocol was based on the Generic Design and

Construction Process Protocol - GDCPP (Cooper et al., 1998), it would make evident and visible the role and responsibility of the practitioner in each phase of the modification process. Also, if based on the Occupational Therapy Intervention Process Model - OTIPM (Fisher, 2009), it would capture the values and concepts underpinning occupational practice as well as the occupational therapy process. Therefore, it can be seen that combining the principles of the GDCPP (Cooper et al., 1998) with the conceptual model and occupational therapy process of the OTIPM (Fisher, 2009) provides the opportunity to understand interventions involving home modifications as an occupational therapy design and construction process.

8.2.3 To develop an occupational therapy, design and construction process protocol specifically for home modifications

The purpose of Phase 2 of this PhD study was to develop a Home Modification Process Protocol by conceptualising the occupational therapy practice involved in home modifications as a design and construction process, and with data from the questionnaire data and guided by the OTIPM (Fisher, 2009). Firstly, it was possible to both visualise and describe this process. Whilst interventions involving home modifications can be described through the occupational therapy process, it was interesting to note that practitioners have an important role in planning the design of the intervention. Furthermore, the term *intervention implementation* better describes the involvement of the occupational therapist as they are not directly responsible for the installation of the intervention themselves. Thus, the term *intervention implementation* acknowledges that installing a home modification is a dynamic process and one which the practitioner works with building professionals to achieve.

Secondly, by using the occupational therapy process for home modifications, it was then possible to use the GDCPP (Cooper et al., 1998) to conceptualise the process as a home modification as four main phases, based on the OTIPM (Fisher, 2009) and 9 sub-phases based on the GDCPP (Cooper et al., 1998). Finally, using the principles of the GDCPP (Cooper et al., 1998) it was possible to create a framework for the protocol, and by using an iterative process it was possible to populate the content of this framework, which then became the Home Modification Process Protocol. This iterative process was an important part of developing the protocol because whilst it allowed the researcher to develop the content based on a conceptual model of practice, it also allowed for addressing the issues

identified in the literature, thus, the Home Modification Process Protocol potentially should:

1. Provide a systematic approach to the process of modifying the home of older and disabled people;

2. Ensure ethical and professional practice is followed by enabling occupational therapists to verbalise and visualise their role in the process of modifying the home;

3. Reduce the complexity of the current process by identifying the key questions, actions, and outcome of each phase, as well as the tools to support each phase;

4. Ensure that the person has choice and control through their involvement in all phases of the process;

5. Guide professional reasoning based on a conceptual model of practice;

6. Ensure consistency of occupational therapy practice by accommodating regional, legislative, and regulatory differences between practice settings;

7. Improve the effectiveness and efficiency of practice by ensuring practitioners collect the right information, at the right time;

8. Identify tools that support each phase;

9. Ensure that financial constraints, and other contextual issues within practice become a design consideration and not a barrier for accessing funding for a modification.

8.2.4 To test the proposed protocol, in practice and to critically evaluate the potential for the new process protocol to improve professional practice within the context of home modification implementation

The team of practitioners who trialled the use of the Home Modification Process Protocol over a four month period reported the following four benefits of using it in professional practice. Firstly, through mapping their existing process onto the Home Modification Process Protocol they reported a better understanding of their role as occupational therapists in the design and construction of a home modification. Secondly, they reported an increase in confidence when discussing issues with the building surveyors because they had a greater understanding of what and why they needed to discuss specific issues during the design and construction process. Thirdly, by having a greater understanding of each individual sub-phase of the process, particularly those sub-phases involved in the first face to face meeting with the person, they reported they were less likely to omit collecting

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important information, for example the person's goal for the modification, which is needed in the later sub-phases of the process. Fourthly, the Home Modification Process Protocol acted as an effective audit tool for identifying which sub-phases of the Protocol were missing and required enhancement in the practice setting. Through this audit, the practitioners and the researcher identified and developed professional reasoning tools to support practice.

However, testing the Home Modification Process Protocol through a case study research design drew attention to a number of potential challenges in implementing the Home Protocol in practice. Firstly, training is required so that those using the Protocol have an understanding of the concepts and terminology behind the OTIPM (Fisher, 2009) and GDCPP (Cooper et al., 1998). Secondly, whilst the Protocol is an effective audit tool this mapping exercise is complex because the occupational therapy process may be embedded in the overall organisation's process of delivering home modifications and as such it is necessary to *unpick* which elements are related to the occupational therapy process and which are not. Thirdly, whilst the Home Modification Process Protocol provides a way of visualising professional practice in the field of home modifications, the case study found that implementing the chances to incorporate the process in other similar practice settings might be challenging. For example, the information technology systems used in the practice setting that support the modification process may make it difficult to accommodate the necessary changes in order to implement the use of the protocol. Fourthly, more than one occupational therapy team can be involved in the home modification process and for the Protocol to be successful it requires collaboration between both teams. However, in this situation the Protocol makes it easier to identify which parts of the process each team is involved with and what information collected in the earlier sub-phases will be useful for those involved in the later stages. Therefore, it can be seen that whilst the practitioners involved in the case study reported benefits to their professional practice from using the Home Modification Process, there are also challenges with adopting this approach to practice.

8.3 Contribution to Theory

Currently, no single overarching theory explains the role of home modification as an intervention for supporting older and disabled people to remain living in their own home environment. Instead, a series of theories from the field of environmental gerontology,

occupational therapy, and the built environment provided a theoretical model to explain how the process of modifying the home environment contributes to health and well-being of older and disabled people. Figure 27 illustrates and shows, through the use of arrows, how theories from occupational therapy and built environment have contributed to the development of key theories in environment gerontology (for example, the Environmental Press model by Lawton and Nehemow, 1973). The model then illustrates, again with arrows, the contribution specific theories from occupational therapy (Fisher, 2009) and the built environment (Cooper et al., 1998) have made to the development of the Home Modification Process Protocol. Figure 27 also shows for the first time, how through this study, knowledge from the field of occupational therapy and design and construction is adding to the body of knowledge in environment gerontology by providing a theoretical framework for understanding the process required to modify the home environment of older and disabled people.
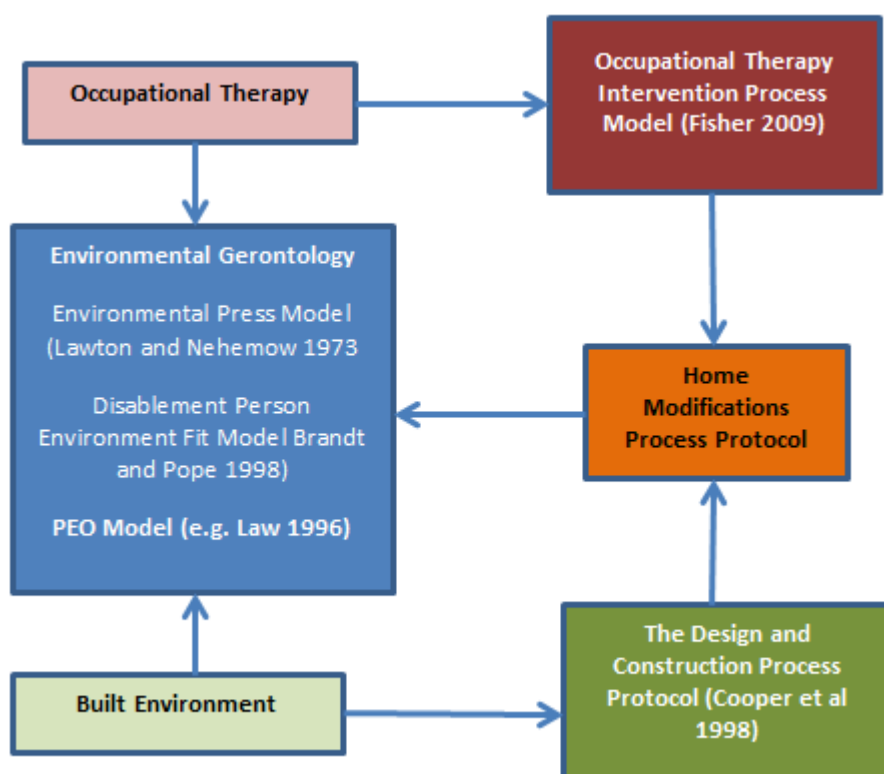

Figure 27 Theoretical Contribution to Knowledge

The OTIPM (Fisher, 2009) is a relatively new conceptual model within occupational therapy, and whilst it has been used significantly in the development of assessment tools (for example, the Assessment of Motor and Process Skills by Fisher and Bray, 1999), it has not been used significantly to influence practice in the field of home modifications. However,

unlike other PEO models, it shows promise in the field of practice because it shares concepts and phrases that are associated with design and construction. Within this PhD study, these concepts were useful when analysing the data from respondents to the questionnaire and when developing the professional reasoning tools used in the case study. Also, unlike other models, the OTIPM (Fisher, 2009) has a process framework that guides the occupational therapist through the key phases of the occupational therapy process by identifying key questions and decisions that occupational therapists have to make when delivering interventions. Again, the OTIPM (Fisher, 2009) process became useful when designing the Home Modification Process Protocol, particularly as it ensured the influence of the practice context was a key part of the practitioner's decision making process, rather than these factors being a barrier to the delivery of effective interventions. Therefore, this study has shown the value of the OTIPM (Fisher, 2009) in the field of home modifications as it provides practitioners with the concepts they need to understand their practice.

