UNSW AUSTRALIA

DIY home modifications: What information is required at point-of-sale?

Final Report

PEER REVIEWED

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Contribution of Authors

Catherine Bridge designed and led the project. She developed the methodology, managed the research process and analysis, and finalised the report.

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Fredrick Zmudzki developed the economic methodology, undertook the economic analysis and drafted the economic section of the final report.

Shelley O'Neil conducted the video ethnography sessions and provided the preliminary video analysis.

Phillippa Carnemolla contributed to the final report writing and generated figures.

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Glossary

ADHC	Ageing, Disability and Home Care
CCSP	Community Care Supports Program
CHSP	Commonwealth Home Support Program
COTA	Council on the Ageing
CPA	Cerebral Palsy Australia
DIY	Do-It-Yourself
DSS	Department of Social Services
HACC	Home and Community Care Program
HIA	Housing Industry Australia
HMMSC	Home Maintenance and Modifications State Council
ILC	Independent Living Centre
MBA	Master Builders Association
MND NSW	Motor Neuron Disease Association of NSW
MODA	Modifications Australia (formerly HMMSC)
NDIS	National Disability Insurance Scheme
NSW	New South Wales
OT	Occupational Therapist
PDC NSW	Physical Disability Council of NSW
PWDA	People with Disability Australia
QR	Quick Response code (readable by a mobile phone)
SCIA	Spinal Cord Injuries Australia
SRA	Stroke Recovery Association NSW

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Executive Summary

This report presents the final findings of an interdisciplinary research project examining the phenomena of 'Do It Yourself' (DIY) home modification projects undertaken by the general public outside of any government funding program. The rise of the DIY culture, fuelled by reality shows and media in conjunction with a can-do spirit has always been valorised and is seen as a part of taking greater personal control and responsibility for what's important. Recognition particularly more recently that people including those with disabilities routinely consume as part of the effective accomplishment of everyday life creates a new agenda, one more focused on relatively mundane commodities and on ordinary processes of use and acquisition in and around the home as a response to disability itself.

The fact that all people prefer to remain at home as they age irrespective of some level of disability or impairment makes the analysis of the practice, costs, benefits and liabilities of undertaking home modification as a 'Do It Yourself' (DIY) activity significant. Further, the increasing importance placed on policies directed deinstitutionalisation, restorative care and community home support make understanding the role of DIY home modifications critical as home modification has been shown to substitute for care by increasing the accessibility and usability of the home, whilst improving an individual's ability to function and contributing to greater feelings of dignity and security.

This New South Wales based research project examined DIY home modifications for people with disability of all ages and their carers. The key research questions that this project aimed to address were:

- the current size of the DIY home modifications market in NSW and its potential growth;
- consumer attitudes towards DIY and their experience of DIY home modifications;
- industry and retailer attitudes towards DIY and their experience of service provision in this context; and
- the development of resources to assist people undertaking DIY home modifications.

Background

The move to home based care is reflected in recent changes to disability services and aged care sectors in Australia including the introduction of the NDIS and the implementation of the Living Longer Living Better aged care reform package. The aged care reforms include a move to consumer-directed care which will give older consumers of those services more control over how their funds are spent, including on home modifications. The NDIS is an insurance model approach to disability care, which aims to individualise care and give participants greater choice and control of their care packages. Neither the NDIS nor the aged care reforms accommodate home modifications, which are undertaken on a DIY basis by a participant/care recipient or their family and friends. Individual packages of care do however give people more

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control over how they spend their funds and for what, including home modifications. Additionally, considering that people who are ineligible for government funding schemes are likely to choose to do home modifications themselves, it is necessary to understand the current extent of the DIY market and ensure the provision of information and resources to assist individuals to undertake home modifications safely. While the number of home hardware providers around Australia has increased steadily over recent decades, the legislative and policy framework for government interaction is undeveloped and the research evidence base to underpin policy development is non-existent.

Method and techniques

The research project was divided into six methodological stages and utilised mixed method techniques:

Stage 1: A literature review and policy review of home modification schemes, funding initiatives, and DIY more broadly which resulted in the *Positioning Paper: DIY Home Modifications: Point-of-Sale Support for People with Disability and their Carers* has already been published see Bleasdale, McNamara, Zmudzki, & Bridge (2014).

Stage 2: Semi-structured interviews with industry bodies, consumer organisations and government agencies.

Stage 3: Two parallel surveys. One directed to consumers who choose to undertake 'DIY home modifications' and the other, directed to industry providers of DIY products and advice. The surveys were supplemented by video ethnography of a stratified sub sample of consumers who had undertaken DIY home modifications.

Stage 4: An economic analysis to estimate the size and potential growth of the DIY market in NSW

Stage 5: A video ethnography was conducted four people selected from the 'Do it Yourself" survey and who indicated that they were willing to participate in further research. The ethnographic research entailed a sit down interview, actuality interview, video observation, and accompanied shop

Stage 6: Public and industry engagement via a 'World Café' forum regarding the type of resources that might be of greatest assistance to consumers and providers in the future.

Understanding of the point-of-sale purchase experience provides insight into what works and what doesn't for individuals as each person 'unpacks' and vocalises their thought and behaviour process during their home modification experience, providing some insight into what is in mind during the process for them.

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Stakeholder experience summary

Most participants reported a generally positive experience of the DIY process enabling participants to maintain a sense of control and independence. Negative aspects of the DIY experience were related to a lack of information around products and doing home modifications, and issues in communicating the needs of a disabled person to tradespeople. Time and cost were also significant motivators. Many respondents mentioned that they were unable to wait to have the modifications done through a government program, particularly if there was limited time between a person returning from hospital and requiring a home that was adequately modified to address their needs. DIY modifications were also seen as cost effective. Other motivations included trust, expertise and confidence, having the required knowledge, availability and ease, and sustainability.

Consumer responses ranked hardware stores as the most utilised or popular place to source information about DIY. Friends and relatives also scored highly; followed by websites and disability advocacy groups. Print media, TV, and pharmacies, were the least utilised sources of information. Participants indicated that the resources they would find most useful would be fact sheets, websites and online videos.

Representatives from government agencies and industry mostly reported positive accounts consumers DIY experiences. However some expressed concern over the competencies required to complete home modifications safely. Very few official assessments were made of DIY home modifications. This was probably due to the fact that DIY is necessarily done outside of government funded schemes and the checks and assessments such programs entail. Maintaining control, cost, time, lack of trust in tradespeople, and individual expertise and confidence were cited as reasons for an undertaking DIY home modifications.

State and local governments, home care agencies, consumer organisations, and occupational therapists, were all considered sources of information about DIY home modifications. In store, advice was given specific to the client's needs. It was suggested that information resources specific to DIY home modifications would be useful and that the resources should be tailored to the different groups requiring modifications, their different life stages, and made available in a variety of formats.

Economic Analysis

A decision analytic model was developed to estimate cost effectiveness of DIY home modifications and our results confirmed in the retail data of at least 15,000 modifications per year, the annual cost offset to health and aged care services would be in the order of $3.75 million per year. This is a conservative estimate and it is potentially 3 or 4 fold this quantity of modifications; in which case the net cost saving could be as much as $15 million per annum. The main conclusions are firstly, that government programs to support 'DIY home modifications', for example through point of sale and other information sources, are potentially cost effective for both consumers and governments. Secondly their market share has been growing and will continue to

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grow into the future. Importantly, we also found that DIY home modifications are a significant part of the Home Hardware market in NSW.

Resources

There was a recognised need for resources that would help consumers make informed choices about home modifications. The resources addressed included websites, factsheets, purchase dockets, shelf strips and online videos. A major point of discussion was whether QR codes would be a useful inclusion in these resources.

Websites were considered most useful as an information source prior to a store visit. They were valued for both general and specific searches and were seen to be quick and easy to use. Fact sheets were regarded as an important resource and it was suggested that QR codes linking to further material would be a useful inclusion.

Participants indicated that price, product name and barcodes were essential content for shelf-strips. QR codes were considered a viable option to link to further information but not essential. Purchase dockets were not seen as a useful way to provide further information, for example with the addition of a QR code, other than purchase history.

There was a positive response to video material. It was seen as worthwhile to make this content available through websites and linked from other resource types through the use of QR codes.

Conclusion and Recommendations

This empirical study of home DIY is the first to explore and elaborate, the motives, success and failures in the relationship between older people, people with disabilities and their carers with home hardware and trades in relation to the DIY materials they buy and use to address, restore and prevent functional disability within the home environment. Having underlined the dynamic but also pragmatic nature of this relationship we suggest that new combinations of knowledge, materials and skills arise from and are important for the formulation of these types of DIY projects. The results from the combined data collection support the project's initial premise to develop point of sale resources. In particular, the inclusion of video material and QR codes is seen as useful and should be considered in the development of future resources.

It is recommended that further research be conducted into understanding the most effective mechanisms for providing the type of information resources identified as needed by this research to the people who need it most, particularly given the changing nature of home hardware offerings and distribution of knowledge, skill and competences involved in doing DIY.

Additionally, the research revealed that there is a role for DIY home modifications in palliative care contexts and that further research should be undertaken to ensure that timely and appropriate advice is provided to ensure quality of life is maintained to the highest degree possible despite deteriorating health.

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Introduction

This final report concerns the results of a large mixed method exploration of the practice of 'Do it Yourself' (DIY) home modifications as relevant to the experience of policy makers, industry and consumers within NSW, Australia. This research found substantial numbers of home modifications are undertaken on a DIY basis without government assistance. For instance, reasons given by consumers for undertaking 'DIY home modification' independently included: being ineligible for funding, lack of trust in the government and service providers, time constraints, cost savings, aesthetics, and the desire for greater choice, control, and customisation of the modifications.

The report is structured into several sections. First, it defines the term DIY in the context of responses by older people, people with disabilities and their carers making changes to their homes to improve their ability to: do; be and become. Second, it provides some context in terms of policy. Third, it sets out the projects aims and methodology. Fourth, it summarises the stakeholder interviews, clarifying and contrasting motivations, concerns and expectations. Fifth, it provides an economic analysis of the DIY market. Six, it explains the video ethnographic process and findings. Seventh, it presents the results of the Policy world café forum. Lastly it concludes by summarising the key findings and presenting some recommendadtions and ideas for future research.

Defining DIY

The definition of DIY (do-it-yourself) in the context of home modifications can be problematic. This is in part because definitions of DIY commonly exclude assistance from friends, family or professionals, however they recognise the importance of recruiting the relevant professional when there is a need for specialist skills or qualifications (Bridge et al. 2014; Davidson and Leather 2000; Mackay 2011). Therefore, in the context of DIY home modifications for people with disability of all ages, we advocate a broader definition of DIY. In this section, we firstly outline our definition of DIY before discussing participants' understanding of the term and propose subsequent modifications or alternative definitions.

For the purposes of this report, the definition includes people with disability of all ages, including owner builders, who may enlist the assistance of professionals, handymen, relatives and friends, as long as the person with disability retains control over:

- Design of the modification
- Product/component choice
- Position in which the modification is placed; and
- Cost of the modification.

This definition allowed for people who were not home owners, but excluded the following:

- Home modifications which are undertaken as part of a funded home

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modifications scheme regulated by a State of Federal agency; and
- Home modifications which have been prescribed by an Occupational Therapist, or other professional.

Therefore, we defined DIY home modifications as a "home modification project that is undertaken by a person with disability themselves or with the assistance of family members or friends" and we asked participants whether they agreed with this definition. The results showed that 91.1 % of consumers and 72.7% of industry respondents agreed with this definition. The strong rate of agreement by consumers could reflect a differing view of independence and self-provision as informed by their disability. Depending on the context, there are varying levels of control over and input into the modifications that can still be defined as DIY even though they may require assistance from others. The higher degree of disagreement with the definition in industry responses could reflect an attitude that doesn't acknowledge that independence and self-provision may manifest along a trajectory that progresses from full control and DIY to a higher degree of input from others. This may also reflect differing opinions socially and culturally on how a functional body should perform.

Both groups offered alternative definitions to DIY. These invoked differing levels of assistance in the designing, planning, management and installation phases. Typical of the idea that DIY home modifications allowed for the assistance of others were quotes such as these:

> *"Home/modifications designed by person with disability, but constructed by professional trades working under instruction of PWD" (C15)*

> *"Undertaken by a person with a disability themselves or with the assistance of family members or friends or completed by a competent person under instruction from the disabled person" (C20)*

Others placed great emphasis on the self-provision aspect of the definition in that doing it yourself meant that the individual should take ownership of all the tasks:

> *Anything done without assistance of a trade person. 'Do It Yourself' is exactly what it says. (18)*

Others placed more emphasis on the modification part of the definition rather than the DIY part:

> *"doing necessary work to make safe ability for an elderly person" (C30)*

> *"Having new items installed or existing items modified to make life easier for a disabled resident" (C35)*

The semi-structured interviews reflected similar attitudes to the DIY home modifications definition used in this project as those revealed in the survey. Some respondents maintained that it meant the individual did the modifications themselves while others accommodated the broader definition. For example, the following quotes are indicative of those who believe that DIY home modifications can include assistance from others:

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> *So it's making their own assessment of what they need and possibly going and buying bits and pieces and putting them in themselves, or getting a family member to install a handrail for them, or put a ramp in, or that sort of thing. (Arthritis NSW, 14122013).*

Other respondents adhered to a more traditional and restrictive view of home modifications believing that DIY home modifications meant the person needing the changes made them without assistance.

> *Well I take it literally as DIY – well I will do things myself, other than pay big bucks to get a service provider to come in (Carers NSW 14112013)*

> *In the building industry do-it-yourself will relate direct to a non-licenced person doing it, generally, so do-it-yourself may mean that you yourself go off to Bunnings and buy a handrail and put it in yourself as opposed to getting a handy person or a licenced contractor to do the work and there are problems with doing it yourself. (MBA 31012014)*

The varying degrees of agreement and opinions on what constitutes DIY home modifications may have influenced our respondants responses to the other questions asked in interviews and surveys. The variation in definitions reflects some to be expected diversity in understanding of disability, independence and agency. However, the majority of respondents from both industry and consumer groups agree with the definition proposed by the project which demonstrates an understanding that DIY home modifications in a disability context are generally self-funded and may require assistance from others to complete. It is important to have the definition of DIY home modifications established so as to consider how the responses to this and other questions reflect the experience of people with disability who undertake home modifications.

Background context to the research

This research 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. As communicated in the positioning paper for this research (Bleasdale, McNamara, Zmudzki and Bridge, 2014), the emergence of DIY home modifications as a phenomena is unsurprising as Home Modifications are one way to support independence and make it easier and safer within the home environment.

The current policy reform environment has shifted toward home-based support in both aged and disability care, increasing consumer expectations of choice and control including thr ability to remain outside instiional settings. Consequently, 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* (LLLB) aged care reform package.

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This is important in the context of acknowledging that the vast majority of Australia's housing stock was not built to accommodate ageing in place and with new built housing accounting for only 2% of Australia's housing stock each year (National Housing Supply Council, 2010), there is a critical supply-side shortage of suitable accommodation, let alone accommodation that is bespoke to a particular persons needs and wants.

Ageing in place reduces pressure on health and aged care systems by reducing dependence on institutional care and is therefore a preferred option for government policy makers and providers. (Tinker, 1997; Wiles et al., 2011). Ageing in place and deinstitutionalisation more generally are seen as having benefits to individuals, the community and government. On an individual level, the ability to remain in one's home while ageing or experiencing disability helps support and maintain independence, autonomy, and social connections (Wiles et al., 2011, p. 1). At a community level, having older people and people with disability remain active members of the community; can ensure that their civic contributions are maintained and that the greater community retains diversity.

As Australia and the world move toward the largest aged population in history, all policies that lessen the burden on health and care systems and which encourage social sustainability and participation, as well as active ageing, are becoming increasingly important. For instance, within Australia, the population of people aged 65 years and older is projected to increase rapidly from 3.2 million in 2012 to between 5.7 and 5.8 million in 2031 (Bleasdale et al., 2014) . More significantly, the population percentage of people aged 85 and older will increase from 1.8% in 2012 to between 4.5% and 6% in 2061. This is a significant increase in the aged proportion of the population and will put considerable pressure on aged care and disability support systems and is only likely to increase the drivers for the DIY Home Modification phenomena.

Concurrent with significant demographic change, is the increase in client expectations of receiving support at home, including increasing demand for home modifications. Historically, government schemes to fund home modifications have existed in some form for eligible participants since the first world war when the Department of Veterans Affairs started to develop policy and funding for veterans with serious injuries that left them with residual disabilities, this service was then extended to cover their children and war widows. Since that time, access by a wider range of Australians was made possible with the advent of National Home Modification subsidies to support deinstitutionalisation and ageing in place policies under the Commonwealth Home and Community Care (HACC) program that was established in the late 1980's.

The Home modification program was particularly well established and developed within the State of NSW. More recently, this program has been rebadged and re-launched as the Commonwealth Home Support Program (from 1 July 2015) under the National 'My Aged Care' portal and under this scheme some government home modification subsidy is possible for those over the age of 65 years. For those under 65 years of age, the National Disability Insurance Scheme (NDIS) came on line as a pilot scheme in 2014

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and the transition to full National coverage is planned to rollout over the next three to five years, access to subsidised home modifications are a funded part of this person centred approach for eligible participants. Nevertheless, government concern about the economic sustainability of current approaches, the lack of knowledge, potential for gaps make this research into 'DIY Home Modification' significant.

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Aims and Methods

The research undertaken and reported on in this report, aimed to address the following two problems:

Little or no research into home modifications that are undertaken *outside* of government-subsidised schemes, such as people either commission tradespeople directly or undertake work themselves (both identified as DIY in this report).

Need to understand the impact that undertaking DIY home modifications may have on individual wellbeing, ability to age in place, and economic and wellbeing outcomes for policy and reform agendas.

The overall goal of this project was to conduct research to enable an understanding of the type of resources required to assist all Australians to undertake DIY home modification projects more safely and appropriately into the future.

The research considered the five most common DIY product types, as follows:

- Grabrails
- Ramps
- Hand-held showers
- Level-access shower recesses
- Hand-railings for stairs and steps

Research began in 2012 and was completed in 2015. The semi structured interviews were conducted in 2013-2014. Surveys were conducted in 2014. The video ethnography component of the research was conducted from late 2014 till early 2015. Data analysis was conducted from late 2014 to early 2015. Development of the prototype resources was conducted from early to mid-2015 to inform our policy forum.

Research Questions – Qualitative Research

The key questions that directed this research were:

1. How many people are not utilising government-subsidised Home Modification and Maintenance Services and are undertaking DIY home modifications?
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?

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From these key questions the following sub-questions emerged:

a. What impact has undertaking DIY home modification had on the person and their household?

b. What assessments are made about the quality of the home modification project/s?

c. In what aspects of the planning and implementation of the DIY process are people with disability and/or their carers mainly involved?

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 their DIY 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 investigated the estimated size and composition of the DIY home modifications market and developed cost effectiveness modelling scenarios. These scenarios examined the respective costs, benefits and DIY trends in NSW, Australia. The following research questions were asked:

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 in providing 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?

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 conducted in the positioning paper that support this project suggest that, in NSW and Australia, home modifications play an important role in:

- enabling ageing in place;

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- improving independence; and
- facilitating participation.

Research Stages

This multi-method research project was divided into six stages:

Stage 1: A literature review and policy review of the home modification schemes, funding initiatives, and DIY more broadly.

Stage 2: Semi-structured interviews with industry bodies, consumer organisations and government agencies.

Stage 3: A questionnaire survey of consumers who choose to do home modifications DIY and industry providers of DIY products and advice.

Stage 4: An economic analysis to estimate the size and potential growth of the DIY market in NSW

Stage 5: A video ethnography of DIY home modifications.

Stage 6: Public and industry engagement via a 'World Café' forum about the intended development of Point of Sale (POS) resources.

Stage 1: Literature and policy review

The results of the Stage 1 literature and policy review can be found in the positioning paper previously published by Bleasedale et al (2014), while stages 2, 3, 4, 5 and 6 are covered in this final report. The literature review drew on academic articles, books and journals, and non-government and government policy documents, to report on the current opportunities for funded home modifications, and the reasons as to why people may choose the DIY option. The policy review drew upon key policy documents at Federal and NSW state government level, particularly in the context of the aged care reforms and the NDIS, which is being rolled out nationally from 2014-2018.

Stage 2: Semi-structured interviews

In-depth semi-structured interviewing techniques are a well-established method to gain knowledge and understanding of various stakeholders' perceptions and views of older persons' housing (Judd et al. 2004; Morris et al. 2005; Quinn et al. 2009 cited in Bridge et al. 2011). The usefulness of such an approach can be applied to understanding perceptions of home modifications for people with disability of all ages, particularly considering that disability increases with age. Interviews were conducted with 12 consumer organisations, two government agencies, and four industry organisations. The interviews were divided between two researchers with one researcher per interview. All interviewees were provided with a participant information sheet and required to sign a consent form (See appendices 1 and 2).

