

DIY Home Modifications: Point-of-Sale Support for People with Disability and their Carers

Positioning Paper

**PEER
REVIEWED**

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Glossary

ADHC	Aging, Disability and Home Care (an agency of FACS)
CCSP	Community Care Supports Program (NSW)
CDC	Consumer-Directed Care
DIY	Do-it-yourself
DVA	Department of Veterans Affairs
FACS	NSW Department of Family and Community Services
HACC	Home and Community Care Program
ICF	International Classification of Functioning, Disability and Health
LLLB	Living Longer Living Better
NDIA	National Disability Insurance Agency
NDIS	National Disability Insurance Scheme
UNCRPD	United Nations Convention on the Rights of Persons with Disabilities

Executive Summary

Despite a vast amount of research into home modifications in Australia and their benefits for government and individuals, there exists a significant knowledge gap about home modifications that are undertaken outside of government-subsidised schemes. This project investigates a previously overlooked area of home modifications research, to examine do-it-yourself (DIY) home modifications and expand upon current research that examines the cost-benefit of home modifications for consumers and governments.

The context for this project is the recent aged care and disability care reforms in Australia and the implications they represent for self-care and housing, particularly in New South Wales (NSW). The National Disability Insurance Scheme (NDIS), launched in July 2013, and the *Living Longer Living Better* (LLL) aged care reforms, which are being incrementally increased in NSW, focus upon the delivery of home-based support and consumer-directed care packages respectively. This shift in focus, from ongoing support and care toward the delivery of support in the home, has the potential to influence decisions about what home modifications consumers may make, how they may make them, where they live, and the support and care they receive (Economics., 2009). These reforms further underline the growing desire of Governments and individuals in Australia to age in place.

It has been well documented that the vast majority of Australia's housing stock was not built to accommodate ageing in place (Carnemolla & Bridge, 2011; Department of Human Services, 2005). New built housing accounts for approximately 2% of Australia's housing stock each year (National Housing Supply Council, 2010) , resulting in an ageing housing stock with little new housing able to fully accommodate an ageing population or support people with disability to live at home for as long as possible. Home modifications, then, will remain the primary means through which individuals can "remain living independently within their own homes and community networks for as long as practicable." (Department of Human Services, 2005)

In NSW, the Home and Community Care (HACC) program has been the main context for the development of home modification services. People who have used these services value the outcomes of greater independence, heightened confidence, greater security, and increased sense of wellbeing that home modifications can afford (Carnemolla & Bridge, in press; Jones, de Jonge, & Phillips, 2008). This project examines home modifications that have been undertaken outside of government-subsidised schemes, such as the former HACC program, in order to shed light on the practice of DIY home modifications, investigate their potential cost-benefits, develop resources to assist DIY home modifications in the future, and identify areas for further research.

Section 1: Introduction

Do-it-yourself home modifications

This research focuses on home modifications that are undertaken do-it-yourself (DIY) that is, undertaken outside of the existing government-subsidised home modification programs (i.e. HACC). Home modifications (also known as residential modifications or home adaptations), are the “changes made to the home environment to help people to be more independent and safe in their own home and reduce any risk of injury to [themselves,] their carers and careworkers” (Adams, Carnemolla, Bridge, McNamara, & Quinn, 2014, p. 1). Home “modifications [can] include changes to the structure of the dwelling ... and the installation of assistive devices inside or outside the dwelling” (ibid). The Australian Bureau of Statistics (ABS) (2012) defines a carer as a “person of any age who provides any informal assistance, in terms of help or supervision, to persons with disabilities or long-term conditions, or older persons ... [and] [t]his assistance has to be ongoing, or likely to be ongoing, for at least six months”. Studies have confirmed that individuals requiring care prefer to receive it in their own homes, reflecting the trend away from institutional service provision to care at home, as endorsed by governments and the OECD (Bell & Rutherford, 2012). Australian governments have responded to this desire and need for people to age-in-place by subsidising long term home care. Home modifications are one example of subsidised support that currently exists, and government support of the DIY home modification option may be equally as justified.

Home modifications are an integral contributor to the ongoing wellbeing and safety of people with disability, older people and their carers. Appropriate home modifications have the potential to increase the independence and quality of life of individuals, as well as reduce their ongoing care costs (Carnemolla & Bridge, 2011; Carnemolla & Bridge, in press). Support to help people with disability, older people and their carers arrange home modifications is available to eligible persons from various agencies such as Lifetime Care and Support, the Department of Veterans Affairs (DVA), Motor Accident Authority and the former nationally-administered Home and Community Care (HACC) program, Public or Community Housing Authorities, as well as from successful insurance claims. It is generally acknowledged that non-English speakers, persons not born in Australia, and Aboriginal and Torres Strait Islanders have been underrepresented amongst HACC clients receiving home modification services (Carnemolla & Bridge, 2011; Hodges & Bridge, 2007). Therefore, information about, support, and funding or subsidised-assistance for home modifications is not readily accessed by, or available to, everyone. For the general population who are home owners or have their landlord’s permission for minor modifications to rented premises, potentially limited access to subsidised assistance and support means that many may choose to undertake home modification projects themselves, or with the assistance of family members or friends.

Various components or materials associated with home modifications are freely available for direct purchase at hardware stores and other retail outlets, and through catalogues and online stores. These materials include items such as grabrails, hand-held showers, portable ramps and other assistive equipment. While the components themselves need to meet a minimum standard of quality to be sold in Australia, there is no requirement for the retailer to provide advice or ensure that the item is appropriate for the individual user or is used or installed correctly. Where people decide to undertake modifications themselves and source the components from retail stores, catalogues or websites, they are unlikely to receive information at the point-of-sale about the suitability of the proposed home modification, the materials or

equipment and its installation; nor are they likely to receive any information on the maintenance and warranties that may apply to the modification once it is installed. This is of concern, as the incorrect or inappropriate use of a home modification component can cause serious harm to the user, carers, and other household members.

The research aims to address this concern by examining the interactions between consumers, retailers and governments engaged in home modifications, to investigate how and why consumers undertake DIY home modification projects in order to provide appropriate resources to assist consumers in the future. The research topic was informed by anecdotal evidence which suggested DIY home modification projects were relatively commonplace, despite there being little data gathered to point to its extent, or the reasons why this option is chosen over others.

Structure of the paper

The following sub-sections discuss theoretical perspectives on enabling environments and home modifications, and identify the aims and research questions for this project. Section 2 provides an overview of the Federal and State policies and programs that underpin the research, the economic drivers to age in place and an overview of the existing home modification schemes in Australia to provide a context for researching DIY home modifications. This is followed by a review of relevant DIY home modification literature in Section 3. Section 4 outlines the research methodology (qualitative methods and economic modelling) employed. Finally, Section 5 concludes the paper by outlining the next stages of the project.

Theoretical framework

The theoretical framework that underpins this research explains how individuals interact with the built environment, and moreover how the built environment can impact upon the individual. Housing, and the built environment more generally, have a strong influence upon the “health, mobility, independence, autonomy and wellbeing ... [of] older persons and those with disabilities” (Bridge, 2008, p. 9). The majority of the built environment in Australia is not designed to accommodate every human impairment or life-change. Therefore, the built environment can quite quickly switch from one that is enabling to one that is disabling, depending on the individual’s particular activities or abilities (Bridge, 2008). Appropriate home modifications, then, can transform a formerly disabling environment into an enabling environment for the user.

The capacity for appropriate home modifications to contribute to and improve individual wellbeing has been extensively researched (see Carnemolla & Bridge, 2011). Appropriate home modifications help reduce accidents such as falls, increase the ability of an individual to remain living at home for longer, and thus reduce the cost to governments of long-term, institutionalised or residential care (Smith & Widiatmoko, 1998). However, little is known about home modifications that are undertaken outside of government-subsidised programs (see Section 2 for an overview of these programs). Understanding the individual choices people make about home modifications is important in order for governments to successfully plan for population ageing and rising disability prevalence.

Bridge’s activity-centric model (2008, p. 172), based on the International Classification of Functioning, Disability and Health (ICF) framework, provides a theoretical framework for examining DIY home modification projects. As this research explores the notion of transforming disabling environments into enabling environments through home modifications, the activity-

centric model can help us to examine the interactions between the individual, their environment and the activity (i.e. a DIY home modification project).

Figure 1 over the page demonstrates how the activity centric model can be applied to examining DIY home modifications using *DIY* in place of *activity*.

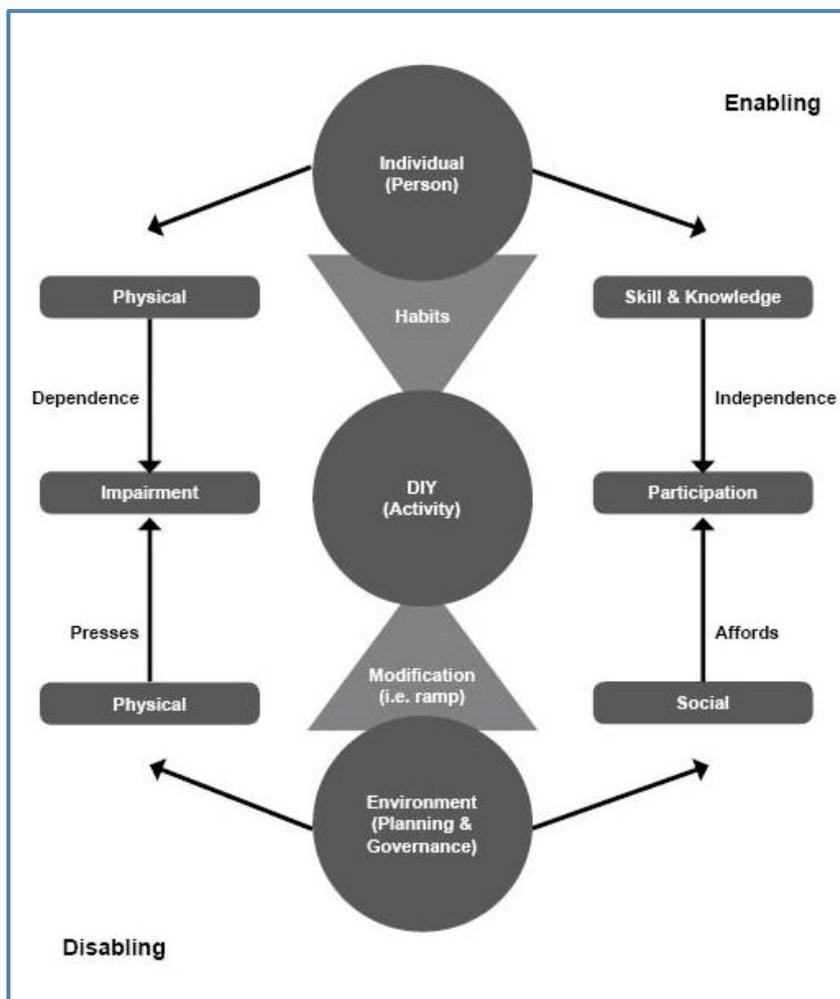


Figure 1: Activity-centric model applied to DIY home modifications (Adaped from Bridge, 2008, p. 172).

Bridge (2008, p. 171) argues that “an individual’s ability to perform activities is shaped, on the one hand, by their health status and activity forms or preferred performance habit/routines while on the other hand, by the environmental setting ... and the equipment availability, type and quality required for optimal activity performance.” Applied to DIY home modifications, the activity-centric model can be used to identify which elements, or aspects, of the DIY process and the environment influence each other, and how these impact upon the individual and their participation in the broader community.

Aims and research questions

Project Goal

The overall goal of the project is to establish resources to provide advice and support to consumers intending to undertake DIY home modification projects, to assist them to install DIY home modifications safely and appropriately. These resources will be made available online and at the point-of-sale for retailers and consumers. This information could also advise consumers where to find the best information to assist them in their choices, for example through the Home Modification Information Clearinghouse's website, an Occupational Therapist, a Pharmacist, or relevant government department. Resource development is discussed further in this paper in Section 5.

Project focus – DIY home modifications

This project will focus on five key home modification interventions that can be undertaken DIY, but may also cause the most harm to users if unsuitable for the situation and/or installed incorrectly. These are:

1. grabrails – position and installation;
2. ramps - fabrication and installation;
3. hand-held showers – choices and uses;
4. level access shower recess – waterproofing, floor fall and tiling; and
5. hand railings for stairs and steps.