This PhD study has also provided definition of home modifications. By building upon existing definitions, as well as respondents' perception of the purpose of a home modification, the definition (stated below) has attempted to provide a multifaceted description of home modifications. It has extended previous definitions of home modifications (Stark, 2003; Bridges & Sanford, 2012; Seinfeld & Maisel, 2012) by explaining that home modifications can improve both health and well-being, since previous definitions have tended to focus on safety and independence. Similarly, as a definition, it describes the mechanism by which modifying the built aspects of the home environment improves health and well-being. Finally, unlike previous definitions, which focus on the benefits the person gains from having the home environment modified, this definition identifies that society also benefits from investing in home modifications.

> 'Home modifications improve functional health by enabling a person to safely and independently perform activities of daily living. Furthermore, a home modification improves well-being by giving the person choice and control over the activities they want, need, or have to participate in. A home modification does this by either reducing or removing architectural barriers in the environment, thus improving access to facilities in and around the home. Home modifications not only benefit the person but can directly benefit the carer or indirectly benefit society by reducing the costs of health and social care.'

8.4 Contribution to Methodology

This PhD study has contributed to methodology by showing the value of a pragmatic worldview of research (Feilzer, 2009). For example, by adopting a pragmatic worldview of research, the findings from this study support the argument that this approach to research generates tangible findings (the Home Modification Process Protocol) which helps provide solutions to problems practitioners experience in the real world (Barrett & Barrett, 2003; Feilzer, 2009; Morgan, 2009). Also, it was this pragmatic approach to research that allowed the researcher to adopt a flexible but logical and systematic method to address the aim and objectives of the study, which was particularly valuable when the aim changed following the initial analysis of the survey data.

A pragmatic worldview of research also supports the use of a scholarship of practice in phase 3 of this study. From the findings from the case study, this research adds to the growing body of knowledge which shows how scholarships of practice are a meaningful and effective way of reducing the gap between those who generate evidence and those who use it in professional practice (Forsyth et al., 2005; Kielhofner, 2005). This study has shown this by enabling the use of the Home Modification Process Protocol to be trialled in the reality of professional practice. Through the relationship developed between the practitioners and the researcher, it allowed the practitioners to be able to offer valuable and realistic feedback as to the value and challenges of using the Home Modification Process Protocol in practice. Additionally, through this feedback, the researcher has been able to identify future areas of research in order for the Home Modification Process Protocol to be implemented into wider practice; as such the case study practitioners were able to contribute to occupational therapy research thereby helping to bridge the gap between research and professional practice.

8.5 Contribution to Practice

Whilst research has been conducted in other countries on the practitioners' perception of their role within the home modifications process (Cowell & Bridges, 2007; Fange et al., 2012), it is the first time that the views of occupational therapists working in the field of home modifications in the UK have been recorded. Whilst the findings from this questionnaire have been discussed earlier in this chapter, it is interesting to note that the views expressed by the respondents are similar to those occupational therapists in Sweden

(Fange et al., 2012) and Australia (Cowell et al., 2007). Thus, it is hoped that the Home Modification Process Protocol would be of value to those practitioners practising outside of the UK.

Whilst home modification has been a traditional role within occupational therapy, it is the first time that the process used by occupational therapists when modifying the home has been described as an occupational therapy design and construction process. Through the development of the Home Modification Process Protocol, there is the potential to address the professional (Johansson et al., 2009; Clemson & Lever, 2014) and ethical need (COT, 2013; HCPC, 2016) for practitioners to better understand the intervention they are providing and to be able to express their role in the design and construction of a home modification.

This PhD study has also raised the question as to what the 'intervention' is within home modification practice. In the literature, the intervention appears to be the installed modification and outcome measures designed to evaluate the intervention tend to be focused on how the installed modification has improved the person's performance in the occupation. However, the findings from this PhD study have shown that each phase of the Protocol is important, because the outcomes from each phase can ultimately influence the final performance of, and, satisfaction with, the modification. Therefore, this raises the question as to whether or not the *home modification process* is what practitioners should be defining as their intervention. The researcher identifies the following possible advantages for the home modification process being the intervention:

• The intervention is evaluated in terms of how the process has improved the person's health and well-being;

• The practitioner has responsibility to be involved in all phases of the process, not just elements of it;

• If the intervention fails, then an audit of the home modification process enables the issue to be identified;

• Researchers are able to define which aspects of the intervention they are investigating;

• It becomes clear what tools are required, or should be developed, to support particular aspects of the home modification process.

The necessary skills and knowledge to design and construct a home modification are not taught in detail or depth at undergraduate level. Once qualified, there are training opportunities for practitioners but these tend to be based on the knowledge and skills required to design a particular type of modification; or how to design a modification for a particular health condition or disability. Through the case-study, it was evident from the feedback from the Lead practitioner that the Home Modification Process Protocol would provide a useful educational and training tool for occupational therapists coming into this area of practice. This is because the Home Modification Process Protocol not only describes the process involved in effective practice, but it also explains the role of the practitioner and identifies the knowledge and skills required at each phase of the process.

8.6 Challenges and Limitations

During the study, the researcher faced a number of challenges and limitations to the research process and the impact of these on the research is discussed in this section.

The first limitation is related to the design of the questionnaire. When the questionnaire was originally designed, it was not intended to generate data to develop a home modification for occupational therapists. Therefore, if developing a process had been the initial intention of the research, it would have been possible to include specific questions about respondents' concerns over the process they currently use; as well as asking questions regarding what would help the respondents overcome these issues.

The questionnaire was only completed by 135 occupational therapists, thus making it difficult to generalise the findings to a wider population. However, those who did complete the questionnaire represented the different places where practitioners work in this field of practice. As the researcher was interested in the collective responses from the respondents, this did not provide opportunity to compare the differences in responses based on the level of experience of the practitioners, and whether or not the respondents who currently use models of practice made a difference to the way they answered the other questions in the survey.

A second limitation of the study was the method used to recruit the case study site. Due to the time available, the team involved in the study were self-selecting. One of the reasons the team wanted to be involved in the research was their interest in using the Home Modification Process Protocol to develop and promote their role in their practice setting.

Thus, the researcher had been concerned that they would want a positive outcome from using the Protocol. However, through the scholarship of practice, the practitioners were honest about the challenges of using the Home Modification Process Protocol.

The researcher also acknowledges that this case study occupational therapy team was small, only four practitioners, and based in a housing team, where their role already appeared to be appreciated by their housing colleagues. Again, if the team had been larger and based in a social service team (where practitioners tend not to work directly alongside the housing professionals) then this could have provided a different outcome. However, given the financial resources available to the researcher, the time available to create a scholarship of practice, and to trial the Protocol, it appears that the chosen case study site was appropriate and it enabled realistic findings to be generated from the data.

A further challenge faced by the researcher was maintaining the scholarship of practice. The researcher was based 200 miles from the case study site and as such it was difficult to observe the daily impact of using the Home Modification Protocol over the four month trial. Although the researcher developed strategies to maintain contact with the practitioners, the practitioners did not feel that these strategies were necessary and did not appreciate the value the monthly reflection sheets and any e-mail communication would make to analysing the use of the protocol. Therefore, the researcher did not capture the weekly or monthly changes in the way the practitioners thought and experienced the use of the protocol during the 4 month implementation period.