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Consumer organisation interviews

The consumer organisations interviewed were:

- Alzheimers Australia NSW (11 March 2014)
- Arthritis NSW (14 December 2013)
- Carers NSW (14 November 2013)
- COTA NSW (28 November 2013)
- Cerebral Palsy Alliance (17 December 2013)
- Motor Neurone Disease NSW (26 November 2013)
- Multiple Sclerosis Society (22 December 2013)
- Physical Disability Council NSW (26 November 2013)
- People with Disability Australia (29 November 2013)
- Spinal Cord Injuries Australia (1 November 2013)
- Stroke Recovery Association NSW (25 November 2013)
- Vision Australia (19 December 2013)

All consumer organisation interviews were recorded with consent, and transcribed. The semi-structured questions and themes are attached in appendix 3**.** The main topics and themes addressed the types of data and information both collected and provided by the organisations; motivations for people undertaking DIY home modifications; planning and design preferences; level of assistance provided; experiences and impacts of undertaking DIY home modifications; and asking if the organisation would support the project research further by providing a letter of support and assisting in recruiting their members to complete the surveys. Results were analysed using NVivo qualitative analysis software. The coding themes for the interviews and the coding tree are available in appendices 4 and 5 respectively. The coding themes were applied to all interviews, including those with government agencies and industry and retailer interviews.

Government interviews

Interviews were conducted with two relevant NSW Government agencies:

- NSW Fair Trading (27 November 2013)
- Ageing, Disability and Home Care agency of the NSW Department of Family and Community Services (27 November 2013)

The semi-structured questions and themes discussed in the interview are attached in appendix 3**.** The themes reflected those asked in the consumer organisation interviews. Results were analysed using NVivo software. The thematic nodes used to frame and analyse the data from the interviews and qualitative components of the surveys are attached in appendices 4 and 5.

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Industry interviews

Industry organisations that were known to be involved in providing information to consumers concerning home modification were contacted and interviews were conducted with four industry organisations:

- Bunnings Alexandria (3 December 2013)
- Housing Industry Association Ltd (26 November 2013 via teleconference)
- Master Builders Australia (26 November 2013 via teleconference)
- Pharmacy Guild of NSW (5 March 2014)

In Australia, the majority of hardware stores sell handrails and grabrails, pharmacists also sell Showering aids, some of which may also be hired on a short term basis (e.g. clamp on rails, handshower adaptors and bed poles etc.), while the Housing Industry Association and the Masters Builders Association have building advice services which inform their members and consumers about what is possible. For example, the renovations market is often considered in the context of it being a single major component of the overall residential building industry. However, there are many diverse segments. A recent report by the Housing Industry Association cited the huge growth in non-professional builders and the ageing of the bay-boomers as major drivers in DIY renovation activities (HIA, 2014).

Two of the industry interviews were conducted in person and two interviews were conducted via teleconference. The semi-structured questions and themes for these interviews are attached in appendix 3**.** Results were analysed using NVivo software. The thematic nodes used to frame and analyse the data from the interviews and qualitative components of the surveys are attached in appendices 4 and 5.

Stage 3: Surveys

Two surveys were conducted. One was directed at consumers, the other at industry. The consumer survey comprised three sections (see appendix 6). Section 1 "Your experiences of do-it-yourself home modification project/s" (Q1-9) enquires about consumer experience and opinions of DIY home modifications. Section 2 "Your health state (before and after the modification project/s)" (Q1) is intended to understand whether the modifications have improved, maintained or decreased the recipient's health. Section 3 "A few questions about you" (Q1-9) collected demographic data.

The industry survey was divided into two sections (see appendix 7**)**. Section 1 "Your experiences of do-it-yourself home modification project/s" (Q1-9) pertained to participants' experiences and opinions of DIY home modifications. Section 2 "A few questions about you" (Q1-6), collected demographic data.

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Surveys were available in hard copy and online through Key Survey[1]. The surveys provided participants with the project information and the decision of a participant to complete and return the survey was understood as consent. Due to the low response rate to the industry survey, a researcher was required to visit the local hardware stores to distribute and collect the completed surveys. A total of 45 consumer surveys and 33 industry surveys were completed. Paper (hard copy) surveys were manually entered into the Key Survey portal. The surveys were analysed using the Key Survey Report tool, NVivo qualitative software where possible (only answers which allowed a qualitative response), and manually.

The recruitment of participants was dependent on whether participants were being recruited for interviews or surveys. Relevant consumer organisations, government agencies, and industry groups were contacted and permission granted to conduct an interview. The relevant authority within each organisation was also required to sign a letter of support so that we could continue conducting research within their organisation. This was necessary to distribute the surveys. Consumer survey respondents were recruited through mailing lists, websites and newsletters of the organisations that supported the research. The survey was available both online and in hard copy.

Industry surveys were distributed through stores where store managers had agreed that staff could complete the surveys. This momentum did not always translate to the store floor. Store staff were often busy and did not prioritise the survey which resulted in low completion rates. To rectify this, a researcher was given permission to visit stores to distribute and collect surveys. This ensured that the sample size was statistically significant.

Data was analysed with NVivo, a qualitative analysis software program, with reports from Key Survey, and manually.

Stage 4: Economic analysis

The economic evaluation includes two components. Firstly data sources developed provide a retrospective analysis based on both sales value and volume of DIY products for the three year period 2010 to 2013, for NSW Australia. This provides an initial previously unavailable estimate of the size, composition and growth trend of the DIY market.

Secondly, to provide context to the scale and potential benefits of DIY home modifications, a basic model has been developed combining the DIY retail product

[1] Key Survey is an online software package that facilitates data collection and analysis in a secure, controlled environment.

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figures and data from previous published research into the costs and effectiveness of home modifications, as well as related aspects, such as falls in the home.

Five common modifications were chosen for investigation, these are:

- grabrails;
- ramps;
- hand-held showers;
- level-access shower recess; and
- hand railings for stairs and steps.

A decision analytic model was developed to evaluate cost effectiveness (Figure 1). This approach supports assessment of costs, and potentially ongoing benefits, over a forward timeframe of 10 years. The model also enables the integration of the 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:

- 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) (Bridge et al. 2014)

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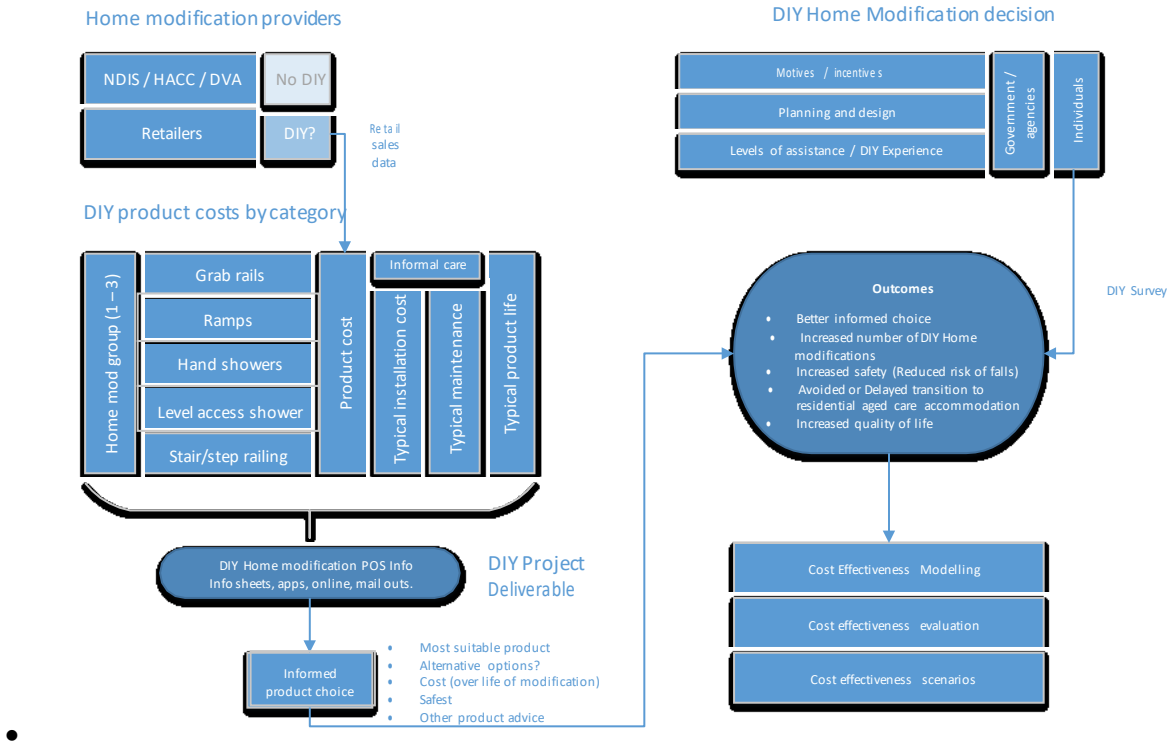


Figure 1. Economic evaluation components

In this study a cost effectiveness approach was undertaken to reveal the size and potential growth for the DIY home modification market in NSW. A cost effectiveness study incorporates health benefits into the economics of an evaluation by using health-related quality of life (HRQoL) outcomes. HRQoL measures are then used to calculate quality-adjusted life years (QALYs) gained (Davis, Robertson, Comans & Scuffham, 2011).

Quality Adjusted Life Years (QALY) account for time in various health states as a result of an intervention (in this case a home modification) and convert to units that are comparable across health care interventions. It should be noted that QALYs are not a perfect outcome measure, with a number of technical and methodological shortcomings (Phillips, 2009; Round, 2012, Bobinac, van Exel, Rutten & Brouwer, 2014). However they are a broad, summary outcome measure in which years of life are adjusted to account for patient utility. The QALY continues to be a well-established and globally-preferred standard measure of quality of life (Muennig & Bounthavong, 2016; Round, 2012; Karmon, 2015).

In order to calculate QALY's for analysis an instrument that assesses Health Related Quality of Life (HRQoL) is included as part of the survey. There are a number of the HRQoL instruments available and they are slected based on validity and most appropriate for the sample, size and location of the study (Tian-hui & Lu, 2005). In this study the EQ-5D has been selected for a number of reasons. First, it asseses health aspect dimensions relevant to home modification interventions including mobility, self-care, activites, pain and depression. Second, the EQ-5D is a well-established and commonly used instrument internationally (Gusi, Olivares & Rejendram, 2010). Third,

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the EQ-5D has been validated across a broad range of populations and is a generic measure (not disease-specific) (Marra, Woolcott, Kopec & Shojania, 2005).

The QALY approach used in the EQ-5D instrument seeks to express the value of changes in quality of life and length of life in a single number by attaching quality of life weights to different states of health and illness and then multiplying those weights by how long the states last. Thus the `Q' in the QALY is calibrated on a cardinal scale between 0 (for dead) and 1 (for full health). So one QALY represents one year of life in full health, or two years in 0.5 health, and so on.

Figure 2 illustrates the assumed trajectories and weights in our economic evaluation methodology and as such serves to illustrate the assumptions inherent on how DIY home modifications impact on individuals wellbeing. Recent research indicated that some dimensions of the EQ-5D, together with key demographic data such as household status, could be used as a proxy for measurement of subjective wellbeing (De Vries, Cubi-Molla, & Devlin, 2012 cited in Bridge et al. 2014).

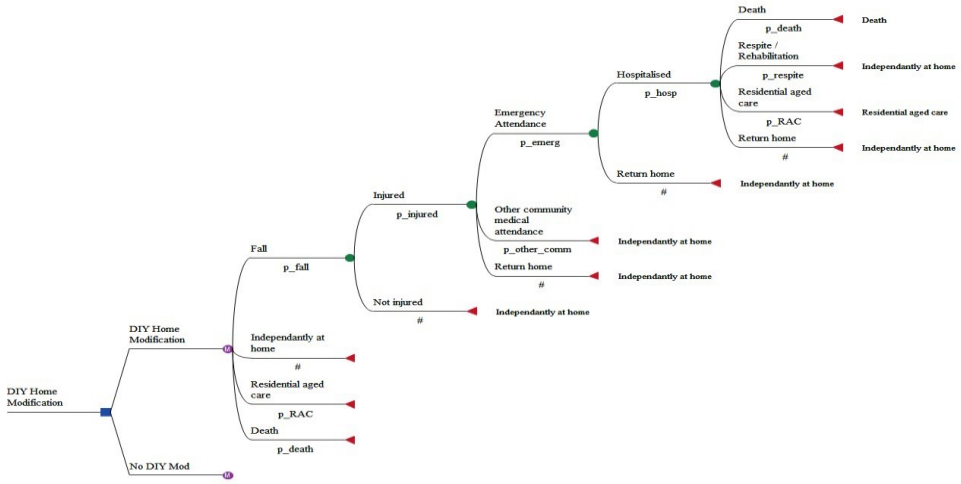


Figure 2. Markov modelling of the impact of home modifications on wellbeing

The modelling was not undertaken as a formal outcome based analysis, rather as a framework to examine the retail cost data in terms of potential benefits forward over several years. This enabled the cost effectiveness to reflect the characteristic timing differences, where DIY modification costs are undertaken substantially up front, while the benefits then result over several years.

Stage 5: Video ethnography

A video ethnography was conducted with four participants who were selected from the survey respondents and who had indicated that they were willing to participate in further research. Video participants represented a stratified sample composed of two female participants, one of whom resided in an urban area and one rural, and two male participants, one urban and one rural resident. A professional video ethnographer, Shelley O'Neil of 'Jump the Fence', was contracted to do the interviews and filming. All

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participants were sent participant information sheets which included both consent and revocation of consent forms which were required a signature (see appendices 8 and 9). The ethnographic research entailed a sit down interview, actuality interview, video observation, and 'accompanied shop' as outlined in table 1.

Table 1. Ethnography methodology and outputs

Methodology	Key Output
Sit Down Interview	
In-Home 1-on-1 or paired interview. Researcher leads a focussed exploration of issues to enable participant's detailed report.	Understanding of how disability affects day-to-day life for participants, their need for home modifications, their means for pursuing a DIY option and their installation issues.
Actuality Interview	
Interview during participant's daily home activities and while using product in-home.	Insight into the physical reality and accessibility of the participant's home, how they use their private and personal space and how their products needs fit into that.
Video Observation	
Daily home activities and product participation in-home in a fly-on-the-wall fashion.	Understanding of the participant's physical needs and environment at a level beyond reporting.
Accompanied Shop	
Travel with participant to the retail outlet, record video observation of participant engaged in purchase of product, and interview participant during the process.	Understanding of the point-of-sale purchase experience as participant's 'unpack' and vocalise their thought and behaviour process during the shopping experience. Insight into what is in mind during the process.

The objectives of the video ethnography were to:

- Understand how disability affects day-to-day life for the participants
- Gain insight into the physical reality and accessibility of the participant's home
- Understand the participant's need for home modifications, exploring their means for pursuing a DIY option and associated products needs
- Relate their process from need to installation identifying the challenges and/or relative ease of installation
- Discuss factors around product choices; research methods, the retail environment, cost, and planning for future modifications
- Provide anecdotal evidence of the considerations, benefits, efficacy and ongoing maintenance requirements of the five home modifications product types
- Provide material to be used within QR code Point of Sale information videos.

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Stage 6: World Café: Development of point-of-sale resources

The research team hosted an industry forum in which participants were asked to provide feedback on current and prototype point-of-sale resources using the World Café methodology. Representatives from consumer organisations, industry, and government attended the forum. The first part of the forum was used to present preliminary results from the research. The second half was allocated for the World Café session (see appendix 10).

The World Café is an "innovative *methodology* that enhances the capacity for collaborative thinking about critical issues by linking small-group and large-group conversations. … The World Café utilizes the principles of dynamic networks and living systems to access a source of deeper creativity and shared knowledge that might not be available through more traditional approaches to collaborative work" . This encourages participants to discuss the material and suggest ideas that, in this case, could improve the usefulness, content, design, distribution and accessibility of point-of-sale resources. In this context, the results of participant discussions are intended to inform the development of product resources that contain relevant information and are delivered in a format that is both useful and accessible.

Participants were divided in to four groups that alternated between four tables dedicated to "fact sheets", "Websites", "shelf strips and dockets", and "videos". Examples of current resource types were provided at each table for participants to discuss. A designated scribe remained at each table while the groups rotated. The scribe was responsible for recording the suggestions, ideas and opinions of the participants. The scribe then summarised and presented the comments in a group discussion at the end of the café session. The suggestions and ideas produced through the World Café component of the forum are summarised in a later section in the report.

Interpretative limitations

The research like all qualitative research paradigms has some limitations. Two are worth noting. First the lower than expected survey response rate. For instance, while it would have been preferable to have had a larger response rate to the survey component, particularly the Industry survey, we achieved a reasonable thickness and richness and have some confidence that the data is generalisabile as we reached a point where we reached saturation in regard to our research questions. Nevertheless, the afore mentioned difficulty in recruiting industry participants meant that there were only 33 completed surveys compared to 45 consumer surveys. We contacted a wide number of industry and hardware retailers, but only one hardware retailer agreed to distribute the survey throughout their stores. While their three Sydney-based stores agreed to participate, only two were able to provide completed surveys as the third and smallest store responded that their staff were not experienced in providing advice on home modifications. This means the full diversity of locale, staff and Industry retail

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stores were potentially under-represented and so may not be reflective of industry experience as a whole.

Second the nature of the economic model adopted and its inherent assumptions. The economic model was not designed as a formal cost effective analysis but rather its objective was to use the retailer sales data, and cost and healthcare data to provide perspective on the DIY home modification market. This being said, some limitations included:

- Assumptions around product types and definitions: while some of the selected product types are a supportive home modification, such as a hand held shower, they are also purchased for general use.
- The market share figures for each respondent retailer are subject to variation and the general extrapolation may not apply evenly to each product group in all areas of NSW. The market share approach is necessary for ensuring confidentiality.
- The assumed effectiveness of DIY home modifications to reduce falls is intentionally conservative and below indicative rates for other home modification and falls prevention evidence. There remains uncertainty as to the effectiveness of DIY home modifications.
- Potentially significant areas of benefit are not included in the modelling as data specifically for DIY home modifications are not currently available.
- Health can deteriorate over time so there may be a correlated decrease in the effectiveness of the modification to assist in maintaining quality of life. Modifications may slow the deterioration of health however. This complicates evaluating the cost effectiveness of the modifications across progressively older age groups.
- The uncertainty of the effectiveness of DIY home modifications in lowering the risk of falls requires that the assumed reduction in the rate used in modelling is significantly below that reported in previous research

In order to address these issues, combining the model with sensitivity analysis and conservative assumptions ensured that the results provided an estimate of the DIY market and associated healthcare benefits in NSW. Despite these limitations, the mixed methods approach, combined with the identification of strong themes across surveys, as well as the conservative assumptions on which the economic analysis was based, determined that the results of the research as discussed here, are valuable and rigorous.

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Before proceeding with the report, the next section will discuss the definition of the DIY home modifications as used in this research. This is necessary to contextualise the remaining discussion and analysis. Following this, the economic modelling will be discussed. Results and observations from the semi-structured interviews will precede the survey data and analysis. A section on video ethnography and observations based on the fieldwork will follow. Finally, the results of the world café session will be discussed, before recommendations and directions for future research are made.

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Perspectives of Consumers, Government and Industry: Semi-structured interviews

To gain an understanding of stakeholder perception of DIY home modifications, a series of semi-structured interviews were conducted. Twelve consumer organisations, two government agencies, and four industry organisations were interviewed.

Consumer organisation perspectives

This section presents the key findings from the semi-structured interviews conducted with consumer organisations. It has been structured around the main themes from questions posed to each organisation during the interviews, as outlined in the generic interview schedule and coding for the DIY Home Modification Project.

Understanding of DIY home modifications

All organisations defined DIY home modification as being when the individual requiring adjustment to the home environment undertook modifications themselves or organised for someone to do it for them. This included assistance from a family member, friend or tradesperson. DIY home modifications were 'reactionary' and undertaken in response to an actual rather than anticipated need.

Organisations acknowledged that the individual was in the best position to understand their needs and modifications that would assist them, but not necessarily in determining or implementing the solution in terms equipment selection or physical building adaptation.

> *People do it themselves or organise to get it done because they want something that is going to meet their needs, and because they feel that they know what's best to meet their needs (Carers NSW interviewed 19 December 2013).*

The interviews suggested that an organisations' perception of DIY home modification potentially influenced their response to requests for information from clients. Australian Standards set the benchmark in terms of minimum design and against which the quality of a DIY modification was assessed, and an OT was considered the most appropriate professional to advise clients on what home modifications needed to be undertaken.

Organisations presumed that DIY home modifications occurred without professional input. Because of this, organisations believed that their clients or those assisting them to implement a DIY project would be unaware and have difficulty interpreting the various Australian Standards to achieve a compliant solution and had insufficient knowledge about designing for disability to make appropriate choices. This suggests organisations deterred clients from proceeding down the DIY path and encouraged them to seek professional input from an OT.

