Designer as Ethnographer: A Study of Domestic Cooking and Heating Product Design for Irish Older Adults

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Dedicated to the memories of my Grandfather Pat McMahon (1920-2012) and friend Niall Dermody (1981-2008)

"Sure t'was something different..."

Declaration

This is to certify that this thesis is the original work of P.J. White. The author is solely responsible for the content. Neither the thesis nor the original work contained therein has previously been submitted for a higher degree.

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Summary

In many ways, the design of domestic cooking and heating products reflects the zeitgeist of Irish culture throughout the 20th and into the 21st century. From domesticity to materialism, these products have evolved to meet fundamental human needs within the home. Concurrent with this, the methods and processes designers use to create domestic artefacts have evolved and changed. The emergence of Design Ethnography illustrates an evolution where Design has appropriated an established method of Anthropology for its own particular objectives. However, the integrity of the ethnography practised by designers has been criticised by many, e.g. Dourish questions whether it creates forms of "discount ethnography" (2006, p.548). The designer ethnographer has different objectives to the anthropologist and the particular principles, methods, and understanding of design ethnography have not been fully elucidated for use by professional designers. Bichard and Gheerawo observe "…if anthropologists and ethnographers appear to be becoming designers as such, then perhaps designers should allow themselves to reflect on their 'field' and 'work' more as anthropologists and ethnographers"(2011, p.55). The identification and construction of a design ethnography, epistemology, and methodology that is distinct from, while respectful of that of anthropology, is required.

Design ethnography has been heralded for its ability to investigate future complex issues for humanity, and to produce powerful, democratising, and radical effects (Plowman, 2003). Meeting the demands of a growing older population will be one of these future complexities. Ireland is rapidly becoming an ageing society with its population living longer in ill health (McGill, 2010). 89% of older Irish people would prefer to live at home rather than in institutional care (McGee et al., 2005). Therefore developing healthy environments in which they grow old must be a priority. Particular attention must be given to the design of domestic products that provide older people with basic daily requirements. Domestic cooking and heating products offer basic health and wellbeing needs in the form of nutrition and heat. Prior to designing these products a deep understanding of older people's needs must be determined. To achieve this, empathy and sensitivity are essential (Newell et al., 2010). Comprehensive field studies such as ethnographies are important in gaining understanding and eliciting true user insights (Seidel, 2009, Newell et al., 2010)

This thesis contributes to two domains. Firstly, it identifies and develops an understanding of the essence of design ethnography, and a process by which designers can harness ethnographic methods for the purposes of design practice. Secondly, it provides an example of a designer ethnographic approach to product design for older people, producing insights and product design requirements for cooking and heating products. The research involved design ethnographic fieldwork over twelve months within the homes of forty older adult participants across Ireland and from various socio-economic groups. Personas, design requirements, and concepts were produced, which allowed the researcher to reflect on the role of design ethnographer and inform future practice. Insights into product requirement were deep and far reaching, revealing important and diverse health and wellbeing needs to be addressed for older people in domestic products. A methods and process framework is formulated for conducting future design ethnography, from fieldwork and data analysis to design practice.

Thesis Structure

This thesis is divided into three sections, each section with three chapters.
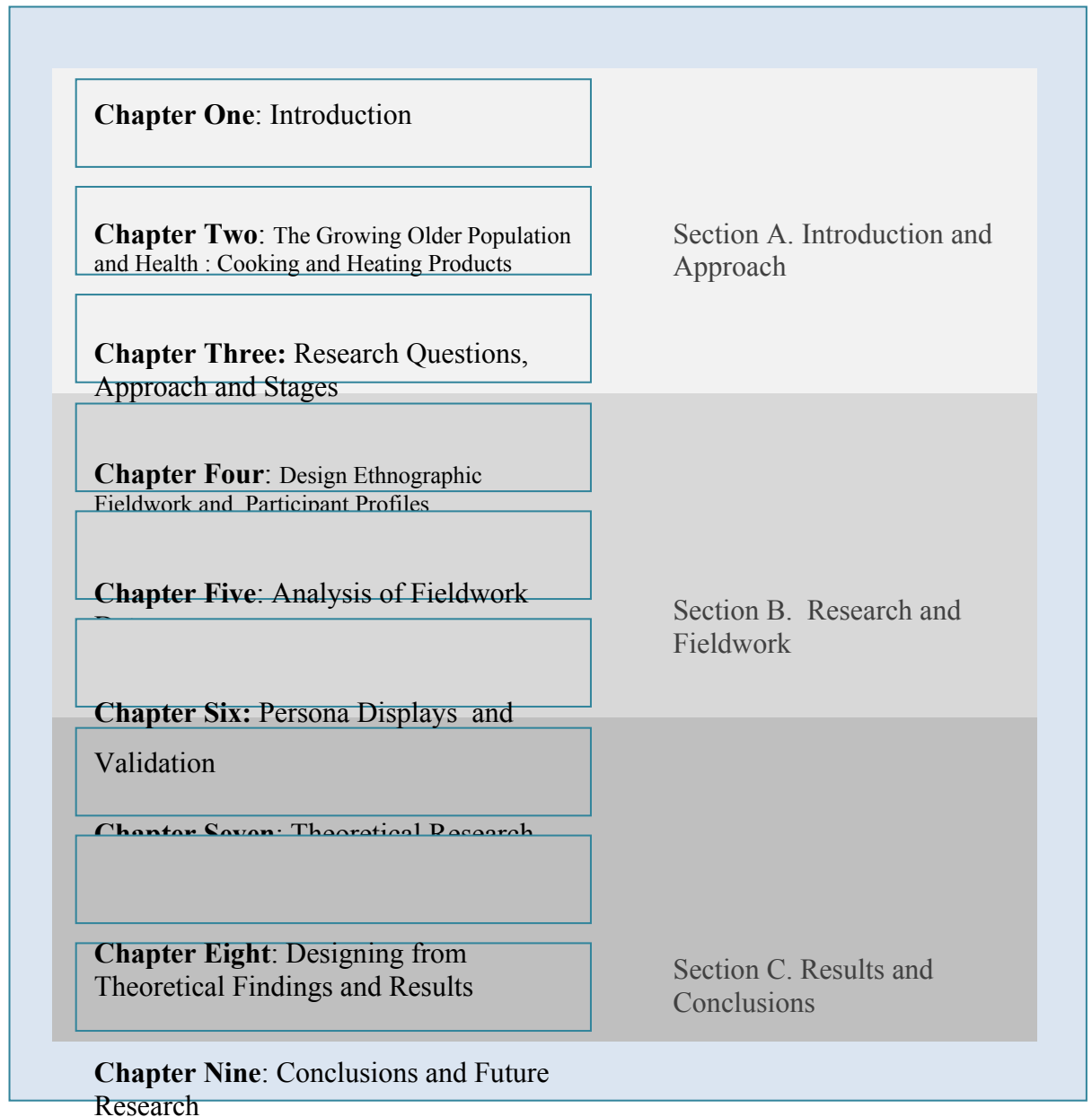
Chapter One: Introduction

Chapter Two: The Growing Older Population and Health : Cooking and Heating Products

Chapter Three: Research Questions, Approach and Stages

Section A. Introduction and Approach

Chapter Four: Design Ethnographic Fieldwork and Participant Profiles

Chapter Five: Analysis of Fieldwork

Chapter Six: Persona Displays and Validation

Section B. Research and Fieldwork

Chapter Seven: Theoretical Research

Chapter Eight: Designing from Theoretical Findings and Results

Section C. Results and Conclusions

Chapter Nine: Conclusions and Future Research

Figure (i): Layout of Thesis Sections and Chapters

Section A. Introduction: This section outlines the context of the research, and poses the research questions, as well as outlining its approach.