As with professional practice, occupational therapy researchers have a professional and ethical duty to ensure older and disabled people are involved in research. Therefore, the researcher is aware that this was not achieved within this study. Nor did the researcher involve the surveyors and other housing professionals involved in this field of practice, and she is aware that their involvement could also have provided useful data in the development of the Home Modification Process Protocol. However, these decisions were made because of the limited time and financial resources available to the researcher.

8.7 Opportunities for Future Research

More research is now required to further develop and demonstrate the efficacy of using the Home Modification Process Protocol in wider practice. The following section discusses four areas where further research is necessary.

The Home Modification Process Protocol was developed to incorporate the regional and regulatory differences amongst practice settings. Therefore, a natural progression for this research is to analyse the use of the Home Modifications Process Protocol in these different practice settings. In particular, as the majority of the practitioners who use home modifications as an intervention work in local authority Social Care Services, a further study is needed to investigate the use of the Protocol in this setting. Additionally, a study should be conducted to investigate the value of using the Home Modification Process Protocol with individual, sole trading, independent practitioners. Research outside of the UK is also needed to compare the use of the Protocol in other countries.

Occupational therapists work alongside other housing professionals during the design and construction of a home modification. Therefore, it would be interesting to assess if the Home Modification Process Protocol would help them to better understand their role in the process of modifying a person's home. However, it is anticipated that to make the Home Modification Process Protocol multi-disciplinary it would require considerably more work to be done in order to determine how this could be achieved.

This PhD study has demonstrated the benefits of using the Home Modification Process in professional practice; further research is now needed to determine what the cost benefits are of using the Protocol in practice. Such analysis should include the cost benefits for the person, particularly comparing the satisfaction levels of people who experience the process without the use of the protocol and those who experience the process with the protocol. Also, because the Home Modification Process Protocol intends to improve the efficiency and effectiveness of the home modification process, it is necessary to analyse the financial cost benefits that should occur, again this would require a cost comparison of the process with and without the use of the Home Modification Process Protocol.

Given the limited guidance and resources available to student occupational therapists and novice practitioners on the home modification process, it would be interesting to assess the effects on professional reasoning skills from using the Home Modification Process Protocol as a teaching tool in this field of practice. This type of study should also help to identify the content of the training and materials needed to support the adoption of the Home Modification Process Protocol in wider practice.

Finally, in this discussion on future areas of research, from phase 1 of the study the findings from the questionnaire highlighted that a number of respondents wanted to be better able to analyse the person environment fit by using computer aided design technology. Whilst research is being conducted on the use of gaming and virtual reality software in discharge planning (Atwal et al., 2014; Money et al., 2015) it appears there is a paucity of research into how these tools can be used for analysing design layouts of home modifications. Thus, it would be interesting to investigate how this technology can be used to support the analysis of the person environment fit prior to the installation of the modification.

8.8 Final reflections

I came to this PhD with two decades of professional experience as a practising occupational therapist. In order to ensure the research process has been robust and thorough I have been mindful for the need to ensure that arguments made and conclusions drawn from the research process have not been influenced by assumptions made from my views as a practitioner, and in particular, the way I wanted the modification process to be. However, I also need to acknowledge that my experience as an occupational therapist has been invaluable to the research process in two important ways. Firstly, my knowledge of occupational therapy and the professional practice involved in the home modification system and process enabled me to systematically and coherently bring together the different strands of literature. By bringing together these strands, it was possible in Chapter 3 to explain and examine the current process used to modify the home environment. Secondly, during the third phase of the research, the building of a scholarship of practice was enhanced by the familiarity I had with the area of practice. My understanding of the work culture, systems, and terminology used by the participants helped me to gain their trust and to build a strong partnership between myself as the researcher, and them as practitioners. Thus, developing this scholarship of practice enabled me to gain insights into the data which would not necessarily have been possible without my prior experience. So, whilst I have learnt the importance of using supervision and reflection to challenge the assumptions and conclusions I am making as a researcher, I have also learnt to recognise the strengths that I bring as a practitioner to the research process.

This PhD study has developed the Home Modification Process Protocol which has the potential to improve professional practice of occupational therapists in delivering effective and meaningful home modifications, such that quality of life is enhanced for the person

requiring the intervention. The study was supported through a scholarship from the UK Engineering and Physical Sciences Research Council.

Appendix 1

RIBA Plan of Work (RIBA 2007)

RIBA ⚛ Outline Plan of Work 2007

Amended November 2008

The Outline Plan of Work organises the process of managing, and designing building projects and administering building contracts into a number of key Work Stages. The sequence or content of Work Stages may vary or they may overlap to suit the procurement method (see pages 2 and 3).

RIBA Work Stages			Description of key tasks	OGC Gateways
Preparation	A	**Appraisal**	Identification of client's needs and objectives, business case and possible constraints on development.	
			Preparation of feasibility studies and assessment of options to enable the client to decide whether to proceed.	**1** Business Justification
	B	**Design Brief**	Development of initial statement of requirements into the Design Brief by or on behalf of the client confirming key requirements and constraints. Identification of procurement method, procedures, organisational structure and range of consultants and others to be engaged for the project.	**2** Procurement strategy
Design	C	**Concept**	Implementation of Design Brief and preparation of additional data.	
			Preparation of Concept Design including outline proposals for structural and building services systems, outline specifications and preliminary cost plan.	
			Review of procurement route.	**3A** Design Brief and Concept Approval
	D	**Design Development**	Development of concept design to include structural and building services systems, updated outline specifications and cost plan.	
			Completion of Project Brief.	
			Application for detailed planning permission.	
	E	**Technical Design**	Preparation of technical design(s) and specifications, sufficient to co-ordinate components and elements of the project and *information for statutory standards and construction safety.*	**3B** Detailed Design Approval
Pre-Construction	F	**Production Information**	F1	Preparation of production information in sufficient detail to enable a tender or tenders to be obtained.	
				Application for statutory approvals.	
			F2	*Preparation of further information for construction required under the building contract.*	
	G	**Tender Documentation**	*Preparation and/or collation of tender documentation in sufficient detail to enable a tender or tenders to be obtained for the project.*	
	H	**Tender Action**	*Identification and evaluation of potential contractors and/or specialists for the project.*	
			Obtaining and appraising tenders; submission of recommendations to the client.	**3C** Investment decision
Construction	J	**Mobilisation**	Letting the building contract, appointing the contractor.	
			Issuing of information to the contractor.	
			Arranging site hand over to the contractor.	
	K	**Construction to Practical Completion**	Administration of the building contract to Practical Completion.	
			Provision to the contractor of further Information as and when reasonably required.	
			Review of information provided by contractors and specialists.	**4** Readiness for Service
Use	L	**Post Practical Completion**	L1	Administration of the building contract after Practical Completion and making final inspections.	
			L2	Assisting building user during initial occupation period.	
			L3	Review of project performance in use.	**5** Benefits evaluation

The activities in *italics* may be moved to suit project requirements, ie:
D   *Application for detailed planning approval;*
E   *Statutory standards and construction safety;*
F1 *Application for statutory approvals; and*
F2 *Further information for construction.*
G+H *Invitation and appraisal of tenders*

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Appendix 2

RIBA Plan of Works (2013)

Appendix 3

Generic Design and Construction Process Protocol (Cooper et al., 1998)

Appendix 4

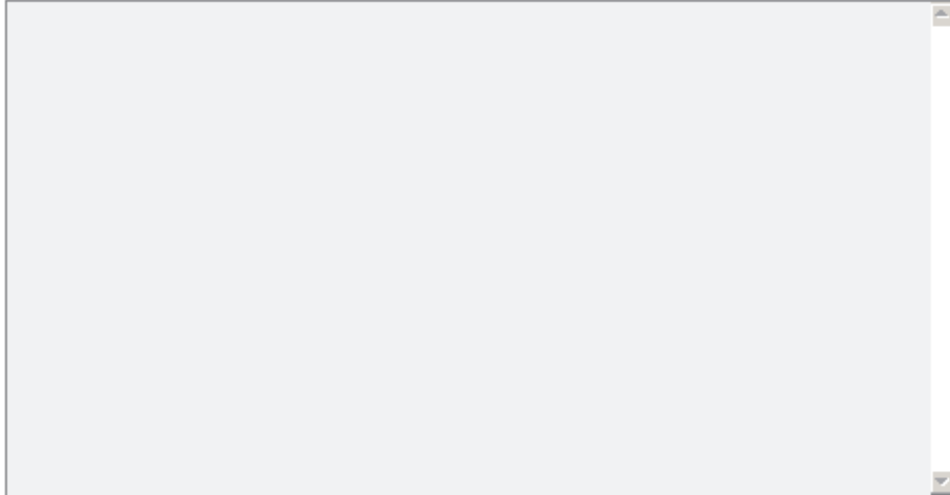## Standardised assessments used in home modifications