While not advocating the DIY approach without professional guidance, organisations did accept that even if a DIY solution was not fully compliant or the most appropriate,

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from the client's perspective, it was often better than no modification at all. The appropriateness of the DIY approach was also commonly linked to the scale and complexity of the home modification required. The simpler the job, the more accepting organisations were of their clients adopting a DIY approach:

> *….. Some things that would probably be relatively straightforward for someone to do themselves, and the more complex modifications you'd like to think people would get some sound advice before they just go in and gut the bathroom, and that sort of thing (COTA interviewed 28 November 2013)*

Information being collected about DIY home modifications

Organisations did not collect information relating to DIY home modifications. The comments shared were based on retrospective reflection on their experiences;

> *No – COTA doesn't collect any data or evidence of the extent to which people do DIY home modifications. (COTA interviewed 28 November 2013)*

> *So often it's in those sorts of conversation you get to hear about it (DIY) and that's as far as it goes in terms of our information collection I suppose. …the regional advisors when they go out to do their home visits, they would then be told. (MND interviewed 26 November 2011).*

Information being provided about DIY home modifications

The interviews reveled that each organisation provided clients with varying levels of information about DIY home modifications. Here is a summary of the reported responses to client enquires concerning DIY home modifications.

- All organisations operated a manned help or information call line (phone based).
- Each organisation tailored information to match their clients' anticipated needs given the nature of their disability and circumstance.
- Most did not have information on hand about DIY home modification, and were choosing instead to refer clients to other agencies or trusted resources.

In terms of the referral processes, the most common referral was to an OT or the Independent Living Centre. Carers were referred to Carers NSW.

> *I would be referring them back to someone like an OT, through their local health service…*

> *We'll often refer people to the Independent Living Centre for that individual advice …. (Arthritis NSW interviewed 16 December 2013)*

Organisations commented on the difficulty preparing information about DIY home modifications given the wide variation in clients' needs and circumstances. A key issue was to alert clients to the range of potential solutions available to them. Providing clients with information about where and how to seek expert assistance was considered most important. Ensuring information was current was identified as an issue for organisations.

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New technologies were seen to both facilitate but also act as barriers to their clients obtaining information. Organisations advised that many of the clients did not have access to a computer or other mobile devices, nor had the technical skills to search for information via the internet. They also highlighted the importance of making information available in multiple languages and a variety of formats, such as audio presentations for those suffering a visual impairment.

> *… certainly some of our members do prefer printed information, but more of them are migrating to accessing information online, using email much more often. And then of course when they don't have speech, then they're using technology much more anyhow. So they might be more geared up for computer online information delivery. (MND interviewed 26 November 2013)*

The ability for clients to see and touch assistive devices was important, noting that this opportunity was removed for those ordering items on-line but also often at the point of sale given modern product packaging and the absence of floor stock on display, as well as the lack of floor staff to ask.

> *One of the difficulties we have as blind people is that we cannot view products or even solutions that might be presented as images on the internet…. Being blind, you actually prefer to have a look, in terms of physically having a look, and that often presents a problem in places like Bunnings because most products are now sold in blister packs or some other form, that you can't literally have a look and feel of the product. (Vision Australia interviewed 19 December 2013)*

Organisations also commented that clients were overwhelmed by the amount of information available and its complexity.

> …people are confronted with an overwhelming range of services and choices and they won't know which one will create the most value for them or will contribute most to achieving what they want to do, which is invariably to live at home safely and securely… *(Alzheimer's Australia NSW interviewed 11 March 2014)*

Motivation for people to undertake DIY home modifications

The interviews revealed organisations' understanding of client's motivation to do DIY home modifications. The DIY approach enabled individuals to exercise control and in doing so, to maintain their sense of autonomy and independence. DIY home modifications facilitated an individual's choice to continue living in and be cared for in their home. Individuals also maintained control over the aesthetics or look of the modification. This aspect was closely associated with the desire to maintain the appearance of 'normality' of the home environment, helping to demonstrate their independence.

> *…people require that level of* control, so they tend to do it themselves – assuming they have that relationship with the person they're utilising, to maintain *a certain level of quality and ensure it fits their needs. (PDCN interviewed 5 November 2013)*

Clients were reported as being forced to do DIY home modifications. The most cited reason motivating DIY was the time and bureaucracy involved with using funded

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service providers, followed by a lack of knowledge about services available to assist them. Other reasons included a lack of trust in the service providers, having sufficient expertise (or access to it) and confidence to attempt the DIY project, and pride or not wanting to receive welfare assistance.

Cost and time were also factors in the choice to do DIY home modifications. For those who were well resourced, DIY enabled them to undertake modifications in a timely manner and to the desired standard or quality. However for those with limited resources, the DIY option allowed them to moderate the costs.

> …my own experiences are that a lot of people are forced into doing their own stuff DIY, because the cost of having things changed is quite prohibitive. *(SRA interviewed 25 November 2013).*

Some organisations identified how undertaking a DIY home modification was an opportunity to support a family member or friend reflective of a gifting relationship.

> *The fact that their family or someone can contribute, to make it not a problem anymore, or make a solution for them. I think that's really good.....That's a positive thing. It's community building as well. Family members that can step in and offer a solution, it's really positive. (MSS interviewed 12 December 2013)*

Modifications were also sometimes motivated / necessitated by the need to get and provide a safe working environment within the home for carers,

> *… if it's not OH&S for home care [provider] then they will say "we can't provide this service until this is done." Whether they live in a private home, or housing, you know it has to be fixed up before they provide that service. So with that if a family's really desperate for that service you will find that will fix it up then. (CPA interviewed 17 December 2013).*

Planning and implementation of DIY home modification projects

The interviews revealed the following about consumer organisations' understanding of how DIY home modification projects were planned and implemented, and the level to which the individual requiring the modification was involved in the process.

In general, there was limited knowledge among the organisations about the implementation of DIY home modification projects. Given that organisations believed modifications were reactionary, it was assumed that most were one-off projects rather than integrated as part of routine maintenance or an initial build,

> *But in terms of specific home modification stuff, it's not really something we come across a lot. (Carers NSW interviewed 19 December 2013)*

The approach to implementing a DIY home modification depended largely on the scale of modification but also the capacity of the individual requiring the modification. Capacity in this case includes both the nature of their disability as well as their level of building / construction knowledge.

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> *…. you get some highly independent people out there who would likely be involved from beginning to end, in terms of designing what they need or don't need, and sourcing information, sourcing the products, getting them installed. And then you would have other people who would perhaps need more assistance in terms of managing the process. Identifying what the needs are, helping them with any applications for funding. I think you'd probably get people on both ends of the spectrum and a lot of people in between. (Arthritis NSW interviewed 16 December 2013).*

Impact of DIY home modifications

The consumer organisations had little firsthand knowledge about whether DIY home modifications were successful and their impact on clients. They highlighted aspects which assisted clients, but also referred to the difficulties experienced by clients while attempting to implement a DIY home modification.

DIY home modifications could be initially successful, but over time, due to continued deterioration in health or other changes in the individuals' circumstances (e.g. children getting bigger and more difficult to lift) the modifications could become inappropriate or less effective. This then prompted the need for additional and more extensive modification of the home environment. DIY home modifications were often implemented as a temporary 'stop gap' with families recognising the need for future adaptive work or an alternative solution.

> *… the family 2 years earlier had made their own ramp: "this will get us by for now", knowing that they have to do major modifications later on but they don't have the money so they'll do a tiny bit themselves in the mean time to get them by until they need to do some major modifications. (CPA interviewed 17 December 2013).*

A successful DIY home modification delivered positive outcomes or improvements for the individual even though it might not be considered the most appropriate or ideal solution. Organisations acknowledged that success or failure depended largely on individual perspective.

> *……. most of the time people who have gone ahead and done a bathroom modification they're usually happy with it if they've got the right information before they've started it. (MND interviewed 26 November 2013)*

The most commonly cited reason for why DIY home modifications were unsuccessful was the failure to understand how to adequately address the needs of the individual requiring the modifications.

> *……..The ones we hear when they've had to redo the bathroom is usually because they've done it quickly without any information to hand, and they've found out later on that it's not going to work. (MND interviewed 26 November 2013)*

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Government agency perspectives

This section presents the key findings from the interviews conducted with government agencies. It has been structured around the main themes from the questions posed to each agency/organisation, as outlined in the generic interview schedule and coding for the DIY Home Modification Project.

Understanding of the market for DIY Home Modifications

Neither agency was aware of the extent to which people with disability and/or their carers were undertaking DIY home modifications. ADHC observed that the statistics from the ILC demonstrated that people were doing modifications without government assistance and that there was anecdotal evidence of people undertaking DIY home modifications. It noted that waiting times for assistance, an issue often addressed in the agency's ministerial correspondence, may increase the demand for DIY home modifications.

NSW Fair Trading were unable to give any indication about the size of DIY home modification activity as they dealt more specifically with licensing issues, and not home modification complaints more generally.

Motivation for people to undertake DIY home modifications

Maintaining control over their home and the process of modifications was understood to be a major driver for DIY home modifications, along with issues of time, trust and confidence. This was the case particularly for low level adaptations, such as grabrail installations. It was thought DIY would be more common amongst the aged population, as young people with disability typically have a long association with an occupational therapist who will provide advice about home modifications. It was suggested that control, confidence and trust were motivators for choosing the DIY option:

> *For people who only need low level stuff I think there's a thing of "Why can't I do it myself? Why can't I have control over who does it?" Even people with disability may not want to do it themselves, but they may have a family builder who they know and trust can do it if they get an OT in. … I think sometimes you want to try and control that a little bit, and have some say in how things are done in your own home. (NSW Fair Trading, 27 November 2013)*

Planning and implementation of DIY home modification projects

There is a lack of knowledge concerning the extent of involvement that people with disability and their carers have in the planning and implementation of DIY home modifications. Considering that current funding options do not provide for DIY home modifications, interviewees assumed that the costs, planning and installation were covered by individuals and their family and social networks.

> *DIY is being 100% by themselves, with their own money from their own information, which doesn't have government support at the moment. (ADHC 27 November 2013)*

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It was questioned whether the necessary checks about the appropriateness of chosen contractors and building regulations were being undertaken. This could be problematic in terms of complaints and possible disputes at a later date, especially if any unlicensed contractors were used:

> *I wouldn't be surprised if people weren't fairly limited in what they check more broadly. They think about what they've got to get done, and not about any other checks they've got to do, in relation to who they use, how to check the person's appropriate for the job, all that. I wouldn't be surprised if a lot of people just didn't do those checks. (NSW Fair Trading, 27 November 2013).*

Information being provided about DIY home modifications

Again, because the government agencies did not specifically collect information about DIY home modifications, they could not be certain as to where people currently sourced information about products and project planning. They did however offer suggestions. These included the Independent Living Centre, local hospitals and hardware stores. Local government was also suggested an information and referral pathway. Both agencies emphasised the importance of online information, suggesting the internet would likely be the first place to look, and that search tools such as Google, and video channels such as YouTube, provide information and act as a point of contact and referral:

> *So often it's around having some point of contact to point you in the right direction. That's how I think people these days tend to … they'll ring whoever they think, or they'll go online and Google it. (NSW Fair Trading, 27 November 2013)*

There was a consensus that information resources specific to DIY would be useful and that the resources should be tailored to the different groups requiring modifications, different life stages, and available in a variety of formats. There was evidence to indicate that people were already undertaking DIY home modifications, and suggestion that this may increase under the personalised funding packages of the NDIS. Therefore, there should be more effort to empower consumers with the relevant information. It was observed that different information would be required at different parts of the process and depend on the level of ability and motivations of the people choosing DIY home modification. Three cohorts were identified:

- People who have a comprehensive disability package and require somebody to talk through options with them
- People who want to remain outside the system or are excluded from it and therefore choose DIY home modifications
- People who have the confidence and skills to do the jobs themselves, e.g. families who can do the modifications and are proactive about it.
  (ADHC 27 November 2013)

Information should be available electronically and a range of options in terms of content and provision should be considered to reflect the range of vulnerable groups being catered for:

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> *And I think when you're dealing with more vulnerable groups, I think you do have to have a range of options for them. And I think also having information that's very simple and "are you installing grabrails?" …If it's not in one place people will miss stuff, I think you'll find. (NSW Fair Trading 27 November 2013).*

Impact of DIY home modifications

Interviewees rarely encountered reports of negative impacts of DIY home modifications. Any negative feedback was said to be reported from service providers who had been asked to fix a DIY home modification, and these comments were often viewed as an over-reaction. The modifications may not have met the required regulations; however, they met the purpose required by the user without causing harm. Thus any negative comments were based on the discrepancy between what was considered a textbook solution and the solution chosen by the person undertaking the DIY. This was particularly seen to be the case for lower level modifications as they are more often done DIY than complex modifications.

> *… The disasters are that the mods aren't quite right, they're pretty shonky, they're just DIY, it's like a wooden ramp that someone's knocked up out the back of their house. You certainly hear of people telling those stories, well, I couldn't get a service, so I wacked something in myself, and it's been fine. (ADHC 27 November 2013).*

The ability of DIY home modifications to support ageing in place, was also seen as a positive.

> *It's important to allow people to remain in their own homes and be mobile and be able to enjoy their own home. I think the intention is to help people to enjoy living in their own home, have mobility around their own home, to actually have a better quality of life…and to be safe. (NSW Fair Trading, 27 November 2013).*

Quality assessment of DIY home modifications

Interviewees did not know of any assessments being made about the quality of DIY home modifications. This was because if they were done with neither government assistance nor a licensed tradesperson, there was no channel to quantify the number of DIY home modifications and their relative success rate. The only time assessments may be made is if there were a problem with the modification and a negative impact on well-being, which required assessment and/or services:

> *… if somebody's functioning in a community, that's their business. So, until there's something quite serious, there's a problem, they might need services, no assessment would be done. (ADHC 27 November 2013).*

NSW Fair Trading agency could potentially be involved in dispute resolution concerning the quality of home modifications if a licensed builder or tradesperson was used. This could include DIY home modifications (in line with the definition of DIY used in this research, which includes the use of builders and tradespeople). Therefore choosing licensed contractors is an important consideration to be aware of when undertaking DIY home modifications.

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> *We would deal with any complaint that we had about how something was done. It could go through our mediation area, it could [go] through to our compliance area. Often we expect people will negotiate with the person who's done the work to come back and fix it. (NSW Fair Trading 27 November 2013)*

DIY modification failures and successes

Where comments could be made based on the interviewee's knowledge of the area, responses were similar to those given when asked what impact DIY home modifications had. Negative reports were generally from service providers rather than consumers, and it was suggested that this had to do with service providers validating their own business. However it was also acknowledged that there had never been a report of a very successful home modification. It was concluded that DIY may sometimes be blamed for a poor outcome, but generally DIY home modifications were done out of necessity. So the problem may be that the funded home modification systems cannot provide home modifications in a timely manner.

> *I've never heard of any actual accidents or incidents, or anything like that has come of it. Just that a provider has gone in and not been happy with what they've had to deal with. I've never heard of any disastrous outcomes of DIY, and certainly not of low level ones. Conversely I've never heard of any great news stories either, other than "just got the grabrails in and we were all fine". (ADHC 27 November 2013)*

Industry perspectives

This section presents the key findings from the interviews conducted with industry organisations. It has been structured around the main themes from questions posed to each industry organisation during the interviews, as outlined in the generic interview schedule and coding for the DIY home modification project.

Information being collected on DIY Home Modifications

The majority of industry representatives interviewed were unaware of the extent to which people with disability, older people and their carers undertake DIY home modifications, although some were aware of the importance of and an increase in the DIY home modifications market.

Those who were aware of the importance, but not the size, of the market had either engaged in educational activities about safety and DIY home modifications, or had been made aware of a trend toward design that supported people staying in their homes as they age.

> *In the last three to four years there's been a more [of an] awareness of fitting home to make, the lifestyle more safe, or safer for elderly people with disabilities and there's also been a bit more publicity by various Government departments…In the actual home though I think we're seeing more awareness that this is a growing market. (MBA 31 January 2014)*

Other interviewees reported limited awareness, which they noted was a concern. It was also mentioned that the lack of knowledge about the extent of DIY home modifications

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reflected a disconnect between knowing that people would contact licensed tradespeople to undertake the home modifications, and being able to actually track the number of people who make requests.

> *I think the awareness level from my point of view and probably our store's point of view is nowhere where it should be. I wasn't aware that there were certain programs out there that you actually can apply for a rebate etc. to go ahead and do it yourself etc. That's news to me which is already a concern but also an opportunity I suppose going forward, so if we had more literature. (Bunnings 3 December 2013).*

> *Don't know about it we don't, just don't. And this is the disconnect. My membership covers people who are licensed who aren't doing DIY as a fundamental. So even though we know these DIY people will be calling up members to do this work, it's not a number that we track. (HIA 26 November 2013).*

Information being provided about DIY home modifications

The majority of industry interviewees mentioned that they referred any enquiries about home modifications to organisations who could supply information about products, standards, planning, and other things that may be necessary to think about when choosing DIY home modifications. These included, home care agencies, disability support groups, state and local government, and the ILC. The ILC was considered a particularly useful resource as they allowed people to actually view the products, e.g. grabrails, and get a feeling of how it would work for them,

> *I used to go on to the website, get the address get the phone number and say "look ring them up" because I think as I understand it too you can go there and you can actually look at the things and I think that's important too because it's one thing to see something in a catalogue or on a computer screen but if you can … look at it and touch it and think about how it will work in your home. (PG NSW 5 March 2015).*

It was mentioned that builders could find necessary information and useful resources at Livable Housing Australia and Standards Australia.

Additionally, websites and the internet were mentioned as being very popular and useful research and information sources.

> *We get a lot of hits on the website. …The research they're doing before people come in now is second to none; Google's a huge part of that. …But definitely the research, Google, online or websites are a big part of what we do. (Bunnings 3 December 2013)*

Motivations for undertaking DIY home modification

The majority of interviewees suggested that cost and time were the main reasons that people would choose DIY home modifications. DIY was a less expensive option and allowed more control over when the modifications were done and who would do them. In addition to this, trust, confidence and the influence of reality TV shows showcasing

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DIY renovations and makeovers were also posited as reasons informing decisions to undertake DIY home modifications.

> *The most obvious reason is cost. If one does it oneself it is much less expensive. Two, I think there's a time element – if you can do it yourself, or a member of your family can do it for you, they can come at a time that is convenient for you, you know them you trust them you don't mind having them in the house… (PGNSW 5 March 2014)*

Planning and implementation of DIY home modification projects

Interviewees did not know to what extent and which aspects of the planning and implementation process that people with disability, older people and their carers were involved with. They did however make suggestions which included:

- being assessed by a health professional who would advise what modifications may be of assistance;
- providing information in store so people can feel confident and try to do the modifications DIY;
- individuals nominating the items that would suit their purposes and budget and using this to make the decision as to whether they would require assistance or could do it themselves; and
- being aware of where to find information and using this to engage people to do DIY home modifications they require.

> *So I would imagine that part of it is initiated by the people but part of it is actually initiated by the health care professional who will come into the home and suggest things that could be done in the home to make things more safe. (PGNSW 5 March 2014)*

Impact of DIY home modifications

Modifications were generally seen as being positive and as enabling ageing in place and it was considered important that people could remain in their homes as long as possible. The lack of purchase returns suggests consumer satisfaction with DIY products. This may reflect informed purchase decisions through research conducted prior to store visits.

> *Generally when someone makes that purchase it's an informed purchase, it's a requirement, it's obviously fit for purpose and they'll take it. I really haven't seen anything come back. (Bunnings 3 December 2013).*

It was raised however, that while home modifications may have a positive impact on people's functioning ability, they may conversely be negative in the way they highlight a person's disability. Home modifications emphasise difference and can have an associated stigma.

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> *…some of them don't like it because if they have to put in a ramp where they've had stairs, it is so obvious that there is a ramp. It's completely, it's obvious and it sort of makes them feel, I think, outside of the mainstream. I mean "other people" have stairs, "other people" don't have hand rails or "other people" don't need to use a shower stool in the shower. And I think that, it kind of carries a sort of stigma, if you will. (PGNSW 5 March 2014)*

Quality assessment of DIY home modifications

Similar to what was reported in the interviews with consumer organisations and the government agencies, industry organisations did not know of any measures or systems that were used to assess DIY home modifications. Because DIY is undertaken by the individual without government assistance, it was thought that no checks could be done or were necessary, and that the project would be just "hit or miss" (PGNSW 5 March 2014).

If a tradesperson had been contracted and there was a contract in place, any complaints about the home modifications could be taken to NSW Fair Trading, where an assessment would be conducted. There would be recourse if a licensed tradesperson had been engaged. This would not be an easy process,

> *When you do genuine DIY, not requiring these approvals and not part of the scheme, the answer would be there's no check and balance apart from the person themselves and the persona and the contractor, if they use a contractor. And if it went completely pear-shaped, say they were doing one of the more expensive things like the ramp, and there is some sort of contract in place, not a fully-fledged contract, and if it did get prickly, then Consumer Affairs [Fair Trading], would potentially have a function, and place some sort of check and balance, but that wouldn't be an easy process, I suspect, because the work was so small. (HIA 26 November 2013).*

Experiences of DIY Home Modifications: Survey

The following section analyses the main themes from the data collection drawing on both survey and interview material. It does so by focusing on the questions asked in the surveys and discussing the responses supplemented by material from the semi-structured interviews.