Examples of these modification interventions are illustrated in Appendix 1.

Research Questions – qualitative research

The key questions that direct this research are:

1. How many people are not utilising government-subsidised Home Modification and Maintenance Services and are doing home modifications DIY?
2. What information do retailers of home modification components have or need?
3. What information is currently provided to consumers who purchase these home modification components?
4. What information do consumers need, and in what formats?

From these key questions the following sub-questions emerge:

- a. What impact has doing the home modification project/s had upon the person and their household?
- b. What assessments are made about the quality of the home modification project/s?
- c. What aspects of the planning and implementation of the project process are people with disability and/or their carers mainly involved with?
- d. Where do people with disability and/or their carers source information about the products they require and how to plan and complete their projects?
- e. How did people rectify the mistakes?

- f. What things stood out for people in the successes?
- g. Do people talk about their experiences as positive or negative and/or with pride?

Research Questions – Economic evaluation

The economic evaluation component of the project will investigate the estimated size and composition of the DIY home modifications segment of the market and develop cost effectiveness modelling scenarios examining the respective costs, benefits and DIY trends in NSW, Australia. The following research questions will investigate this component.

1. What is the estimated size and value of the DIY home modification market in NSW, Australia?
 - a. How is this distributed across five core product groups?
 - b. What are the implications for potential harm avoided, such as reduced risk of injury from falls in the home?
2. What are the potential implications of DIY home modifications supporting improved (or delayed decline) in quality of life?
 - a. What is the potential net saving of delaying transition to aged care facilities?
 - b. What is the estimated cost effectiveness of government funded initiatives such as this project to provide DIY point-of-sale information or supports?
 - c. What are the growth patterns and trends in each of the five chosen modification groups?
3. What are the estimated key benefits from the five DIY home modification groups (see Section 1)?

Conclusion

Home modifications have widely acknowledged benefits. However, research is needed into DIY home modifications to establish the potential benefits for consumers and governments of these kinds of home modifications. The policy, program, and literature reviews (see Section 2 and 3) that support this project suggest that, in NSW and Australia, home modifications play an important role in:

- enabling ageing in place;
- improving independence; and
- facilitating participation.

The practice of DIY may also support these outcomes through empowering individuals to maintain choice and control.

This Positioning Paper has sought to underline the need for research into DIY home modifications within a changing reform environment in Australia. Gaining a detailed understanding of DIY home modifications, the experience of undertaking these modifications, problems and successes, and the potential market size and value, will enable governments to

plan for alternatives to the existing home modification schemes and assist in the development of resources to assist consumers to make informed decisions about DIY home modifications.

Section 2: Background to the research

Introduction

The disability and aged care environment in Australia is moving towards two distinct models, one for older people and one for younger people. This distinction was proposed to address perceived limitations in the existing aged care and disability care sectors, and aims to deliver consumer-directed care and person centred care to clients. These models of care may become drivers for DIY activities such as home modifications. It is necessary to acknowledge that the practice of DIY is not new; however, due to the drivers in reform it is timely to examine DIY home modifications in order to gain a better understanding of how they relate to the existing funded home modifications sector and how they may influence future policy and practice. Understanding the motivations for DIY, and the potential motivators that are likely to increase or decrease due to the policy reform, may influence potential policy levers which will impact the viability of this sector in the future.

Importantly, not all DIY home modifications may be quality modifications. Some policy reform was intended to reduce “red-tape”, yet one also needs to consider *why* these levels of bureaucracy existed. In the first instance, they exist to protect the consumer; therefore there may be a need within the changing policy environment for other means of protecting consumers. This section considers the economic drivers for home modifications, the existing home modification service provision in Australia, the changing reform environment and what this means for DIY home modifications.

Economic drivers for home modifications

The expected need of home modifications and the corresponding relative benefits naturally increase with age. Previous studies of government-subsidised home modification schemes have indicated that the role of modifying homes is a cost effective measure when compared to the relatively high cost of government funded support services (Carnemolla & Bridge, 2011; Home Adaptations Consortium, 2013). This suggests that home modifications are likely to generate significant net benefits in terms of a corresponding reduction in the need for formal in-home care (Lansley et al., 2004). DIY home modifications represent an existing consumer-directed modification option, with the additional implication that this option is not funded by government.

In Australia, the population aged 65 years and over is projected to increase rapidly in the coming decades from 3.2 million in 2012 to between 5.7 million and 5.8 million in 2031. As a proportion of the population, this represents an increase from 14% in 2012 to between 18.3% and 19.4% in 2031, with substantial implications for health and housing services (Australian Bureau of Statistics, 2013). Further, the number of people over 85 years is also projected to increase rapidly. This older group is projected to increase significantly to more than double within 20 years (to 842,500 people in 2031), to double again by 2045 (1.7 million), and to double once more by 2069 (3.5 million) (Australian Bureau of Statistics, 2013). In percentage terms, people aged 85 years and over made up 1.8% of Australia’s population in 2012, which is projected to increase to around 4.5% to 6% of the population by 2061, the highest growth rate of all age groups. In this context, the potential demand for DIY as a home modification option is

also expected to increase with these age groups ageing faster than the general population. It follows that these projections will form a key basis for the estimated cost effectiveness of DIY modifications.

The cost profile of a home modification is typically an initial investment, followed by a relatively marginal maintenance cost per year, a potential renovation or replacement at, for example, ten years, and virtually no recovery cost. That is, the materials are not available to be sold and costs recovered. In the case of tenants, this could in fact be an additional cost if the property has to be restored prior to vacating. Benefits include a potentially reduced rate of decline in health, reduced cost of home care services and reduced risk of injury for example through falls. Bell and Rutherford (2012) underlined the exponential demand for home modifications in age groups over 85 which, as outlined in the ABS figures above, is projected to be the highest growing aged group in Australia in the coming decades.

Rising disease rates are further influencing factors for governments to consider home modifications as a means of adapting existing housing stock to better enable people to age in place. Ensuring older Australians remain healthy is “one of the most important medical and economic challenges facing Australia[n]” (AIHW, 2007, p. 48) governments. Rates of diseases such as diabetes, arthritis, and long term mental or behavioral conditions are increasing amongst the Australian population (Australian Government Department of Health, 2012). In 2012 in excess of 50% of the population aged 75 years and over had a form of arthritis (ABS, 2012, p. 15) and 16% of people aged between 65 and 74 reported having a form of diabetes (ABS, 2012, p. 19). Similarly, osteoporosis affects older Australians more acutely than younger Australians, with 1 in 20 women and 1 in 5 men over the age of 65 affected by osteoporosis (ABS, 2012, p. 16). Rates of mental and behavioral conditions, such as dementia, anxiety disorders and depression, have increased from 9.6% of the population in 2001 to in excess of 13% in 2011-12 (ABS, 2012, p. 21). The number of Australians living with dementia is predicted to increase by 300% to 942,624 by 2050 from 2011 levels (Deloitte Access Economics, 2011, p. 9). Increases in diseases like those discussed, combined with disability rates that increase with age “from 39% of those aged 60-64 years to 82% of those aged 85 years and over” (AIHW, 2007, p. 60), places immense pressure on the reforming aged and disability care sectors in Australia.

An estimated “4.2 million people or 18.5% of [the population] reported having a disability in 2012” (ABS, 2012). Disability prevalence, according to the ABS (2012), has fallen by 1.5% between 2003 and 2012.

Home modification schemes

Home modification schemes are a common means of adapting existing housing stock to enable individuals to remain living at home for as long as possible in countries such as Australia, Canada, the United States of America (USA), the United Kingdom (UK) and Japan (Scotts, Saville-Smith, & James, 2007) and northern European countries. In Australia, home modifications have predominately been delivered through State-administered home modification and maintenance services (HMMS). These services have been funded through the Home and

Community Care (HACC) program since its inception in 1986¹ (Home and Community Care Review Working Group, 1988). The HACC program is a joint Commonwealth-State, cost-shared program, targeting the frail elderly, younger people with disability and carers. The major goals of the program are to enhance wellbeing and independence, and avoid premature and inappropriate admission into residential care for clients (Home and Community Care Review Working Group, 1988), thus encouraging ageing in place and reducing care costs to governments.

The current policy reform environment has shifted toward home-based support in both aged and disability care, creating some overlap of clientele and program function between the HACC program and new aged care and disability services. These changes increase client expectations of receiving support at home in the future, are likely to result in increased demand for home modifications, and pose challenges for providers and funders of home modifications services.

Reform context

The disability services and aged care sectors in Australia are undergoing significant reforms in the form of the National Disability Insurance Scheme (NDIS) and *Living Longer Living Better* (LLLBB) aged care reform package. These reforms separate the care of Australians into two distinct models, one for older people and one for younger people. Both aim to increase and improve access to supports for those who require them and focus on the delivery of this support in the home rather than in residential facilities.

Reforms to disability services were initiated by a broad coalition of community and service organisations following a number of reports critical of the disability system in Australia, and were backed by a government-initiated enquiry by the Productivity Commission (2011). The enquiry found that the State-based systems were “inequitable, underfunded, fragmented, and inefficient and ... (gave) people with a disability little choice” (Productivity Commission, 2011, p. 5). It recommended the establishment of a national insurance scheme, the NDIS, to deliver the resources needed by people with disability in order to “enhance the quality of life and increase economic and social participation for people with disability and their carers” (Productivity Commission, 2011, p. iv). The previous (and largely current) State-based systems block-funded approved service providers, and operated under a model where people with disability were provided with support according to the availability of resources and capabilities of the service to which they were designated. In contrast, the NDIS is based on an insurance model which was designed to overcome numerous barriers identified by the Productivity Commission in the old State-based “provider-centric model”, and increase “the capacity for people with disabilities or their families to exercise choice about the services they use, and to have control over the financial resources allocated to them” (Productivity Commission, 2011, p. 102).

The significance of the new NDIS in terms of the value it places upon consumer choice and control has already been alluded to, and the mechanism of the individual plan is prescribed in the NDIS legislation. This mechanism enables “participants” (the term given to those who are

¹ It is important to note that the Department of Veterans Affairs (DVA) began providing home modifications to veterans in 1918 and this formed the basis for home modification services through HACC.

eligible for the NDIS) to access support, and means that services, equipment and other assistive technology can be purchased to meet their very specific and individualised needs, in turn underpinned by their articulated wishes and aspirations. The insurance model enables the consideration of a range of options which increase independence, including assistive technology and home modifications. However, the insurance model does not allow do-it-yourself in the initial planned implementation. This balance, of effectively spending money whilst ensuring the wellbeing of the participant and enhancing their opportunities to participate in and become contributing members of the community, characterises the insurance model which underpins the new NDIS in Australia.

The new system also represents a significant break with the past administration of disability services, which have been delivered by the individual States and Territories. Bringing the country under a single, Federally-administered scheme has meant a significant amount of work both politically and administratively, to enable the first trials to commence in 2013, trials which are taking place alongside state-based initiatives and thus facing complications of potential overlap. The NDIS eligibility criteria and their operation differ from other state-based programs, and the geographic demarcation will provide a point of evaluation until the scheme is implemented in its totality.

Significant reform is also taking place in aged care policy in Australia. The significance of reform will be in the greater proportion of packages of support and care delivered in the home relative to those which provide for residential care. The principle of consumer-directed care has already been adopted in all new, home-based support packages available to eligible older clients from July 2012, and will be gradually implemented throughout the new aged care system, residential as well as home-based (Department of Health and Aging., 2012). This principle acknowledges the importance of having choice and control over support and care options amongst the constituency of older people who require assistance, as a means of maintaining not only self-esteem and dignity, but also a range of physical and cognitive functioning, and ensuring that support is adapted to fit in with people's culture, values and activities. This is particularly important in the family home, where the support provided needs to take account of other household members, their patterns of living, and the way in which older clients can exercise their independence so that they can continue to socialise and participate in activities which are meaningful to them.

Conclusion

Safe and secure housing greatly contributes to successful participation in the community for people with disability and older people. Housing assistance is important in preventing people with disability and older people from experiencing acute forms of homelessness (e.g. rough sleeping), and also in supporting the individual to participate in the community through the enhanced independence of an accessible and well positioned home (Tually, Beer, & McLaughlin, 2011). Home modifications are a commonly accepted measure to enable individuals to age in place and have the potential to create savings for government in health care provision. Given that the current reform environment focuses on person-centred and consumer-directed care and emphasises the delivery of services in the home to people with disability and older people, then modifying the home environment is imperative to enable individuals to age in place and place less pressure on institutionalised care provision.