The following table lists the standardised assessments used in the field of home modifications and taken from De Jonge and Cordiner (2010). The assessments italics have been added by the researchers as they were developed post De Jonge and Cordiner (2010)

Occupational Performance	
Canadian Occupational Performance Measure	Baptiste, S., Carswell, A., McColl, M.A., Polatajko, H. and Pollock, N., 2014. Canadian occupational performance measure (COPM). Canadian Association of Occupational Therapists (CAOT).
Occupational Circumstances Assessment – Interview and Rating Scale (OCAIRS)	Forsyth, K., Deshpande, S., Kielhofner, G., Henriksson, C., Haglund, L., Olson, L., Skinner, S. and Kulkarni, S., 2005. The Occupational Circumstances Assessment Interview and Rating Scale. Version 4.0.
Occupational Self-Assessment	Baron, K., 2006. Occupational Self Assessment Version 2.2. Model of Human Occupation Clearinghouse.
Occupational Performance History Interview II (OPHI)	Kielhofner, G., Henry, A.D. and Walens, D., 1989. A user's guide to the occupational performance history interview. American Occupational Therapy Association, Incorporated.
Level of Independence	
Barthel	Mahoney, F.I., 1965. Functional evaluation: the Barthel index. Maryland state medical journal, 14, pp.61-65.
Functional Independence Measure (FIM)	Uniform Datat System for Medical Rehabilitatio. (1997). Functional Independence Measure (Version 5.1). Buffalo.
Katz index of Activities of Daily Living	Kalz, S., Ford, A.B. and Moskowitz, R.W., 1963. Studies of illness in the aged. The index of ADL: a standardized measure of biological and psychological function. JAMA, 185, pp.914-919.
Accessibility and Safety of the Environment	
Comprehensive Assessment and Solutions Process for Ageing Residents (CASPER)	Sanford, J., Pynoos, J., Tejral, A. and Browne, A. (2001). Development of a Comprehensive Assessment for Delivery of Home Modifications. Physical & Occupational Therapy In Geriatrics, 20(2), pp.43-55.
The Home Environment Assessment Protocol (HEAP)	Gitlin, L.N., Schinfeld, S., Winter, L., Corcoran, M., Boyce, A.A. and Hauck, W., 2002. Evaluating home environments of persons with dementia: interrater reliability and validity of the Home Environmental Assessment Protocol (HEAP). Disability and rehabilitation, 24(1-3), pp.59-71.
HOME FAST	Mackenzie, L., Byles, J. and Higginbotham, N., 2000. Designing the home falls and accidents screening tool (HOME FAST): selecting the items. The British Journal of Occupational Therapy, 63(6), pp.260-269.
Housing Enabler	Iwarsson, S. and Slaug, B., 2001. The Housing Enabler. An Instrument for Assessing and Analysing Accessibility Problems in Housing.
I-HOPE	Stark, S.L., Somerville, E.K. and Morris, J.C., 2010. In-home occupational performance evaluation (I–HOPE). American Journal of Occupational Therapy, 64(4), pp.580-589.
Usability in my Home (UIMH)	Fänge, A., 2002. Usability in my home. Manual.
Residential Environment Impact Scale (REIS)	Fisher, G., Forsyth. K.,Harrison. M.,Angarola. R.,Kayhan. E., Noga.P., Johnson. L., & Irvine. L. (2015. Residential Environment Impact Scale. USA: MOHO clearing House
SAFER	Oliver, R., Blathwayt, J., Brackley, C. and Tamaki, T., 1993. Development of the Safety Assessment of Function and the Environment for Rehabilitation (SAFER) tool. Canadian journal of occupational therapy, 60(2), pp.78-82.
SAFER-HOME v.2	Chiu, T. and Oliver, R., 2006. Factor analysis and construct validity of the SAFER-HOME. OTJR: Occupation, Participation and Health, 26(4), pp.132-142.
The Home Occupational Environment Assessment (HOEA)	Baum, C.M., & Edwards,m D. F. (1998) Guide for the home Occupational-Environmental Assessment. USA: Washington Unviersity.
Wesha	Clemson, L., 1997. Home fall hazards: a guide to identifying fall hazards in the homes of elderly people and an accompaniment to the assessment tool, the Westmead Home Safety Assessment (WeHSA). Co-ordinates Publications.

Appendix 5

3. What is the purpose of a housing modification - please describe?

4. As an occupational therapist, which theoretical model influences your practice.

○ Model of Human Occupation

○ KAWA Model

○ Person Environment Occupation Model

○ Person Environment Occupation Performance Model

○ Occupational Performance Model: Australia

○ Canadian Model of Occupation Performance

○ Other Model

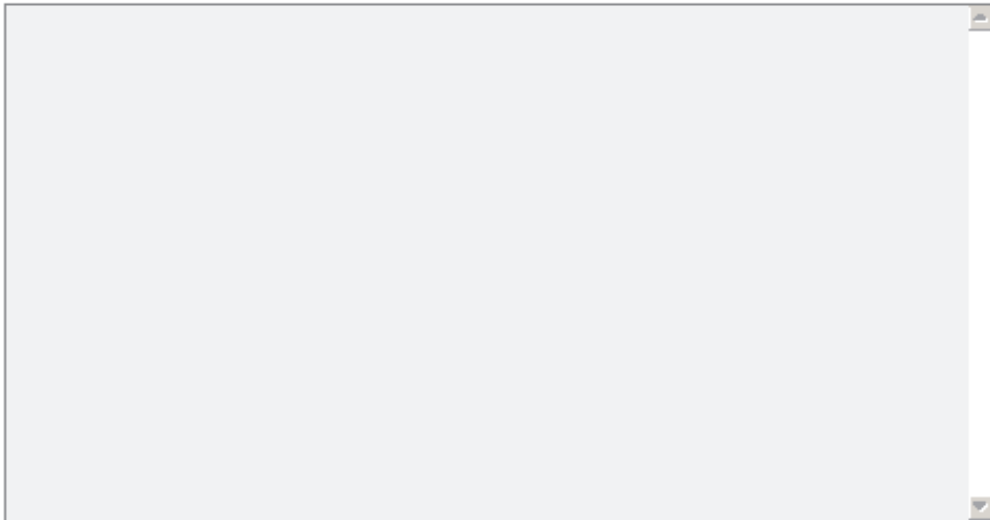○ My practice is not influence by a specific model of occupational therapy

If other, please specify

Occupational Therapy and Understanding the Design Process for

Designing bathroom modification

The following questions look at the process involved in the design of bathroom modifications.

A user refers to the person needing the housing modification.
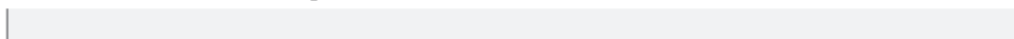
5. Briefly describe your role in the process of designing a bathroom modification.