Demographics of survey respondents

First, it is necessary to provide an overview of the demographics of the survey respondents. The majority of retail and industry survey respondents were aged between 18-64 years at 87.9% (Table 2). This result is expected considering the age range in which people enter and remain in the work force. The consumer age group with the highest number of respondents was the 75+ years group at 37.8%, followed by 18-64 at 31.1%, 65-74 (26.7%), and 4.4% represented by 0-17 year olds. This may reflect the increased number of modifications needed by people as they age. It is assumed that the 0-17 year old age group is reflective of people either born with a disability or who have acquired one, and which is proportionately lower by population than aged populations. Additionally, these results may also be influenced by the

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method of survey participant recruitment. Some of the consumer organisations through which the surveys were distributed, such as Alzheimer's Australia NSW, are more likely to recruit elderly participants due to the nature of the disease, although most surveys would be completed by their carers.

Table 2. Industry and consumer survey respondents by age

Age group	Industry %	Consumer %	Response Total	Consumer Total
0-17	0%	4.4%	0	2
18-64	87.9%	31.1%	29	14
65-74	9.1%	26.7%	3	12
75+	3.0%	37.8%	1	17

The gender distribution of industry survey respondents is male dominant. Males represent 63.6% as compared to 36.4% of females (see Table 3). This may reflect the greater number of males traditionally involved in the construction industry (see for a discussion on gender in male-dominated building trades). Consumer survey respondents were predominantly female. The reasons for higher female response rates may reflect the larger contribution of women in care giving roles (Arber and Ginn 1990; Dentinger and Clarkberg 2002).

Table 3. Industry and consumer respondents by gender

Gender	Industry %	Consumer %	Industry Total	Consumer Total
Male	63.6%	42.2%	21	19
Female	36.4%	57.8%	12	26

Additionally, consumer survey respondents were asked about the ownership status of the residence in which they live (Table 4). The survey specified house but this included freestanding and semi-attached dwellings, apartments, and townhouses. All references to houses in the context of the survey are therefore inclusive of these dwelling types. The majority of respondents owned the house which was modified. No respondents reported that they lived in rental accommodation. This is unsurprising as permission from the landlord is required to undertake modifications in properties not owned by the consumer, and therefore having these approved is a more complex process. Landlords may also be concerned that modifications may devalue their property. As note, the lower usage of assistive devices in rented properties, may "reflect less commitment or authority on the part of tenants to make changes in housing that they do not own, and/or less interest on the part of the landlords to maintain safe environments for tenants."

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The nature of the survey would likely target older people, who are more likely to own their own home, than younger age cohorts. Therefore, when asking about DIY home modifications, it is expected that there would be a higher proportion of respondents who own their home rather than rent. However, there may be some bias against people with disability. Young people with disability have more restricted housing careers and are more likely to be tenants, especially public housing tenants (Beer & Faulkner 2008). Therefore when asking about DIY home modifications, it is expected that there will be a higher proportion of respondents who own their home rather than rent and this may exclude some young people with disability from responding.

Table 4. Ownership status of residence

Is the House?	Response %	Response Total
Fully owned (includes if mortgaged)	93.3%	42
Being purchased (includes being purchased under a rent/buy scheme)	4.4%	2
Rented through a real estate agent	0.00%	0
Rented through a state/territory housing authority	0.00%	0
Other	2.2%	1

Survey respondents were also asked what suburb they lived in and how long they had lived there (table 5). The majority of respondents were long-time residents. This is unsurprising, as it is common for disability to increase as people age and therefore the modifications may have been necessary over the course of time while people have resided in their current location.

Table 5. Length of time residing in current suburb or town

How long have you lived in this suburb or town?	Response %	Response Total
Up to 12 months	0	0
1-5 years	11.1%	5
5-10 years	26.7%	12
10-20 years	11.1%	5
20 + years	51.1%	23

Industry respondents were also asked about which suburb or town they worked in and how long they had worked there for (see table 6). The results were varied, which reflects general mobility trends in the workforce.

Table 6. Time respondent has worked in current suburb or town

How long have you worked in this suburb or town?	Response %	Response total
Up to 12 months	12.1%	4

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How long have you worked in this suburb or town?	Response %	Response total
1-5 years	27.3%	9
5-10 years	24.2%	8
10-20 years	15.2%	5
20 + years	21.2%	7

When the home modifications were done

To gain an insight into the types of modification done over time both consumer and industry respondents were asked about what type of modification had been undertaken or assisted with, and when (Table 7).

The consumer survey results indicated that grabrails and hand-held showers were the most popular modifications made over listed time periods. Grabrails ranked as the most common modification in all time periods except for 2000-2004 when it more hand-held showers were listed as being installed, 1995-1999 where all modifications were listed as equal, and 1985-1989 where both hand-held showers and ramps were listed as more frequently installed. Overall, of the five product types, level access shower recesses were the least reported modification that was installed. Hand railings were the next least reported modification, with ramp installations being listed as slightly higher.

Modifications listed in the "Other" category were most frequently reported in the most recent time period, from 2010-2015.

Table 7. Consumer survey modifications by year

When was the modification done?												
Response %	Grabrail		Hand-held shower		Level access shower recess		Ramp		Hand railings		Other	
Year:	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total
2010-2015	53.33	24	37.78	17	24.44	11	20.00	9	22.22	10	26.67	12
2005-2009	15.56	7	15.56	7	6.67	3	13.33	6	8.89	4	6.67	3
2000-2004	6.67	3	11.11	5	2.22	1	4.44	2	6.67	3	2.22	1
1995-1999	4.44	2	4.44	2	2.22	1	4.44	2	2.22	1	2.22	1
1990-1994	2.22	1	0.00	0	0.00	0	2.22	1	0.00	0	0.00	0
1985-1989	0.00	0	2.22	1	0.00	0	2.22	1	0.00	0	0.00	0
Before 1985	8.89	4	4.44	2	4.44	2	4.44	2	6.67	3	2.22	1

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Grabrails and hand held showers were also the most reported modification made over time by industry survey respondents (table 8). Level access shower ramps were the next most frequent modification type reported as installed over the time periods surveyed, followed by hand railings. Ramps were the least reported modification over time. The complexity of installing a level access shower recess may indicate why more industry respondents reported assisting in its installation than consumer respondents reporting having done the modification DIY.

Table 8. Industry modifications done by year

When was the modification done?												
Response %	Grabrail		Hand-held shower		Level access shower recess		Ramp		Hand railing		Other	
Year:	%	Total	%	Total	%	Total	%	Total	%	Total	%	Total
2010-2015	57.14	8	57.14	8	42.86	6	42.86	6	42.86	6	21.43	3
2005-2009	21.43	3	35.71	5	21.43	3	14.29	2	28.57	4	7.14	1
2000-2004	42.86	6	28.67	4	21.43	3	14.29	2	21.43	3	7.14	1
1995-1999	14.29	2	14.29	2	14.29	2	14.29	2	14.29	2	7.14	1
1990-1994	14.29	2	14.29	2	14.29	2	7.14	1	7.14	1	7.14	1
1985-1989	0.00	0	0.00	0	0.00	0	7.14	1	0.00	0	7.14	1
Before 1985	0.00	0	0.00	0	7.14	1	7.14	1	0.00	0	7.14	1

In both the consumer and industry surveys, all modifications by the five product types were reported at a higher rate in the most recent allocated time period, this being 2010-2015. This reported increase may reflect the increase in health problems and deterioration in functioning ability as people age and the correlating increase in need for modifications. Comparing this to table 5 above, suggests that these modifications are being made in houses in which people have been long-term residents. The lower rates of reported modifications in earlier year periods may correlate to a higher standard of health and functioning ability when respondents were younger. This is highly plausible considering the majority of consumer survey respondents were 65 years and older as shown in table 2.

The higher rate of modifications reported by industry in the same 2010-2015 period may reflect the length of time the respondents have been working in the industry. It may also reflect an increase in awareness of DIY home modifications correlated to the broader investment at a government and society level to encourage ageing in place, as well as the increasing aged population.

The most common and popular areas to modify and types of home modifications

The survey asked which part of the home was modified and respondents were able to select from, front or rear access; bathroom; laundry; kitchen; and other. Of these,

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bathrooms were the area of the home that had the most modifications, with 75.6% responding that their bathrooms had been modified. Front or rear access were the next most modified part of homes, with 60%, followed by other at 35.6%, kitchens at 17.8% and the laundry at 15.6% (see table 9).

The other areas which were specified generally pertained to access both into and between areas of the home including:

- an extended ramp at the back, pathway ramped down the side of house to provide the only access out of the house (which could be included in the front or access category);
- new door cut to give access for wheelchair; bedroom;
- access from attached garage – two small hand rails to help my husband get up a step, small ramps from hallway into bathroom, bedroom and laundry
- to provide safe access to living area and main bedroom upstairs from lower level entry
- wheelchair platform in doorway linking verandah and kitchen
- hallway, door width
- shed access, pathways, side gates
- stairs
- other areas not specifically access oriented included,
- bedrooms
- living room
- separate toilet
- outdoors: clothes line lowered

In one case, the whole house was completely rebuilt to accommodate the owner's disability.

Table 9. Part of home modified

Which part of the home was modified?		
Area	**Percentage**	**Number of respondents**
Front or rear access	60%	27
Bathroom	75.6%	34
Laundry	15.6%	7
Kitchen	17.8%	8
Other	35.6%	16

We were specifically interested in the five product categories that formed the basis of the economic analysis, and which were therefore important to include in the survey. These home modification categories were grabrails, hand-held shower/s, level access shower recess, ramps, hand railings for stairs, and 'other'. Table 10 shows the prevalence of the products and modification projects for both consumers and industry.

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Table 10. DIY project by consumer and industry

Which do-it-yourself home modification project/s have been completed?/ have you been involved with?	Consumer Response %	Consumer Response Total	Industry Response %	Industry Response Total
None	N/A	N/A	6.06%	2
Grabrail/s	75.56%	34	57.58%	19
Hand-held shower/s	57.78%	26	51.52%	17
Level access shower recess	31.11%	14	27.27%	9
Ramps/s	46.67%	21	45.46%	15
Hand railings for stairs or steps	42.22%	19	48.49%	16
Other	42.22%	19	39.39%	13

For both consumers and industry, grabrails were the most used product in home DIY modification projects, 75.6% and 57.6% respectively. Hand-held shower/s were the next highest product installed as part of modifications at 57.8% for consumers and 51.5% for retailers. Ramps, hand railings, and other, were of similar percentages, ranging between 42.2% for railings and other, and 46.7% for ramps for consumers, and 45.5% for ramps, 48.5% for hand railings, and 39.4% for other, in industry response. The installation of a level access shower recess was the least undertaken DIY home modification project in the context of this survey. This is unsurprising as the installation of a level shower recess is potentially more labour intensive and requires more expertise, skills, and multiple tradespeople, e.g. plumbers, tilers, electrician, and glazier, compared to installing grabrails and hand-held showers.

The types of modifications mentioned in the 'other' category ranged from minor and simple modifications, to more complex modifications and rebuilds. Common minor modifications included alterations to make cupboards and storage units more accessible, modifying entry points for greater access, and installing lever handled taps for easier use.

The larger modifications mentioned included a bathroom and kitchen reconfiguration, complete refits and modifications bathrooms, a complete knockdown and rebuild, installing a stair lift, building a chair riser, installing a higher toilet and basin, and installing an electric powered wheelchair platform.

Motivations for undertaking DIY home modifications

We identified common themes in the experience of undertaking DIY home modifications by asking participants about the positive and negative aspects of the process.

- Aesthetics
- Availability/ease of doing the modifications
- Confidence
- Control

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- Cost
- Expertise
- Independence
- Knowledge
- Time
- Trust
- Sustainability

These themes also reflect some of the overarching motivations for undertaking DIY home modifications. Of these key themes, time, cost, control, trust and aesthetics were mentioned most frequently.

Time

Time and cost were both consistently mentioned as being a benefit of DIY. Respondents reported DIY home modifications increased control over the timeliness and time needed to complete the modifications, and avoided waiting for assessments and funding approval. This was particularly pertinent for people with conditions that were unpredictable or which could deteriorate rapidly.

> *Not eligible for funding as cancer was terminal - funding a joke as not eligible when first diagnosed and then when really needed it - it would of been too late. (C11)*

This quote describes the issues with home modifications as a service, both in terms of being eligible and in terms of the actual service provided. It is an example of somebody whose disease progression, though unpredictable, required modifications which were not eligible for funding, nor would the funded modifications have been timely and appropriate for the illness and associated needs. In these cases, people have no choice but to fund and undertake the modifications themselves.

Time did not just refer to the length of time to actually plan and do modifications, but also referred to the pressure of time that required people to get the modifications done from when they first became aware of the need for them to return or remain at home. For example, some respondents referred to the urgent need to have the modifications installed before their partner or family member returned home from hospital. This was often the case when the severity of the disability hadn't been planned for, was unexpected, or the disability had been acquired through an accident. In that case, the time allowed to ensure the house was suitably modified before the person returned from hospital meant that waiting for government assistance was not always feasible:

> *"The modifications were needed urgently to allow my husband to come home from hospital following a fall. He needed wheelchair access and rails for toilet and shower. The rails were quickly installed by a local carpenter. Peter made his own ramps from timber available in his shed."*

Modifying a house in the time between a patient's admission and discharge from hospital is sometimes problematic. There are issues about the discrepancy between

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the complexity of the modification and the assessment, approval and installation process if using government assistance:

> *People's discharge from hospital is problematic related to that, there are issues about getting what are perceived to be quite simple modifications in, and having to wait nine months for it when you can grab a grabrail and do it myself [sic]. (ADHC 21112013)*

In these scenarios, the need for the home modifications outweighs the possibility of waiting for government assistance and is a major factor in the decision to undertake DIY home modifications. It is important to acknowledge that despite these issues, NSW has comprehensive home modification services across the state, which should reduce the impact of some issues. However, other States and Territories have problems with the inconsistent delivery of government funded home modification schemes, as highlighted in the "Key Directions for the Commonwealth Home Support Programme Discussion Paper", . The paper's review of home modification services observed inconsistency in approaches nationally with regards "to client access, assessment, prioritisation and approaches to the payment of fees" . The review also found that there is "inequitable delivery of services across the country, within and between regions and workforce issues related to access to occupational therapists, licensed builders, and other licensed tradespersons". It was further found that "these issues were more pronounced for rural and remote services" . Inconsistency and inequity in the delivery of services, therefore motivates and at times necessitates, people's decision to undertake DIY home modifications.

Cost

DIY home modifications are also undertaken for financial reasons. DIY home modifications give the consumer greater choice over products, labour, and design, and often can draw on family or friend networks for free labour and advice.

> *This modification was done twice, once by my brother in law and husband that laid a cement ramp that was quick and easy to do and too steep then it was done again after my talking to various people and designed properly. The best thing was having a couple of friends help my husband and the saving of money. To have it done thru a building company I had 2 quotes of $11,000 and to do it ourselves cost $4,000 (C1).*

This comment clearly illustrates, how despite a process of trial and error, the resourcefulness of family and friends can help limit costs. Cost as a motivating factor was also mentioned in the in depth interviews:

> My own experiences are that a lot of people are forced into doing their own stuff DIY, because the cost of having things changed is quite prohibitive (*SRA NSW 25112013).*

Trust and assistance from friends and relatives

The value of friends and their input in DIY modifications went beyond considerations of finances, time and convenience. Unsurprisingly, considering that home is an inherently private space, some recipients mentioned the value of having friends assisting with

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modifications being less of an intrusion than a stranger doing them. Intrusion in this sense, not only refers to physical intrusion of space and privacy, but could also be interpreted as an intrusion on aesthetic sensibilities, desired standards and ideas of quality. This is reflected in comments which mention that undertaking DIY home modifications using their own skills, or the assistance of friends, ensures the work is done to the desired standard and is less stressful:

> *Having family do this renovation was less stressful than strangers (C10)*

> *Having had some work done by professional installers previously, I was disillusioned with the level of standards. Having completed the work myself, gives me a stronger sense of satisfaction and I know the work was completed to a high standard. I did the work, I take pride in how it works and I "own" the work (C13).*

Comments such as these were supported by comments made in further interviews:

> *Because it is a **home** modification, generally people are pretty protective of that environment, so particular age groups, I suppose – and I'm making almost an assumption – but from my own experience particular age groups have a particular attitude to bringing those people in (PDCN 05112013).*

Comments such as these put the 'home' back into modifications. They remind us that it is a personal and private space that is being modified and that the life changes that have necessitated home modification combine to create a stressful situation which can be heightened by reliance on strangers who are not familiar with the consumer's needs, their home space, their aesthetic preferences and their expectations of the modifications, including appropriateness, aesthetics, and quality of the work.

DIY home modifications are not just a utilitarian response to a situation but involve a range of emotional investments and adjustments. Trust in those involved in the modifications is a concern for those who require them, and is another reason beyond the mere practicalities of time and finances, that family and friend networks feature prominently in DIY provision.

Control

The need to have the modifications suit the individual, functionally, aesthetically and financially, and in a way that maintains the individual's notion of home, requires control over the process. Control over the design of the project was a motivating factor to undertake DIY home modifications and was also frequently mentioned as a positive aspect of doing such projects in this way. Increased control meant an opportunity to design modifications that responded directly to an individual's needs in ways more generic modifications could not. For example, one respondent mentioned that what was good about DIY home modifications was:

> *Designing to suit your own need and budget. You have control of the way you want the space to function and how to use your abilities. Ability to adjust to limitations of the space/home/outside area without unnecessary and impractical adherence to AS1428 that is developed to suit generic public situations and what is thought to be people's ways of doing things. (C21)*

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The individual nature of disability is highlighted here and reflects a need for design with the needs of the individual in mind. As disability is not experienced the same way by all people with disability, generic solutions do not necessarily respond to people's needs in the most effective way. Knowing what they have problems doing, what is needed to assist them, what they want to be able to do, and how they like to manage and negotiate spaces and daily tasks, means that people with disability often have a clear idea of what can help them, or can guide the direction of solutions, in a way that is more nuanced than generic solutions.

Aesthetics

Control also extends to the aesthetics of the modifications. Again, we emphasise the "home" component of DIY home modifications. The appearance of the modifications and potential stigma attached to them is one area which people are particularly keen to exert some form of influence over them. For example, one respondent commented on the appearance of one particular modification that he had seen and which he thought was aesthetically pleasing and not the hospital look that many modifications resemble, an issue for those requiring modifications:

> *Not the medical look, it's got a brushed stainless steel, it looks nice actually, I was actually quite impressed (PWDA 29112013).*

> *They don't want it to look like a hospital bathroom. So handrails, even the fact that they might be stainless steel, still reminds them of being in hospital, so they might want a bit more flexibility of colour of the items that are being used. (MND NSW 26112013)*

Another reflected on the importance of the home and ensuring the modifications do not detract from their perceptions of the home environment and the need to have control over that. This is true not just for people with disability, but for their carers also:

> *I want to have a say in how things are going to be renovated, how they look. I think that going to be a significant issue (Carers NSW 14112013)*

Attitudes such as this reflect Wylde's, observation that just because people may require modifications, it doesn't necessarily mean, that "they want to use adaptive products or accessible solutions that detract from their personal or environmental appearance" (Wylde, 1998). Wylde's comments reflect those of Hook, Verbaan, Durrant, Olivier & Wright (2014) who argue that the appearance and aesthetics of devices was crucial and had the potential to negatively impact on experiences of using assistive technology resulting in possible rejection and refusal to adopt . While, Hook et al's study was dealing with DIY assistive technology for children with a disability rather than DIY home modifications, the findings are applicable to this research. They found that aids were rejected or abandoned despite addressing the individual's functional requirements, because the aesthetics emphasised disability, marking the user as different . These concerns were expressed for both DIY and some commercially developed products .

Aesthetics therefore play an important part in people's willingness to accept and use assistive objects and modifications. Maintaining some kind of control over the

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appearance of modifications, also allows the users to regain some agency and self-determination, with regards to both their disability and their relationships with their carers.

Successfulness and evaluation of DIY home modifications

Undertaking DIY home modifications, does increase the possibility that modifications aren't completed to Standards. This does not mean, however, that they are unsuccessful. Modifications can still be considered successful if they help people remain at home and function adequately.

> *…might be like, these bars aren't great, but the person's able to use them are at no risk of them falling. So I mean I have had those sort of things (ADHC 27112013)*

In these cases, it is through necessity that people choose DIY home modifications and, while it may not always result in what a professional would have prescribed, in terms of enabling the recipient to remain at home, the DIY home modifications could be considered successful. Modifications and their success are therefore highly context dependent.