Section B. Research and Fieldwork: This section documents the design ethnographic fieldwork process and analysis. It introduces 7 personas created from the study and documents the process of validation.

Section C. Results and Conclusions: This section presents the theoretical research findings of the research. Through design practice and reflection it presents the results of the research, the conclusions, and future research possibilities.

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Preface

It may seem somewhat egotistical to commence what is considered a human centred thesis with a rather self centred introduction. However, in this instance it is appropriate to understand the researcher's background and interest in the subject area. Firstly, from as far back as I can remember, I have had an interest in becoming a creative professional. This interest grew through my primary education and was consolidated and strengthened in my secondary education. It was my technical school second level education that this interest grew, specifically through the practical skills of Art, Engineering, Woodwork, and Technical/Engineering Drawing. During the period of commencing my undergraduate studies in 1998, and graduating with an Honours degree in Industrial Design in 2002, I had developed a deep interest in the design of consumer products. It was later in my professional career that this deep interest matured.

Seven years working as a Product Design Engineer with small, medium and large Irish and international businesses exposed me to the rich, complicated and nuanced world of Product Design. These years offered me a real appreciation for the art and practice of designing and I witnessed firsthand the intricacies and skill sets involved in designing a product. During this experience I also gained an appreciation for people; in the first instance through the personnel involved in creating products: from craftspeople, engineer's toolmakers to marketers. More importantly though, I began developing an appreciation for the people and cultures I was designing *for*.

This appreciation and interest developed greatly during my years working with Irish based cooking and heating product manufacturer Waterford Stanley Limited[1]. Here my role was Product Designer and this role was situated within a research and development department. The responsibility of the Product Designer in this instance included, but was not limited to the aesthetics, functionality, engineering, and usability of products. As part of a three member engineering team, this involvement resulted in the successful creation of multiple product concepts, prototypes and production models. A turning point occurred during this experience (this will be discussed in Chapter 3 '3.2 Personal Story'). This turning point can now be viewed

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[1] Waterford Stanley Limited is based in the Republic of Ireland and is part of the UK based AGA Range-master group. The author has worked primarily with Waterford Stanley, however together with AGA Rayburn in Telford UK on several joint design projects.

as a professional transition from 'self centred' to 'human centred designer'. This in turn prompted my return to academia in 2008.

Conducting a PhD in Product Design offered me a unique opportunity to explore, discover, and learn more deeply about my profession. From this I feel I have greatly expanded my academic knowledge and interest in design. However, equally, I have realised that there is so much more to know and discover within design disciplines, particularly in understanding the people and cultures we as designers are designing for. I believe that now designers have a unique opportunity to shape and expand their own profession both as a standalone discipline and in forging new links with other disciplines. This should be lead by aligning design and people closer together through the methods and process we use. In doing this I believe we can greatly widen the remit of design disciplines both within industry and academia.

Acknowledgements

Commencing and conducting a research PhD is a test of endurance. For me it was one that could not have been achieved without the support and understanding of my family, friends, and colleagues.

Firstly, I would like to recognise and thank the best family a lonely academic could ask for. I would like to thank my mother for her support, the many novenas, and her inspirational work ethic. My sisters Marie, Teresa, Siobhán, and brother Simon. Brothers in law Karsten and Ruairi, niece Aoife, and soon to be sister in law Maura. Thank you to Daragh, Rob, and all my friends including Chrissie the whippet: you all fuel my insanity. Special thanks go to Siobhán for the support, belief, organisational skills, suggestions, and inspiration.

This research owes a debt of gratitude to the many participants, carers, occupational therapists, and community members involved, particularly Mr. Jim Walsh of Slieverue, Co. Kilkenny and Anne Coffey of Newbridge Sheltered Housing.

I have the privilege of being a lecturer in an exciting new program in Product Design within the Department of Design Innovation in NUI Maynooth. Being instrumental in developing this program has been an honour and has complemented my research greatly throughout the past four years. Within the department I would like to thank my supervisor and "renaissance engineer" Dr. Frank Devitt, thank you very much for the opportunities, freedom, and belief. Thank you to my colleague Martin Ryan for all the support and understanding, also to the undergraduate design students for the perspiration and inspiration. I also would like to thank the staff of the School of Business in NUI Maynooth, Prof. Anne Huff, and Damini Kumar.

Finally, a special word of thanks goes to Mr. Donald Nichol R.I.P. for some very timely and fatherly advice at the start of this research journey back in October 2008.

Section A: Introduction and Approach

Chapter 1.
Introduction

1.0. Introduction

Chapter Overview

This chapter sets the scene for the research and establishes its major influences. Firstly, it outlines the evolution of cooking and heating products through fundamental needs. The history of designing cooking and heating products in Ireland is discussed and is shown to reflect the zeitgeist of Irish culture in the 20th and into the 21st century. The chapter then moves on to reflect on the changing role of the design discipline by way of methods, processes, and person centricity. It discusses this firstly through design thinking and then specifically through design ethnography. Outlining both the attractiveness and disparities in design ethnography the chapter concludes with a reflection on the important future role of the designer ethnographer.

1.1.   Cooking and Heating Products: Evolving from Fundamental Needs

> ....besides stimulating invention, and so bringing material progress, the fire must have increased the density of the population, for several reasons: it gathered larger communities together; much stuff that was inedible when raw, became good diet; and areas once too cold could be inhabited. 'In the coldward march of civilisation' each improvement in the art of heating - the hearth, the chimney, the stove- adds a stage to this coldward march."
> (Wright, 1964 p.5)

As Wright suggests in his book '*The History of Cooking and Heating Products',* fire, together with the products we use in our daily lives, has greatly enhanced civilisation and added longevity to life. Into the future, ever improving living conditions in developed countries will bring with it improved quality of life (World Health Organisation, 2000) and advances in product development will continue to reflect this positive progression of humanity. For millions of years civilisation has been evolving means of controlling fire for warmth and to cook food. Perhaps one could look back to the hunter-gatherers of the Stone Age to see the first attempts of domestic cooking and heating. From open fire to fire contained within a cast iron

enclosure to control heat, the history of cooking, and heating products, reflects humankind's necessity to invent and progress.

In Europe, these products reached new heights of popularity and potential during the Industrial Revolution. This was mainly due to advancements in cast iron production in Coalbrookdale United Kingdom; pioneered by Abraham Darby, and powered by a burgeoning consumer demand for domestic consumer products. Moving into the early part of 20th century, the now iconic AGA™ cooking and heating product was designed by Swedish engineer Gustaf Dalen. This product is now associated as a turning point in design history as the first all in one domestic cooking and heating appliance. To this day AGA products maintain a strong presence in homes across the world. Noted for its versatility and efficiency, the AGA cooking and heating product was designed by Dalen indirectly to address a disability. The fact that his wife suffered a visual impairment gave him the impetus to create a product to aid with the daily chores of heating the home, cooking food, and boiling water. From its creation born out of necessity, this product has evolved and assumed other roles in domestic life. The 20th century saw it evolving into an artefact reflecting convenience, domesticity, modernity, and material culture.

Cooking and heating products have evolved through the ages under many categories and terms. The following traditionally fall under the remit of domestic cooking and heating products with terminology differing from culture to culture.