Section 3: Review of DIY home modifications literature

Introduction

In order to understand the *activity* of DIY home modification projects, the motivations and circumstances or *environment* and *person* influences on this activity also need to be identified, including the broader social, built environment and policy factors which influence decision making about home modifications. This section examines the existing literature on DIY and home modifications both nationally and internationally, to provide a broader context for the research project and come to a definition of DIY home modifications.

Methodology

A traditional systematic literature search was conducted to find studies and information directly relevant to undertaking DIY home modification projects. Systematic searches involve criterion-based critical appraisal based on an established hierarchy of evidence. This method was unfeasible to employ for this project as due to the dearth of literature currently available on DIY home modifications. The aim of this search was to identify existing research and suitable material which may be useful for the development of point-of-sale resources. The major limitation of this search strategy was in finding very little information or research specific to DIY home modifications. A variety of search terms, based on “DIY”, “home modifications” and “disability” (see

Appendix 4: Literature Search Strategy) were used to generate a list of relevant literature. The UNSW library ‘Search first’ function and databases including ARCH (Australian Architecture Database), ASSIA (Applied Social Sciences Index and Abstracts), BUILD (Australian Building Construction and Engineering Database), CINAHL (Cumulative Index to Nursing and Allied Health Literature), Google Scholar, Medline, NLA (National Library of Australia) Trove, and WorldCat were searched. Additional literature was also found through the reference lists of key sources found. The list consisted of nine articles, six of which had some relevance, and three books, which were focused on providing examples of how to achieve home design which would enhance accessibility for people who were ageing. In addition, the Home Modification Information Clearinghouse Research Library database was searched.

Given the paucity of studies on DIY home modifications accessed by the initial literature search, the search for relevant literature was extended by adding search terms to each of the three key research themes, and by snowballing from references found in the relevant articles. A range of peer reviewed articles, grey literature and information books, manuals and electronic resources were obtained from this extended search. They were reviewed in order develop a conceptual framework on which to build an understanding of the practice of doing home modifications DIY. Given the requirement of the project to deliver point-of-sale information to customers who are opting to do home modifications DIY, the review of the manuals, electronic resources and other practical guides on how to approach and achieve tasks is also reviewed following the review of the literature.

As such, a key aim of the project is to identify broad themes and issues around the decisions to do home modifications DIY to assist future research and to inform the interview questions to stakeholders who participate as respondents in this research. This information will directly inform the development of the resources available at point-of-sale, and how best to organize, disseminate and promote these resources so that people have access to them as required.

DIY: meanings, resources and growth

What is meant by “do-it-yourself” (DIY) in regards to home modifications can be problematic. A standard working definition of DIY home renovations is offered by Mackay (2011, p. 1) who states: “DIY ... occurs when homeowners decorate, alter, build, maintain or repair any part of the house and home rather than paying a professional tradesperson to do the work for them.” This definition would appear to exclude the option of hiring a person to do the work, however, in his study of DIY in New Zealand, Mackay (2011, p. 144) described the practical assistance by others, often family or friends, as “helping-hands”, which was provided when specific expertise was required and sometimes when additional labour was needed to speed up the process. Although definitions of DIY commonly eschew professional assistance, they also acknowledge the importance of hiring an external professional where there is a need for specialist skills or qualifications, such as plumbing (Davidson & Leather, 2000; Mackay, 2011). Some examples of DIY definitions are shown in Table 1 below. These illustrate the range of understanding of the practice of DIY.

Table 1: Definitions of DIY

Definitions of DIY	Source
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Definitions of DIY	Source
DIY is a consumption process, one that involves acquisition, assembly and transformation of retail commodities.	Gurtoo, Saru & Williams, 2013, p. 336
DIY now refers to one of the popular, if enforced, leisure occupations within the Western world... A largely post-1945 phenomenon it covers a huge range of practical household tasks that are now carried out by the resident of the home rather than a specialized professional.	Webb & Suggitt, 2010, p. 85
... any creation, modification or repair of objects without the aid of paid professionals. We use the term "amateur" not as a reflection on a hobbyists' skills, which are often quite advanced, but rather, to emphasize that most of DIY culture is not motivated by commercial purposes.	Kuznetsov & Paulos, 2010, p. 295
... the term DIY (DIY) is used to refer to people providing for themselves services which they could be expected to pay a professional to do. However, the core field of reference for the term has always been and remains in relation to householders undertaking home maintenance and improvement themselves DIY.	Watson, 2012, p.371

The particular importance of the home environment to people with disability and older people, both personal and instrumental, encourages an acceptance of a broad range of definitions of DIY according to the meanings attributed by people with disability themselves. The existence of specialist home modification schemes in most European and English-speaking countries provides a definitional divide, with home modifications done outside of those schemes mostly able to be considered as DIY. Taking this broad approach helps to widen the search for relevant literature and data, and to document a wide variety of experiences of people with disability and carers who have altered their home environment without using these schemes.

This project will look at examples where the person with disability or their carer has done work themselves, has received assistance from relatives or friends, and also where they may have accepted or sought the assistance of someone who is either a DIY practitioner, or a tradesperson. We consider all of these to be a part of the DIY suite of options. However, it is necessary to distinguish between this broad definition of DIY and regular contracted work. This definition needs to be characterised by aspects of design, decision-making (possibly project management), product choice and location, and holding liability for quality and maintenance. In addition to the "informal" professionals which Mackay (2011, p. 147) identified, and the hiring of contractors for the completion of specialised or difficult/ dangerous tasks within the project, the definition, relating to people with disability, must also include the hiring of home handypersons, who would in some cases complete all the practical tasks involved in the project whilst the customer may choose and supply the materials. There is evidence that handyperson work is considered differently from that of a contractor. For example, a local authority in the UK offers a subsidised service doing repairs and "DIY" for older people and people with disability (Shepway District Council., 2013).

The definition of DIY, for this project, will extend beyond the generic understanding of the concept, and include arrangements whereby a person with disability chooses to have another person do work on their behalf, over which the person with disability retains control over the:

- design of the modification;
- product/component choice;
- position in which the modification is placed; and
- cost of the modification.

In addition, the person need not be a homeowner, especially in circumstances where a person is living in rented accommodation. It will also be limited by the following exclusions:

- home modifications which are undertaken as part of a funded home modifications scheme, regulated by a State or Federal department; or
- home modifications which have been prescribed by an Occupational Therapist, or other professional.

Aspects of the work itself can be done by someone who is a professional or licensed tradesperson, or handyman, under the direction of the person with disability or their carer. Therefore, building on the definition by Mackay (2011) at present, we understand DIY in home modifications to be:

A home modification project that is undertaken by a person with a disability themselves or with the assistance of family members or friends.

DIY information resources

The literature search identified a range of different guides and information sources designed to support people choose products and to plan and carry out various projects to make their homes more accessible. This section briefly addresses the range of information that is available.

Searching for information and advice is often a part of the DIY home renovation process, occurring after initial design and financial choices have been made (Mackay, 2011). From a study conducted in New Zealand, Mackay (2011) has identified that obtaining information directly from people is the preferred method of information gathering. Indeed, Mackey (2011) identified that most people prefer to consult a trusted friend or family member who has undertaken a similar project and, to a lesser extent, consult friends with professional trades experience who are willing and able to give advice about how to do the job. Another source of information is from the staff of hardware stores and depots, with high expectations placed upon those staff to provide expert advice (Mackay, 2011, pp. 130-131).

The guides and information sources identified in the literature search include; DIY guides, self-help brochures, magazines (see Figure 2 over the page), websites, online instructional videos, and online discussions. Reality television, radio and film were also identified as sources of inspiration for consumers. Some examples of information and inspiration sources are detailed in Table 2 below.

Table 2: DIY information sources

Source type	Example/s	Summary
Websites	familyhandyman.com	The Family Handyman is a

Source type	Example/s	Summary
		US-based site with projects, advice, ideas and forums relating to every room in the house and a range of skill sets (linked to the <i>Family Handyman</i> magazine).
Online videos	How-to instructional videos/demonstrations: - How to build a wheelchair ramp	A four-part step-by-step video that shows the process of building a wheelchair ramp at the entrance to a dwelling, from planning/designing to cutting timber, creating a gradient and installing a hand rail. Produced by Lowes (USA-specific).
Online discussions	forums.whirlpool.net.au	Large online forum containing discussions ranging from technology to DIY. Users post questions and stories of DIY experiences.
Radio	The Homies on Weekends with Simon Marnie on 702 ABC Sydney.	The Homeis radio segment involves Sydneysiders calling in to speak to Simon Marnie and the guest “Homies” to discuss all manner of DIY home renovation.
Television	Better Homes and Gardens (Channel 7, Australia)	Lifestyle program, with associated magazine, provides advice and ideas for cooking, DIY home renovation/decorating, craft, gardening and pet care (Yahoo7, 2014).
	The Block (Channel 9, Australia)	The Block is “Australia’s biggest renovation reality series ... [that] follows couples competing against each other” (ninemsn, 2014) to renovate and transform dwellings.
	Grand Designs (Channel 4, UK)	The program “follows some of Britain’s most ambitious self-building projects, as intrepid individuals attempt to design and construct the home of their dreams” (Channel 4, 2014).



Figure 2: DIY magazines
(source: C.Bridge, 2013)

DIY – a growing phenomenon

DIY home renovation has been described as a “significant cultural phenomenon” (Mackay, 2011, p. 1). It has a growing influence in business, through significant industry development and growth, in the media, through lifestyle shows and publications, as well as in the normalisation of DIY as a regular household practice (Mackay, 2011). However, doing home renovations DIY is a relatively recent and growing phenomenon, whose origins and determinants are still not well known (Bogdon, 1996). The term DIY, or do-it-yourself, and its practice did not become commonplace until after World War II (Webb & Suggitt, 2000). In the UK, prior to this time, the prevalence of rental accommodation amongst the population, together with the availability of cheap labour, meant that attempting to redecorate or renovate DIY “would have appeared eccentric” (Webb & Suggitt, 2000, p. 85). The links between DIY and the home appear to be historically contingent. In Australia, the tradition of the owner-builder has been relatively common, particularly so in times of housing shortages, paucity of commercial tradespeople, and during rapid population expansion (Dingle, 2000). The link between home building and renovation DIY and historical periods of population expansion and resources shortages is found also in the USA (Mackay, 2011; Webb & Suggitt, 2000). However, Gelber (1997) challenged the belief that in the USA men doing DIY home renovations are following a long tradition of American householders, acknowledging that, whilst people living in rural areas may have been used to constructing, renovating and maintaining their properties, in fact in the cities prior to World War II those with enough money to own property rarely took any part at all in building or repair work, or even basic maintenance. Watson and Shove (2005) acknowledged that whilst the term “DIY” was used in a US advertisement in 2012, and the activities of building, renovation and maintenance are relatively commonplace across cultures and time, the rise of the phenomenon of DIY is quite culturally and temporally specific to the UK in the second half of the 20th Century. Mackay (2011) also identified this as the same period of time when DIY grew in New Zealand.

The growth in popularity of DIY home renovation is reflected in the sales figures of major hardware retail stores. In 2011 the DIY retail sector in Australia secured a significant market share (52%) of all spending related to home renovation (Retailbiz, 2011), and continues to perform well. In the decade leading up to 2000, Baker and Kaul (2000) estimated that households in the US spent close to \$200 billion on household renovations and maintenance. Watson and Shove (2005) reported growth figures in the UK DIY market of 7–8% per annum through the 1990s and into the early 2000s, with about 62% of the adult population claiming to participate in DIY activities, and around 13% of time in the home spent on DIY activities. Between 1997 and 2001 the DIY sector in the UK grew by a further 25% (Watson & Shove, 2005). The growth in the development of “big box” hardware warehouse retailers such as Home Depot (in the USA) and Bunnings (in Australia and New Zealand) is significant. Home Depot has expanded into Canada, and increased its net sales from \$3 billion to \$50 billion between 1989 and 2001 (Hernandez, 2003, p. 84). Similarly, Bunnings has experienced significant market growth, with earnings for the 2012-2013 financial year alone growing by 7.5% to \$904 million (Wesfarmers, 2013, p. 16). Bunnings’ revenue has grown from \$7,151 million in 2009 to \$9,167 million in 2013 (Wesfarmers, 2013, p. 26), thus illustrating growth and potential growth of the home improvement, renovation, hardware and DIY industries.