This must be countered of course by legitimate concerns about the safety of the modifications if they are not checked or not done in adherence to Australian Standards. Such attitudes were also expressed in the participant interviews:

> *I think just highlighting some of the considerations that people need to be mindful of….and I think it's important just to help explain the importance of seeking advice, even if it's just to consult with a professional to make sure you're on the right track around this (Arthritis NSW 161213).*

Despite the validity of the concerns expressed in the survey responses, the interviews suggested a more complex view on the situation. While interviewees had heard of things going wrong with DIY home modifications, they did clarify their comments by noting that the problematic cases tended to be more sophisticated, larger projects,

> *I have heard of scenarios where people have wanted to start doing things themselves, and the OTs have been horrified because they have actually been detrimental to a disability and stuff. But they're quite high level and sophisticated things (ADHC 27112013).*

Some respondents however also doubted how valid some of the claims were,

> *I've heard of all the horror stories, but they're all from service providers. "Oh, we had to go out to this farm in the middle of nowhere, and he's been going up this ramp, and pulling himself up by a rope to get ..." But they're all horror stories to validate their own business a lot of the time (ADHC 27112013).*

Additionally, others questioned the negative appraisal of some home modifications because they didn't meet professional standards. It was argued that DIY home modifications were not necessarily an unsatisfactory outcome, particularly if was a workable solution to the problem:

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> *Depends of what your definition of 'fail' is. I'm thinking of something traumatic when I think of failed. Sometimes I think it only needs to be as specialised as it needs to be, so if you can jerry up a solution and that solution works, then it's a solution. (MSS 12122013).*

The adequacy of a modification may be something that also changes over time and this can reflect on the success of the project,

> *So if it works it works. Usually in my experience where it doesn't work, or fails, is when the situation changes (MSS 12122013)*

Negative aspects of DIY home modifications

Aside from safety concerns, there were general comments made on negative aspects of DIY home modifications. A frequent issue raised was the difficulty in finding builders and tradespeople willing to do the type of modifications required and who would listen properly to what people wanted. The lack of tradespeople who met these needs often resulted in modifications that did not fully address the client's needs.

> *It was extremely time consuming to get the plans exactly as we wanted them. Discussing these plans with professional trades did often involve a whole education session on why we would want something a certain way. We often struggled to get tradesmen to change from their standard practice in the way that they constructed something. (C15)*

A lack of information and products that were designed for people with disability were also cited as problematic. This is encapsulated by the following quote from the consumer survey:

> *Most products are designed assuming users are fully able. Many trades are used to only working in a fixed approach with standard products, technics and often no awareness of how people with differing abilities function. (C21)*

Professional's and tradespeople's lack of awareness and understanding about a person with disability's requirements can lead to less successful home modifications. As Heywood (2004, 130) notes, less successful adaptations are caused by a failure to recognise the needs of disabled people and their families, as well as ignoring through a person's need for dignity and control.

Positive and negatives of home modifications from industry perspective

Industry survey results reflected similar themes. The reasons as to why DIY home modifications were regarded as positive can be categorised into two main themes – satisfaction from helping others, and awareness of the benefits DIY home modifications provides.

Satisfaction from helping others

Respondents reported that the personal satisfaction from assisting others was a positive aspect of DIY home modifications. The ability to make people's lives easier,

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problem solving, and being able to provide professional advice that helps people, was rewarding and fulfilling.

Acknowledging the benefits it brings to others

While the first theme reflects personal satisfaction, the second main theme was an acknowledgment of the satisfaction the DIY home modifications brought to others. DIY home modifications were regarded as positive because they were cost effective, time efficient, avoided planning permissions, and gave greater control to the person requiring the modifications. Enabling people with disability and older people to stay at home longer was also seen as a positive.

With respect to the negative aspects of DIY home modifications, responses could be categorised into concerns around time, cost, trust and control, concerns around the lack of professional input, and concerns around the ability of consumers to complete a DIY project safely.

Time, control, trust and cost

Respondents reported the cost of products and the time taken to do DIY home modifications as negative. It was noted that the time period to complete the projects was too short, or conversely that the projects took longer to complete than expected. The lack of control over accountability of workmanship, a lack of awareness of the types of modifications needed, as well as a lack of trust in tradespeople, was also cited as negative aspects of DIY home modifications.

Lack of professional expertise

Industry respondents expressed concerns around the lack of professional expertise in DIY home modification projects. This included: no input from designers, the use of builders who don't have the necessary skills or training to understand the needs of people with disability, and the unreliability of family and friends. These could result in unnecessary mistakes and a less professional job.

Ability and safety

Following on from concerns about the lack of professional input, respondents also cited lack of ability as a safety issue. The lack of qualifications and experience to complete the projects to the required standard was a particular concern, as was the influence of DIY television programs which respondents thought increased people's confidence in their ability to do DIY projects, without their having the ability to do them safely.

Assessments made about the quality of DIY home modification projects

DIY home modifications were rarely assessed for quality and little information was recorded. This observation was also reflected in the survey responses, table 11. The majority of respondents, 44.2%, had no assessments of their DIY home modifications made. Respondents reported a higher percentage of assessment by occupational therapists being made prior to the modifications being done as compared to after the modifications, 30.2% and 25.6% respectively. This suggests that while occupational therapists may advise clients about the type of modifications they should install, fewer

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assessments are made about whether the clients actually installed the modifications successfully.

Table 11. Assessments on quality of DIY home modifications

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.	Response %	Response total
None	44.2%	19
I had an Occupational Therapist assessment done before the home modification project/s	30.2%	13
I had an Occupational Therapist assessment done after the home modification project/s	25.6%	11
I had a building consultant inspect the home modification project/s	9.3%	4
Other	27.9%	12

Quality assessments made in the 'other' category included obtaining them from specialist tradespeople, builders who consumers thought they could trust and communicate with and handymen, but otherwise no assessment except for the individual's own evaluation of their work. Unofficial visits from OTs were also listed in this category, and of these, two of the respondents noted that the OTs were family members.
These results, combined with those from the semi-structured interviews indicate that there is potential to develop an improved system for assessing whether DIY home modifications appropriately address the needs of the client.

This section has dealt with consumer and industry perspectives on the experience of DIY home modifications, the majority of which were reported as positive. The main benefits and corresponding motivators for undertaking DIY home modifications were:

- Time: DIY home modifications negated waiting for funded assistance and were often faster to install without waiting for tradespeople or planning permissions. This allowed people to address their needs in a timely manner and potentially reduce their rate of health deterioration.
- Cost: DIY home modifications were frequently reported as cost efficient although the cost of some product types was sometimes referred to as expensive.
- Trust and assistance: Consumer survey respondents cited the lack of trust in tradespeople to understand their needs and the installation of home modifications that adequately addressed these needs as a reason to choose DIY home modifications. Assistance from family and friends was frequently cited as beneficial and less intrusive.
- Control: DIY home modifications provided consumers with a greater level of control over the project. This included control over the design, products and materials used, cost, and accessing assistance when required.

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- Aesthetics: Respondents reported that DIY home modifications enabled greater control over the appearance of the project. This was important as consumers preferred modifications that didn't increase the visibility of their disability, and expressed dislike for the medical appearance of some assistive technology.

DIY home modifications were generally considered successful if they assisted the person with disability of any age and improved the ease with which they could conduct daily activities. It was recognised that needs may change over time and that the ability of the DIY home modifications to accommodate the required needs would vary with disease progression. Reports of DIY home modifications having adverse effects were rare and generally regarded as exaggerated.

Consumer and Industry groups reported some negative aspects of DIY home modifications. Consumers reported difficulty in finding products designed for people with disability, as well as issues with communicating their requirements to tradespeople. Industry also considered issues of time, cost, trust and control as problematic, and expressed concern over the lack of professional input and the ability of consumers to safely undertake DIY projects. Industry respondents did however report that the satisfaction in being able to assist others, and the broader benefits of DIY home modifications, as positive aspects of the process. The next section looks at the data gathered pertaining to point of sale resources.

Resources for DIY home modifications

The aim of this research is to develop point of sale resources about DIY home modifications which would benefit anybody considering undertaking DIY home modifications. To inform the development of these resources we asked participants about the resources currently available, which ones they had used, and what would be useful in the future. Data from interviews and surveys suggest that resources are important and the way they are delivered and made accessible can have a significant impact on the experience of DIY home modifications. Research showed that useful and accessible resources were valued and could inform decisions about DIY home modifications. The necessity of resources is particularly important considering the context in which decisions about DIY home modifications are made. Most DIY home modifications are reactive rather than proactive, often only a priority after illness or an accident. Coping with changes in ability, especially at the time of diagnosis, can be overwhelming and may effect consumer decisions. For example, one of the stakeholder interviewees mentioned that even though information resources existed, locating these resources may be complicated by, at the same time, also learning to cope with and manage the diagnosed condition or disability:

> *I think the information is around but it's one of those really peculiar quirks of, when you have an onset of a disability later in life you have to find the information and also at the same time, deal with the enormity of the fact that you've been given the diagnosis of dementia and what does that entail and everything from an emotional and coping sense. So we often find that people don't make, if you like, 'rational' choices around information seeking that you might ordinarily expect them to do.*

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This demonstrates the need not only for resources that provide adequate information, but also resources that are accessible at different stages of need. Indeed the second paragraph suggests more energy should also be invested in raising awareness of the benefits of being proactive about DIY home modifications.

For both consumers and industry respondents, hardware retailers ranked as the most utilised or popular place to source information about DIY. Friends and relatives also scored highly, followed by websites and disability advocacy groups. Print media, TV, and pharmacies, were the least utilised sources of information (see table 12).

Table 12. Survey responses to sourcing product information

Where did you or the person you care for source information about the products required and how to plan and complete the project/s? What resources are you aware of that may help customers with DIY projects?	Consumer Response %	Consumer Response Total	Industry Response %	Industry Response Total
Hardware store	46.67%	21	75.76%	25
Pharmacy	4.44%	2	15.15%	5
Disability or Advocacy Group	22.22%	10	42.42%	14
Friend/Relative	35.56%	16	39.39%	13
TV	0%	0	24.24%	8
Print media	4.44%	2	27.27%	9
Website	22.22%	10	48.49%	16
Other	46.67%	21	21.21%	7

OTs were frequently mentioned as another source of information (9 responses). Other options included personal expertise, research and knowledge, care support co-ordinator tradesmen, specialists including both contractors and retailers such as those specialising in surgical supplies, and bathroom and tap ware, and other specialist stores/consultants, as well as the Independent Living Centre, and some social clubs. The frequency with which OTs were mentioned suggests they play an important role in providing advice about home modifications ,and that it may also be worthwhile to disseminate the proposed information resources to and through OTs.

Sourcing information about DIY home modifications from friends and relatives was something that also was mentioned in the semi-structured interviews:

> *" I think to a degree it's about learning from others who are blind, and that social interaction and peer support that happens, that we know happens in the blind community. You get a lot of people learning from each other. So one person might talk about something that they've done that's benefited them at home. So other people say "Ah, that's a good idea."" (Vision Australia 19122013)*

Accepting assistance from friends and relatives lowered both the financial and emotional investment, financial in that it was often cost effective to have friends

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contribute as it reduced labour costs, and emotional, as some respondents mentioned that having friends and family members assist the work was less stressful than having strangers in the house.

> *It was a shame we could not get any financial help, even for the basics, but having family do this renovation was less stressful than strangers, as the house was in chaos for 4 weeks, we had to bucket bath and use a Portaloo & we were able to get it all done whilst my husband is still reasonably able. (C10)*

When it came to asking what resources would assist DIY projects, or would help to provide advice to customers, fact sheets, brochures and websites ranked the most popular: 73.3% of consumers and 57.8% of industry respondents thought a fact sheet would be useful; 35.6% and 63.6% rated brochures; and 51.1% and 60.6% thought websites would be helpful. Online videos and smart-phone apps were also popular choices at 37.8% and 45.5%; and 24.4% and 33.3% respectively. Print media was seen as the least useful coming in at only 4.4% for consumers and 24.4% for industry respondents. This response demonstrates the trend towards information readily available at point of sale such as brochures and fact sheets, and importantly, indicates the importance of online resources and smart phone technology (see table 13)

These results support the project's proposed resources: QR codes, online videos, consumer fact sheets which are available online and in print, and pamphlets. The training resources available online and via existing bodies such as MODA (formerly the NSW HMMS State Council) or Independent Living Centres, also correlate with the proposed resources. Other interesting suggestions for useful information resources included in-store DIY classes, options to physically try and test the items, as well as the provision of design programs where you can build/design the relevant home spaces and which could be considered as potential future actions to improve DIY experience and information provision.

Other options considered as being useful included,

- the use of a case worker to smooth the way;
- information on time frame approvals and funding;
- education of community OTs and better funding options;
- free assessment;
- iPads to help provide information;
- providing information at local doctors;
- product information and installation guides;
- expert advice and online research;
- community knowledge such as talking to other disabled people about their DIY home modifications experience; and
- comprehensive fact sheets that not only explain how but why certain issues and contexts must be considered in undertaking DIY home modifications.

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Table 13. Resources which would assist DIY home modification projects

What resource/s would assist a do-it-yourself home modification project in the future? / What resources would help you to provide advice to customers about DIY projects?	Consumer Response %	Consumer Response Total	Industry Response %	Industry Response Total
Fact Sheet	73.33%	33	57.58%	19
Brochure	35.56%	16	63.64%	21
Smart-phone App	24.44%	11	33.33%	11
Online Videos	37.78%	17	45.46%	15
Print Media	4.44%	2	24.24%	8
Website	51.11%	23	60.61%	20
Other	28.89%	13	30.3%	10

The Industry survey asked whether respondents provided advice on DIY home modifications and to describe what giving advice generally entailed. Of those surveyed who responded, 66.7% said that they gave advice. This result is due to the size of the participating hardware stores. Both participating stores were warehouse size and had a range of staff, some of whom were specialists, and others who had more general knowledge. Therefore, not everybody in the store was able to provide specific advice on home modifications but could help assist with general advice.

The advice that staff provided ranged from advising on product information to assessing the modifications required and whether they could be done DIY or whether a professional should be engaged. Advice included:

Product Types

- advice about shower rails and outdoor/indoor ramps
- specific advice on drills and to provide a better understanding of tools
- product advice including use.

General Advice and referrals

- being proactive with advice
- asking the consumers what it is they need and then referring them to a professional or providing product information
- providing advice to consumers in store
- providing advice that acknowledges that anything general can be done DIY but that if it's something a tradesman should do, then they are best to use a professional for the job.

Safety

- safety aspects, expected difficulties and AS1428 handouts.

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Customised advice and problem solving

- detailed diagrams and written advice based on clinical need, with recommended position, angle, dimensions, recommended materials, contact details of tradespeople, details of complementary equipment, follow up as needed
- possible solutions that can be provided using the equipment in store.

Product types which were mentioned in response to this question included showers, ramps, pavers, retaining walls, gardening, tiling, flooring, grabrails, hand railings, non-slip treads for stairs, drills, doors, sheds and basic DIY projects. Providing advice about shower rails and outdoor/indoor ramps appeared frequently in survey responses, which may indicate the popularity of and need for these types of modifications. Interestingly, the reference to Australian Standards 1428, which are not designed for domestic dwellings, suggests a lack of awareness of relevant standards and other safety requirements that require compliance. This suggests a need for greater education and provision of information around safety aspects and Standards relevant to DIY home modifications.

Impact of DIY home modifications on health

To assess whether the DIY home modifications had a positive or negative impact on health, the consumer survey respondents were asked about selected health variables before and after DIY home modifications (table 14). At an overall health level, DIY home modifications appear to improve consumer's state of health. This supports existing research which demonstrates the potential of home modifications to increase the independence, safety and quality of life of individuals, increase wellbeing and confidence, as well as reduce care costs (Adams, Carnemolla, Bridge, McNamara, & Quinn 2014; Carnemolla and Bridge 2011; Carnemolla and Bridge 2014; Jones, de Jonge and Phillips 2008; Tanner, Tilse & de Jonge 2008). Four out of the five categories enquired of suggested that the modifications increased the number of people who had previously had issues with mobility, personal care, performing usual activities, and being anxious and depressed, to being reported as having no problems with these issues. The only category where there were more problems reported after the modifications was pain and discomfort, which went from eight respondents reporting no pain or discomfort prior to modifications, to six reported after modifications. Some variables were reported as being the same before and after the DIY home modifications.

Table 14. Health state before and after modifications

Health state before and after modifications				
Response %	**Before the modification/s**		**After the modification/s**	
Mobility				
I have no problems in moving around	20.00%	9	40.00%	18
I have some problems in moving around	62.22%	28	44.44%	20
I am confined to bed	4.44%	2	8.89%	4

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Health state before and after modifications				
Personal Care				
I have no problems with personal care	20.00%	9	48.89%	22
I have some problems washing or dressing myself	51.11%	23	31.11%	14
I am unable to wash or dress myself	15.56%	7	15.56%	7
Usual Activities (e.g. work, study, housework, family or leisure activities)				
I have no problems with performing my usual activities	20.00%	9	28.89%	13
I have some problems with performing my usual activities	40.00%	18	40.00%	18
I am unable to perform my usual activities	24.44%	11	20.00%	9
Pain/Discomfort				
I have no pain or discomfort	17.78%	8	13.33%	6
I have moderate pain or discomfort	48.89%	22	60.00%	27
I have extreme pain or discomfort	20.00%	9	15.56%	7
Anxiety/Depression				
I am not anxious or depressed	44.44%	20	53.33%	24
I am moderately anxious or depressed	28.89%	13	22.22%	10
I am extremely anxious or depressed	6.67%	3	0.00%	0

The majority of variables were reported as improving after the modifications. The exceptions were:

- Being confined to bed (2 before and 4 after)
- Unable to wash myself (constant at 7 before and 7 after)
- Problems performing usual activities (constant at 18 before and after)
- Moderate pain or discomfort (22 before; 27 after)

These variables may present this way for multiple reasons. For example, a report of moderate pain after modifications may not reflect a deterioration in health but plausibly an improvement if previously listed as extreme pain or discomfort. They could also reflect the severity of the illness or disability rather than the usefulness of the DIY home modification. For example, two survey responses in particular showed a general trend to deterioration in health after the DIY home modifications. On closer inspection, both respondents had a terminal illness that would continue to deteriorate over time, these being terminal cancer, and Primary Progressive Multiple Sclerosis (PPMS). In both these cases, the severity of the disease may have progressed post modifications and could possibly reflect the impact of the disease progression despite the modifications. It is plausible that the level of deterioration reported may have been higher without the modifications.

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The generally positive health outcomes of DIY home modifications reported by consumers reflect the research reported in the economic modelling component and in other studies that reflect similar improvement in safety and reduction in falls due to home modifications . For example, conducted research that showed evidence that low cost occupational/physical therapy home interventions which address modifiable environmental and behavioural risk factors can reduce perceived functional difficulties and enhance self-efficacy and fall-related concerns in people who may be transitioning to frailty (2006, 813). Home modifications benefit consumers as well as the government by reducing dependency on health systems and enabling ageing in place (Andrews 2002; Heuman & Boldy 1993; Tanner et al. 2008). This research suggests that DIY home modifications offer similar benefits.

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Economic Analysis of DIY Home Modification Market

The purpose of the economic analysis in this study is to provide an understanding of the size and potential growth of the DIY home modification market in NSW. In order to establish market size, major retail hardware store chains in NSW, Australia, were approached to provide sales data on product volumes and value. This de-identified sales data provided a better understanding of the types of products people are buying and the scale and trend of purchases (Bridge et al. 2014).

Given the commercially sensitive nature of retail sales data, some retailers chose not to provide sales data, despite strict confidentiality agreements being in place. The figures provided by participating organizations were therefore combined with the estimated market share of each group to estimate the total market size in New South Wales. From the collected data, the total DIY home modification market in NSW was estimated to be $13.1 million in 2011 and growing in each year since to $14.8 million in 2012 and $16.8 million in 2013, a year on year growth rate of 12.8% in 2012 and 13.7% in 2013.

The figures as presented in table 15 confirm that grabrails and handrails are a core component, with the generally lower price and high volume sales of hand held showers providing the largest relative proportion. The skew towards hand held showers is accentuated by the absence of larger value modification groups.

The modifications for larger ramps and level access showers are not included as the construction materials purchased for the DIY construction are not traceable at the retail point of sale. The figures shown as 'other' includes related items such as brackets, fasteners and minor components related to the core product groups.

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Table 15. Total DIY home modification product sales in NSW by product group.

	2011		2012		2013	
Product group	**Sales ($)**	**Total sales (%)**	**Sales ($)**	**Sales growth (%)**	**Sales ($)**	**Sales growth (%)**
Hand-held shower	9,128,367	69.7%	10,781,219	18.1%	12,481,301	15.8%
Grabrail	2,910,975	22.2%	2,919,961	0.3%	3,149,782	7.9%
Handrail	629,954	4.8%	626,991	-0.5%	706,344	12.7%
other	367,365	2.8%	329,545	-10.3%	331,034	0.5%
Ramp	59,064	0.5%	115,448	95.5%	135,202	17.1%
Grand Total	**13,095,725**	**100.0%**	**14,773,164**	**12.8%**	**16,803,663**	**13.7%**

Source: NSW Retail data collection

Note: Figures have been converted to NSW total estimates based on each retailer multiplied by respective retailer market share

Analysis therefore suggests that the DIY home modifications market is of a similar size in cost-terms to the HACC/CHSP and CCSP NSW home modification programs share, with an established trend in growth across available product groups for the three years from 2011 to 2013 (see table 15). Sales data for ramps and level access showers are not included in these estimates as the construction materials purchased for DIY construction are not traceable at the retail point of sale.