- Stoves- (open or closed varieties) are products that can be used as a heating and or a cooking product in the home[2].
- Cookers- As distinct from a stove, which can have both cooking and heating functionality, these products usually possess both a surface hob and oven.
- "Range products"-Traditionally "any row of cooking fixtures" (Wright, 1964 p.121). However, this can be used to classify a combined cooking and heating product[3].
- Fireplace- A fixed open source area to burn fuel for warmth complete with hearth and chimney.
- Space heaters- Heating products "to keep each room at a temperature appropriate for use" (Allied Ironfounders Limited, 1952, p.12)

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[2] Some stove models can also have functionality to heat water for central heating.
[3] Some products classified as "Range" models can also have functionality to heat water for central heating.

1.1.1. Domestic Products - Design and Consumer Demand in Ireland

Due to the Industrial Revolution, the United Kingdom at the early part of the 20th century had witnessed great change in their economy and consumer culture. However in Ireland, (excluding Ulster with its thriving textiles and shipbuilding industries) the Industrial Revolution did not have such a major impact (Sisson and King, 2011). In actuality, this period was known to have many negative effects on the Irish economy; local industry was impoverished as inexpensive goods arrived from Britain and local employment was attracted away. (Marchant and Addis, 1985). As a result of this, the mass consumer culture in the first part of the 20th century grew at a much slower pace in Ireland than in other European countries.

The demand for domestic consumer products reflected this, mainly due to the fact that Irish homes received electrification much later than their European counterparts. This was particularly the case in rural Ireland with homes only beginning to receive electricity in the late 1940s. Historian Diarmaid Ferriter offers this stark comparison of Ireland to its European counterparts: "...in 1945 only 2 per cent of [Irish] rural homes had electricity; for rural Denmark and Holland the figures were 85 and 98 per cent respectively" (2005 p.425). However, with a post-war surge in demand for electricity, the supply of domestic consumer products in Ireland increased. Householders sought convenience products and improved living conditions. Arduous domestic tasks were made easier with the development of these products.

The improvement of Irish domestic conditions grew during the 1930s and the 1940s. These decades saw the creation and growth of 'women's societies' most prominently the 'Irish Countrywomen's Association' and the 'Irish Housewives' Association'. These groups reinforced the role of women in Irish society and helped the improvement of Irish domestic conditions. They assumed a strong political role in Irish life advocating and prioritising amongst other items health care, domestic economy, and improved cooking methods for Irish people (Ferriter, 2005). However, it was not just practicalities and fundamentals that Irish people required at this time. In the 1950s, despite widespread poverty and unemployment "[Irish] women desired modernity in a new consumer era" (Ferriter, 2005 p.424). A material culture was growing, with a desire for consumer goods which reflected modernity and convenience. Throughout the 1950s and 1960s material culture in Ireland grew considerably with housing construction and electricity significantly increasing.

Running parallel with a growth in consumer and material culture at this time, a culture of design and designing was also growing in Ireland. In a bid to spur economic growth in a period of austerity, the improvement of Industrial Design and the design of consumer products were looked upon to boost export trade (Marchant and Addis, 1985). To improve the practice of designing in Ireland, a team of Scandinavian designers were invited to audit design activity within factories, colleges and museums. The now famous "Scandinavian Report" was produced from this audit, with 'The Kilkenny Design Workshops' established as a result of this report. This was a creative hub for Industrial Design, creating consumer goods and providing design input for factories which, up to this point, lacked in-house design guidance. Outputs from this workshop included ceramics, jewellery, textiles, and cast iron items such as cooking and heating products.

1.1.2. Designing Cooking and Heating Products for the Irish Market

There are reasons why Irish people have a close affinity with domestic cooking and heating products. This is due to many factors; firstly they address basic wellbeing needs in the home by providing nutrition and heat. This reliance is strong in part due to the Irish climate, being mild and cool. Secondly these products have become important cultural focal points in the Irish home. Historically the heat source, be it fireplace or stove was a central gathering and inspiration point for the Irish tradition of storytelling in the home.

In 1934, Waterford, Ireland, the Allied Iron founders commenced the production, design, and manufacture of cooking and heating products. Since then the means of designing these products has changed dramatically. The process of design and manufacture of these products has become increasingly automated and lean with hand drawn part and assembly drawings replaced with advanced Computer Aided Design packages. However what has remained constant is the attraction to the traditional qualities that these products possess, with many products retaining a retrospective aesthetic.

The changing needs of the cooking and heating product consumer since 1934 have been considerable. Broadly it can be seen as a change from 'essential' item to

'lifestyle' product for the modern consumer (this is reflected in the retrospective advertisements shown in Figure 1.1). Traditionally consumers purchased these products primarily out of domestic necessity both to provide heat and a means of cooking food. In contemporary terms, consumers purchase these products as a personal lifestyle statement. Their desirability stems from its nostalgic appeal with the built in conveniences of modern appliances. It was the input of Industrial Designers from the aforementioned Kilkenny Design Workshops in the 1970s that streamlined and created this change for the Irish consumer.

Throughout the years the process of design and redesign of these products was a reaction to customer feedback from market research. Redesign or "revamp" of products resulted in minor to major modifications aesthetically or functionally to existing products. A complete market shift could result in complete new product development from sketch to fully working assembly. Research and development teams would interpret these issues and design accordingly within appropriate manufacturing or cost feasibility constraints.
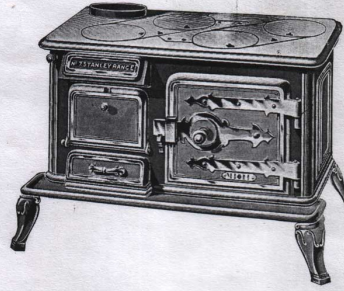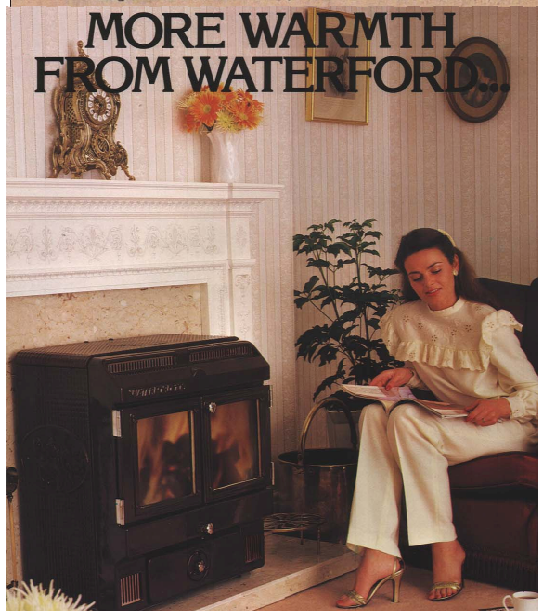
Figure 1.1: Retrospective advertisements of cooking and heating products for the Irish market: reflecting convenience, domesticity and modernity.
Top: No. 7.5 Stanley Cooking Range circa 1957. Middle: Irish Newspaper advertisement circa 1959. Bottom: the Waterford Stanley 106 heating stove circa 1984. Images reproduced with permission from Waterford Stanley Limited © 2011