[text box]

6. Which of the following statements best describes your use of assessment tools:

○ I routinely use a standardised assessment tool as part of the process of designing housing modifications (please indicate below the assessment tool used)

○ I routinely use a departmental designed assessment tool as part of the process of designing housing modification

○ I do not routinely use an assessment tool as part of the process of designing housing modification
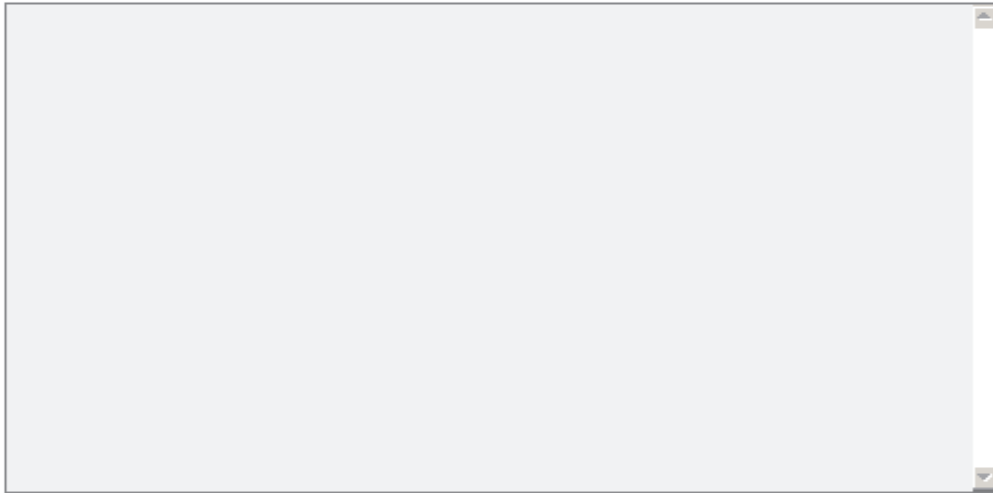
Which standardized assessment tool do you use?
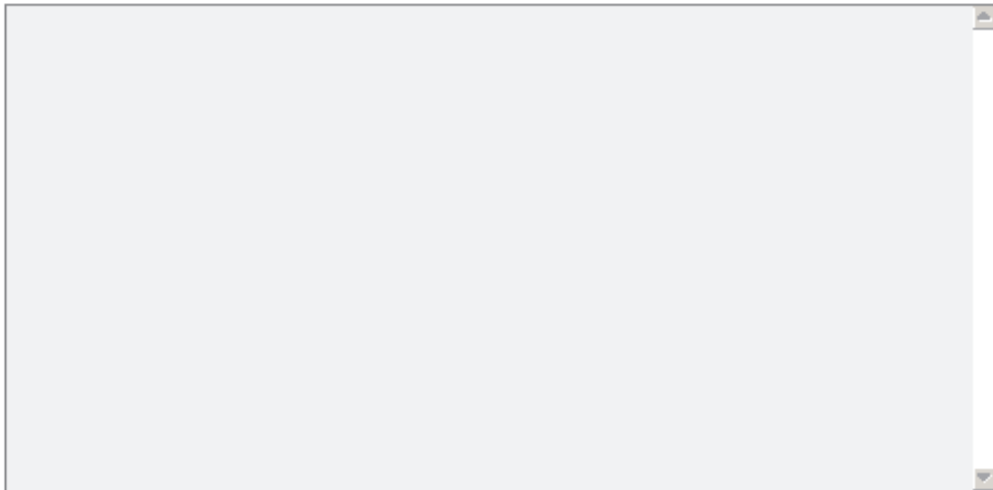
[text box]

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7. Please list the factors you would consider when choosing a wall mounted shower seat for a proposed bathroom modification.

8. Please list the factors you would consider when deciding upon the layout of the proposed bathroom modification.

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9. Please tick one response to each of the following statements.

	Always	Never	Sometimes if the case is complex	Sometimes if I have the time
I do a drawing of the original layout of the bathroom	○	○	○	○
I do a drawing of the proposed layout of the bathroom modification	○	○	○	○
Other professional have the responsibility for drawings the bathroom modification	○	○	○	○
I specify the space layout of the bathroom modification	○	○	○	○
I specify the products to be a part of the bathroom modification	○	○	○	○
It is my responsibility to ensure the final design proposal will meet the users requirements	○	○	○	○

10. Which of the following professionals do you routinely collaborate with during the process of designing a bathroom modification? Please indicate the method or methods you use to communicate.

	N/A	E-mail	Face to face	Telephone	Text	Letter	Report	Other
User	☐	☐	☐	☐	☐	☐	☐	☐
Informal carer	☐	☐	☐	☐	☐	☐	☐	☐
Relative of the user – not in same property	☐	☐	☐	☐	☐	☐	☐	☐
Relative of the user – at the same property	☐	☐	☐	☐	☐	☐	☐	☐
Home Care Manager/Worker	☐	☐	☐	☐	☐	☐	☐	☐
Social Worker	☐	☐	☐	☐	☐	☐	☐	☐
Physiotherapist	☐	☐	☐	☐	☐	☐	☐	☐
Clinical Supervisor	☐	☐	☐	☐	☐	☐	☐	☐
GP	☐	☐	☐	☐	☐	☐	☐	☐
DFG officer	☐	☐	☐	☐	☐	☐	☐	☐
Architect	☐	☐	☐	☐	☐	☐	☐	☐
Builder	☐	☐	☐	☐	☐	☐	☐	☐
Product manufacturer	☐	☐	☐	☐	☐	☐	☐	☐
Supplier/Product Representative	☐	☐	☐	☐	☐	☐	☐	☐

Please identify who else you collaborate with but who are not listed above. Please indicate communication method.

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11. Please indicate the types of information you routinely generate and/or collect during your involvment in designing housing modifications

☐ Assessment forms

☐ Case notes/clinical records

☐ 2D/3D CAD produced plans

☐ Specifications

☐ Hand drawn plans

☐ Reports for the user

☐ Report for grant application

☐ Report for architect/builder

☐ Supervision notes

☐ Quotes for products

☐ Letters

☐ E-mails

☐ Product information

Please list any other information not listed above.

[text box]

12. What tools do you use when drawing plans of a proposed bathroom modification (please tick all that apply)?

☐ I do not draw plans

☐ Paper and Pencil/Pen

☐ 2D Computer Aided Design tool

☐ 3D Computer Aided Design tool

☐ Please specify other design tools you use:

[text box]

13. Routinely, how do you discuss the proposed housing modification with the user? (Please tick all that apply)

☐ Show a 2D CAD drawings

☐ Show a 3D CAD drawing

☐ Give a verbal description of the modification

☐ Show them pictures/photographs of other housing modifications

☐ Show them catalogue pictures of products

☐ Take them to look at a completed bathroom modification (i.e. to a Disability Living Centre)

☐ Joint visit with a design/construction professional to give information

☐ This is done by another professional/agency

☐ None of the above

☐ Other: Please include what other methods you use

[text box]

14. Are users routinely given more than one design layout option to consider?

◯ Yes, if it is possible to give more than one option

◯ No

If no, what is the reason for this?

[text box]

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15. How do you evaluate/analyse the proposed design of the bathroom modification? (please tick all that apply)

- [ ] I use the 2D/3D plan drawings to evaluate the design
- [ ] I discuss the plan drawing with the clients to gain their feedback
- [ ] I discuss the plan drawing with other professionals to get their feedback
- [ ] I use my experience from doing bathroom modifications to help me evaluate the design
- [ ] I use published guidance documents to support my evaluation
- [ ] I use department guidance documents to support my evaluation
- [ ] This is not my role

Please indicate which guidance documents you use:

[text box]

16. Please think about the last 5 bathroom modifications you were involved in designing.

Now list up to 10 factors you considered when analysing whether the design would support the user's occupational performance (e.g. Checked on the plans the door was wide enough for the user's wheelchair to fit through)

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

17. When a user or their carer have not been happy with a completed bathroom modification you have been involved with, can you identify the cause of this. (Please tick all that apply)

☐ I rarely get feedback after I am involved in a bathroom modification

☐ The look/aesthetics of the modification

☐ The modification did not meet the user's/client's needs

☐ The workmanship

☐ The modification was not what the user/carer was expecting

☐ My recommendations/specifications were not followed by the builder

☐ My recommendations/specification were not followed by other professional involved in the process

☐ Other (please specify)

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Occupational Therapy and Understanding the Design Process for

Information you collect and feel is important

The follow questions explore the information you feel is important and you collect during the process of designing bathroom modifications.