Cost-benefit modelling

Given that quantitative data for those who have undertaken DIY modifications is not available, the economic component is not a formal cost effectiveness evaluation. Rather, the motivation for cost-benefit modelling is to examine scenarios, combining the above mentioned retail data with published incidence and cost figures for falls in the target community based DIY group. Although there is clearly substantial variation in fall-related costs and outcomes, the model parameters and inputs are used consistently in both arms of the model, the control base-case and the DIY home modification intervention. This focuses the model estimates on the key variables of the cost of the DIY modification, and the scenarios of reduced risk in falling.

Regarding targeting of the DIY home modification population, there is an implicit element of revealed preference reflected through initiating, planning, installing and self-funding a DIY modification. In the modelling undertaken, the base-case 10% reduction in falls (that is, from the NSW 25.6% average fall rate) shows an average estimated reduction in costs of $2,508 and an increased estimated 0.03 quality adjusted life years (QALYs). In the case that the fall rate reduction was higher, the benefits will increase as presented towards the previously reported 50% range (Figure 2).

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At a DIY home modification level as confirmed in the retail data of at least 15,000 modifications per year, at the 10% base case rate of reduced falls, the annual cost offset to health and aged care services would be in the order of $3.75 million per year. The retail data indicate potentially 3 or 4 fold this quantity of modifications, in which case the net cost saving could perceivably be above $10 million and potentially as high as $15 million per annum.

In this context, the DIY home modification point of sale project, at a cost of $253,000 could, under conservative assumptions, also plausibly generate significant benefits through increasing the number of modifications, or effective fall rate reduction via improved product choice and installation.

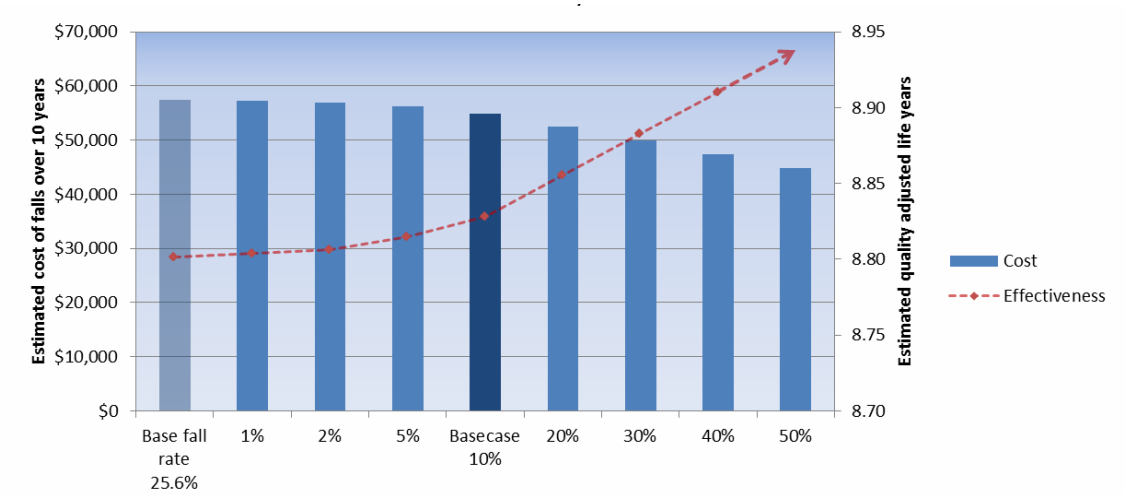


Figure 3. DIY home modification cost effectiveness.

The modelling suggests that DIY interventions are cost effective due to the relatively low cost of DIY home modifications. Moderate reductions in the risk of falling can offset significant healthcare costs and/or early transition into residential or aged care facilities. The lower costs are a result of all aspects of planning, product selection, purchase and installation or construction being undertaken by privately funded individuals or their family and friends. In addition to the base case (a conservative base case scenario assumes a 10% reduction in the fall rate for those who have installed a DIY home modification) being lower cost under conservative assumptions, that is, the cost of the DIY modification is more than offset by reductions in healthcare costs, there are also benefits in terms of healthcare related quality of life, as a by-product of reduced falls (McNamara et al. 2014).

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Video Ethnography Outcomes

Ethnography has been successfully demonstrated as a qualitative research methodology that relates the stories of people's lives and daily practices. Technological developments along with the availability and decreasing cost of audio-visual equipment have seen an increase in the uptake of visual ethnographies as way to compliment and extend the practice of fieldwork through written notes and audio recordings. While providing the ethnographer with more tools which to conduct their research, the essence of the ethnographic work is constant. As Murthy notes, "As ethnography goes digital, its epistemological remit remains much the same. Ethnography is about telling social stories" . It is the stories of people's experiences with DIY home modifications that we sought to tell through the video ethnography component of this research.

Participants were selected from earlier survey participants who had indicated their interest in further research, and who had made either one or multiple DIY home modifications of the five product types. This resulted in a stratified sample that representative of rural/urban and male/female variables and through this additional variables including:

- Age and life stage
- Profession/education level
- Level of disability
- How recent the disability is
- Financial means
- Access to retail stores
- Assistance with product installation
- Uptake of smartphone technology
- Engagement with internet technology

These factors influenced each individual's choice to undertake DIY home modifications and also their experience of DIY home modifications. Four of these case studies are documented in Appendix 15 with links to video content.

Each participant's story related the multiple factors that influence people's experience of DIY home modifications. They also suggest that people often do home modifications both with funding assistance *and* as DIY. This challenges assumptions in much of the literature which focus on home modifications only as a funded option. It is also an important consideration with respect to the NDIS and its individualised care packages.

The video ethnography showed product decisions were based on the following variables:

- Level of concern for aesthetics
- Cost
- Availability
- Advice

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Most significantly, it was found that product choices often depended on how informed participants were of the choices, in that people can only look for what is already known to them. This process can be visualised by the use of the Johari Window (Figure 1).



Figure 4. Johari window of known and unknowns

These observations reflect those of the interviews and surveys discussed earlier. The Johari paradigm can provide a framework through which to conceptualise participants' information needs which is important when considering product resources. We next provide an example of the four categories of the Johari window based on the ethnographic case studies which are profiled in detail in Appendix 15:

Known knowns

Participant feels they have a level of knowledge and experience sufficient to make an informed choice:

- Jack has already built and used a ramp and is rebuilding it the same way with some improvements based on having used it for a couple of years.
- Chris has tried different ramp slopes while carrying shopping to make sure his ramp design is easy for him to use.

Known unknowns

Participant seeks advice on a product because they're aware they have no knowledge.

- Robyn asks the man at Bunnings to recommend a hand held shower that suits her primary need i.e. price.
- Toni is interested in a grabrail shower so she asks the assistant as Cass Brothers

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if the one she likes could be used as a grabrail.

Unknown knowns

Participants say one thing yet their actions reveal another. Ethnographic observation revealed ways that participants choose to ignore what they 'know'.

- Robyn says the hand held shower is easy to use: "Paul doesn't seem to have any trouble with it", yet she was observed to have difficulty replacing the hand set.
- Toni knows the slight lip on the edge of her shower floor could be a trip hazard yet she lays down a towel along the edge to warn herself of the danger but also as a way of telling herself it's OK.

Unknown unknowns

Participants are aware of the possibilities.

Participants are aware of the inadequacies of the products/advice:

- Jack was advised to fit a hand held shower yet this was inappropriate as he can't raise his arm.
- Chris's builder insisted the garage had to be stepped yet the concreter said it was normal to have level access for wheelchair users.
- Robyn bought a suction grabrail without knowledge on the weight limit for someone as big as Paul.

Participants are unaware of the inappropriate ways they are using products:

- Robyn uses insecure step from Innovations as an exercise step for Paul.
- Paul uses the hand held shower as a grabrail.
- Jack's ramp has a trip hazard at the bottom of the ramp.
- Toni uses her glass shower screen as a grabrail.

Contextualising the observations from the video ethnography in relation to the Johari window provides useful insights into the range of information needs of the participants and which can be extrapolated to the broader information requirements of those undertaking DIY home modifications more generally.

Different participants were satisfied with different levels of product information ranging from very basic to highly technical and sought different kinds of recommendations ranging from personal to professional. These can be categorised into the following:

Abdication of personal responsibility

- Robyn: "*I don't know, men just know these things*".

Personal/Anecdotal

- Bunnings assistant to Robyn "*works beautifully, nothing wrong with it*."
- Robyn "*I was volunteering at Driver Reviver and a friend said my brother got a grant to pay for those things, I'll ask him about it*."

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Technical

- Cass Brothers assistant to Toni: "*If you want the shower rail to be a grabrail you need this one*."
- Anstey's assistant "*The Australian Standard is 35mm*."

Professional

- Chris: *"I downloaded the CAD blocks into my 3D rendering*."

Participants sought advice, and found useful advice, from a range of sources, each with their own positives and negatives. These are outlined in Table 16.

Table 16. Positive and negative factors of advice from different sources

	+	-
Professional e.g. doctor, OT, social worker	Enlighten to the unknown unknowns. Give a broad overview.	May have fixed ideas e.g. Jack's Veterans Affairs shower
Retail Personnel	You can talk one-on-one and explain needs.	They'll only offer what is in the shop. Unless it's a specialist store they may know nothing about disability.
Brand Websites	Can provide full technical specs.	Can't compare same specs across brands, information is presented differently. Rarely written for disability.
Online Shopping	Good for discovering a range of what is available.	Can't see and feel the product. Can't inform of unknown unknowns.
Experiential word of mouth	Genuine user based advice from people with similar disabilities and circumstances. Enlighten to the unknown unknowns.	May not be technically sawy or aware of other options, won't give a broad overview of all options.

Table 16 demonstrates that the various methods of information procurement have positives and negatives and none of the options provide information that comprehensively addresses all of the individual's needs. This is partly because disability is highly variable and therefore the possible solutions are dependent on the individual, an observation which was also frequently made in the semi-structured interviews and the surveys. Participants used a combination of information sources to inform their product decisions. The extent to which each source was useful depended on the individual's competency with technology and the internet, the opportunity to see and feel the product, and the opinions of the expert consulted. The positive elements of the information sources listed were that they provided:

- a broad overview of the products and options of which the individual was

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unaware;
- personal interaction in which an individual's needs could be expressed and addressed;
- detailed technical specifications; and
- consumer reviews and information based on personal experiences.

All of these information sources and the content they provided were useful and frequently used in combination by the participants.

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DIY Home Modification Resources: World Café

A series of current resources and examples were mocked up for the purpose of the World Café session to be discussed by participants. This was an opportunity for representatives from government agencies, consumer organisations, industry bodies, and members of the public to comment on the current effectiveness of resources and suggest possible ways they could be improved. The results of these discussions are summarised in this section. The five resource types: websites, fact sheets, shelf strips, dockets, and videos will be discussed individually. Participants self-sorted into groups, which meant that each resource type had four groups assess and discuss the examples. Many of the groups mentioned similar points and issues and these will be the main focus of discussion as it is plausible to suggest that the frequency and regularity with which they were mentioned, indicates their importance.

Websites

The website examples in Appendix 11 were discussed by participants. The majority of participants indicated that a website was most useful prior to a store visit. Websites were regarded as being a fast way to search for product information, both in terms of general and specific searches. Incorporating audio-visual material such as product and DIY demonstrations into the site was frequently mentioned as being useful. The issue of accessibility was also raised, with participants commenting that web content should be fully accessible to screen readers for people with visual and hearing impairments. Useful web content included product facts, prices, risks involved, installation information, checklists, and further links. The main results are summarised in Table 17.

Table 17. Important factors and suggestions for websites as resources

	Website		
Used when and why	What used for	Required Content	Suggestions
Prior to store visit Quick Easy to use	General Searches Specific searches	Product facts Prices Risks Installation Checklist Further links	Video: demonstrations Accessibility Independent body to produce fact sheet or monitor content

Fact sheets

The fact sheet examples in Appendix 12 were discussed by participants. Three key points were identified concerning fact sheets. Fact sheets should have:

1. Simple and concise instruction. Any visuals illustrate a detail about the subject at hand;
2. Links to further, more complex instruction which, ideally, would include an instructional video and how to, product information, cost, availability and where to seek help.

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3. Buy-in from industry bodies such as home modification services, suppliers, retailers, builders and architects.

Participant responses indicated that the design and content of fact sheets were important to their usefulness. Important design considerations included the use of strong colour, uniformity of font, ease of readability, use of simple language, small icons, strong graphics so that photographs and other visuals convey a powerful message, and the inclusion of QR codes. It was also suggested that the content could be presented similar to a recipe with the products required (ingredients) at the top of the fact sheet and the instructions below. The QR codes could be used to link to a video demonstration with instructions on the relevant DIY project.

Required content included product information, contacts and links to further information, step by step instructions, cost guides, links to relevant professionals, and other associated products. Participants also indicated it would be useful to have the content either endorsed or monitored by an independent body. The results are summarised in table 18.

Table 18. Important factors and suggestions for fact sheets

	Fact sheet		
Used when and why	Required Content	Design considerations	Suggestions
Prior to store visit Make informed decisions Distributed through hardware stores and pharmacies	Product information Products available Products required Installation Variations in product type Visuals/graphics Links to professionals and further information	Strong colours Readable (Arial 12pt) Uniform font Small icons Simple language Headings in contrasting colours A4 Not too busy	QR codes Visuals to convey strong message Audio-visual instructions Endorsed by independent organisations

Shelf strips

The shelf strip examples in Appendix 13 were discussed by participants. Participants identified three key points pertaining to shelf strips and the content they should display:

1. Price

2. Product name and barcode

3. QR code would be helpful but not essential

There was some discussion around whether additional information was necessary such as: the inclusion of a symbol that would indicate an "accessible" product and who would determine if a product was accessible; installation details; and listing other items to support installation. Printing braille on the shelf strips was also suggested, however it was questioned whether that was realistic.

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Because of the limited size of the shelf strip, the inclusion of extra details would not be feasible. QR codes were seen as a viable option to link to further information which could be thought provoking and prompt consumers to think about questions to ask store staff, family and friends, and professionals such as OTs and tradespeople.

Dockets

The docket examples in Appendix 14 were discussed by participants. Participants were presented with the possibility of adding QR codes to purchase dockets and were shown some existing examples. The majority of participants thought it unnecessary to print QR codes on dockets. Dockets were seen primarily as being to validate purchases and to facilitate return and refund of product if necessary.

Reasons for not printing QR codes on dockets were that dockets were too easy to lose, easily damaged, and faded easily. Participants suggested that it was more useful to have QR codes available when making a choice on which products to buy, at the point of background research and at the shelf.

Video

Material from the video ethnography (see Appendix 15) was used in the forum. There was a positive response to the video from the participants. A 7 minute video of a couple discussing their DIY home modifications was displayed in the Industry forum prior to the World Café session. A shorter two minute piece on hand held showers was also shown and was used to stimulate discussion on the usefulness of video as an information resource during the World Café.

The video prompted discussion around what things people would want to know, and what information would be required at what stage in the DIY home modification process. In this way, the video resource table discussions focused less on the content and design of the video, and more on broader DIY home modifications processes. The ability of the audio visual material to inspire these discussions indicates its value as an information resource on DIY home modifications. The questions and identified needs pertaining to the DIY process prompted by the video included:

- Product reviews: on Hardware sites, and independent online review forums.
- Product comparisons
- Where to purchase? Online, in store or both?
- Using social media and apps as information resources
- Safety standards
- Matching products with the required purpose
- Home modifications tips and information

A general belief was that such video clips would be a useful resource for people considering DIY home modifications. The videos can provide insight based on personal experiences about what problems may be encountered, what works well, and what people need to consider when planning for modifications.

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Videos could be linked via QR codes and participants mentioned this possibility. Thus, in the context of resources, videos could be accessed directly through websites or via QR codes. Being able to link via QR code is an effective way of linking video content to resources which uses minimal space.

Other suggestions for point-of-sale resources

Other ideas also came up through discussions. Most notable of these were:

- Providing end of aisle posters
- Demonstrations of DIY home modifications and tool use in store
- Wayfinding system within store which participants suggested could be a front door barcode 'reader' of items in the store catalogue and which could direct them to the exact in store location of the item.

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Conclusions

The results emanating from this study imply that DIY home modifications are an important means of supporting ageing in place in a person-centred and cost effective way. The results of this research demonstrated the value of social networks and industry in sourcing information about DIY home modifications. In order to capitalise from the potential of DIY home modifications however, the findings imply that there a clear need to work with government, industry and consumer groups to develop and distribute information resources that support people choosing to do DIY home modifications. Understanding the most effective mechanisms to provide relevant information resources is an important recommendation for further research and a recommendation is made as a next step in supporting DIY home modifications.

Additionally, the research has revealed that DIY home modifications play an important role in palliative care contexts and that more research is required to understand the critical time frame within which DIY home modifications can improve the quality of life for people with disability of all ages. People frequently reported that they chose to undertake DIY home modifications because they could not wait for government assistance without their condition deteriorating further. Therefore there is a need to further understand the contribution DIY home modifications can make in these contexts and what support is needed to ensure that the consumer receives the most appropriate information to ensure quality of life is maintained or to slow their rate of deterioration.

Information provision

The results revealed that although retailers had standard product information about DIY home modification products and could offer specialist advice in-store, consumer respondents are frustrated by the lack of information and products for people with disability. Respondents were equally frustrated by the difficulty in conveying their DIY home modifications needs to tradespeople who are unfamiliar with disability. This highlights the challenges facing people who are seeking to manage their own experiences of aging in place safely and successfuly. Given the projected market sizes, it also signals the opportunities for retailers to improve their own awareness of the ability for home modifications to impact levels of ability as well as review their customer (and staff) information systems in this specific area.

Regarding the type of information, participants expressed a preference for information to be distributed via fact sheets, websites and online videos. The use of QR codes to link with videos that demonstrated products and installation methods was suggested as a beneficial inclusion to resources.

Experience of DIY home modifications

The study results have shown that DIY home modifications generally have a positive impact by enabling older people and people with disability to stay at home longer, and ease the care burden on other family members. Although there were very few official assessments made about the quality of DIY home modification projects, the

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modifications were generally considered successful if they addressed the individual's need.

Typically, people with disability of all ages and their carers have a higher level of involvement in the planning and implementation of DIY home modifications, than in government funded modifications. Participants frequently cited greater control over the process as one of the reasons for undertaking DIY home modifications. This is a critical finding given the goal of autonomy, choice and control as part of the the National Disability Insurance Scheme (NDIS) currently being rolled out across Australia. The NDIS Act specifically documents that an aim of the program is to *support the independence and social and economic participation of people with disability*. This study strongly suggests that DIY home modification fit within this aim.

The ability to remain in one's home, to save money and time, and to have greater control over the DIY home modifications were all successful outcomes. Being able to customise their modifications to their individual needs was particularly important. This also reinforces the person-centred nature of DIY home modifications, in alignment with the goals of the NDIS.

Consumers generally perceived their experience of DIY home modifications as positive. Time and cost saving benefits, greater control over the process, and the sense of pride participating in the DIY home modifications process provides, were all considered positive. Negative aspects were identified as the time spent in the planning and implementation process, difficulty in conveying requirements to tradespeople, and the lack of information and products that are designed for people with disability. These negative aspects can all be ameliorated by improving the levels and quality of information, as well as improved awareness of tradespeople and retailers.

Economic analysis conclusions

The main conclusions from the economic analysis are that:

- DIY home modifications are potentially cost effective both to consumers and governments
- They can help save on long term health costs by enabling ageing in place
- They represent a significant part of the DIY market in NSW
- This market share has been growing and will continue to grow

DIY home modifications represent a significant share of the DIY market and continued growth is predicted based on the ageing population. They are cost saving and cost effective as they save on government funded health costs by enabling people to live longer and maintain functional capacity in their own homes and for longer, as well as helping consumers to save money on the modifications. Cost saving as a motivator to undertake DIY home modifications was mentioned frequently in the survey responses.

While there were limitations to the modelling component, analysis indicated that the DIY home modification market was a similar scale in costs to HACC/CHSP and CCSP

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NSW home modification programs. There is an established trend in growth across product groups from 2011-2013. Home modifications were considered cost effective due to the moderate reductions in risk of falling potentially offsetting significant healthcare costs and early transition to residential aged care.

Modifications not funded by government programs still delivered substantial benefits to society and potentially offset government funded services. Modelling showed that the estimated annual cost offset to health and aged care services as a result of DIY home modifications was $3.75 million for NSW. This estimate is conservative with retail data indicating that potentially 3-4 times this quantity of modifications are undertaking - implying a net saving of between $10-15 million per annum. National figures would be at least three times those of NSW based on population share.

The economic analysis, semi-structured interviews, surveys and video ethnography indicated that DIY home modifications have the potential to provide benefits to government through a reduction of costs and burden on the health system; to industry due to the size of the market and its potential growth rate; and to consumers for multiple reasons including economic, social and health factors. To improve the outcomes of DIY home modifications, it is necessary to ensure there are adequate resources at each point of the DIY process: planning, point of sale, installation and maintenance.