The increased popularity of DIY activities, and associated hardware sales growth as outlined above, has also been attributed to technological advances. The “widening range of hand tools powered by small electric motors have invaded backyard sheds and empowered home handymen to believe that there is nothing they cannot tackle with their trusty Black and Decker in their hand.” (Dingle, 2000, p. 73) Home renovation also correlates with high rates of home ownership in countries similar to Australia. Tracing the origins of DIY home renovation, Webb and Suggitt (2000) identified a surge in interest during the oil crises of the 1970s, when economic conditions prompted people to improve their homes rather than seek to buy new houses. In the UK, increased home ownership and technological improvements in tools, building materials and techniques, have contributed to high participation in DIY home improvement, reported as 42% of adults in 1993 to 1994 (Baker & Kaul, 2000; Davidson & Leather, 2000). Technological advances in tools and building materials, as well as increased levels of advice given to customers by retailers, have been important contributors to the growth in popularity of DIY home renovations. Watson and Shove (2005) identified how retail outlets have improved the way they group and display component parts, providing information leaflets and demonstrating completed projects in store, as well as improving the ability of their staff to provide advice and respond to customer demands. Ou (1999) emphasised the diversity of materials available to builders in Canada from the 1970s onwards, with new materials making construction easier and more affordable. Mackay (2011) has also focused on the increased availability of materials in the large hardware stores, whilst also noting the improved technology, such as self-adhesive floor tiles, which help to encourage DIY enthusiasts to consider taking on larger and more complex projects.

The technology that is available and the ways in which materials can be put together in an aesthetically pleasing manner, are features of the increasing media around DIY home renovations, both in print and television. Leonard, Perkins and Thorns (2004, p. 107) have analysed various media in New Zealand and identified how they influence the aspirations of homeowners, who the researchers found view their homes as “works in progress”. Lewis (2008) describes the various television home renovation programmes as versions of reality television, with local preferences and styles woven into an increasingly global format. Rosenberg (2008) argues that the increase in this genre of television programmes is not due solely to the

requirement to fill more air time on the large number of channels available throughout the day, but is very much a response to the increased consumerism of the population, and an increased focus on the home as a canvas for alteration, particularly in societies where home ownership is high.

Types of DIY renovations

There are diverse types of DIY renovations, and the type of renovation householders choose is dependent on many factors. Bogdon (1996) analysed the American Housing Survey to identify the extent to which common renovations and repairs were done DIY. Factors which have an impact on whether or not projects are done DIY include the skill and competency of a householder, their age, the household composition and the size and scope of the project itself (Bogdon, 1996). Age positively relates to competence, experience and time available to conduct DIY renovations, and is impacted by declining strength. Whilst households with more adults tend to include someone who has the capacity to undertake tasks DIY (Bogdon, 1996). In a study of DIY home renovations in New Zealand, Mackay (2011) identified different classes of tasks and projects, from building and external works, to repairs and maintenance, and alterations and decoration inside the home. Williams et al (2012), examined the self-service economy in the UK and identified that installing a bathroom was attempted DIY by 19% of the households surveyed, with only 11% attempting plumbing work DIY. In both of these tasks there was a high rate of formal contracting, at 67% and 61% respectively.

Published figures for types of DIY renovations are aggregate total investment which generally includes large, high value home extensions, additions of rooms and major refitting projects. In this context, the focus of this research is the five DIY product categories; grabrails, ramps, hand-held showers, level access shower recesses and hand railings for stairs and steps. While these defined product groups include substantial bathroom modifications, for example for a level access shower modification, there are also likely to be a high proportion of relatively lower value modifications such as grabrails. It follows that the DIY modifications examined in this research are a specific subgroup, included in wider aggregate DIY figures. This provides context to the first DIY market estimation being undertaken through the retailer survey, discussed further in might be.

Section 4: Methodology

Choosing to DIY

The reasons for DIY renovation are nuanced and diverse. Previous studies have examined social scientific models to understand why people choose the DIY option for home renovation over others (Davidson & Leather, 2000; Watson & Shove, 2005; Williams, 2004, 2008). Whilst these studies are useful in explaining why people may choose to renovate DIY, it is not clear why people choose to undertake DIY from an ageing or disability perspective. Nadin (2011) and Williams et al (2012) explain that decisions are influenced by individual, socio-economic and cultural circumstances, and the availability of viable alternatives. Williams (2004) has studied the DIY preferences of a number of socio-economic groups (in the UK), and has found that lifestyle choices predominate in the decision to do tasks DIY amongst the more affluent groups, but economic reasons of cost and ease amongst the poorer groups override considerations of lifestyle preference. Williams (2008) has found similar results in rural areas of England, with a slightly increased tendency of contracting out larger projects, but a greater likelihood for less

affluent people to be non-voluntary participants in DIY than are wealthier people. The following sections explore alternative drivers for doing DIY home renovations.

Self-provisioning and DIY

Doing home renovations DIY is one of a range of activities common to self-provisioning, a practice of engaging in activities which can be supplied through the formal market, but where in fact people opt to instead operate in ways that do not involve the exchange of money and include reciprocal non-monetary exchanges for goods and/or services (Adriaenssens & Hendrickx, 2009). Studies into self-provisioning have been concerned to understand the extent to which it occurs, and the motivations of people for choosing this rather than seeking provision from the regular market. Williams and Nadin (2011) have argued that whilst the sale of goods has largely moved to the formal market the delivery of services such as home maintenance and renovation, has not followed to the same extent. Studying population centres in post-Soviet Ukraine, their data reveals that self-provisioning is more common than is contracting out to the formal market for a range of household maintenance and renovation tasks, and that, whilst some tasks such as bathroom renovations are less commonly done DIY than others, these are more commonly outsourced to informal labour rather than to market tradespeople (Williams & Nadin, 2011).

Research in the US has indicated that home repairs represents the largest segment of the non-market, self-provisioning economy, at almost 30% of all informal household expenditures (McCrohan & Smith, 1991), whilst Adriaenssens and Hendrickx (2009) have concluded that in Belgium decisions about home renovations are made after first considering whether to outsource the job formally, usually based on its complexity, and if this is not chosen then decide whether to outsource it informally or do DIY. The availability of skill-based contacts and an inclination to engage in social relationships provides people with the option of getting assistance from skilled professionals, and Mackay (2011) has described how the completion of a difficult or skilled job, such as plumbing or plastering, is often negotiated with a friend “for a few beers” or at “mate’s rates” (Mackay, 2011, p. 147).

One of the motivating factors for self-provisioning is the lack of availability, or reliability, of tradespeople, and/or the lack of value attributed to their charges. In studying whether DIY is a lifestyle choice or an economic necessity, Williams (2004) concludes that it is usually a combination of both, with the tendency of more affluent households to DIY still based on economic calculations about what they can afford to contract out. These calculations also take into account the relative benefit of hiring a tradesperson, and Williams (2008) has found that 11% of those he questioned about their motivation to DIY did so because of the unreliability of tradespeople (availability, not turning up etc.), with a further 10% not having confidence in the quality of work undertaken by tradespeople. Davidson and Leather (2000, p. 753) have identified that in addition to affordability, the reluctance to hire contractors is also based on a “fear of poor work standards or excessive charges”. Williams and Nadin (2011) have found that in the Ukraine about 14% of their research participants made decisions to self-provision household maintenance and renovation tasks because of a shortage of tradespeople or concern about the quality of their work for the money outlaid.

Lifestyle choices and DIY

There appears to be some level of agreement that motivation to do DIY is subject to a range of influences, and that, while in some cases economic circumstances dictate that DIY is the only possible way a job can be done, a number of factors also determine that DIY is the preferred

option even when contracting can be afforded. The home is increasingly becoming a special site of consumption (Woodward, 2003), one where people are encouraged to shape and manipulate to take advantage of functional and style advances, whilst at the same time ensuring it remains an “authentic” space for relaxation and personal/family life. Woodward (2003) has identified narratives of the “desire to decorate and possess beautiful things”, which is concerned with aesthetic impact and takes accounts of style and fashion; and “relaxed, homely and practical”, which prioritises the personal tastes of the householder and is less influenced by lifestyle media. Mackay (2011) has identified both narratives within the “to-do” lists of DIY enthusiasts in New Zealand, with tasks associated with functioning in the home allocated as “urgent”, and aesthetic choices classed as “wants”, with the latter often being completed first because they tend to be simpler and also provided a great sense of satisfaction.

The desire to make functional changes to a home, at minimum cost and with high aesthetic values may drive a significant amount of DIY activity, but it is influenced by the personal values held by the householders. Mackay (2011) underlined that some people actively seek recycled materials and tools to use in their DIY projects, or use material they have had stored away for some time, indicating a tendency toward thrift and environmental sustainability. Previous research has also indicated that strong concerns about climate change also contribute to design decisions for some home renovators who are seeking to decrease their impact on the environment (Maller & Horne, 2011). However, home renovators’ personal aspirations, such as more and bigger bathrooms, often negate some of the sustainability measures taken within a renovation (Maller, Horne, & Dalton, 2012). If policies to encourage homeowners to complete these kinds of desirable renovations are to be successful they will need to take greater account of people’s daily practices of living.

When larger home renovation projects, such as additions or bathroom and kitchen remodelling that involve structural alterations, are accompanied by disruption and stress, Mackay (2011) has reported it is males who DIY, whilst their female partners are heavily involved in the planning and in supportive roles. However, the significant increase in the number of females owning property and engaging in home improvement has been noted by Dyer (2003), and recent television home renovation programs such as *The Block* on Australia’s Channel 9, and *House Rules* on Australia’s Channel 7, feature couples working together; male and female and female and female.

Financial and lifestyle motivations

Drawing on some of the themes relating to the motivations for DIY home renovation, the correlation with financial status resonates with the relatively impoverished situation of people with disability in Australia, and worldwide. It is estimated “that forty-five per cent of people with a disability in Australia live in or near poverty, more than double the OECD average of 22%” (PricewaterhouseCoopers, 2011, p. 9). The extent to which this is a driver of DIY home modification will be important to establish.

Factors other than financial matters motivate people to take on home renovations. Much of the work that has been done in recent years has focused on the meaning of home for an individual and those with whom they live. Mackay (2011, p. 202) identified three major narratives within his research on what DIY home renovation means to those who engage with it as:

- an activity to “personalise” the home;
- a practice to “adapt” the home; and
- a form of active and productive enjoyment.

The role of the DIY enthusiast as a consumer of DIY products is also addressed by Mackay (2011), in terms of theoretical constructs of identity building, and of the individual as an active participant in the globalised consumer society. Whilst acknowledging that the rise of big box retailers has enticed people to shop and to derive ideas during the visit rather than before, Mackay (2011, pp. 77-78) rejects that the act of DIY is one totally of consumption. DIY is essentially productive in nature, and leads him to utilise the term “prosumer” to describe his research respondents, indicating this dual role of producer and consumer (Mackay, 2011, p. 211).

The term “consumer” is a commonly used term to describe people with disability who use services in Australia. With the advent of person-centred and consumer-directed approaches, the full range of options open to a consumer will now be available in a service context. The dual roles of choosing options and providers, and then determining the nature of the support provided through the exercise of choice and control indicate a greater level of active involvement than the term “consumer” denotes. The term “prosumer”, meaning “one who is both producer and consumer” (Ritzer & Jurgenson, 2012, p. 379), may be more relevant for the range of service arrangements through the new systems, and, ideally in the area of home modifications.

Individual choice in home modifications

The subjective choices of individuals who require home modifications are increasingly viewed as important in assisting that individual to function successfully in their home environment. Fänge and Ivanoff (2009) emphasise the importance of the home for the increasing numbers of older people who are ageing in place, not only in terms of the practical comfort and security it offers people once adapted to address their mobility limitations, but also through the opportunities it affords people to exercise their independence and autonomy and to enjoy activities and experiences of participation. Tanner et al (2008) have emphasised that the home is not just a physical environment but is a social home, a place for relationships and engagement with others; and a personal home, where we can express out identity, and feel a sense of belonging and security.

Whilst the goal remains much greater adherence to Universal Design Standards and availability of suitably accessible housing, this does not mean that the implementation of standards is the answer. The complexity of the process of prescribing accurately the modification that is fit for purpose for the individual is well illustrated in the study conducted by Dusenberry, Simpson and DelloRusso (2009) into the graspability of handrails. They found that different shapes of rails were useful in different falling scenarios, but that in the most serious scenario (falling forwards down stairs) the most significant design feature was the availability of finger and thumb purchases either side of the handrail.