Figure 1.2: Montage of cooking and heating products designed for the Irish market through the years.
From left to right, top to bottom: The Stanley 101 stove circa 1969; The Stanley 103 stove designed by Kilkenny Design Workshops in 1982 (Marchant and Addis, 1985); Stanley Errigal Cooker circa 1989; Stanley Erin stove Circa 1990; Stanley Compact 600x600mm cooking and heating appliance Circa 2003; Stanley Grainne stove designed in 2006; Stanley Donard range redesigned in 2007; Stanley Fusion Pellet Stove designed in 2008. Images reproduced with permission from Waterford Stanley Limited © 2011

1.2. Broadening the Role of the Design Practitioner: Design Thinking

The montage of products in Figure 1.2 mirrors the changing role of consumer requirements through the years, and in part the changing role of the design practitioner. This can be seen in the change from the pure utility of the 'Stanley 101' stove moving towards the aesthetic qualities of the 'Stanley 103', and in the conveniences and lifestyle appeal of the 'Stanley Compact' to the environmental conscientiousness of the 'Stanley Fusion Pellet Stove'. The role of the design practitioner has continually changed through the 20th century, being the creator of items for mass consumption in the Industrial Revolution, to social activist in the Arts and Crafts Movement (e.g. William Morris). From creating items of high decoration in the Art Nouveau and Art Deco periods, to the stripped back modernism of the Bauhaus school. Throughout the 20th century the role of design has been divided; grappling both with providing items for monetary gain and inspiring social conscience.

Currently the paradigm of 'Design Thinking' harnesses both these roles, providing a creative means of approaching business, innovation and social issues (Brown, 2009). Design thinking therefore can be seen as an attempt to broaden or democratise the role of design and the design practitioner. Design thinking is best described as the thought and behaviour process created from design practice. The application of design thinking in broader applications is now seen as more valuable and more powerful than the act of designing itself. Its application is now being used to address diverse complex issues and "wicked problems" (Buchanan, 1992, p.15) from politics to health (Brown, 2009, IDEO, 2009). Design thinking as a paradigm is not new and has been in development throughout the 20th century, simultaneous with the development of the profession of the Industrial Designer (approx. early 1950s to the current day). This process of development is cited by Bousbaci as a transition from "intuitive and artistic designer" in the 1950s to the designer as "reflective practitioner" into the 1980s (2008, p.38) (cited from Schön, 1983).

Therefore design thinking consolidates the role of the designer as a holistic practitioner, reflecting as well as doing, thus broadening the remit of the design profession. Idealistic as it may seem, design thinking and the process of design (both

practice and thought) hold many advantages as a problem solving process. Advantageously according to Buchanan it straddles the complicated transition between theory and practice stating that: "Designers are exploring concrete integrations of knowledge that will combine theory with practice for new productive purposes" (1992, p.6). The holistic and creative nature of designing can offer answers, differing perspectives, or at a minimum, fuel engaging discourse with complex issues that we are faced with today. Design thinking is advantageous for the following reasons:

- Complicated issues that are not direct and linear in nature require appropriate tailor-made approaches. Design thinking and the design discipline is, in its nature 'adaptable', it can be linear or non-linear, with methods that can be chosen to suit a given problem.
- It is holistic, creative, and ever increasingly multi-disciplinary in nature, therefore allowing differing views from diverse perspectives.
- It is empathic and reflective, therefore viewing problems in broad and multiple perspectives.
- As design thinking is iterative, exploratory, and divergent, it proposes multiple solutions. It encourages and allows for uncertainty and failures; it builds upon these factors for the betterment of the solution.
- Design thinking approaches are convergent and practical. Therefore resulting in conclusions that are actionable.
- Above all and transcending all the points above; central to the design thinking ethos is human or person centricity (Brown, 2009).

Design thinking does however hold disadvantages. Design in comparison to other disciplines, and as a field of research is considered relatively new. Strength in the future of the design discipline and design thinking approaches will lie in growing and providing more robust methods and processes. For this reason design thinking has in the past delved into other fields of research to borrow tried and tested methodologies e.g. Psychology, sociology and anthropology. Design researchers must continue to do this, both to strengthen the discipline and to further help in answering broader and deeper questions. Design already has intrinsically creative elements to its methods and processes. As human centricity is a core value in the

design thinking ethos, a move to greatly integrate methods in gaining insight and empathy into people are required to complement this.

1.3.   Anthropology in Design

The profession of design had been shaped by numerous disciplines. The most significant influences have been disciplines with people and cultures at their core. Henry Dreyfuss can be seen as the first influential Industrial Designer to cross disciplines in meeting the demands of people and design. Through simplifying complex anthropometrics he created seminal texts for designers such as *Designing for People* (1955) and *The Measure of Man* (1960). In 1968 Doug Engelbart the now acclaimed inventor of the computer mouse, implemented elements of psychology into design to create intuitive computer products and systems (Moggridge, 2006). His work shaped and inspired the field of User Experience design (UX) as we know it today.

Victor Papanek first heralded a strong anthropological message in design activity proclaiming "The only important thing about design is how it relates to people". Papenek utilised anthropological methods for design purposes to distil this message. In his 1972 book '*Design for the Real World-Human Ecology and Social Change'* he looked at the designer's role in culture, sustainability, disability and social issues in the Third World (Papanek, 1984 2nd ed). As a result of this, Papenek can be considered one of the first 'designer anthropologists'. His work in terms of design thinking can now be seen as defining; broadening the remit of the designer as influencer, thinker and catalyst for social change.

The turn of the 1980s saw the company PARC Xerox utilise anthropological methods for design in industry. At a stage where computer systems were moving from specialised labs into more mainstream applications; researchers noted disparity between what people said and did and hence required a first-hand view of usage (Blomberg et al., 2003). In doing this, Ethnography, a branch of Anthropology, was used for its methods and approach. In addition to this at the time, ethnography was used in the broader developing field of "Computer Supported Cooperative Work"

described by Wasson as "...how humans interact with computer software in the workplace" (2000, p.380).

1.3.1. Ethnography (and Ireland) - A Short Overview

Ethnography was developed by anthropologist Bronislaw Malinowski in the early part of the 20th century. It was developed as a means of immersion and understanding cultures by way of fieldwork and reporting first hand their way of life (Button, 2000). Malinowski's work originated and developed in studies of island tribes, and involved getting as close as possible to 'natives' with an aspiration to deeply understand life through their point of view. Since its development in the early part of the 20th century, with the growth in qualitative research, ethnography has since gained widespread popularity across the social sciences. Widely used in studies to gain understanding of people, cultures and subcultures, ethnography has been used in many diverse areas, from homeless people to school children (Spradley and McCurdy, 1972) to drug abuse in society (Agar, 1980) and female bullfighters (Pink, 2001).

In Ireland, ethnographies and key texts in ethnography have greatly shaped knowledge of Irish culture. They have changed how we perceive ourselves and how we are perceived internationally throughout the 20th century. At the early stages of the 20th century, with a growth in the discipline, Ireland must have offered a tremendous sense of intrigue to the ethnographer. Ireland being an island state geographically isolated on the edge of Europe with a rich unique culture would have held an instant appeal. Heightening Ireland's rugged intrigue in the early 20th century would have been the fact that it was a newly developing free state, one that had been decimated by a famine in the previous century.

The most influential ethnographic studies on Irish culture were conducted by American ethnographers. Firstly by anthropologists Arensberg and Kimball during the 1930s and 1940s; their report on the community and family structure in rural western Ireland was received with great acclaim. Later in 1979, the influential albeit controversial book *'Saints Scholars and Schizophrenics'* was published by American ethnographer Nancy Scheper-Hughes. Here she reported on rural Ireland and cases

of mental health, later to be met with disdain by the participants and widely opening a debate on ethics in ethnography (Scheper-Hughes, 1979). In the late 2000s Ireland's '*Intel's global ageing project*' moved Irish ethnographic studies into industry and design spheres.