Key findings

In summary, the findings from research were that:

- Despite policy aiming to support ageing in place there remain significant challenges in providing support services which would enable this. These challenges need to be considered in the context of the aged care reforms and the NDIS implementation.
- People enact creative solutions and exert control over their own futures through choosing home modifications that enable them to remain and function capably in their own homes. The same creativity, control and agency were shown by the participants in this research.
- Successful ageing in place can be encouraged through DIY home modifications
- There is a need to have better information resources about DIY home modifications to help older people and people with disability to remain safely in their own homes for longer
- The creativity and efforts of those doing home modifications can be recognised as "resources in the design and provision of services, a service that aims to support individuals who are ageing in place might have the potential of being empowering" (Johansson, Josephsson & Lilja, 2009, p. 66). Applying the results of this research to inform the development of point-of-sale information resources for DIY products can equally empower older people and those with a disability.

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- Participants have a broad range of information needs from very basic to highly technical and desire recommendations ranging from personal to professional;
- Modification needs vary greatly according to disability, as even within apparently similar disabilities, what works for one may not work for another. It is therefore difficult to provide a 'one size fits all' POS information solution;
- The optimal solution may be a layered approach, offering varying levels of detail and technicality depending on consumer's needs and competency levels.

Recommendations

This research has demonstrated that one way to encourage successful ageing in place is through DIY home modifications. It has also indicated that there is a need to have better information resources about DIY home modifications which could help an ageing population and people with disability to remain safely in their own homes for longer. One of the more concerning consequences of a lack of information is the potential for incorrect or inappropriate use of a home modification component, signalling the potential for serious harm to the user, carer or careworkers.

This research demonstrated that participants have a broad range of information needs from very basic to highly technical and desire recommendations ranging from personal to professional. As well as this, modification needs vary greatly according to disability, as even within apparently similar disabilities, what works for one may not work for another. Although there is a clear need for information at point of sale for DIY home modifications as identified by the study, it is difficult to provide a 'one size fits all' information solution. It is recommended that any POS solution may be a layered approach, offering varying levels of detail and technicality depending on consumer's needs and competency levels.

In summary recommendations relating to any future POS development for DIY homemodifications include:

- there is a role for anecdotal user experience or user reviews as a way of addressing the diversity of individual disability, provide authenticity and share user experiences;
- information that addresses the 'unknown unknown' factors would be desirable;
- the use of video clips showing real user experience be incorporated into point of sale resources; and
- POS resources be made available in a variety of formats and accessible at every stage of the decision making, construction and maintenance process.

Future research

The information from this research can be used to develop resources that in turn are made publicly available, so as to benefit all consumers. This research has demonstrated the value of social networks and industry in sourcing information about DIY home modifications. There is a need to work with government, industry and

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consumer groups to develop and distribute information resources that support people choosing to do DIY home modifications. Understanding the most effective mechanisms to provide relevant information resources is a useful area of further research and we suggest it as a next step in continuing this project.

One of the key findings of this research indicates that DIY home modifications play an important role in palliative care contexts and that more research is required to understand the critical time frame within which DIY home modifications can improve the quality of life for people with disability of all ages. Also, the issue of lead times is raised, with people frequently reported that they chose to undertake DIY home modifications because they could not wait for government assistance without their condition deteriorating further. This highlights a need to further understand the contribution DIY home modifications can make in these contexts and what support is needed to ensure that the consumer receives the most appropriate information to ensure quality of life is maintained and/or rate of health decline minimised. For instance, more work needs to be done on standards and performance and getting better cross-sectoral understanding about how those are conceived and attached to professional or industry positions

In recognition of the increased participation and control that DIY home modifications offer people, application of the results of the study have the potential not only to minimise potential harm, but to equally empower the elderly and those with a disability. Given the alignment of these results with the goals of Australia's NDIS, one of the recommendations from this research is the recognition of the potential for any further research to support and enhance the NDIS goals for people living with a disability.

There are clear opportunities for further research into DIY home modifications, particularly in the context of the goals of the NDIS in the following ways:

- To capture anecdotal user experience and user reviews as a way of addressing the diversity of individual disability, provide authenticity and share user experiences, including information that addresses the 'unknown unknown' factors in any particular DIY home modification;
- To develop video clips showing real user experience to be incorporated into point of sale (POS) resources;
- To develop accessible POS resources in a variety of formats to cover every stage of the decision making, construction and maintenance processes;
- To establish a repository of resources that retailers of home modification components could access and print off, to be placed near those components in the retail outlet, or available to consumers as an App for their smartphones or tablets. This information could also advise consumers where to find information to assist them in their choices e.g. HMinfo, occupational therapist etc.; and
- To develop a user-friendly App to assist consumers to access all of this information when in store or when researching their choices.

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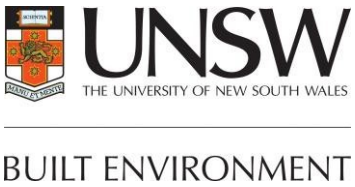
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Appendix 1: Participant Information Sheet

PROJECT INFORMATION STATEMENT



Date: 11 October 2013
Project Title: DIY Home Modifications: Point of Sale Support for People with Disability and their Carers

Approval No.: 135096

Participant selection and purpose of study

You are invited to participate in a study of DIY (do-it-yourself) home modifications. You were selected as a possible participant in this study because you are an industry body serving retailers/a hardware retailer operating in NSW, from whom people may purchase components, tools and materials which may be used in the DIY construction of the following home modifications:

- Grabrails – position and installation
- Ramps - fabrication and installation
- Hand showers – choices and uses
- Level access shower recess – waterproofing, floor fall and tiling.
- Hand railings for stairs and steps.

Description of study

If you decide to participate, we will contact you to make a time to speak you to conduct an interview. This can be conducted over the telephone or by visiting you at your place of work. The interview will take between 20 minutes and one hour, and will explore:

- what data and other information may be available which assists in understanding the prevalence and experience of people who have done these home modifications DIY;
- the relevance of key themes emerging from the DIY literature to the issue of accessible home modifications;

We cannot and do not guarantee or promise that you will receive any benefits from this study.

Confidentiality and disclosure of information

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission, or except as required by law. If you give us your permission, we plan to publish the results in a report presented to the NSW Family and Community Service's Ageing, Disability and Homecare Department, and in academic reports, conferences and journals, and other media.

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Your consent

Your decision whether or not to participate will not prejudice your future relations with The University of New South Wales or other participating organisations.

If you have any questions, please feel free to ask Nicole McNamara, phone 02 9385 4529, email nicole.mcnamara@unsw.edu.au, who will be happy to answer them.





Nicole McNamara
Catherine Bridge
Research Officer
Clearinghouse

Associate Professor

Director, HMinfo

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Appendix 2: Consent Form

BE HREAP FORM 4 – PROJECT CONSENT FORM September 2013

PROJECT CONSENT FORM

UNSW THE UNIVERSITY OF NEW SOUTH WALES
BUILT ENVIRONMENT

Project Title: *DIY Home Modifications: Point of Sale Support for People with Disability and their Carers*

You are making a decision whether or not to participate in a research project.

This PROJECT CONSENT FORM enables you to indicate your preparedness to participate in the project. By signing this form, your signature indicates that you have decided to participate.

You will be given a PROJECT INFORMATION STATEMENT that explains the project in detail, and that statement includes a revocation clause for you to use if you decide to withdraw your consent at some later stage. The PROJECT INFORMATION STATEMENT is your record of participation in the project.

This PROJECT CONSENT FORM will be retained by the researcher as evidence of your agreement to participate in this project.

Please complete the information in this box.

Please indicate which of the following options you agree to by ticking one of the following options:

☐ I consent to being quoted and identified

☐ I consent to being quoted but I do not want to be identified

.....
Signature of Research Participant

.....
Please PRINT name

.....
Date

Name of researcher: *Nicole McNamara*
nicole.mcnamara@unsw.edu.au
02 9385 4529

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Appendix 3: Interviews – Semi-structured questions and themes

Questions for Disability and Carer Organisations	
Topic/Theme	**Questions**
Data and Information	Have you conducted any studies on the phenomenon of doing home modifications DIY, or are you aware of any which may have been done, either in Australia or overseas? Do you keep any data relevant to enquiries or other interactions with people who are interested to do their home modifications DIY? Has this increased since the NDIS came into effect?
Motivation for doing modifications DIY	Are you aware of members who have done home modifications DIY, and the reasons for doing them this way? Has any research been done to date with members that provides data or information about choosing this option? Do issues of housing location impact on a person's motivation to do modifications DIY? (Explore some of the themes around this. Previous questions from themes worksheet: Gift relations, aesthetics, etc.)
Planning and Design Preferences	Are there particular elements of design (eg integration with aesthetics of home, functionality and visitability), which impact on design choices? Do people see these modifications as stand-alone projects, or consider them as sub-projects within broader home renovation plans? If the latter, does this influence the choices made on the products used and the extent to which they are installed DIY? What are the design and planning experiences of pwd who choose DIY home mods? Most cost effective for given design choices (product alternatives, materials used, ongoing maintenance)
Level of Assistance doing the work	What is your understanding of what "DIY" means in the context of home modifications? Is there broad agreement with a definition of DIY for pwd, which precludes specialist funded schemes and externally planned makeovers – but does include some level of contracting out when needed? Do pwd tend to undertake the tasks themselves, or get others to assist, or some combination? [Different for each mod type, in line with scale and complexity] Is the organisation aware of any organisation which has done or applied to do a major renovation project to directly assist a person with disability and/or their carers (such as Men's Shed, Rotary, Lions etc)? Are there some of the mods which can be wholly attempted, whilst others require assistance at some point? Do those able to assist have time to start, and see project to completion?

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Questions for Disability and Carer Organisations	
Topic/Theme	**Questions**
	Have you been approached by any groups (or are you aware of any initiatives by groups), such as Rotary, Lions, Men's Sheds, or even TV renovation shows, to assist individuals to make their premises accessible?
Experiences of the DIY option	Do impairment and support issues impact on doing the DIY tasks, and vice versa? What data/information may be available which helps to understand the experience for pwd and their carers? By modification group (hand rails, ramps, etc).
Impact of doing the modifications DIY	How do pwd and carers assess the success or otherwise of their DIY home mods? Outcome of having a well-functioning, safe home modification with no unexpected surprises, and that the project was seen as cost effective. What impact do DIY mods have on the home environment? What impact do DIY mods have on the wellbeing of the pwd and their quality of life? Any assessment of the capacity of DIY home mods to enhance or inhibit delivery of services in the pwd's home? Value of having DIY home modification fact sheets at POS, both for government individualised funded and self-funded projects.
Involvement in research and project outcomes	Will the organisation provide a letter of support for the research? Would the organisation be willing to recruit respondents from members for our project? What would be the most appropriate and effective way to elicit responses? What other methods to promote the research would be appropriate, and could be supported by the organisation?

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Questions for Government agencies	
Topic/Theme	Questions
Data and information available regarding components, installation, warranties and maintenance re modifications	Do these products fall into a specific classification, or generically under hardware and plumbing and building supplies? What regulations exist which relate to the quality of products and components available for purchase, and the installation of these? Are there minimum expectations relating to warranties of both products and work done to install the products? Are there standards or other regulations governing the maintenance which must be done following installation? If any of the above exist, how are they monitored and enforced? If they do not exist what generic or specific standards or codes of conduct could regulate the way these components are marketed and sold?
Motivation for doing modifications DIY	Is the Department aware of the factors which influence the decision by people to undertake these modifications DIY? Probes: any awareness of market gaps?
Planning and Design Preferences	What kind of information do consumers have access to if they choose to do these modifications DIY? What should they have?
Level of Assistance doing the work	
Experiences of the DIY option	
Impact of doing the modifications DIY	What other regulations or requirement pertain to consumers or retailer/contractors if, following installation, the modifications are to be used within the home "workplace"?

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Questions for Retailers	
Topic/Theme	**Questions**
Data and Information	Can retailers identify people who are purchasing the components for these mods?
Motivation for doing modifications DIY	Has any marketing work been done which identifies and addresses the motivations of people purchasing these materials, and the info they need to DIY? Commercial motivation to capture share of growing DIY home mod market (under planned increased government individualised funding) What are the estimated trends in DIY market (by product group? – identifiable product list for hand rails, other fittings / not directly identifiable for materials used in other groups, ramps, etc) This project is investigating the size of the planned government funding. (Could include perspective to retailer sales, if limited confidential sales data on specific DIY products were available).
Planning and Design Preferences	Is there any data available which lets us know the range of products which are being purchased to facilitate the DIY modifications under study? If so, what do these data tell us about people's style and other preferences? Has any market research been done, in relation to these modifications, to ascertain people's preferences? (Commercial motivation for all preferences – Home mod suggested products through POS information sheets / apps / HM Info site. Ongoing sales plus maintenance products, paint, repairs, etc. Assume no retainer sales volumes available. Identifiable products for some modification groups (handrails, etc.) Not easily identifiable for other larger mods, eg timber / concrete ramp, level shower access, etc [even though the larger mods are not easy to identify in specific sales, retailers have potentially significant opportunity for sales growth of DIY mod products.)
Level of Assistance doing the work	Does the data and qualitative info tell us anything about what level of jobs are being done DIY, and whether it is pwd themselves or friends/family, or even kindly tradies who are doing this work? Do sales of tools and other equipment and materials, along with relevant components, tell us about the extent to which people are doing these tasks DIY? Product sales motivation for each case of who installs or assists with the DIY mod, including ongoing maintenance. Have you been approached by any groups (or are you aware of any initiatives by groups), such as Rotary, Lions, Men's Sheds, or even TV renovation shows, to assist individuals to make their premises accessible?

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Questions for Retailers	
Topic/Theme	**Questions**
Experiences of the DIY option	Any particular problems or issues that customers require assistance with in any of the home mods specified? Retailers assisted by having DIY fact sheets at POS in stores and information available via apps / websites. – Lower customer questions and potential problems if DIY Home mod info available at POS.
Impact of doing the modifications DIY	Retailers increased number of happy DIY modification customers, if correct products and installation. – Assisted by POS/web DIY home mod fact sheets. Retailers also have ongoing sales of maintenance and repair materials for DIY home modifications (possible estimate of forward maintenance market if sales data available).

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Appendix 4: Coding for Interviews

Themes (Primary Node*)	**Category (Secondary Node)**	**Sub-categories *(Based on the literature)* (Tertiary Node)**
Interpretation *What DIY Home modification means to the organisation.*	**Definition** *How 'Do-it-yourself' is interpreted - What's included or excluded from the definition*	
	Attitudes towards DIY *Does DIY carry a positive, neutral or negative connotation? Does the organisation encourage or discourage DIY?*	
Data and information *What is known about DIY Home modifications*	**Evidence / Data collected** *Is data about DIY being collected or recorded?*	
	Provision *What information does the organisation provide?* *How this information is provided – method?*	
	Referral to *Who the organisation typically refers clients to in needed to modify their home.*	
Motivation *Reason for DIY Home modification*	**Autonomy / Independence** *Wanting to maintain control over the quality of their environment and lifestyle.*	***Aesthetics*** *Personal taste or preference*
		Choice *Over product selection, timing, placement within home, etc*
		Demonstration *Expression of an individual's independence*
	Self-provisioning *Best or only way of solving or improving the quality of their environment.*	***Availability*** *Ease of sourcing & installing the product*
		Confidence *Confidence to undertake the DIY home modification*
		Expertise *Necessary expertise (self or via family & friends) to undertake a DIY home modification*
		Time *Needing to make the modification quickly or convenience.*

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		Lack of Knowledge *Unaware of other options being available.*
		Lack of Trust *Fee of tradespersons over-charging or quality of their work*
		Shortage of Tradespersons *Shortage or difficult accessing tradesperson to assist*
	Gift Relationships *A way for family, friends or charitable agency to provide assistance.*	
	Financial / Cost *Perceived as most cost effective of making the necessary home modification.*	
Planning & Design Preferences *When are DIY Home Modifications undertaken or considered – Timing.*	**Unknown** *Organisation has no knowledge about this aspect of DIY*	
	Integration *Opportunity take to affect a home modification as part of a larger renovation project*	
	Maintenance *Part of a long-term schedule of maintenance / opportunity taken due to necessary repairs.*	
	One-off task *Specific modification aimed at overcoming a particular difficulty or barrier*	
Level of Assistance *How are DIY Home Modifications undertaken*	**Unknown** *Organisation has no knowledge about this aspect of DIY*	
	None *Work undertaken wholly by the individual*	
	Partial - use of specialities subcontracted *Specialised or more technical components undertaken by contractor or expert tradesperson.*	
	Project Managed others *Work directly undertaken under their instruction*	

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	Fully assisted *Various components undertaken by a range of others including family, friends, tradesperson.*	
Experience of DIY *Ability of the individual to implement a DIY Home modification project*	**Unknown** *Organisation has no knowledge about this aspect of DIY*	
	Successful *Individual was able to implement a DIY Home Modification.*	
	Unsuccessful *Individual was unable or experience problems in attempting to implement a DIY Home Modification.*	
Impacts *How effective are DIY Home Modifications.*	**Unknown** *Organisation has no knowledge about this aspect of DIY*	
	Positive *DIY Home modification positively impacts the individual.*	**Quality of life** *DIY modification improves the individual's health or sense of wellbeing.*
		Safety / Risks *Improved the safety of the home environment for the individual*
		Service Delivery *Improved the delivery of services to the individual*
		Aesthetics *Improved the aesthetics of the home setting*
	Negative *DIY Home modification negatively impacts the individual.*	**Quality of Life** *DIY modification threatened the individual's health or sense of wellbeing.*
		Safety / Risks *Poses a safety or increased risk of the home environment for the individual.*
		Service Delivery *Inhibited delivery of services to the individual*
		Aesthetics *Decreases the aesthetics of the home setting*

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Other Issues	*Issues revealed during the course of the interview which fall outside the standard questions but impact the delivery of a DIY Home Modification Project.*	

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Appendix 5: Coding Tree

CODING TREE

Primary Node *Secondary-Node Tertiary Node*

Interpretation

- Definition for DIY
- Attitudes towards DIY

Data & Information

- Data Collected
- Provision
- Referral to

Motivation

- Control
  - Aesthetics
  - Choice
  - Autonomy / Independence
- Self-provisioning
  - Availability
  - Confidence
  - Expertise
  - Time
  - Lack of knowledge
  - Lack of trust
  - Shortage of labour
  - Pride
- Gift Relationships
- Financial / cost
- Safe working environment / Home as workplace

Planning & Design

- Unknown
- Integration
- Maintenance
- One-off tasks

Level of Assistance

- Unknown
- None
- Partial – use of speciality subcontractors
- Project Managed Others
- Fully assisted

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Experience of DIY

- Unknown
- Positive
  - Improves quality of life
  - Improves safety / risk
  - Improves service delivery
  - Improves aesthetics of the home
- Negative
  - Reduces quality of life
  - Threatened safety / increases risk
  - Barrier to service delivery
  - Reduced aesthetics of the home

Other Issues

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Appendix 6: Consumer Surveys

UNSW AUSTRALIA

Do-It-Yourself Home Modifications - Consumer Survey

The Home Modification Information Clearinghouse at UNSW is undertaking research that investigates how home modifications, done in a do-it-yourself manner, have changed your quality of life. Description of study: The aim of the research project is to develop resources to assist people with disability and their carers to undertake home modifications in a do-it-yourself manner. More importantly, we want to know if home modifications done in a do-it-yourself manner make a difference to your quality of life, and learn from your experiences of doing home modification/s in this way to help all Australians in the future undertake modifications safely and appropriately. Who can participate? Anyone over the age of 18 who lives in NSW. Ensuring your privacy: Any information you give us will remain confidential. You will not be personally identified and the information you give us will only be used for research purposes. *** If you decide to participate, please click 'Next' to continue with the survey. This research has received ethics approval from the University of NSW. Ethics approval no. 145013. If you have ever provided advice or assistance about a DIY home modification, or have been contracted to undertake a home modification for somebody else, you can complete an Industry Survey here.

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

1. We define a do-it-yourself home modification as a "home modification project that is undertaken by a person with a disability themselves or with the assistance of family members or friends." Do you agree with this definition?

- O Yes
- O No

Please describe your understanding of a do-it-yourself-home modification:

.....

2. 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)

.....

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3. 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)

.....

4. When was the modification done? Select the time band for the work done, multiple selections are possible.

Matrix: part 1 of 2

	Grab rail/s	Hand-held shower/s	Level access shower recess	Ramp/s
Year:				
2010-2015	☐	☐	☐	☐
2005-2009	☐	☐	☐	☐
2000-2004	☐	☐	☐	☐
1995-1999	☐	☐	☐	☐
1990-1994	☐	☐	☐	☐
1985-1989	☐	☐	☐	☐
Before 1985	☐	☐	☐	☐

4. When was the modification done? Select the time band for the work done, multiple selections are possible.

Matrix: part 2 of 2

	Hand railings for stairs or steps	Other
Year:		
2010-2015	☐	☐
2005-2009	☐	☐
2000-2004	☐	☐
1995-1999	☐	☐
1990-1994	☐	☐
1985-1989	☐	☐
Before 1985	☐	☐

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5. 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)

.....

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

.....
.....
.....
.....

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

.....
.....
.....
.....

8. 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)

.....