Heywood (2004) identified that a range of issues beyond functional need were considered to be important by people with mobility impairment, such as dignity, a positive self-image, inclusion of personal and cultural values in decisions about modifications, relief from danger and discomfort, the removal of barriers to independence, the need for choice, and good communication about the options available. Golant (2012, p. 40) has advocated,

... a more holistic analytical approach to environmental congruence that recognizes the dual importance of both the residential comfort and residential mastery emotional experiences of older Americans.

Such an approach clearly promotes much greater involvement of people in the decisions which are made to render their homes more accessible, and highlights the retention or even increase of independence and control as being equally as important an outcome as the functional utility of the modification itself. Involving clients in decisions about the services and interventions which are applied in their own homes to assist with their daily living, has been shown to enhance outcomes, particularly in relation to autonomy, independence and problem-solving. Stark, Landsbaum, Palmer, Somerville and Morris (2009) studied how a client-centred home modification intervention positively impacted on the daily activity performance of older adults over time. Facilitating the involvement of older people in decision-making processes associated with home modifications has been demonstrated to be effective in assisting them to navigate and address the dynamic and ever-changing environment which is presented by “ageing in place”:

... services that enhance older people’s creative efforts at problem-solving, rather than services that only support functional independence, have the potential for supporting agency and being empowering (Johansson, Josephsson, & Lilja, 2009, pp. 64-65)

The functional independence gained from home modifications was not always a goal in itself, but more often a prerequisite to undertaking independent activities. The study concluded that providing assistance in problem-solving was at least as important as delivering home modifications that enable independent functioning.

Picking and Pain (2003) conducted focus groups with people with disability, to ascertain their views on how they would like to be involved in decisions made about modifications made to their homes. These group discussions identified a significant level of understanding and knowledge about the types of modifications required, and their impact, and highlighted the strong willingness of participants to take more responsibility for the modifications by being integrally involved in the decision-making process. In terms of the impact upon current practice, this research identified that it was not necessary to have occupational therapy assistance at each point in the process of installing the modifications, and that the project could be managed by others with specialist occupational therapy assistance brought in at particular times. It also recommended that:

... the provision of information and opportunities to take control should be made available to the client by the occupational therapist at the outset of the adaptation process (Picking & Pain, 2003, p. 8).

The meaning of home

The home is increasingly becoming the locus of delivery of a range of support and healthcare services, as ageing in place and community living policies become more firmly enshrined in policy. The house, as a home, is for many a source of “ontological security” (Dupuis & Thorns, 1998, p. 24), a place that is both safe and secure, and where a person can express their individuality and exert control. The concept is at once deeply personal and individual, and at the same time reflective of a person’s connection to their immediate surrounds and the context of their community and society. Looking at the meaning of home to older people in New Zealand, Dupuis and Thorns (1998) emphasise the depth associated with concepts such as “individual choice” and “cultural values”, by pointing out the historical, familial, and social connectivity which is bound up for the individual in the way their home is organised and presented. Their research demonstrates temporal dimensions to the meanings embodied in the home, with the transition from house to home taking time, and the function of the home as a repository of memories

being greatly significant to those interviewed. It is also a place where identities are influenced, if not shaped, by the roles an individual plays, and how they develop over time (Dupuis & Thorns, 1998, pp. 42-43).

The concept of ontological security can provide useful insight into how important a home is to an individual and family, and how decisions to significantly modify the home environment to enable greater access and functioning to a person with mobility impairment need to take account of how the individual sees and uses the spaces around the home. Woodward (2003, pp. 394-395) views the home as a special site of consumption, one where people are increasingly encouraged to shape and manipulate to take advantage of functional and style advances, whilst at the same time ensuring it remains an “authentic” space for relaxation and personal/family life. Indeed, Woodward (2003, p. 398) identified narratives of the “desire to decorate and possess beautiful things”, which is concerned with aesthetic impact and takes accounts of style and fashion; and “relaxed, homely and practical” (Woodward, 2003, p. 402), which prioritises the personal tastes of the householder and is less influenced by lifestyle media.

The gift relationship

Another facet of DIY home modifications which bears theoretical consideration is the notion of the “gift relationship” (Titmuss, 1997). Within DIY, a gift relationship involves family members or friends volunteering their time and expertise (or some trades task is conducted at a reduced rate), to assist in the DIY project. Boulet, Healey and Helton (2008) have addressed these types of relationships within a wide variety of activities that constitute community volunteering in Australia, a range that includes more traditional roles of caring, often by families, of relatives with a disability or who are ageing. The vital role of carers not only to their relatives, but also to the broader professional services and administrative systems that are funded to address the needs of people with disability is well acknowledged, and their difficulties in coping with underfunded and inefficient systems recorded (see for example Carers NSW, 2012). The linking of these activities with the broader movement of volunteers contributes to social capital and, according to Boulet et al. (2008), is critical to our way of life now, offering the prospect of an alternative gift economy, which operates on reciprocity and is markedly different from our current market-exchange economy.

This concept is interesting to the current research, not just because of the reference to the important roles that are played by family carers, but also because it is common to hear anecdotes of people with disability and families getting assistance from a friend or family member who has particular trades skills. Until recently the contribution of family carers was not adequately recorded or quantified, and identifying more accurately the extent to which important home modifications are done with the assistance of essentially unpaid friends, will help calculate the real cost of living with disability in an inaccessible environment.

DIY and participation

An important aspect of this research is how the DIY home modification impacts on the quality of life for individuals. Traditionally this has been viewed mainly in functional terms, with the specific modifications made to address a specific deficit, and once remedied the modification restoring or enhancing a person’s activity functioning. An important aspect of the new NDIS and LLLB reforms is the requirement for all interventions to contribute to positive outcomes, with a particular emphasis on enhancing the capacity of the individual to participate in activities, both within and outside of the home (Disability Care Australia, 2013). Providing a framework around the notion of “participation” can help to identify tangible outcomes and influence the process by

which the need for modifications is assessed, and solutions negotiated and prescribed. Borrel, Asaba, Rosenberg, Schult and Townsend (2006) have identified four key themes that describe the participation of people who suffer chronic pain, these are taking initiative and making choices, doing something physical, doing something social, and doing something for others.

These four categories can have significant implications for the way in which home modifications are installed in a person's home if participation is a stated outcome. Whilst it can be argued that the added functionality the modification provides to the individual will impact on all four of these categories, failure to account for the active nature of each, and rendering the person passive throughout the process, could contradict the intended goal. Existing online communities of people with disability and carers facilitate the sharing of expertise and knowledge of how to do home modifications with others across the internet (see for example Whirlpool forums:User #488188, 2012, November 19). Online communication platforms provide proactive examples of each of the above mentioned categories, and suggest that, at least for some people, the practice of DIY home modifications may be as important as the positive effect that the finished modification has on their quality of life.

The DIY experience

There is a growing body of research about the experience of doing DIY home renovations. This literature has yet to include accounts of people with disability, or their carers and family members, undertaking home modifications DIY.

Some research, however, has explored the processes which lead to the decision to DIY. Stewart (2005) has written of her experiences providing care for her ageing parents in their home, after her mother's illness and declining mobility forced decisions to be made about whether or not there was a need to move them into a residential facility. The detailed description of the complex interactions between carer and local authority, and carer and service provider, highlight the disparity between the policy aim of individualisation of care and the actuality of delivering it to people in their homes. Organising for the provision of a ramp or step-lift to enter the house proved particularly problematic despite its need being assessed and an allocation funds agreed to (Stewart 2005). The various social service officials could not agree on the best solution, and the author had a wooden ramp built with her own funds after her mother's paid assistant had fractured her skull slipping when pushing her mother's wheelchair over the temporary ramp. McDermott et al (2006) describe the experience of a wheelchair-mobile man who bought a new-build ground floor apartment, off the plan, and who experienced significant reluctance on the part of the builder to make changes to the design of the apartment to ensure it was accessible and allowed the owner and his family to function independently. Whilst some changes to the bathroom were eventually made, the owner had to remove fire doors himself in order to get in and out of the building, and also had to construct a small ramp DIY to manoeuvre his wheelchair over the raised threshold at the rear of the apartment, so that he could gain access to his garden. Both examples describe DIY as the only way that a particular access barrier was overcome, one as a result of unwillingness to adapt the design of a new apartment to meet the mobility requirements of its purchaser (McDermott et al., 2006), and the other borne of frustration with the local council processes for approving and implementing a home modification to an eligible consumer (A. Stewart, 2005)

DIY practice is more commonplace in assistive technology devices for people with disability, than it is for home modifications. Hurst and Tobias (2011) studied a range of DIY solutions applied to overcome deficiencies within assistive devices, which in fact were unusable due to a

mismatch between original design and individual need. Over 35% of assistive devices end up unused or abandoned, and their findings emphasised both the potential to adapt the devices DIY for optimal functionality, and the resultant engagement and empowerment by the people with disability themselves through this process. Some of the strategies that proved successful included the iterative adaptation of existing designs to address changing needs; the sharing of design, product and other relevant information and resources by means of online communities and other web resources; and the potential of rapid prototyping tools, such as 3-D printers, to quickly produce designs within an iterative process. As well as the innovation that was discovered within this research, the authors recognise the empowerment potential of the sharing of knowledge on the internet, and that this would be enhanced by the inclusion of information about how to customise designs.

Brown and Mulley (1997) have researched some examples of home-made aids and modifications, undertaken by householders whose relatives were in receipt of respite care at a UK hospital. One modification viewed was an extension to a fitted wooden rail, which was too short, and which was elongated by attaching an old steel pipe, with the ends protected by “lemonade bottle tops” (Brown & Mulley, 1997, p. 37). Whilst the authors identify that some of the DIY adjustments in their study did not work and/or were dangerous, they also pointed out that some of the solutions had the potential to be developed into new, innovative products. They also noted that the installation of some products was relatively straightforward:

Effective items of equipment such as stair rails are cheap, simple and can be easily and quickly installed by those caregivers with basic DIY skills, if they are told what is required (Brown & Mulley, 1997, p. 37).

These examples demonstrate that ingenuity and creativity are borne of different circumstances, but point to a process of involvement of householders and their active engagement in the design and decision-making processes about modifications and other technology to assist them in their home, to achieve optimum outcomes.

Housing suitability

DIY work can impact the quality of housing stock. Previous research into why home owners choose to undertake modifications and repairs DIY, suggests that poor quality DIY work can lead to dwellings deteriorating to a state where it is no longer economically viable for the dwelling to be repaired (Davidson & Leather, 2000). Whilst disrepair has been attributed to the characteristics of the building, the response to this and the quality of the repair undertaken is much more open to the choices and preferences of the householder, who will tend to include “cosmetic” alterations amongst repairs, leading to a housing stock overall which building experts believe is not being maintained to adequate standards (Littlewood & Munro, 1996). The decline in the provision of capital grants for the improvement of private dwellings in the UK, and corresponding insufficiency of self-initiated and funded maintenance is the focus of a study on how lower income homeowners would prefer to receive assistance from local authorities (J. Stewart, Clayton, & Ruston, 2006). The limited study identified that home owners favoured DIY options to maintaining their homes, demonstrating a level of personal responsibility which local authority policy increasingly relies upon to ensure the quality of housing stock is maintained. The research speculates, however, that this level of responsibility is perhaps less likely to be adopted by people in ill health or on low incomes who are unable to access the resources required, with a concomitant risk to the quality of their housing.

New Zealand's housing stock is affected by numerous environmental stressors which can influence decisions to age in place. Irrespective of common housing issues such as cold, damp, and accessibility, there is an increasing trend of older people (aged over 65) living in houses which have not been adequately maintained (Saville-Smith, James, Warren, & Coleman, 2009). A 2004 survey identified that more than half of the survey respondents who were aged 65 and over had not carried out any maintenance or repair work on their homes in the previous twelve months (Saville-Smith et al., 2009).

The importance of housing suitability is all the greater when we consider the emerging discourse of health and the delivery of a wider range of diagnostic, preventative and even primary health and medical services to the home. Whilst some countries, like Sweden, have modified apartments to enable wheelchair use and access, and have installed lifts in apartment buildings, others, like the USA and Australia are looking at these challenges for the future, in the context of moving healthcare out of the hospital and into the home (Westrin, 2013).