1.3.2. The Emergence of Design Ethnography

The marriage between ethnography and design evolved through the 20th century firstly through studies in material culture, consumerism, and the anthropological study of object in culture. Ethnographers strove to understand the role of artefact in socio-culture and what it reflected- about culture, gender, race and beliefs. The role of the ethnographer changed when introduced into industry in the early 1980s to address matters of design in technology such as with the aforementioned PARC Xerox. Essentially in this instance the ethnographer was being utilised in a process of building customer requirement. Previously the ethnographer's role was to report theoretically on phenomena, however what was emerging was the ethnographer's role in the practice of designed artefact. Work such as this highlighted the strengths of ethnography in the process of designing. This amalgamated the disciplines closer with emerging titles of 'design anthropologist/ anthropology' and 'design ethnographer/ ethnography' to classify this union. The term 'Design Ethnography' was created by ethnographers Tony Salvador, Genevieve Bell and Ken Anderson who offered this explanation of the emerging field:

> "Design Ethnography focuses on the broad patterns of everyday life that are important and relevant specifically for the conception, design, and development of new products and services" (Salvador et al., 1999, p.36)

Typically the design ethnographer's role involved their studies of material culture and how it informed product design. Firstly by gaining understandings of socio-cultural relationships and then developing these for a design audience (Drazin and Garvey, 2009). Therefore, to better understand design ethnography it is important to point out that these roles were conducted by anthropologists inputting into a design role, rather than design informing anthropology.

1.3.3. Design Ethnography: Attractiveness and Advantages

Design ethnography as an emerging and future discipline is an attractive and advantageous idea for many reasons. Broadly, the advantages lie in their shared mutual viewpoints. One can juxtapose design methods with ethnographic methods as they should both maintain human centricity as a core value. To look in greater detail, advantages lie in their complementary approach to research enquiry. Ethnographic approaches over traditional design approaches (such as focus groups and questionnaires) are said to offer holistic and descriptive approaches in natural settings to deeply understand users (Blomberg et al., 1993, Blomberg et al., 2003). This holistic and descriptive approach through exploration and discovery complement the uncertainty and creativity inherent in early stages of design research. In addition to this, ethnographer R.J. Anderson, suggests that ethnographic methods provide designers with a more reflective and holistic approach to problem solving. This he states enables "designers to question the taken for granted assumptions embedded in the conventional problem solving framework" (1994, p.170). It is because of these attributes that design ethnographic methods have been heralded for their ability to investigate future complex issues for humanity and create powerful, democratising, and radical effects (Plowman, 2003).

For business and economic reasons, design and ethnography is considered an increasingly attractive combination; especially when it comes to producing 'innovative' output. Described perhaps in an over optimistic and simplified fashion Salvador et al., asserts that design ethnographers are "...designing technology that consumers want and need" (1999, p.37) However optimistic that may sound, a study by Cooper and Edgett strengthens this statement, ranking ethnography as by far the strongest method to foster innovation in new product research and development. This study compared proven methods such as focus groups, lead user analysis and brainstorming. Its findings show that ethnography produces "the greatest insights and depth of knowledge into users unmet and unarticulated needs" (Cooper and Edgett, 2008, p.3). The appeal therefore is that ethnography provides new, interesting, and previously unthought-of insights into people as product and service users. A belief echoed by Wasson who attributes design ethnography's appeal to the fact that it "...promises to reveal a whole new dimension to "the user"

[investigating] not just what consumers say they do, but what they actually do"
(2000, p.378)

The advantages of combining design and ethnography is also noted to greatly benefit
the field of anthropology. Drazin and Roberts claim that: "Design is one of the main
ways anthropology has an articulation with the world beyond the discipline" (2009,
p.85). This statement suggests that the practical, creative, and real world application
of design broadens, gives a voice to, and showcases the field of anthropology.

1.3.4. Design Ethnography: Disparities and Disadvantages

As discussed, the union of both design and ethnographic approaches from a
methodology point of viewpoint, holds many advantages. However, due to their
differing backgrounds it is difficult to create an absolute harmonious marriage.
Further to this, it is unrealistic to believe that in a relatively short period of existence
its joint approach would be seamless. It is inevitable therefore that some disparities
and disadvantages appear in its creation. Firstly an underlying disparity exists
between these disciplinary backgrounds. Due to ethnography's foundation within
anthropology, ethnographers are primarily orientated to provide for social gain and
social knowledge. In contrast, design and particularly the profession of Industrial
Design, were born out of consumerism and to provide for mass markets. This
contrast can provide conflict in agendas for purist ethnographic researchers. This, to
the extent that it is claimed: "...much of academic anthropology holds a aberrant
distain for the business world" (Plowman, 2003, p.35).

Disadvantages in design ethnography can be grouped into two other areas; firstly
time, and secondly cost to conduct ethnographic studies for design purposes. Time
to conduct research appears to be a recurring problem within design ethnography.
With this Macaulay et al cites a common disparity: " ....[ethnographers] like to spend
considerable time there [in the field] whereas designers want to, or have to, get down
to the nitty gritty of building things as soon as possible" (2000, p.40). Sperschneider
and Bagger agree with this sentiment, stating that "...when it comes to time
constraints, ethnography is the very antithesis of design" (2003, p.43). Cost is seen
as another disadvantage, particularly for businesses adopting these methods. Cooper

and Edgett state that "the cost and time of conducting [ethnography] is considerable, while the skill set of the researcher must be high" (2008, p.3)

Together with these disadvantages, there are notable disparities in approach and output. According to Wasson, when ethnography is adapted for design purposes the results and outputs are seen to be less theoretically contextualised (2000). As a result, this provides critical points of reflection particularly from an anthropological viewpoint. Dourish in his paper *"Implications of Design"* questioned whether ethnography for the purposes of design creates forms of "discount ethnography" (2006, p.548). Similarly, Anderson suggests that designers see and use ethnography solely as a data collection tool overlooking the complexity of the practice (1994). As a result Button posits that design may be "in danger of diluting the initial thrust of sociological studies" (2000, p.328).

1.3.5. Future of Designer as Ethnographer

Despite the perceived disadvantages of design ethnography, the advantages outweigh these greatly; in particular if we are to look to the future role of the discipline. Design ethnography has a central role to play in the development of design thinking and has the potential for an even greater impact on the future of the design practictioner. As an emerging combination from vastly different backgrounds there are natural differences in practices between design and ethnography. It should be noted that anthropologists with certain misgivings such as the ones discussed (Dourish, 2006, Anderson, 1994, Button, 2000), also see immense potential in the union of design and ethnography. The important aspect of this is that the disparities and disadvantages discussed are actionable, and with work can be reconciled to greatly benefit humanity. This strengthens further the cause for developing future exploration and discourse in the role of designers conducting ethnographies. It can be said that the designer using ethnography has different objectives to the anthropologist and the particular principles, methods, and understanding of design ethnography have not been fully clarified for use by professional designers. In this regard Bichard and Gheerawo observe:

"...if anthropologists and ethnographers appear to be becoming designers as such, then perhaps designers should allow themselves to reflect on their 'field' and 'work' more as anthropologists and ethnographers" (Bichard and Gheerawo, 2011, p.55).