18. Please tick the information you routinely collect about the person when designing bathroom modifications.

- [ ] Height of the user
- [ ] Weight of the user
- [ ] Width of the user
- [ ] Transfer ability (bath/toilet/shower)
- [ ] Functional or medical need to maintain body temperature
- [ ] Reach in sitting and standing
- [ ] Range of movement in upper and lower limb joints
- [ ] Range of movement in trunk
- [ ] Range of movement in neck
- [ ] Standing and sitting balance
- [ ] Standing and sitting tolerance/staying
- [ ] Sitting tolerance/staying
- [ ] Dexterity and grasp
- [ ] Pressure care requirements
- [ ] Hearing ability
- [ ] Visual ability
- [ ] Cognitive ability
- [ ] Prognosis of medical condition
- [ ] Prognosis of functional abilities
- [ ] Problem solving skills
- [ ] Ability to make own decisions
- [ ] None of these
- [ ] Please list any other information you routinely collect about the person

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19. Please tick the information you routinely collect about the user and the occupation they perform when designing bathroom modifications. (Please tick all that apply)

- [ ] Circulation space required for mobility aids
- [ ] Circulation space required for moving and handling equipment
- [ ] Risk to the user's safety when performing the occupation
- [ ] Risk to the carer's safety when performing the occupation
- [ ] Type of equipment used during occupation (e.g. perching stool mobility aids, shower seat)
- [ ] Type of assistance the user requires from a carer
- [ ] Space the user requires to perform a specific activity
- [ ] Space the carer requires to assist with a specific activity
- [ ] Where each aspect of the occupation is performed (i.e. if bath transfers is the issue, do you routinely collect information of where the user gets dressed?)
- [ ] How habits impact on occupation
- [ ] How rituals impact on the occupation
- [ ] How cultural requirements impact on the occupation
- [ ] Time and frequency occupation is performed
- [ ] Needs of other users of the bathroom
- [ ] Resources or tools needed whilst performing the occupation or activity (i.e. shampoo/creams)
- [ ] None of these
- [ ] Please list any other information you routinely collect about the occupation

[text box]

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20. Please indicate the information you routinely collect about the bathroom environment.

- [ ] Dimensions of room
- [ ] Structure of the floor
- [ ] Structure of the walls
- [ ] Existing floor covering
- [ ] Door width
- [ ] Window dimension
- [ ] Type of glass in window
- [ ] Size of sink
- [ ] Position of sink
- [ ] Height of floor to underside of sink
- [ ] Type of taps
- [ ] Size of bath
- [ ] Position of bath
- [ ] Size of shower cubicle
- [ ] Position of shower cubicle
- [ ] Height of shower tray
- [ ] Position/entry/exit of wall pipe
- [ ] Position/entry/exit of waste pipe from sink/bath
- [ ] Ventilation present
- [ ] Lighting levels
- [ ] Position of light switch
- [ ] Height of toilet
- [ ] Style of toilet flush
- [ ] None of the information
- [ ] Please list any other information you routinely collect about the environment

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Occupational Therapy and Understanding the Design Process for

Finally, general questions on your thoughts on the design of bathroom modi...

Thank you for getting this far.

The final two questions focus on your general thoughts on the design of bathroom modification.

21. Please indicate how you feel about the following statements.

	Strongly Agree	Agree	neither agree or disagree	disagree	Strongly disagree
I feel confident with the process I use when involved in the design of the bathroom modifications	O	O	O	O	O
I feel the process I use enables me to analyse if the proposed design meets the user's requirements	O	O	O	O	O
I feel a 3D model of the proposed bathroom modification would help me analyse the design	O	O	O	O	O
I feel confident the user always has a good understanding of the bathroom modification they will be getting	O	O	O	O	O
I am confident knowing how the existing construction of the bathroom potentially impacts on how the bathroom can be modified to meet the user's requirements	O	O	O	O	O
I feel I collaborate effectively with the other professionals involved in the design of the bathroom modification	O	O	O	O	O
The assessment forms I routinely use prompts me to collect all the required information I need during the process of designing a bathroom modification	O	O	O	O	O
Users fully understand the role of occupational therapist in the design of the bathroom modification	O	O	O	O	O
I feel confident in explaining to others my role in the design of bathroom modification	O	O	O	O	O
Other professionals involved in the design of bathroom modifications understand the role of the occupational therapist	O	O	O	O	O
I have a good understanding of the occupational therapy theory behind the design of housing modifications	O	O	O	O	O
I don't use an OT model/theory because existing the theories do not fit with housing modification work	O	O	O	O	O

22. Please describe 3 things you would change to improve the way you currently design bathroom modifications?

1. _____
2. _____
3. _____

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Appendix 6

Ethics forms and ethics approval

Information leaflet for case study participants
Information letter to case study employer
Ethical Approval for Phase 1
Ethical Approval for Phase 3

Proof of Concept of the Process Protocol for Home Modifications
Information Leaflet for Participants

Who Am I

My name is Rachel Russell. I am a PhD Candidate and Occupational Therapist based with the SURFACE research centre at the University of Salford. My interest is in occupational therapy involvement in the home modification process.

I need your help with the research I am conducting. From the earlier part of my research, I have developed a process for occupational therapist to use to support their practice when modifying home environments. I now need to find out if the process works in clinical practice. Your organisation has agreed to be used as a case study site, and for me to approach you for your consent to participate in the study.

What is involved in the study?

Your involvement will help me to try out the process protocol. I would like you to take part in 2 focus group sessions with your other colleagues.

In the first focus group, I will be asking questions about:

- The process you currently use when modifying home environments
- What you find good and not so good about the process
- How you would like to evaluate how my process

The second focus group will be asking questions about:
- What difference the process made to your practice
- What was good and not so good about the process
- What you think needs to be changed about the process.

I anticipate that each focus group will take about 2 hours to do.

1

Headed paper was used

Date

Dear *(title of appropriate person)*

I am a PhD Candidate undertaking research at the University of Salford. I am undertaking a research study titled: "The proof of concept of a process protocol for home modifications". The purpose of the study is to establish if the use of a process protocol will support the practice of Occupational Therapists involved in home modifications.

Prior to undertaking the study, I need your agreement and consent to approach the following individuals (*the individual OT's within the Housing Team will be named)* within your organisation to take part in the study. I will recruit these individuals to the study by using an information sheet. Prior to their participation, individuals will complete an informed consent form.

I will make every effort to ensure the study does not disrupt the working environment. Data collected will remain confidential, including the location and name of your organisation. I have gained ethical approval for this study from the University of Salford, College of College of Science and Technology research and Governance and Ethics Committee.

My research is supervised by Professor Marcus Ormerod and Rita Newton. Should you have any further queries please do not hesitate to contact me.

Yours Sincerely

Rachel Russell MSc
PhD Candidate
University of Salford

Academic Audit and Governance Committee

College of Science and Technology Research Ethics Panel (CST)

University of **Salford** MANCHESTER

To	**Rachel Russell and Rita Newton**
cc:	**Prof Mike Kagioglou, Head of School of SOBE**
From	**Nathalie Audren Howarth, College Research Support Officer**

MEMORANDUM

Date   3rd **December 2012**

Subject: **Approval of your Project by CST**

Project Title: **Understanding the process Occupational Therapists use when designing housing modifications**

REP Reference: **CST 12/45**

Following your responses to the Panel's queries, based on the information you provided, I can confirm that they have no objections on ethical grounds to your project.

If there are any changes to the project and/or its methodology, please inform the Panel as soon as possible.

Regards,

Nathalie Audren Howarth
College Research Support Officer

Academic Audit and Governance Committee

College of Science and Technology Research Ethics Panel (CST)

University of
Salford
MANCHESTER

To	**Rachel Russell and (Rita Newton and Marcus Ormerod)**
cc:	**Prof Charles Egbu, Acting Head of School of SOBE**
From	**Nathalie Audren Howarth, College Research Support Officer**

MEMORANDUM

Date   **14 March 2014**

Subject: **Approval of your Project by CST**

Project Title: **Proof of Concept of the Process Protocol for Home Modifications**

REP Reference: **CST 14/08**

Following your responses to the Panel's queries, based on the information you provided, I can confirm that they have no objections on ethical grounds to your project.

If there are any changes to the project and/or its methodology, please inform the Panel as soon as possible.

Regards,

Nathalie Audren Howarth
College Research Support Officer

Appendix 7

Focus Group Questions Session 1

Question Type	Purpose
Opening	Participants get acquainted and feel connected
Introductory	Begins discussion of topic
Transition	Moves seamlessly into key questions
Key	Obtains insight on areas of central concern in the study
Ending	Helps Researcher determine where to place emphasis and brings closure to the discussion

Krueger (1998)

5 minutes at start of session to discuss rules/roles/ethics

1 **Introductory questions**

   1. What do you see your role is in the design and construction process of home modifications?
     (7 minutes)

2 **Transition Questions**

   2. When you do a home modification, how do you know when the process has gone well, what are the factors that have played a role? *(flip chart)*
     (10 minutes)

3 **Key Questions**

   3. Using the cases you've got in mind; can you walk me through the steps that got your from the start to the end of the process *(roll of wall of paper to capture information as a process)*

     3.1. Probe/listen for

       3.1.1. Referral
       3.1.2. Assessment of client
       3.1.3. Assessment form
       3.1.4. AHA follow-up visit
       3.1.5. Summary of assessed needs form
       3.1.6. Eligibility criteria
       3.1.7. Specification forms (shower/bathing)
       3.1.8. AHA report
       3.1.9. Eligibility criteria*)*

4. Who are the key people that are involved in the process with you and where do they fit in with the journey? *(No props)*
   4.1. Probe/listen for
      4.1.1. Clients prioritise
      4.1.2. Identifying needs (essential/desirable)
      4.1.3. Carers needs

5. Looking at this process, where does it work well?
   5.1. Probe/listen for
      5.1.1. Communication
      5.1.2. Collaboration
      5.1.3. Understanding the issues
      5.1.4. Why do you think it works well?