Conclusion

The purpose of this literature search was to find issues of commonality between DIY home renovations and DIY home modifications specifically for people with disability. Some of the specific impacts, both positive and negative, of home modifications upon people with disability have been considered, with the importance of home and client choice and control being central to client perceptions of how successful modifications have been. Some questions have been raised about the capacity of service providers who deliver home modifications to respond to the choices and preferences of clients, and a broad understanding of the term "DIY" has emerged, one which refers to work done outside of the schemes which deliver these services.

Studies of DIY home renovation have only emerged recently, and do not yet encompass research into home modifications. The descriptions of the various stages of the DIY process provided by Mackay (Mackay, 2011) provide a basis for comparison with how people with disability and their carers approach undertaking home modifications. The range of motivations and the decisions needed to be taken could be related to, and add to, the various rational choice frameworks which Williams (2008) identified, and add to these. Currently, though, issues related to home modifications continue to be addressed largely through technical journals, and those evaluating the effectiveness of particular service and therapeutic interventions. Other than the account by Stewart (2005), there are no directly relevant studies into DIY home modifications, and thus we are at this stage unable to make even the most basic assessments of the extent to which it occurs, the reasons why, and, leading from these, what the size of a possible DIY market for home modifications might be.

Section 4: Methodology

Introduction

This project takes an exploratory, mixed-methods approach to research, using qualitative methods coupled with an economic cost-benefit analysis to answer the four key questions identified in

Section 1: Introduction and develop a suite of point-of-sale and online resources. The methods employed and forecast completion dates are summarised in Table 3 below.

Table 3: Research methods

Method	Participant/s	Data	Stage/Time
Semi-structured interviews: <i>key stakeholder interviews</i> (conducted in person and over the phone)	Representatives from key stakeholder organisations including: <ul style="list-style-type: none"> - Government Departments - Disability and Carer Organisations - Retailers 	Organisations' perspectives and experiences of DIY home modifications	Stage 1: October 2013 – March 2014
Consumer Survey and Industry Survey (online and hard copy)	Individuals: <ul style="list-style-type: none"> - Consumers - Hardware store employees - Pharmacists - Building industry association members 	Individual experiences of DIY home modifications	Stage 2: April – June 2014 (8 weeks)
Economic cost-benefit analysis	Hardware retailers Wholesalers of related products	Sales volumes	Stage 3: April – June 2014
Resource Development	Researchers and funding body		Stage 4: September – November 2014

Ethics approval for the human research elements of the project was sought and granted in October 2014 and March 2014 by Human Research Ethics Advisory Panel (reference numbers 135096 and 145013).

Qualitative methods

Overview

This project uses two different methods to gather qualitative data. 1) semi-structured interviews with representatives of key stakeholder organisations to understand the DIY market from a government, retailer, organisational and agency perspective; and 2) surveys that explore the first-hand experience of people who have undertaken DIY home modification projects or have been involved in the DIY process in a professional capacity.

Stage 1: Key Stakeholder Interviews

The first stage of data gathering involved semi-structured interviews with representatives from a range of disability and carer organisations, relevant government agencies, hardware retailers,

and industry associations (whose members, clients and/or customers include people with disability and their carers). This stage commenced in October 2013 and was completed in March 2014. In total, 20 interviews were conducted. These interviews, (also referred to as key informant interviews) were held with senior managers or their delegated representatives of key stakeholder groups, namely: disability organisations; retailers; retailer associations; wholesalers; and State and Federal Government agencies. Each interview followed the same format, with similar questions asked of each interviewee (see Appendix 2). The key stakeholder groups that were approached for interview are listed in Appendix 3.

Of the key stakeholder groups approached, the three Government agencies were those most likely to be involved in, or aware of, any practices of DIY home modifications, and could provide details of who else in the various systems would be able to assist the research later on. Ageing, Disability and Home Care (NSW Department of Family and Community Services) funded the project and were interviewed to provide information about the funding and regulatory framework for the delivery of home modifications in NSW, and how this may be affected with the progressive rollout of the NDIS. As such, the National Disability Insurance Agency (NDIA) were approached for interview in order to understand how they will fund home modifications, to establish whether this will be able to be done DIY, and also to understand how they may deal with instances where participants or applicants have already done DIY modifications, or insist on doing them DIY. The NSW Department of Fair Trading (Fair Trading) deals with issues concerning licensed tradespeople, in terms of education and information, and complaints. A representative from Fair Trading was interviewed to ascertain the extent to which issues related to home modifications were being dealt with in their office.

Although the focus of this project is upon people with disability and their carers, and the recent disability and aged care reforms in Australia disassociate ageing from disability, an interview was also conducted with the NSW Council on the Ageing (COTA) as disability is not confined to those aged under 65 years. Indeed, it is anticipated that the age of research participants will vary from 18 years to 85 years and over and reasons for undertaking DIY home modification projects will vary a great deal.

Stage 2: Consumer and Industry Surveys

The second stage of qualitative data gathering commenced in April 2014. This stage involves two surveys, containing both open-ended and closed questions. These surveys are designed for:

- Consumers: who may be people with disability and their carers who have completed one or more of the chosen DIY home modification; and
- Industry members: who may be people who are involved in DIY home modification projects – Hardware store employees, Pharmacists, Master Builders Association and Housing Industry Association members, as well as other industry members.

Both the consumer and industry surveys are available online, can be completed over the phone or by mail, and will run for approximately eight weeks (see Appendix 4 and Appendix 5 for copies of the surveys).

Participant recruitment for these surveys will be achieved by utilising the existing communication channels that disability/carer and retailer/wholesaler organisations use to connect with their members or clients. This list comprised the disability/carer and retailer/wholesaler organisations that provided letters of support in the first stage of the research indicating their willingness to

support the project in the future. Communication methods included social media and e-mail communications as well as the distribution of flyers at events or via regional offices (see Table 4



Do you know someone who has modified their home to accommodate ageing or disability?

Have you installed a grabrail, hand-held shower, ramp or something similar for a family member or friend?



Your experiences of do-it-yourself home modification projects matter!

We would love to hear from you if you:

- Have experience of a do-it-yourself home modification project
- Live in New South Wales
- Are over 18 years old

Share your experiences of doing home modifications online here:

http://bit.ly/DIY_consumer_survey

We would like to invite you to complete a survey so that we can better understand why people choose to do home modifications in a do-it-yourself manner. More importantly, we want to know if home modifications done in this manner have made a difference to your quality of life.

The research aims to develop resources to assist all Australians to undertake do-it-yourself home modification projects safely and appropriately.

This research is being undertaken by the Home Modification Information Clearinghouse at the University of New South Wales, with funding from Ageing, Disability and Home Care, NSW Department of Family and Community Services. UNSW Ethics Approval No. 145013

If you require any assistance or have any questions please feel free to ask Nicole McNamara (ph: 02 9385 4529 email: nicole.mcnamara@unsw.edu.au)

and

Figure 3).

Table 4: Participant recruitment methods employed for the Consumer and Industry surveys

Organisation	Surveys advertised via
Alzheimers Australia (NSW)	Website: dementiaresearchfoundation.org.au ,

Organisation	Surveys advertised via
	social media channels
Arthritis NSW	Twitter, Facebook, e-newsletter
Carers NSW	Website: carersnsw.org.au, e-news bulletin (May)
Cerebral Palsy Alliance	TBA in May
Motor Neurone Disease (MND) NSW	Website: mndnsw.asn.au
MS Society (MSS)	Facebook, printed information left for clients in NSW, twitter
People with Disability Australia (PWDA)	Twitter, Facebook
Physical Disability Council NSW (PDCN)	Website news: http://www.pdcnsw.org.au/ , Website: specific issue consultation page , Facebook
Spinal Cord Injury Australia (SCIA)	e-newsletter, Facebook, twitter, SCIA independence expo (April 5, 2014)
Stroke Recovery Association (SRA) NSW	e-newsletter
Vision Australia	NSW client services staff were asked to pass the information on to clients. The flyer in a newsletter which goes to all of the clients in the sixty local client groups we have linked to our NSW Sydney metro and regional offices
Housing Institute of Australia (HIA)	e-newsletters: NSW, Hunter and ACT
Master Builders Association (MBA)	Twitter
Pharmacy Guild of Australia (PGA)	NSW Guild Bulletin (e-mail bulletin - May)



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Have you installed a grabrail, hand-held shower, ramp or something similar for a family member or friend?



Your experiences of do-it-yourself home modification projects matter!

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If you require any assistance or have any questions please feel free to ask Nicole McNamara (ph: 02 9385 4529 email: nicole.mcnamara@unsw.edu.au)

Figure 3: Advertising flyer for the DIY Consumer survey

Each survey is short, taking approximately 10-20 minutes to complete and invites the respondent to describe their own experience of undertaking or advising/assisting with a DIY home modification project.

The surveys collect basic demographic information about respondents (age group, gender, and location – i.e. regional or metropolitan) which may help to ascertain whether DIY is more common in regional NSW or metropolitan, and may influence how resources are disseminated

or in which format. They are also designed to collect basic information about what modifications were done, where they were done (i.e. front/rear access, kitchen, bathroom, bedroom etc.) when they were done (time-period), and whether any assessments (such as an Occupational Therapist assessment) were completed on the modifications. This information will help us to gain a detailed understanding of the types of DIY home modifications that have been completed, as well as the prevalence for professional assessments to be carried out. Importantly, the surveys ask respondents what was good and what was bad about their particular DIY home modification project/s, thus encouraging storytelling to gain a richer understanding of the individual experience of the DIY process and learn about any successes or failures. In addition to this information, both surveys ask respondents about resources which they have used or are aware of, and to identify any types of resources that may be helpful in the future for DIY home modifications. The results from these questions could inform the direction that the resource development takes.

The Industry Survey asks industry members about the advice that they give and resources that they are aware of, which may indicate areas for future training. The Consumer survey also includes five questions based on the EQ5D quality of life instrument (discussed in the next section of this Section). The EQ5D questions were modified slightly to add a *before* and *after* element (see Appendix 3) in order to determine whether the installation of a DIY home modification impacts the quality of life of respondents.

Economic evaluation

Introduction

In the context of the well-established trend of population ageing in Australia and the strong preference of many older people and people with disability to remain safely and independently in their own homes longer, the economic evaluation and modelling will investigate the potential scale and economic implications of DIY modifications, and the role and benefit of government initiatives to provide support to those considering DIY home modifications, such as this project.

The economic component of this project is not a formal, outcomes based evaluation of DIY home modifications. It will however, develop new estimates of the DIY market, and further it will position the value of projects which support the DIY option (such as this point-of-sale project) in perspective of key estimated benefits. The modelling will also enable comparative scenarios to consider the well documented implications of an aging population.

Method

In order to investigate independently initiated and funded DIY modifications, the data sources will be two fold. Firstly, as the primary source of DIY products and materials, the major retail hardware store chains have been approached to provide sales data on product volumes and value. Secondly, this will be supplemented by a survey of consumers who have undertaken a DIY home modification to provide data on modification type, quality of life, and cost. Cost will be measured indirectly through combining specific modifications with the retail data and the NDIS schedule prices.

Specifically the data sources are:

1. Retailer sales data: (Retrospective three years TBC)
 - Sales volumes and value for five defined product groups;

- These data will not include age or demographic details of who purchased the DIY products; and
- Figures will be commercially de-identified in the evaluation.

2. Survey of individuals (Consumer Survey) who have completed a DIY home modification:

As input to the economic evaluation the survey will include:

- Details before and after the DIY modification (Retrospective three years TBC);
- Age and demographic profile (TBC);
- Modification group and cost estimated through retail data, NDIS schedules, as well as associated maintenance; and
- The EQ-5D quality of life instrument supporting Quality Adjusted Life Year (QALY) estimates has been selected as it requires only five multiple choice questions.

The data sources have been chosen as the best available for DIY home modifications and will provide new estimates of DIY market size and trends. There are however limitations to the data. These limitations are as follows:

- The DIY survey is a retrospective questionnaire including before and after DIY framing and is subject to recall accuracy and bias given a potentially extended period since the modification was undertaken.
- The EQ-5D quality of life instrument has been selected to capture potential aspects of mobility, self-care and anxiety, however it is of potentially low sensitivity for minor or lower value modifications such as bathroom grabrails.