Bichard and Gheerawo's observation can be considered as a call for designers to create from within, to merge the disciplines further. As previously discussed, design ethnographies, for the most part, are conducted by anthropologists feeding into design practice. By designers practicing ethnographic research, a more informed, rounded and stronger discipline can emerge. By doing this, designers can input experiences, methods, and processes into this emerging field, benefiting both design and anthropology. To this end, Bichard and Gheerawo offer the design profession encouraging advice:

"It is the very nature of designers to challenge and change things around them, and this is also true for the tools and the techniques commandeered from ethnography" (2011, p.54).

The ethos of designers such as Victor Papanek are as influential and relevant now as they were over forty years ago, perhaps even more relevant. With the emergence of design ethnography, designers are now needed in different ways. Assuming differing roles, they are providing solutions and viewpoints for our future social problems; e.g. designing for health, wellbeing, disability, and the sustainability of our environment. Chapter 2 will outline and discuss a future social occurrence where design ethnography has prime relevance: the growing older population. This is an increasing worldwide phenomenon, seen as both a major achievement and issue for humanity. Outlined will be specific future issues relating to Irish older adults and the relationship between health and domestic cooking and heating products. Here design ethnography can play a central role.

Chapter Summary

There are combined functions in this chapter; however, its primary function is in setting the scene for the research. It does this by firstly describing the changing role

of cooking and heating products through the 20th century, both by design and in the lives' of Irish people. This chapter discusses independently the changing face of both contemporary design and designer and how design thinking and specifically design ethnography should shape this change. This chapter established complementary links between design and anthropology, through ethnography, for the purpose of forging this change. The chapter demonstrates a future need for designers to adapt and utilise ethnographic methods as a means to enquire into future complex human needs. Also this chapter examines how ethnographic methods can enhance and push the boundaries of design disciplines.

Chapter 2.
The Growing Older Population and Health:
Cooking and Heating Products

2.0. The Growing Older Population and Health: Cooking and Heating Products

Chapter Overview

This chapter will firstly outline key ageing population statistics relating to the world, Europe, and Ireland. This will demonstrate the rapid growth of older cohorts in the future. It provides a background into global ageing research including Ireland's research position. It will detail methods, processes, and activity in design research for the ageing population; highlighting ethnographic methods. It will review the current and future health requirements, and demonstrate the importance in designing for the health of older people, and the design of fundamental domestic products. It will discuss literature, highlighting the fundamental health needs of nutrition and environmental conditions for older people. By doing this cooking and heating products will be put into context as the most fundamental domestic products for the health of Irish older people. It posits why these products should be considered as priority design research considerations, including how and why ethnographic methods are appropriate for this.

2.1. An Overview of the World's Older Adult Population

It is now well documented that the world's population is ageing. It is projected that the population of people aged 60 and older will rise from just over 700 million in 2007 (United Nations, 2007)[4] to over 1.2 billion in 2025 (World Health Organisation, 2000). By 2050 two billion older people are projected to be alive (United Nations, 2007) which will account for one out of five persons in the world (World Health Organisation, 2000). At this stage it is predicted that older people will outnumber young people (Harper and Leeson, 2008). By the year 2150 it is predicted that one out of three people in the world will be 60 years or over (United

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[4] Although The United Nations class the global older population as aged 60 years+ many other statistical sources widely report the older population as 65 year old+.

Nations, 2006). Within this older adult population, the population aged over 80 years of age are a cohort classed as the 'older old' or 'oldest old'. Growing at a rate of approximately 4% per year, these represent the older population's fastest growing cohort, predicted to account for two out of ten older adults by 2050 (United Nations, 2007) [5].

Since the end of World War II the proportion of older adults has risen by unprecedented levels in developing countries. Examples of this were witnessed in USA and Canada with a major 'baby boom' occurring during the period of 1946-1965. From this baby boom, these countries are now seeing their first cohort of 65 year olds (assumed retirement age). From 1950 to 2007 the world's percentage of older people has seen a steady rise from 8% to 11% however, this is predicted to greatly increase in the future, doubling to 22% by 2050 (United Nations, 2007). There are many reasons stated for this increase in population. Factors such as decreasing fertility, together with lengthening life expectancy and mortality decline in older persons cited as the main reasons (United Nations, 2001). Aligned with this are improvements in sanitation, housing, nutrition, and medical innovations in the developing world (World Health Organisation, 2000).

Global population ageing is a major achievement for all humanity. It is one that will have profound effects on the 21st century life, socially, economically and in other ways. These effects seen negatively, or if underestimated, could create multifaceted threats to health, wellbeing and social aspects for older people. Equally, and seen positively, the global ageing population can produce many opportunities which could greatly benefit civilization.

2.2. Older Person Populations - Europe and Ireland

Europe's older population is also growing rapidly. Between 1960 and 2060 population ageing has occurred and is predicted to continue across all European member states (Eurostat, 2011). In some European countries it is predicted that by 2050 more than two in five persons will be aged 60 years or over (United Nations, 2001). With 22% of the world's population of older adults living in Europe (United

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[5] The oldest old cohort is classed as 80+ by the United Nations, however, referred to as 85+ by many other publications.

Nations, 2006) the World Health Organisation predict older adults will make up one-third of its population by 2025 (2002). Of this older population the number of Europeans over the age of 80 will almost increase threefold from 2008 (21.8 million) to 2060 (61.8 million) (Giannakouris, 2008). Currently, Italy and Germany have the highest percentage of older adults in Europe both exceeding 25% of the population (United Nations, 2007).

Similarly, Ireland's population both north and south has seen, and will continue to see a rise in its older population. It is forecasted that between 2010 and 2060 Ireland will have the largest population growth in Europe equating to an increase of 46% (Eurostat, 2011). Census figures from the Republic of Ireland in 2006 show that 11% of the population are 65 or older (Central Statistics Office Ireland, 2007)[6]. Population figures for the same period are higher in Northern Ireland standing at 14% of the population (Central Statistics Office and NISRA, 2008). In total it is calculated that approximately one million people aged 60 and above now live in the whole island of Ireland. To date, comparable to other developing countries, this is a relatively low percentage of the population with a slow increase over the last century. Cited reasons for this being the high levels of emigration witnessed during the decade of the 1950s, and the high birth rate up to the 1980's resulting in a large youth population (Fahey et al., 2007). However, this trend is predicted to change dramatically in the coming forty years with a projected rise to 29% of the population by the year 2041(McGill, 2010). The largest growth will be in the older old cohort (cited in this instance as 85 years+) which is predicted to rise fivefold, from 74,000 to 356,000 by 2041 (McGill, 2010) (detailed figures shown in Figure 2.1). By this year the projected life expectancy at birth in Ireland will be 86.5 years for males and 88.2 years for females (Central Statistics Office, 2008) .

Ireland is globally ranked 50th by percentage population aged 60 or over (United Nations, 2007). This standing may not be one of the highest in the world; however recent economic challenges are very relevant to its rapidly growing population. In recent times (2007-present) Ireland has been one of the hardest hit countries by the global economic recession. According to The National Economic and Social

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[6] A differing reflection of the older population may be seen in the 2011 census due to predicted younger population immigration and migrants returning home post "Celtic tiger" period (circa 1996-2007 years of substantial economic growth for Ireland).