6. What parts of the process do you think don't work so well? *(flip chart)*
   6.1. Probe/listen for
      6.1.1. Clients prioritise
      6.1.2. Option appraisal
      6.1.3. Communication
      6.1.4. Collaboration
      6.1.5. Why don't you think it works well?

7. Do you think your process is occupation-focused?
   7.1. Probe/listen for
      7.1.1. Case load pressures
      7.1.2. Eligibility criteria
      7.1.3. Expectations of clients/carers/significant others
      7.1.4. Communication barriers with AHA
      7.1.5. Essential need/desirable
   (55 minutes)

4 **Ending Questions:**
   Summarise main findings. Discuss the Process Protocol for Home Modification and implementing it into practice (PowerPoint presentation)
8. Thinking about all that we've discussed and the purpose of the Process Protocol for Home Modification, what do we need to do to adopt it?
   8.1. Take each phase and discuss

9. How do you think we can evaluate the impact it has had on your practice?
   (10 minutes

Focus Group Questions – Session 2

Question Type	Purpose
Opening	Participants get acquainted and feel connected
Introductory	Begins discussion of topic
Transition	Moves seamlessly into key questions
Key	Obtains insight on areas of central concern in the study
Ending	Helps Researcher determine where to place emphasis and brings closure to the discussion

Introductory questions

1. What impact did the first focus group have on your practice   (10 minutes)

Transition Questions

2. How have you used the Home Modification Process Protocol, can you state two positive and two negative things about the tool? (ensure each participants answers)
(20 minutes)

Key Questions

3. What difference has it made to your understanding of the home modification process?
Probe/listen for:

      3.1.1.   Holistic
      3.1.2.   Communication
      3.1.3.   Understanding information needed
      3.1.4.   Collaboration

(15minutes)

4. Think about those key indicators we planned to measure, what difference has the process protocol made compared with the old process
   4.1. Probe/listen for
      4.1.1.   Communication]
      4.1.2.   Collecting information at the right time
      4.1.3.   Effective use of time
      4.1.4.   Collaboration
      4.1.5.   Option appraisal
      4.1.6.   Client centred

(30 – 40 minutes)

5. What difference has it made to the outcome of what you do?
(20 minutes)

6. What changes do you think there needs to the process protocol?
(15 minutes)

Ending Questions:
7. What next?

Appendix 8

Code Book – Assessment pages 1 - 5

Code Book - Assessment Phase

Name	Coded Text	Reference Number
Assessment Phase		
	Need to take into account means of mobility, circulation space required, functional ability and needs of other family members	1
	Assessing with the person what their needs are in relation to home environment	2
	Assessing with the person what their needs are in relation to home environment	3
	Assessment of need within legislative framework and LA criteria	4
	Assessment of need within legislative framework and LA criteria	5
	Thorough assessment of persons abilities and limitations including understanding of any possible prognosis of condition / progression of disability. A through understanding of persons aspirations and their needs / wishes	6
	A through understanding of persons aspirations and their needs / wishes	7
	A through understanding of persons aspirations and their needs / wishes	8
	Following a functional assessment of needs my role is to design and plan the layout and facilities in the bathroom to meet the individual's current to long term needs.	9
	Following a functional assessment of needs	10
	Assessment of need, including all the usual background, health and social information; functional assessment and demonstration in the bathroom of current abilities; assessment with equipment.	11
	health and social information	12
	functional assessment and demonstration in the bathroom of current abilities; assessment with equipment	13
	functional assessment and demonstration in the bathroom of current abilities; assessment with equipment	14
	Application of eligibility criteria (i.e. eligibility for a service: FACS) and consideration of local OT guidance (guidance matches disability and risk to choice of adaptation or equipment taking into account need and cost and various other considerations e.g. developmental needs, family circumstances, prognosis etc	15
	Application of eligibility criteria (i.e. eligibility for a service: FACS) and consideration of local OT guidance (guidance matches disability and risk to choice of adaptation or equipment taking into account need and cost and various other considerations e.g. developmental needs, family circumstances, prognosis etc)	16
	OT Assessment	17
	OT Assessment	18

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Appendix 9

Code Book Sub-Phase 8

Code Book Sub-Phase 8

Coded Text	Reference Number
Notification to surveyor/budget holder that payment can be made to contractor (although build quality, technical aspects require surveyor to sign-off).	1
OTs follow up on completed works	2
and then sign it off on completion so builder gets paid.	3
Follow up of provision once in place.	4
checking completed work where time allows - or telephone check in some cases.	5
OT review.	6
Sign of work when complete.	7
FOllowup to check suitability	8
Review the modification within the whole environment	9

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Appendix 10

Process Protocol

Appendix 11

Case study: Forms used in practice

Housing Assessment Form - Full

HOUSING OCCUPATIONAL THERAPY ASSESSMENT	

Name of client:	
Address:	
Home number:	
Mobile number:	
Contact person: **(if not client, relationship to client)**	
Date of birth:	
Other people present:	
Date of assessment:	
Housing OT:	

Medical Information
Diagnosis / Past Treatment:
Medical Treatment:

GP:	Address:
Consultant:	Department/Hospital:

Environmental - Social
Home Situation – family / informal carers:

Other agencies providing support		Details of input (name, frequency)
Care Manager		
Home Care / Care Agency		

Meals on Wheels		
District Nurse		
Physiotherapist		
Community Alarm		
Day Centre		
Other		

Environment – physical – accommodation

Accommodation:

RBG:	
RSL/HA:	
Privately rented:	
Owner Occupier:	

Address / tel.no. of landlord / Housing Assoc.

Type of accommodation:

House	
Flat	
Maisonette	

Bungalow		
General layout **(Space, thresholds, sketch)**		
Access:		
Stairs:		
Bathroom:		

D = Discussed	1 = Independent	3 = Dependent on

						someone
A = Assessed		2 = Independent with difficulty				4 = Unable

Occupational Performance Areas – Functional Assessment – Personal ADL

MOBILITY	D	A	1	2	3	4	
Indoors							
Outdoors							
Stairs							
Steps							
SEATING							
Chair Transfers							
Wheelchair							
Maint' posture							
BED							
Transfers							
Adjusting position							
TOILETING							
Transfers							
Hygiene							

KEEPING CLEAN Strip wash							
Bathing							
Showering							
Operating Taps							
Dressing							
Grooming / Shaving							
NUTRITION							
Eating							
Drinking							
DOMESTIC ADL							
Meal / drink prep							
Carrying items							
Housework							
Shopping/ pension							
Door entry							
Plugs / switches							
Heating							

Environmental – Cultural

Financial Situation

State Pension		DLA		Independent Living Allow.	
Private Pension		Care component		Invalid Care Allowance	
Income Support		Mobility component		Blue Badge	
Housing Benefit		Attendance Allowance			
Council Tax benefit		Mobility Allowance		ADVICE REQUIRED	

Leisure

Work

Performance Components/Skills:

Sensory: (sight, hearing, perception)

Motor: (ROM, strength, balance, co-ordination, dexterity)

Cognitive: (memory, orientation, problem solving, judgement of risk)

Psychosocial: (mood, motivation, self-esteem, roles)

Other relevant information:

Housing Assessment Form - short

Name	Address

Area of Concern (Details of problems being experienced in ADL)

Relevant Medical Information

Performance Skills (mobility, strength, sensory , cognitive ……..)

Environment (Social support, accommodation, equipment ….)