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9. 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)

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

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

11. What is your age group? OR what is the age group of the person you care for? Please pick one

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

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12. What is your gender? OR what is the gender of the person you care for? Please pick one

- ○ Male
- ○ Female

13. Is the house? Select from these answers or write your own below.

- ○ Fully owned (includes if mortgaged)
- ○ Being purchased (includes being purchased under a rent/buy scheme)
- ○ Rented through a real estate agent
- ○ Rented through state/territory housing authority

Other (please specify)

.....

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

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.....
.....
.....

15. 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

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16. Where did you find out about the survey? Select from these answers or write your own below

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

Other (please specify)

.....

17. If you answered the survey on behalf of someone else; Are you Please pick one

- O Paid Carer
- O Friend/Relative
- O Guardian for child under 18
- O Guardian for person with cognitive impairment

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

- O No
- O Yes

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19. 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

.....

Thank you for completing this survey.

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Appendix 7: Industry Surveys

UNSW AUSTRALIA

Do-It-Yourself Home Modifications - Industry Survey

The Home Modification Information Clearinghouse at UNSW is undertaking research that investigates do-it-yourself home modifications. Description of study The aim of the research project is to develop resources to assist people with disability and their carers to undertake home modifications in a do-it-yourself manner. More importantly, we want to learn about the do-it-yourself process and learn from your experiences of providing advice and/or assistance with home modifications/products or outcomes in this way, to help all Australians in the future undertake modifications safely and appropriately. Who can participate? Anyone over the age of 18 who lives in NSW. Ensuring your privacy Any information you give us will remain confidential. You will not be personally identified and the information you give us will only be used for research purposes. ** This research has received ethics approval from the University of NSW. Ethics approval no. 145013. Click 'Next' to continue with the survey. If you, your carer, or someone you care for has ever undertaken a do-it-yourself (DIY) home modification, you can complete a Consumer Survey here.**

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

1. We define a do-it-yourself home modification as a "home modification project that is undertaken by a person with a disability themselves or with the assistance of family members or friends." Do you agree with this definition?

- O Yes
- O No

Please describe your understanding of a do-it-yourself-home modification:

.....

2. Are you a: Please pick one

- O Hardware store employee
- O Pharmacist
- O HIA member
- O MBA member

Other (please specify)

.....

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3. Which do-it-yourself home modification project/s have you been involved with? Please pick the answers which apply. Multiple selections are possible.

- ☐ None
- ☐ Grab rail/s
- ☐ Hand-held shower/s
- ☐ Level access shower recess
- ☐ Ramp/s
- ☐ Hand railing/s for stairs or steps

Other (please specify)

.....

4. When was the modification done? Select the time band for the work done, multiple selections are possible.

Matrix: part 1 of 2

	Grab rail/s	Hand-held shower/s	Level access shower recess	Ramp/s
Year:				
2010-2015	☐	☐	☐	☐
2005-2009	☐	☐	☐	☐
2000-2004	☐	☐	☐	☐
1995-1999	☐	☐	☐	☐
1990-1994	☐	☐	☐	☐
1985-1989	☐	☐	☐	☐
Before 1985	☐	☐	☐	☐

4. When was the modification done? Select the time band for the work done, multiple selections are possible.

Matrix: part 2 of 2

	Hand railings for stairs or steps	Other	Not Applicable
Year:			
2010-2015	☐	☐	☐
2005-2009	☐	☐	☐
2000-2004	☐	☐	☐
1995-1999	☐	☐	☐
1990-1994	☐	☐	☐
1985-1989	☐	☐	☐
Before 1985	☐	☐	☐

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5. Do you provide advice about do-it-yourself modification project/s in your workplace?

- ○ Yes
- ○ No

If YES, please describe what this advice usually entails:

.....

6. Please decsribe what is/was good about being involved in do-it-yourself home modification project/s?

	Description	Not Applicable
Description	.....	☐

7. Please decsribe what is/was bad about being involved in do-it-yourself home modification project/s?

	Description	Not Applicable
Description	.....	☐

8. 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 stores
- ☐ Pharmacy
- ☐ Disability or Advocacy group
- ☐ Friend/Relative
- ☐ TV
- ☐ Print media (e.g. newspaper or magazine)
- ☐ Website

Other (please specify)

.....

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9. What resources 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

10. What is your age group? Please pick one

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

11. What is your gender? Please pick one

- ○ Male
- ○ Female

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

.....

.....

.....

.....

13. 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

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

- ○ No
- ○ Yes

15. 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

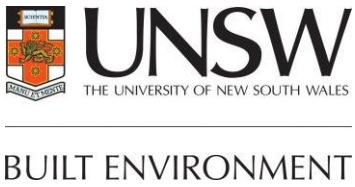
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Thank you for completing this survey.

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Appendix 8: Video Ethnography PIS

PROJECT INFORMATION STATEMENT



Date: 05/11/2014
Project Title: DIY Home Modifications: Point-of-Sale Support for People with Disability and their Carers

Approval No.: *145054*

Participant selection and purpose of study

You are invited to participate in a study of do-it-yourself (DIY) home modifications. You were selected as a possible participant in this study because you have undertaken, or you are about to undertake, a DIY home modification (i.e. a grabrail, hand rail, hand-held shower, level access shower recess, or access ramp).

Description of study

If you decide to participate, a researcher will conduct an interview with you and/or your carer at home which will be recorded using a video camera. Some (1-2 minutes of edited video) of this footage may be used in resources that we plan to develop to assist consumers to undertake DIY home modification projects safely and appropriately in the future.

The in-home 1-on-1 interview with the researcher or paired with a carer or family member or friend will take approximately 3.5 hours of your time and will involve the following elements:

- *Sit-down interview* about your home modification needs, the process of undertaking your home modification/s and the experience of doing the home modification/s.

- *Home-tour interview and video observation*: We will ask you to take us on a tour of the DIY home modifications that you have done and ask you to talk about the DIY process, what it was like to undertake the home modification/s and anything else that you feel is important.

- *Accompanied shop:* Together (with you, plus a carer, family member or friend) we will visit the retail store that you purchased some or all of the items you needed when doing your home modification OR if you did this on-line, we will ask you to take us through where and how you sourced information and materials for your DIY home modification/s. We will talk about the shopping experience and any problems or issues you encountered. We cannot and do not guarantee or promise that you will receive any benefits from this study.

Occasional Paper: DIY Home Modifications: What information is required at point-of-sale? Final Report
March 2016, DOI: 10.26288/5c468a878a53c
ISBN: 978-0-7334-3585-0 **www.homemods.info**

Confidentiality and disclosure of information

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission, or except as required by law. If you give us your permission, we plan to publish the results in a report for ADHC, and other academic papers. We plan to use some of the footage we obtain during the interviews/visits for point-of-sale or online resources that will assist consumers in the future to undertake their DIY home modification projects safely and appropriately.

Recompense to participants

As a thank you for participating in the two interviews we would like to offer you a $50 gift voucher for Coles.

Your consent

Your decision whether or not to participate will not prejudice your future relations with The University of New South Wales or other participating organisations. If you decide to participate, you are free to withdraw your consent and to discontinue participation at any time without prejudice by completing the statement below and returning this entire form to Sophia Maalsen, Room 3046, L3 Red Centre West Wing, UNSW Australia, Sydney, NSW 2052.

If you have any questions, please contact Sophia Maalsen (Tel: 02 9385 4529 E: s.maalsen@unsw.edu.au). If you have any additional questions later, Dr Catherine Bridge (Tel: 02 9385 5357 E: c.bridge@unsw.edu.au) will be happy to answer them.



Ass Prof Catherine Bridge

Director

Home Modification Information Clearinghouse

Room 3046 Red Centre West Wing

UNSW Australia

Sydney NSW 2052

REVOCATION OF CONSENT. Project Title: DIY Home Modifications: Point-of-Sale Supports for People with Disability and their Carers

(Please send this entire form to the above address.)
I hereby wish to withdraw my consent to participate in this research project. I understand that such withdrawal will not jeopardise my relationship with The University of New South Wales, other participating organisations or other professionals.

.....	.....	.....
Signature	Please Date	PRINT name

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Appendix 9: Video ethnography consent form

PROJECT CONSENT FORM

UNSW THE UNIVERSITY OF NEW SOUTH WALES

BUILT ENVIRONMENT

Project Title: *DIY Home Modifications: Point of Sale Support for People with Disability and their Carers*

You are making a decision whether or not to participate in a research project.

This PROJECT CONSENT FORM enables you to indicate your preparedness to participate in the project. By signing this form, your signature indicates that you have decided to participate.

You will be given a PROJECT INFORMATION STATEMENT that explains the project in detail, and that statement includes a revocation clause for you to use if you decide to withdraw your consent at some later stage. The PROJECT INFORMATION STATEMENT is your record of participation in the project.

This PROJECT CONSENT FORM will be retained by the researcher as evidence of your agreement to participate in this project.

Please complete the information in this box.

Please indicate which of the following options you agree to by ticking one of the following options:

☐ I consent to being quoted and identified

☐ I consent to being quoted but I do not want to be identified

☐ I consent to being filmed for the purposes of this research

☐ I consent to the film segments being used to develop Point of Sale materials to assist other people undertaking DIY Home Modifications

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.....

Signature of Research Participant

.....

Please PRINT name

.....

Date

Name of researcher: Ass Prof Catherine Bridge (Research Leader)

E: c.bridge@unsw.edu.au

P: 02 9385 5357

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Appendix 10: Industry forum flyer



We invite you to our industry forum to discuss highlights from our research and to provide an opportunity to have your say about point-of-sale resources

DIY home modifications for people with disability is a growing market

- Gain an enhanced understanding of the current state and potential size of the DIY home modifications market. For instance did you know that:
  - The total DIY home modification market within NSW alone has a year on year growth rate of between 13-14% annually
  - Data obtained from one hardware chain indicates an increase in sales from 13.1 million in 2011 to $16.8 million in 2013
  - This will continue to grow as Australia faces its largest ageing population
- ***The DIY segment represents a substantial component of the home modification market***, at least equal in size to the current HACC funding, potentially significantly larger, and also has further growth potential based on current DIY sales trends
- Our research shows that ***hardware stores are the largest source of information*** on home modifications and products

How can industry meet the need for DIY home modifications?

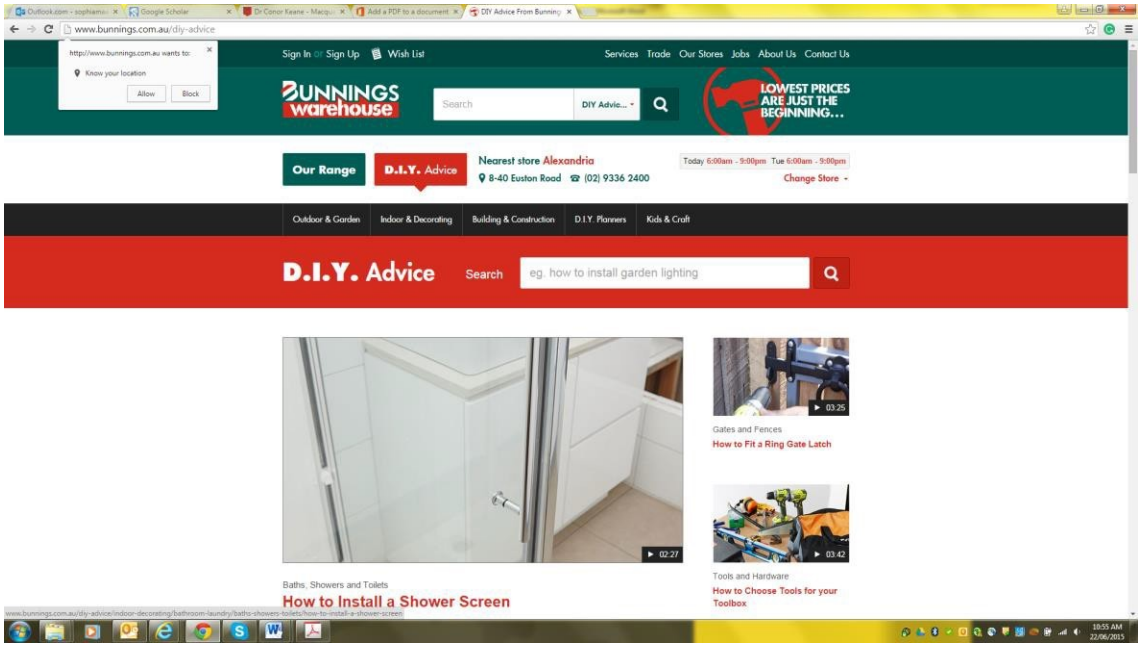
- Have your say in the development of point-of-sale resources so they can best assist in service delivery and improve consumer knowledge and satisfaction.
- Have your say about the ways in which our research can be applied to improve the DIY experience for consumers and service providers, and what might be useful next steps.

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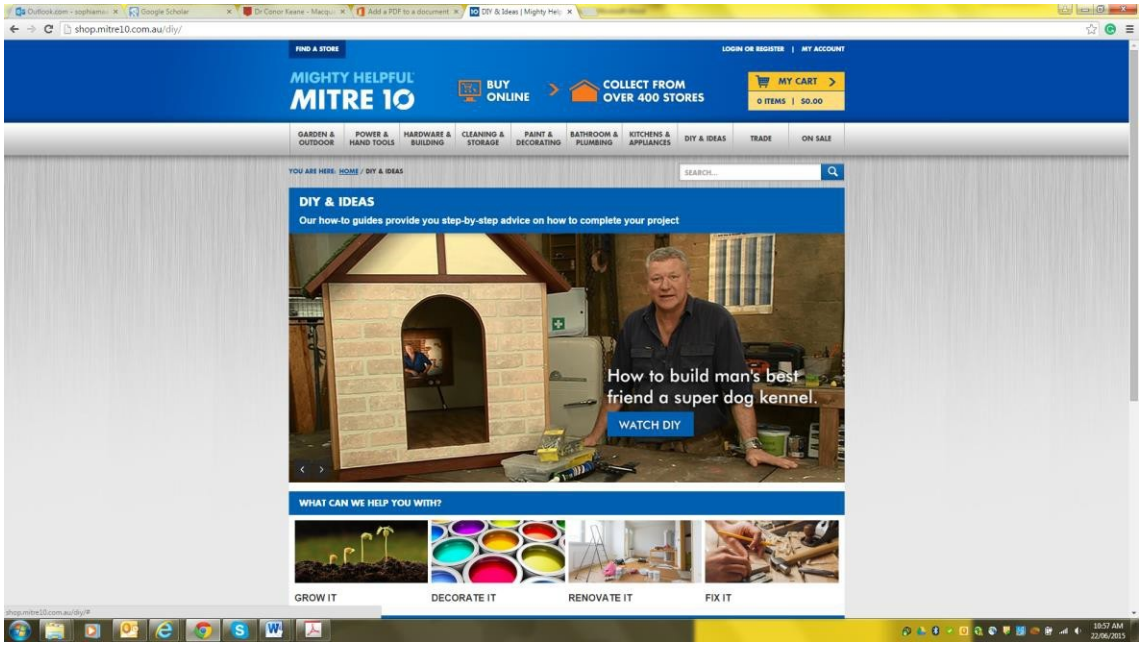


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Appendix 11: Example websites



Source: http://www.bunnings.com.au/diy-advice



Source: http://shop.mitre10.com.au/diy/

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Appendix 12: Example fact sheets



Ramps

Home Modification Information Clearinghouse

Advantages of ramps?

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Things to consider

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Appendix 13: Example shelf strips





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Appendix 14: Example dockets



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SUBTOTAL	$6.09
7.75%Tax	$0.39
TAKE-OUT **TOTAL	$6.48
CredCardAMT TEND	$6.48
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Appendix 15: Video material

Case Study 1: The home I designed and built myself – Chris's story

In 2000 Chris moved from the United Kingdom to Australia to take up an Information Technology (IT) management position. After an accident that resulted in a complete T6 paraplegia he met his wife, an occupational therapist, changed careers and now works in an access consultancy business in partnership with his wife.

Funded by accident compensation Chris was able to design and purpose-build a house to accommodate his impairment and the needs of his growing family of four children under the age of 7. The house was five minutes from the consultancy business where he worked.

Chris and his wife had no family around for support so they used order and routine to keep life running smoothly. Their children helped Chris to reach things when the floor became too cluttered with their toys. Chris designed things like an accessible pool filter, work bench and rubbish disposal system that allowed him to be independent and gave him the opportunity to do as many of the "boys jobs" as possible.

Before Chris' accident he worked in IT so was familiar with Computer Aided Design (CAD) software. He expanded on his ability to use this software to design his whole house. He became what he described as super 'teched up'.

Chris (Figure 5) was incredibly well informed through a personal interest and work interest. He used universal and adaptable design principals when designing his house. His product choices were a result of rigorous research, mostly on-line but also through conversations with friends, visiting retailers, advice from builders and trade workers, and some creative adaption of 'not for that purpose' products. Grab rails were the only DIY modification Chris had not incorporated, regarding them as not necessary for his needs.



Above; Chris in his garage

To listen to Chris' home modification story go to:

https://www.youtube.com/watch?v=GqdDZc_kH4M

This video has been uploaded onto the YouTube channel titled "Home Modification Information Clearinghouse".

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Case Study 2: Once a mechanic and a doer, always a doer – Jack's story.

Jack lived on his own in the three-bedroom house he and his now deceased wife bought when he was 83 years old. Jack was very independent and capable despite his 93 years, back problems, pronounced stoop, loss of mobility in his right shoulder, and the loss of purpose he had felt since his wife passed away at home a year ago.

Jack was able to drive, and would regularly drive to visit family, the club and his exercise class. He did all his own shopping and cooking, and would rather his son did not take over the lawn mowing saying, "You go stale if you just sit around."

Jack's daughter and son Gary were very present in his life and his adult grandchildren visited often. Jack served in New Guinea in the army so had financial support from Veterans Affairs.

Jack had significant hearing loss and a timid German Shepherd. After he was burgled two years ago he had a four-camera video security system installed. Jack did not use a mobile phone or a computer and did not see that he had any need for these types of technologies.

An occupational therapist contracted to Veterans Affairs visited Jack every so often to advise him on his home modification needs. Over the year's handrails, chair stills, and grab rails have been installed. A hand-held shower was also installed, which Jack rejected.

Jack liked to potter and make things. He improved on the chair stills and put the old shower head back on. He built his first ramp soon after moving into the house, just before he "had his knee done", using his building skills and found materials. He welded the handrails himself. Jack and his family more recently built a replacement ramp as the other was rotting and the handrails were not high enough (Figure 6).



Above: Jack standing next to his ramp.

To listen to Jack's home modification story go to:
https://www.youtube.com/watch?v=slh8oEdU3mo

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Case Study 3: Aging at home in the country – Paul's story

Two years ago Paul and his wife, Robyn, 'sold up' their 100 acre 'retirement project' property and moved into a nearby country town because it was becoming too much for them. Paul had a fall two years prior to their move that brought on epilepsy, and a back operation that left him with double incontinence and constant pain. Robyn was driving Paul the 200 kilometre return trip to the nearest hospital at least once a week for his medical needs. More recently, Paul had a hip replacement that temporarily left him immobile.

Paul and Robyn's daughter, was about to move to the USA with their "one and only" grandson so that her American husband could fulfil his family obligations. Paul's son-in-law was an engineer and had installed many of Paul's DIY home modifications.

Robyn had an old mobile phone but she did not like to use it. She had it when she worked at a pharmacy because she had a long drive home at night. They have a computer at home which Paul used to write grant applications for the Lions Club they belonged to, and Robyn used to find quilting patterns.

Paul felt the hospital staff were not very helpful in considering his housing needs and preferences and gave no advice about assistive technology and home modification. As a result he felt he and his family had to "wing it". Consequently Paul relied on word-of-mouth from their friends in regard to getting community services such as the building service used for constructing his ramps. Paul used the internet to find a special walker tall enough and retail assistants at their nearest hardware outlet to find a suitable hand held shower and grab rails.



above: Paul in his kitchen

To listen to Paul's home modification story go to:

https://www.youtube.com/watch?v=liiyitT3cJc

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Case Study 4: Serial renovation experience – Toni's story

After a few years in her apartment Toni felt the bathroom and laundry were too small so she engaged a builder to remodel the space according to her vision. Toni (Figure 7) referred to herself as a "serial renovator" and loved keeping up with the latest products by looking online and in retails stores. Toni sourced most of her components through a local bathroom retailer.

Toni worked part-time as a disability consultant despite her sometimes very debilitating auto-immune disease. The disease affected all her joints and her mobility; when her condition was severe she required a wheelchair, and when her condition was less severe she could do most things around the house.

Toni lived alone with her two cats in a two-bedroom apartment in a modern block. Downstairs was a trendy café where she often caught up with friends. Toni had a strong friend network and had built relationships with her neighbours through mutual assistance arrangements such as child minding, looking after keys and sharing in potluck dinners. Toni paid a cleaner to come once a week to clean her apartment.

Toni's daughter lived locally and Toni regularly looked after her two grandchildren. Toni and her daughter's family also socialised at least twice a week. Toni was quite technically savvy, she had a smart phone and a new iMac for work and personal use.



above: Toni demonstrating her shower

To listen to Toni's home modification story go to:
https://www.youtube.com/watch?v=TWlhSD-79Qo

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