Council, Ireland's crisis is deep and complex comprising of banking, fiscal, economical and social factors (NESC, 2009). The older population in Ireland are traditionally the poorest section of its demographic (Walsh and Harvey, 2011). Therefore without major reform this recession could have serious economical and social effects on their future and rating agencies are already predicting this. Standard and Poor's have stated that without addressing age-related spending needs such as pension and healthcare reform, the Republic of Irelands debt could almost quadruple by 2050 (2010).
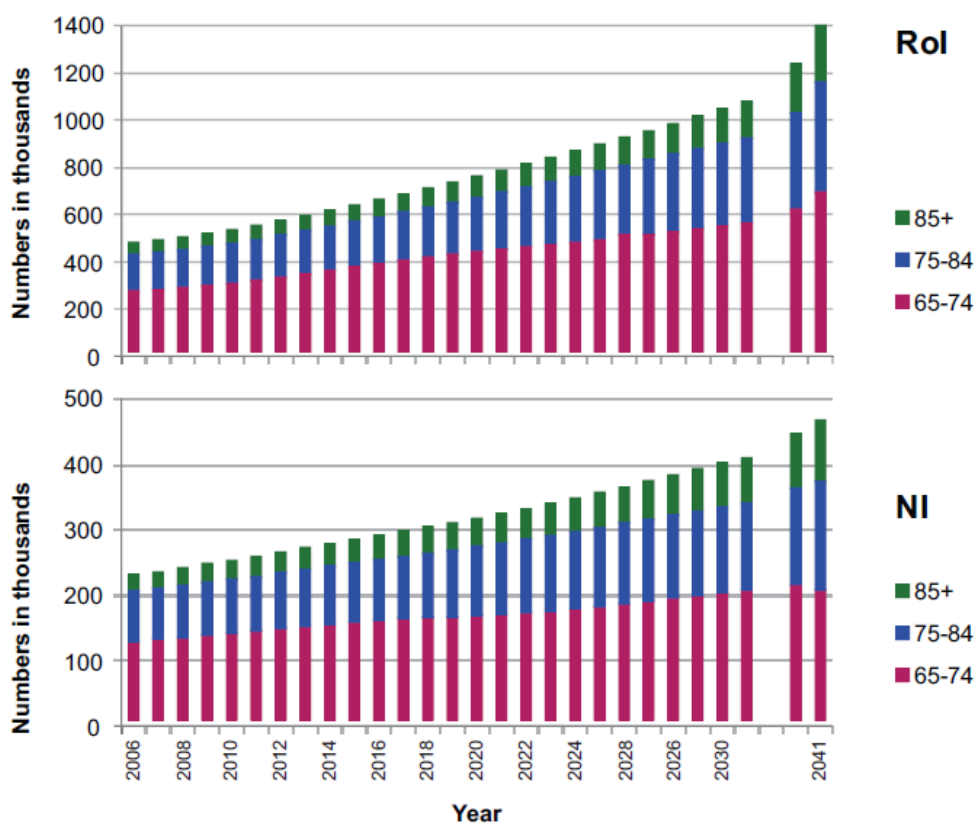
Figure 2.1: Projected rise in age group in the Republic of Ireland (RoI) and Northern Ireland (NI) from 2006-2013 including 2036 and 2041(McGill, 2010).

Reproduced with permission from the Paul McGill; The Centre of Ageing Research and Development in Ireland © 2010

2.3. An Overview of Older Adult and Age Related Research

As a result of the global ageing population, research into ageing and older people is a real, essential, and developing need worldwide. Age related research has only recently emerged as it has only been formally highlighted by the United Nations within the last twenty years. Since the early Eighties there have been two landmark global agendas on ageing. These, according to the U.N. were constructed to address issues of ageing, promote a society for all ages and would outline policies, programs, and priorities in ageing research (United Nations, 2002). The first world assembly on ageing occurred with The *Vienna Plan of Action on Ageing* in 1982. This plan outlined priority research and educational needs in the areas of health and nutrition, protection of elderly consumers, housing and environment, family and social welfare to name but a few (United Nations, 1983).

The progress of the 'Vienna Plan' was reassessed twenty years later with the Madrid International Plan of Action in 2002. The United Nations report *'Research Agenda on ageing for the 21st Century'* translated the Madrid Plan into priority research directions, these being: 1. Older persons and development, 2. Advancing health and well-being of older persons and 3. Ensuring and enabling that environments are supportive into old age (United Nations and IAG, 2003). These priority directions consist of 'major priorities and critical arenas' among the major priorities of research the theme of 'healthy ageing' was ubiquitous. Predominantly, so were determinants of healthy ageing and the quality of life in environmental situations (United Nations and IAG, 2003).

2.3.1. Older Adult and Age Related Research in Ireland

The aforementioned United Nations report greatly influenced ageing policy initiatives in Ireland both North and South. The results of which initiated publications and frameworks such as *The National Development Plan* 2007-2013, *The National Action Plan for Social Inclusion* 2007-2016, *Ageing in an Inclusive Society 2005* and the *Toward 2016 agreement* (Cross, 2009). Ageing research in Ireland is, however, somewhat of a new phenomenon and still in its infancy

(CARDI, 2008) therefore it is in much need of sustained attention in the early part of the 21st century.

Ageing research activity in Ireland has grown steadily since 2005; an exemplar of this is the Centre of Ageing research and Development in Ireland (CARDI). This centre was set up in 2008 to specifically promote the ageing research agenda across the Island of Ireland. Ireland has many ongoing ageing research studies in progress. Ongoing studies into ageing include The Irish Longitudinal Study on Ageing (TILDA). This is a ten year study to document 8,000 Irish people over the age of 50 years in terms of health, social and economic conditions (TILDA, 2006). Further to this, centres of ageing research include the National Centre for the Protection of Older People (NCPOP 2009-), The Older and Bolder Campaign (2007-), The Technology Research for Independent Living Clinic (TRIL 2007-) and The Irish Centre for Social Gerontology (ICSG 2006-). Prominent advocacy groups include Age Concern (Republic of Ireland) and Age NI (Northern Ireland). On a global scale the city of Dundalk in the Republic of Ireland, has been one of the worlds 33 participants in the global age friendly cities project since 2007. For the future, the Irish ageing research agenda is broad, diverse and deep. In a working paper, McGill reviewed ongoing Irish research studies and outlined priorities in ageing and older people research includes health, quality of life, housing, income and poverty (2009).

2.4.   Older Adult and Age Related Design Research

To meet the future demand of the growing older population, the contemporary older adult design research agenda is broad, varied and spread widely. Spanning over many research domains, it is continually evolving its cross disciplinary approach to define new research paradigms and to create robust and rigorous methodologies. None illustrate this better than the growing field of Gerontechnology, a field where studies of the ageing population combine with the design of technology. Gerontechnology attempts to meet a growing demand and explore future possibilities in information communication systems and technology for older people. Within its context it is diverse, vast, and has rich research possibilities; from assistive living products to creating more inclusive human computer interaction systems such as internet and websites.

Human factor and cognitive needs in later life are areas that are large, essential, and emergent. To reflect this need, iterative research is ongoing. A testament to this is the revision of the seminal 1959 reference book by Henry Dreyfuss Associates '*The Measure of Man and Woman*'. This now has been updated to include important anthropometric data and other human factors relating to older adults.

With a research history leading back to the 1960s, Inclusive, 'Design for all' or Universal Design approaches have offered design research strong guidelines into design inclusiveness. In using universal/ inclusive guidelines or 'principles' Universal Design requires designing for users of all abilities regardless of age size or ability and "...to the greatest extent possible without adaptation or specialised design" (Mace, 1997, p.2). These guidelines for the design of products, services and environments are commonly used as the sole procedure in designing for older people.