Another aspect is that the expected quality of life improvement from a modification could realistically erode over time as an individual's strength, health and mobility decline with age. The home modification/s in this respect may be slowing or delaying this decline, however this remains a complicating confounder in evaluating the cost benefit of modifications across progressively older age groups.

A decision analytic model will be developed to evaluate cost effectiveness. This approach supports assessment of costs and potentially ongoing benefits over a forward timeframe of 10 years. The model also enables combining our consumer survey and retail sales data sources with additional costs and probabilities from the literature. Additionally, given the expected uncertainty in some estimates the model also facilitates multiple scenarios to test the implications for variance in key parameters. The decision analytic model inputs are listed below.

Model inputs:

- Estimated DIY market size and costs (Source: Retailer sales data)
- Probabilities of falls across age groups (Source: Published literature)

- Associated risk following a fall of requiring emergency department attendance, hospital admission, or death (Source: Published literature)
- Estimated reduction in fall risk resulting from modification (Source: Published Literature)
- Estimated cost saving of remaining longer in own home rather than an institutional care facility (Source: Published Literature)

In summary, the cost effectiveness and modelling approach is based on the components as presented in Figure 4 below.

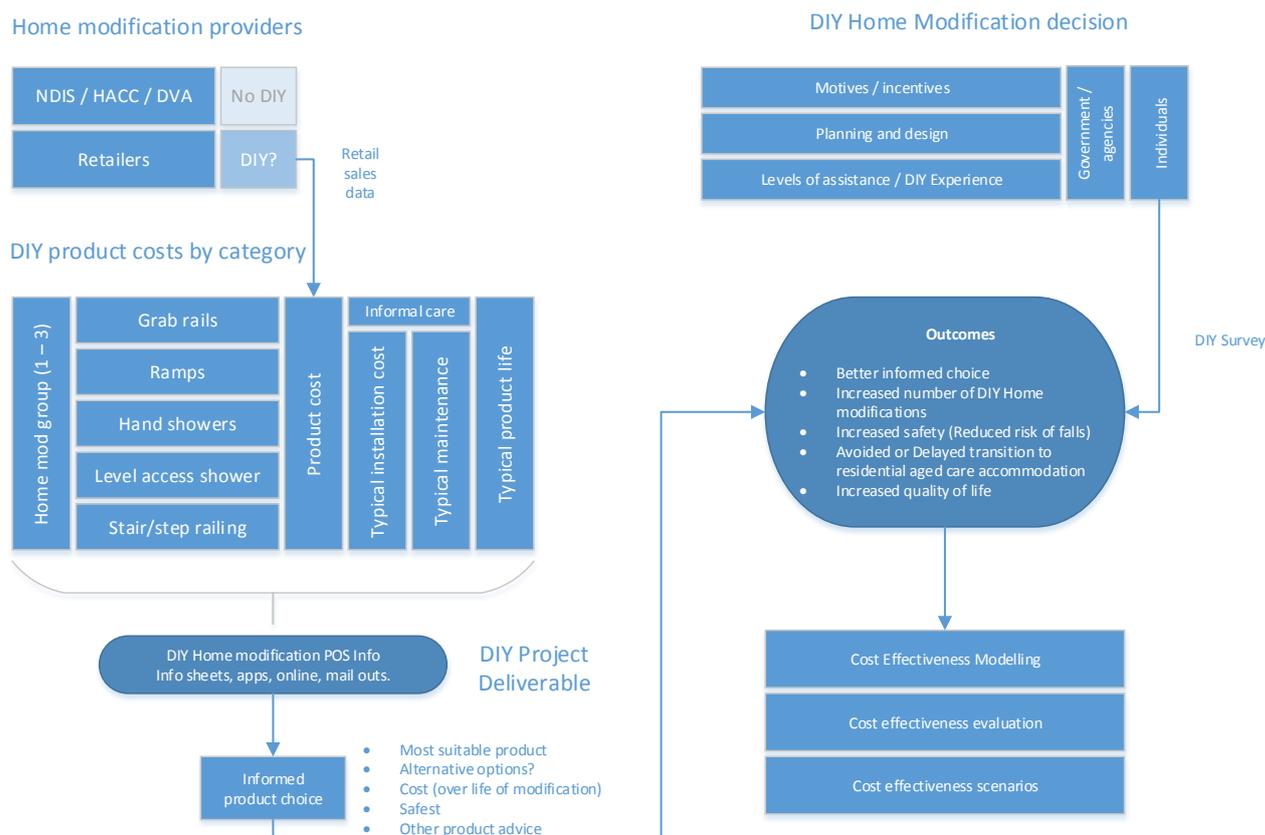


Figure 4: Project economic evaluation components

The sales data will include subgroups for the product categories of grabrails, hand held showers and portable ramps and will be supplemented with figures for typical installation cost, product life and ongoing maintenance. Combined, this will provide an estimated total cost of each modification over its expected life. The data will also be identified for professional trade purchases, to better estimate the target DIY sales. Additionally the data will be reviewed across multiple years to investigate the volume and composition between each category, as well as any trends in growth across years.

Modelling will investigate the cost effectiveness of:

1. DIY home modification
Based on model inputs as above; and

2. DIY home modification – Development of POS Information

Cost of the project, developing material and targeted distribution, compared to aggregate program benefits?

The information resources that will be developed as part of this project is a support intervention to the DIY market, providing better informed product choice and potentially more suitable and safer modifications. In this context, government support and incentives that may stimulate DIY home modifications will be examined in terms of potential outcomes. The potential benefits include better informed DIY decisions, improved safety (reduced risk of falls) and the reduced associated healthcare cost, and potentially reduced home care services in the case that transition to institutional care is delayed. Importantly there are also quality of life aspects, which are also feasibly positive through increased independence, reduced anxiety and potential improved physical and mental health.

The product sales volumes and value will provide the basis of individual DIY modification costs for available groups. These data are comprehensive for grabrails and hand-held showers as these are individual identified products. Other modifications that are constructed from multiple materials, such as ramps and level access showers will be valued using NDIS pricing schedules for benchmark cost.

The DIY consumer survey, aimed at individuals, guardians or carers who have undertaken a DIY home modification will provide a supplementary cost comparison source. As this survey is retrospective, in some cases for a number of years, the data will be subject to recall accuracy. Despite this, the additional source will complement retail sales figures in providing age and other characteristics of individuals. Additionally, costs from the published literature review will be used for reference and to supplement figures where available.

The consumer survey is framed as a retrospective before and after questionnaire covering pre and post DIY modification periods. Questions relevant to the economic evaluation include:

- Type of DIY modification;
- Cost estimated from the DIY modification product group combined with the retail data and NDIS pricing schedule, as well as installation and maintenance costs;
- Age; and
- Quality of life (EQ-5D) – Selected for simplicity of five multiple choice questions while providing a validated health economic instrument for estimation of quality adjusted life years (QALYs).

Proposed future research methods

In addition to semi-structured interviews and the consumer and industry surveys underway, a third method of gathering qualitative data is proposed. This is the use of video ethnography. Video ethnography can provide an in-depth understanding of a small number of participants who have undertaken their own home modifications DIY. This method can illustrate participant behaviours and attitudes about the experience and process of DIY home modification projects. Video ethnography can behave as an anecdotal qualification of research findings, to help translate findings and make them meaningful and comprehensible for the research audience (i.e. people with disability, their carers and governments). Further development is needed on

this proposal, however video ethnography may prove to be a powerful means of storytelling for participants.

Section 5: Next steps

Introduction

The overarching goal of the project is to produce resources that will assist people to undertake DIY home modifications safely and appropriately. This section will explore possible resources which can be developed to assist all Australians in the future to undertake home modifications safely and appropriately. Funding has been allocated to the development of resources from the original project budget.

Proposed resources

Numerous resources designed to provide point-of-sale and online advice and support for people with disability and their carers, as well as older people, will be developed following the completion of Stages 1 and 2 of the qualitative data gathering process. The proposed resources include:

- Quick Response (QR) codes: at the point-of-sale – accessible via a smart phone;
- Videos: online – accessible across multiple platforms;
- Consumer Factsheets: online – retailers, pharmacists, trades professionals and/or occupational therapists etc. can view and print for customers, clients or patients;
- Pamphlets: at the point-of-sale – in-store;
- Training resources: online, or via existing bodies such as the NSW HMMS State Council or Independent Living Centres; and
- In-store events.

QR codes

Smart phones can enable organisations/advertisers to disseminate information instantaneously, without the need for a consumer to take home unnecessary pieces of paper. A QR code is a two-dimensional bar code, commonly used to cause a web page to download into the user's smartphone when scanned with a mobile tagging app (PC Magazine., 2014). Examples of QR codes are shown in **Error! Reference source not found.** and

Figure 6 over the page.



Figure 5: Creative use of QR codes at the University of New South Wales' O-Week 2014 (Source: E.Kucelj, Marketing Officer, FBE, UNSW Australia, 2014)



Figure 6: Everyday use of a QR code on a wine bottle (Source: N.McNamara, 2014)

Video

Video can be an incredibly powerful resource. The Home Modification Information Clearinghouse has produced two short films about the perils of installing a grabrail without proper knowledge, tools, or advice (see Fitzsimon, 2013). These are free to view on YouTube around the world.

Video could be sourced from participants (pending approval from the Built Environment Human Research Panel Ethics) and linked to a QR code at the point-of-sale to provide short (1-2 minute) grabs of pertinent advice or warnings, or to illustrate best-practice examples of DIY home modification projects.

Consumer Factsheets

The Home Modification Information Clearinghouse produces Consumer Factsheets which accompany its Evidence Based Research publications (see www.homemods.info). The findings from this project could be developed into Consumer Factsheets which are peer-reviewed, consumer-friendly, easy to read and easily downloadable.

Suggested Consumer Factsheets include:

- DIY Grabrail Installation – to ensure that consumers have the right rail, the right wall, right fixtures and right position; and
- DIY Hand-held Shower Installation – to ensure that consumers are aware of, and comply with, Standards around water zones and electrical safety, and advantages

and disadvantages of different hose lengths and the importance of grip when selecting a hand-held shower.

Pamphlets

Pamphlets for specific DIY home modification projects could be developed which would contain important information about installation, warranties, maintenance, assessments and safety. These could be distributed through hardware retailers, disability organisations, advocacy organisations and pharmacies, at expos and in-store events, as well as made available online.

Training resources

Findings from this project could identify gaps in the knowledge of industry members (hardware retailers, pharmacists etc.), and could inform the development of training resources specific to DIY home modification projects, such as webinars or in-store workshops.

In-store events

There is some scope for hardware retailers who already conduct in-store events, such as DIY nights, to expand upon the success of these events and introduce DIY home modification events. Events could range from a DIY grabrail installation night to an assisted living event with information for consumers, demonstrations and staff on-hand to ask for advice.

Summary

The need for research into DIY home modification projects in Australia is clear. This need is confirmed in the literature review conducted. Little is known about the extent to which people with disability and their carers, or older people and their carers, undertake home modifications DIY. The experience of the DIY process and the effects of DIY home modification projects on individual quality of life are unknown. As governments move toward person-centred and consumer-directed care within the aged care and disability care sectors and champion consumer choice and user-pays approaches, understanding DIY home modifications will play an important role in providing alternative resources and options for consumers seeking to age in place.

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Appendix 1: Five home modification interventions

1. Grabrails



Figure 7: Grabrails in bathroom
(source: NSW HMMS State Council www.nswhmms.org.au)

2. Ramps



Figure 8: Ramp and handrails
(source: NSW HMMS State Council www.nswhmms.org.au)

3. Hand-held showers



Figure 9: Hand-held shower and commode chair
(source: Chris Nicholls, 2009)

4. Hand railings for stairs and steps



Figure 10: Hand railing for steps
(source: N.McNamara, 2014)

5. Level access shower recess



Figure 11: Level-access shower recess and hand-held shower
(source: Chris Nicholls, 2009)

Appendix 2: Generic Semi-Structured Interview Questions

Generic – Interview Schedule

The following is the semi-structured interview guide employed for this

research. Where the following appears: □□□□□□□□□□,

researchers inserted the name of the organisation.

- Guides or reminders appear through this interview guide. These guides are in Italics and only prompted the research of what to say.
- _ denotes statements by the researcher to informants.
- **Q** denotes questions asked by the researcher.
- **P** denotes either prompt or probe for the researcher.