Any Other Information

Housing OT: **Date** ………………………

Home Modification Evaluation Form

<u>**Client name:**</u>

<u>**Client address:**</u>

<u>**Date of assessment:**</u>

- **Equipment / Adaptations being checked:**

- **Has there been a change of circumstances since the adaptation / equipment was provided?**

- **Is the client satisfied with the adaptation / equipment?**

- **When is it used? How is it used? Is assistance required? By whom?**

- **Is anyone else in the household using the adaptation / equipment? If so, are they having any difficulties?**

- **Any reported problems with maintenance or repair?**

- **Is the adaptation / equipment as requested by OT?**

- **Is the adaptation / equipment being used safely and appropriately? Is it meeting the need for which it was prescribed?**

- **Details of any adjustments made, advice given or issues arising from questions above**

- **Has the installation work been completed satisfactorily? Any minor issues unresolved at closure?**

Appendix 12

Phase 2 and 4 Explanation sheet for professional reasoning tools

The Occupational Therapy Intervention Process Model is the theoretical framework the Home Modifications Process Protocol is based on (Fisher, 2009). The tools that we have developed together take their concepts from this model.

Below is a brief description of what the terms mean and include. Please contact me if you need further guidance of clarification.

Glossary of terms for Phase 2 and 4 Clinical Reasoning Tool

Potential built environment requirements: This section asks you to think about the type of attributes the space, products, devices, and product/device interfaces the person will need. This information will help you to inform the surveyor as to what is required in the design of the modification. You will base the person's requirements upon the actions they were observed to perform and did not perform effectively, and the other PET factors you will discuss with the person(s) . Attributes include:

- Naming the type of products/devices required to perform the task: Such as, toilet, washbasin, and hoist (not the brand of product/device).
- Indicating the spacial features required to perform the task: Such as, position of tools/devices in the space, including the position of products/devices in relation to one another. Space needed to perform the actions within the task. Attributes will include measurements such as, heights, widths, length, and area.
- Indicating the type of features the person(s) requires to operate the tool/device interface: Such as low friction shower door, touch sensitive taps, motions sensor lighting.
- Indicating ambient conditions the person(s) requires to complete the task: Such as temperature, lighting, acoustics.

Tool: Tools are the products and devices the person needs to use to perform the task. Tools include both specialist and non-specialist products and devices, from through floor lift to a washbasin.

Tool interface: The interface is the element of the tool the person interacts with when operating or using the tool/device, for example the flush handle on the toilet.

Objects: These are the items the person uses as part of the task but are not tool/devices that support motor, process, or sensory skills. For example, shampoo bottle.

Person(s): Where appropriate, also includes the constellation of people involved in the person's situation.

Issues with motor skills/Issues with process skills: These are skill components you will observe the person complete. You will observe these when the person performs the actions

within the task. If it is not appropriate to observe the actions, then you will need to discuss with the person(s) the cause of the performance deficit. Your direct/indirect observations of the skills the person does and does not perform, will influence the requirements for space layout, choice of tools, and tool interface.

Issues with the person(s) routine
Issues related to persons beliefs regarding space, tools and other materials
Issues related to other users of the home environment; Issues related to the existing built environment:
The above are aspects of the transaction between the person and their environment. You will not directly observe these and will need to discuss with the person(s) how they influence the requirements for space layout, choice of tools and the tool interface.

PET: Person, Environment, Task

Analysing the design has the right fit: Will the design solution provide the requirements the person needs to perform the tasks involved in the occupation**.**

Issues with motor skills:	
Moving self	Includes problems related to the person's transfers and mobility.
Body positions task is performed in	Includes problems related to sitting/standing balance when performing task. Issues related to adopting a position that allows efficient movement of the arms.
Obtaining and holding tools/objects used in the task	Includes problems related to reaching, bending, gripping, manipulating or co-ordination of more than two body parts together.
Moving tools and objects used in the task	Includes problems related to moving, lifting, or transporting tools or objects that are used in the task. Also includes if the person has difficulty with the force, speed, or extent of movement needed to interact with a tool or object. Also includes, issues related to the quality of moving the tools or objects, for example jerky arm movement.
Sustaining performance (This has elements of a motor and process skill)	Includes ability to pace the task and if the person has the endurance to the complete the task. Also includes that they are able to maintain attention on the task and achieve the goal-directed actions.
Issues with process skills	
Organising space and objects	Includes problems related to how the person organises the space (too cluttered), or if the person has difficulty searching and locating objects. Also includes if the person know where put back the tools and objects where they originally came from. Also includes that the person has an awareness of their environment that enables them to manoeuvre around the environment without undesirable contact with tools or objects.
Temporal organisation	Includes problems associated with the person starting or beginning the next action or step in a task. Also, once they begin an action are they able to continue it. Are they able to sequence the task correctly? And do they appropriately complete each action of the task appropriately, for example they do not terminate the action too soon, or persist in an action.
Applying knowledge	Includes problems related to choosing the right tools and objects to complete the task. Do they know how to use the tools and objects appropriately? Are they able to handle the tools and objects appropriately? Do they seek information to operate tools or device when they have been orientated to the environment?
Adapting performance	Includes problems related to the person does not noticing or

	responding to an unexpected event in the environment. Also, does the person have problems adjusting their behaviour to anticipated events in the task or unexpected events.

Issues with other Person Factors and Body Function

Features of the condition or ageing process	Includes considering how the overall medical condition or ageing process will affects the design, for example if medication influences performance, or if the condition results in the need for storage of items to maintain health and well-being, for example colostomy bags. Or if the person is likely to have developmental needs that will influence the design,
Prognosis	Includes considering whether the condition is static or likely to change. How quickly is this change likely to occur and what influence will this have on the overall design approach.
Sensory deficits/stimulation	Includes considering how the person's sensory deficit(s) or response to sensory stimulation will influence the choice of space layout, tools and tool interfaces.
Continence	Includes considering how the person's continence status will influence the choice of space layout, tools, and tool interfaces.
Tissue viability	Includes considering how the person tissue viability needs will influence the choice of space layout, tools and tool interfaces.
Falls risk	Includes considering how the person's risk of falls will influence the space layout, choice of tools and tool interface.
Maintaining body temperature	Includes considering how the person's need to maintain body temperature will influence the space layout, choice of tools and tool interface.
Moviation	Includes considering how the person's motivation will influence the space layout, choice of tools and tool interface
Communication skills	Includes considering how the person's communication skills will influence the space layout, choice of tools and tool interface.

Issues with the person(s) routine

Timing of the tasks	Includes considering how the timing of the task will influence the space layout, choice of tools and tool interface.
Ordering of task actions and steps within the occupation	Includes considering how the ordering of the actions within the task will influence the space layout, choice of tools and tool interface.
Impact of the person's routine on carers	Includes considering how the impact of the person's routine on carers will influence the space layout, choice of tools and tool interface.
Impact of the person's routine on the constellation of people involved in the situation	Includes considering how the impact of the person's routine on the constellation of people involved in the situation will influence the space layout, choice of tools and tool interface.

Issues related to persons beliefs regarding space, tools and other materials

Person's beliefs regarding space, tools and tool interface	Includes considering how the Person's beliefs regarding space, tools and tool interfaces will influence the space layout, choice of tools and tool interface.

Issues related to other users of the home environment

Impact of issues related to other users of the home environment	Includes considering how the issues related to other users of the home environment will influence the space layout, choice of tools and tool interface.

Issues related to the existing built environment

Construction of supporting structures	Includes considering how the construction of supporting structures will influence the space layout, choice of tools and tool interface.
Position of pipe work	Includes considering how the position of pipe work will influence the space layout, choice of tools and tool interface.
Position of windows/door	Includes considering how the position of windows and door will influence the space layout, choice of tools and tool interface.
Drainage	Includes considering how the position of drainage will influence the space layout, choice of tools and tool interface.

Access to power source	Includes considering how access to power source will influence the space layout, choice of tools and tool interface.
Flooring/floor structure	Includes considering how choice of flooring and floor structure will influence the space layout, choice of tools and tool interface.
Ventilation	Includes considering how the existing ventilation will influence the overall design.
Heating	Includes considering how the existing heating will influence the overall design.
Lighting (natural/artificial)	Includes considering how the existing lighting will influence the space layout, choice of tools and tool interface.
Property type/tenure	Includes considering how the property type and tenureship of the home will influence the space layout, choice of tools and tool interface. This will include funding sources for the modification.
Relationship between rooms within the home	Includes considering how the relationship between rooms within the home will influence the space layout, choice of tools and tool interface.
SPECIFIC ANTHROPOMETIRC DATA	
Floor to seat height	
Reach ability (low and high)	
Height	
Weight	
Bi-lateral muscle strength	
Size of person(s) in space	

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