(Establish rapport)

I would like to start by thanking you for responding so quickly to the request for you to participate in this research. I'm sure your views and insights will assist me in better understanding the reasons why people with disability currently undertake home modifications DIY. With your permission I shall record the interview, for the purpose of making detailed notes later.

Q: Did you receive the Project Information Sheet and the ethical Consent Forms I emailed?

Q: Do you have any questions about the topic areas before we start?

Q: What does your organisation know about the extent to which people with disability and/or their carers do home modifications DIY?

P: check understanding of DIY definition in this context

Q: What do your organisation understand to be the reasons why people with disability and/or their carers choose to do home modifications DIY?

P: economic, location, age, level or type of impairment, type/scope of modification, aesthetics, offers of assistance, expectations of poor professional assistance

Q: What aspects of the planning and implementation of the project process are people with disability and/or their carers mainly involved with?

P: design, project management, building

Q: Where do people with disability and/or their carers source information about the products they require and how to plan and complete their projects?

P: What would be the value of information resources specific to DIY, and in what form could these be most useful to people?

Q: What impact has doing the DIY home modifications had upon the person and their household?

P: Do people talk about their experiences as positive or negative, with pride etc?

Q: What assessments are made about the quality of DIY home modifications?

P: For wellbeing of person, eg provision of instruction to use the modification properly; also service provider, for WHS reasons?

Q: Are you aware of any DIY modifications people have done which have failed, or those which have been very successful?

P: How did people rectify the mistakes? What things stood out for people in the successes?

Q: Would be willing to recruit respondents from members for our project?

P:What would be the most appropriate and effective way to elicit responses?

Conclusion:

Q: So in summary, the main things that you have said are... *(list)*... *(Checking validity of what the participant has said)*.

_ Thank you very much for your time, it has been very helpful – your comments will go a long way to inform the interviews we conduct later in the project with people with disability and carers themselves.

_ I appreciate the time that you have taken to explain all this – I know how busy you must be. If there is anything that you would like to be included that you think of later please feel free to e-mail or phone me with these.

Appendix 3: Key Stakeholder Groups involved in the research project

The following table provides a list of the key stakeholder groups and organisations that were approached to participate in Stage 1 of the research project. These were also referred to as key stakeholder interviews.

Table 5: Organisations approached to participate in key stakeholder interviews

Disability/Carer Organisations	Retailers/Wholesalers	Government Departments
Alzheimer's Australia (NSW)	Award Brands	National Disability Insurance Agency [Commonwealth] (NDIA)
Arthritis NSW	Bunnings	NSW Fair Trading
Carers NSW	Hardware Association of NSW*	NSW Family and Community Services [Ageing, Disability and Home Care department] (ADHC)
Cerebral Palsy Alliance	Home Hardware*	
Council of the Ageing (COTA)	Housing Institute of Australia (HIA)*	
Motor Neurone Disease (MND) NSW	Master Builders Association (MBA)	
MS Society (MSS)	Masters Hardware*	
Muscular Dystrophy Association*	Mitre 10*	
NSW Council for Intellectual Disability (CID)*	Pharmacy Guild of Australia (PGA)	
Paraquad (NSW)	Reece Bathrooms*	
People with Disability Australia (PWDA)		
Physical Disability Council NSW (PDCN)		
Spinal Cord Injury Australia (SCIA)		
Stroke Recovery Association (SRA) NSW		
Vision Australia		

* unavailable for interview

Appendix 4: Literature Search Strategy

The search strategy for the project used the search terms listed in Table 6 below.

Table 6: Search terms pertaining to the research questions used to search databases for relevant information

Modification	Method/Mean of modifying	Impact of modification	Person
grab rail/s, grabrail/s, grab-rail/s	do-it-yourself, do it yourself, DIY	access	carer, caregiver, support work/er, attendant care/er
ramp/s	modification/s, modify	home accessibility	disability, disabled
hand-held/hand held shower/s	adaptation/s, adaption/s	universal/inclusive/ barrier free design	mobility impaired
roll-in-shower	home handyman	barrier freedom	limitation, impairment
level access/level-access shower		access to buildings	impaired/limited/physical mobility
wheelchair accessible		Independent, independence	rehabilitation
wheelchair/wheel chair user		self-care	person-centred

Appendix 5: Consumer Survey

Section 1 – Your experiences of do-it-yourself home modification project/s

Q1. We define a do-it-yourself home modification/s as a “home modification project that is undertaken by a person with a disability themselves or with the assistance of family members or friends.”

a) Do you agree with this definition?

Yes No

b) If NO please describe your understanding of a do-it-yourself home modification

Q2. Which do-it-yourself home modification project/s have been completed?

Please pick the answers which apply. Multiple selections are possible.

- Grab rail/s
- Hand-held shower/s
- Level access shower recess
- Ramp/s
- Hand railing/s for stairs or steps
- Other (please specify):

Q3. What part of the home was modified?

Please pick the answers which apply. Multiple selections are possible.

- Front or rear access
- Bathroom
- Laundry
- Kitchen
- Other (please specify):

Q4. When was the modification done?

Select the time band for the work done, multiple selections are possible.

Time	Grab rail/s	Hand-held shower/s	Level access shower recess	Ramp/s	Hand railings for stairs or steps	Other
2010-2015	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2005-2009	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2000-2004	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1995-1999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1990-1994	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1985-1989	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Before 1985	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q5. Where did you or the person you care for source information about the products required and how to plan and complete the project/s?

Please pick the answers which apply. Multiple selections are possible.

- Hardware store
- Pharmacy
- Disability or Advocacy group
- Friend/Relative
- TV
- Print media (e.g. newspaper or magazine)
- Website
- Other (*please specify*):

Q6. Please describe what was good about doing the home modification project/s do-it-yourself:

Q7. Please describe what was bad about doing the home modification project/s do-it-yourself:

Q8. What assessments were made about the quality of the do-it-yourself home modification project/s?

Please pick the answers which apply. Multiple selections are possible.

- None
- I had an Occupational Therapist assessment done before the home modification project/s
- I had an Occupational Therapist assessment done after the home modification project/s
- I had a building consultant inspect the home modification project/s
- Other (*please specify*):

Q9. What resource/s would assist a do-it-yourself home modification project in the future?

Please pick the answers which apply. Multiple selections are possible.

- Fact sheet
- Brochure
- Smart-phone application (App)
- Online videos
- Print media (e.g. newspaper or magazine)
- Website
- Other (*please specify*):

Section 2 – Your health state (before and after the modification project/s)

Q1. Select a response in one box in each group below to indicate which statements best describe your own health state *before* and *after* the modification project/s. If you are a carer, please indicate which statements best describe the health state *before* and *after* the modification project/s of the person you care for.

	Before	After
Mobility		
I have no problems in moving around	<input type="radio"/>	<input type="radio"/>
I have some problems in moving around	<input type="radio"/>	<input type="radio"/>
I am confined to bed	<input type="radio"/>	<input type="radio"/>
Personal Care		
I have no problems with personal care	<input type="radio"/>	<input type="radio"/>
I have some problems washing or dressing myself	<input type="radio"/>	<input type="radio"/>
I am unable to wash or dress myself	<input type="radio"/>	<input type="radio"/>
Usual Activities (e.g. work, study, housework, family or leisure activities)		
I have no problems with performing my usual activities	<input type="radio"/>	<input type="radio"/>
I have some problems with performing my usual activities	<input type="radio"/>	<input type="radio"/>
I am unable to perform my usual activities	<input type="radio"/>	<input type="radio"/>
Pain/Discomfort		
I have no pain or discomfort	<input type="radio"/>	<input type="radio"/>
I have moderate pain or discomfort	<input type="radio"/>	<input type="radio"/>
I have extreme pain or discomfort	<input type="radio"/>	<input type="radio"/>
Anxiety/Depression		
I am not anxious or depressed	<input type="radio"/>	<input type="radio"/>
I am moderately anxious or depressed	<input type="radio"/>	<input type="radio"/>
I am extremely anxious or depressed	<input type="radio"/>	<input type="radio"/>

Section 3 – A few questions about you (or the person who you care for)

Q1. What is your age group? Or what is the age group of the person you care for?

Please pick one.

0-17 years

18-64 years

65-74 years

75 + years

Q2. What is your gender?

Please pick one.

Male

Female

Q3. Is the house?

Please pick one.

Fully owned (includes if mortgaged)

Being purchased (includes if being purchased under a rent/buy scheme)

Rented through a real estate agent

Rented through a state/territory housing authority

Other (*please specify*):

Q4. What is the name of the suburb or town where you currently live?

Q5. How long have you lived in this suburb or town?

Please pick one.

Up to 12 months

1 – 5 years

5 – 10 years

10 – 20 years

20 + years

Q6. Where did you find out about this survey?

Please pick one.

- Alzheimers Australia New South Wales
- Arthritis NSW
- Carers NSW
- Cerebral Palsy Alliance
- Council of the Ageing (COTA)
- Deafness Council of New South Wales
- Motor Neurone Disease (MND) New South Wales
- Multiple Sclerosis Society (MS)
- New South Wales Council of Intellectual Disability
- Paraquad New South Wales
- People with Disability Australia
- Physical Disability Council NSW
- Spinal Cord Injury Australia
- Stroke Recovery New South Wales
- Other (*please specify*):

Q7. If you answered the survey on behalf of someone else; Are you

Please pick one.

- Paid Carer
- Friend/Relative
- Guardian for child under 18 years
- Guardian for person with Cognitive impairment

Q8. Would you be willing to take part in follow up research?

- Yes No

Q9. Please give us your details so that we can contact you:

Name: _____

Address: _____

City: _____

Postcode: _____

Phone: _____

Email: _____

Appendix 6: Industry Survey

Section 1 – Your experiences of do-it-yourself home modification project/s

Q1. We define a do-it-yourself home modification/s as a “home modification project that is undertaken by a person with a disability themselves or with the assistance of family members or friends.”

a) Do you agree with this definition?

Yes No

b) If NO please describe your understanding of a do-it-yourself home modification

Q2. Are you a:

Please pick one.

- Hardware store employee
- Pharmacist
- HIA member
- MBA member
- Other (*please specify*):

Q3. Which do-it-yourself home modification project/s have you been involved with?

Please pick the answers which apply. Multiple selections are possible.

- Grab rail/s
- Hand-held shower/s
- Level access shower recess
- Ramp/s
- Hand railing/s for stairs or steps
- Other (*please specify*):

Q4. When was the modification done?

Select the time band for the work done, multiple selections are possible.

<i>Time</i>	<i>Grab rail/s</i>	<i>Hand-held shower/s</i>	<i>Level access shower recess</i>	<i>Ramp/s</i>	<i>Hand railings for stairs or steps</i>	<i>Other</i>
2010-2015	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2005-2009	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2000-2004	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1995-1999	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1990-1994	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1985-1989	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Before 1985	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q5. a) Do you provide advice about do-it-yourself home modification project/s in your workplace?

Please pick one.

Yes No

b) If YES please describe what this advice usually entails:

Q6. Please describe what is/was good about being involved in do-it-yourself home modification project/s:

Q7. Please describe what is/was bad about being involved in do-it-yourself home modification project/s:

Q8. What resources are you aware of that may help customers with do-it-yourself home modification project/s?

Please pick the answers which apply. Multiple selections are possible.

- Hardware store
- Pharmacy
- Disability or Advocacy group
- Friend/Relative
- TV
- Print media (e.g. newspaper or magazine)
- Website
- Other (*please specify*):

Q9. What resource/s would help you to provide advice to customers about do-it-yourself home modification project/s?

Please pick the answers which apply. Multiple selections are possible.

- Fact sheet
 - Brochure
 - Smart-phone application (App)
 - Online videos
 - Print media (e.g. newspaper or magazine)
 - Website
 - Other (*please specify*):
-
-

Section 2 – A few questions about you

Q1. What is your age group?

Please pick one.

- 0-17 years
- 18-64 years
- 65-74 years
- 75 + years

Q2. What is your gender?

Please pick one.

- Male Female

Q3. What is the name of the suburb or town where you currently work?

Q4. How long have you worked in this suburb or town?

Please pick one.

- Up to 12 months
- 1 – 5 years
- 5 – 10 years
- 10 – 20 years
- 20 + years

Q5. Would you be willing to take part in follow up research?

- Yes No

Q6. Please give us your details so that we can contact you (Any personal information is protected according to the Australian Privacy Principles 2014):

Name: _____

Address: _____

City: _____

Postcode: _____

Phone: _____

Email: _____