2.4.1. Older Adult Consumer Markets

As the global population grows older in the coming decades, there will be an increasing requirement for research into consumer markets and the design of products and services specifically for older people. The benefits of creating such products are many; whether these are researched or designed specifically for, or inclusive of older people needs. These benefits have been stated to address both social needs through inclusion and in adding economic value by creating new market opportunities. Creating products for older people allows for a more inclusive culture, greatly benefiting society as a whole. It is also cited as being a key business driver by increasing commercial value, innovative product offerings, and market positioning (Clarkson et al., 2007). This said however, it is commonly considered that designers and marketers create products and services predominantly for markets segments under 60 years of age. In addition to this, older people are considered to be overlooked by companies engaged in new product development. The majority of consumers over 50 years believe that businesses ignore older consumers in favour of younger markets and have little interest in their needs (AgeOK, 2009).

The 65+ market segment is a growing area for opportunities and older adult consumers are noted to having significant spending power. In Europe, persons over 65 years of age are estimated to have wealth and revenues of over 3 trillion euro (Wintlev-Jensen, 2008). Furthermore it is stated that the older adult and the future old consumer groups combined (50 years +) are the fastest growing and wealthiest of in the world. This cohort account for 75% of the wealth and for half of all consumer spending in the European Union. In the United Kingdom alone the over 50's have 40% of its disposable income, 80% of the nation's wealth and spend £240 million yearly on consumer goods (Shroud, 2010). Despite being traditionally a poorer section of its demographic, O'Neill notes that Ireland's older population has significant spending power with a declared annual income of €6.6 billion (2010).

With emerging older markets the opportunities to develop new product and service offerings are many. Businesses now have the opportunity to address older adult wellbeing needs and to benefit financially from this. Automobile manufacturers are increasingly engaged in design research for older markets. Ford, Toyota and Nissan motor companies are examples of these. Toyota, in a study of American 'empty nesters' (a demographic in which their children have recently left home) created the Toyota 'Venza' Sport Utility Vehicle (IDEO, 2008). Nissan have also applied design research to older markets in their Nissan 'Bevel' aimed at the future old 45-60 year old segment. Japan, having one of the largest economies and the highest percentage of older people in the world (United Nations, 2007) are one of the leading countries in age related design research in industry. Other than the automobile industry, Japanese businesses are meeting older consumer needs in food, packaging, services, and domestic consumer products. Nintendo have successfully targeted software products (known predominately as a youth market product) to older market segments. Examples of these being within the Nintendo DS™ 'Brain Training™' and the Wii™ products (Rowley and Tashiro, 2008). In healthcare and domestic product sectors Intel and Philips have set up research centres to specifically identify older adult needs. Companies such as Proctor and Gamble, Microsoft, General Electric and Whirlpool, have, and are in the process of developing more inclusive product offering for ageing markets.

2.5.   Methods in the Process of Designing for Older People

As the percentage of older people grows, demand will also grow to meet and understand their specific design needs. Design can broadly be seen as a youth centred industry, both in age of designers and in attitude. This can at times unconsciously lead to negative assumptions or social stereotypes of the older population (Wright, 2003). To overcome these assumptions and stereotypes designers are continually evolving design methodologies to attain a better understanding of older consumers. The methods currently used in the process of designing for older people are varied in nature. Due to the relative modernity of this research arena, the methods themselves are in a process of continuous testing, and being iteratively developed accordingly.

As discussed previously, design research for older people is cross disciplinary and spans many domains. Subsequently, the methodologies used within these fields result in a mix of approaches. Depending on the stage in which the design research is conducted, qualitative and quantitative methodologies are utilised and at times used together as mixed method approaches. This suggests the complexity of the design process and the stages within, from identifying user needs to full production of designed artefact.

In the process of designing any product or service, Jones recommends acts of divergence and convergence (1992). Similarly, this is reflected in the Design Councils "Double Diamond Model", (2007, p.10). Framing the process of designing into divergence and convergence is considered as the most efficient, exploratory and rigorous investigation to a given design issue. It allows both space for open enquiry of issues and needs through divergence and synthesis and resolution of issues through convergence. According to the Design Council, divergence and convergence allows the designer to discover, define, develop and deliver in the process of designing (2007). As a whole, when designing for older people, Dishman recommends an empathic approach of observation, asking and performance between people, prototypes, and products at various stages of the design process (2003). This very much relates to user or person centred design methodologies.

2.5.1. User Centred Design Methodologies

Designing appropriate products and services for older people requires deep unbiased understanding of their needs. One consensus across literature in regard to methods in designing for older people is maintaining 'user centricity'. The user centric design ethos suggests keeping users and key stakeholders central to research and included in methodologies (Norman, 1988b). This is in contrast to designers having the sole responsibility of assuming what people require. User centred design keeps focus on the user throughout the design process with the view that this potentially equates to better design output.

As user centred research methodologies rely heavily on human involvement and tapping into deep insights, methods are borrowed extensively from social science fields. As discussed previously design research methods can either be qualitative, quantitative and mixed in approach depending on the stage utilised. However it can be viewed that user centred design methods are more qualitatively lead due to the intrinsic human presence in the research. This view is strengthened in a study by Goodman et al., finding that designers favour "open ended or inspirational data" (2008, p.29) when using user centred design. This is also reflected in the user centred design resource "Method Cards™" (IDEO, 2003), offering designers inspirational cues for arbitrary methods.

Much has been written in regard to the advantages of including older people in the design process, notably Coleman et al., (2003), Fisk et al., (2004), Newell et al., (2010). User centred methods are most advantageous as they can be a direct source of inclusion for stakeholders and inspiration for designers across all stages of the design process, from insight to product launch. However their disadvantages lie in the amount of subjective data some can produce and the length of time it takes to produce the data. Due to matters such as cognitive and sensory capabilities, user centred methodologies are also seen to be more difficult to conduct with older people than with other cohorts (Lines and Hone, 2004, Newell et al., 2007). Therefore, to be both effective and meaningful, it is considered that greater sensitivity is required in conducting these (Newell et al., 2007). Additionally, there is a call for designers to be even more empathic when designing and conducting user centred methods with older people (Coleman et al., 2003).

2.5.2. Early Stage Methods in Designing for Older People

User centred methods can come in many formats. When designing for older people these can be combined or used in multiple instances. When investigating any demographic, commencing the early stages of the design process or "the fuzzy front end" can be a lengthy and arduous process. Uncovering unique insights and building accurate user requirements in any project requires patience and resolve on behalf of the design researcher. Investigating older people requires an additional abundance of empathy and sensitivity.

Allowing participant discourse and feedback in a relaxed, fluid and open manner at early stages can be the most effective means of sensitivity and empathy. In a truly participatory and sensitive manner, simply provoking dialogue with older people is considered as a more productive means of eliciting response rather than forcing rigid opinionated feedback (Chamberlain and Bowen, 2008). This has been achieved through various methods with empathy and sensitivity guiding the approach. To provoke dialogue in focus groups with older people Goodman et al., recommend the use of "visual probes" p.4 together with the creation of personal scenarios relevant to a particular participant (2004). Wherton and Prendergast demonstrate that dialogue through open ended or semi structured interviewing such as contextual enquiries or ethnographies can provide invaluable insight at early stage enquiry (2009) (Ethnographies will be singled out and discussed in 2.6.). For conceptual exploration, Bowen and Chamberlain recommend designing physical 'Critical' artefacts to create discussion and engage older users in dialogue (2008).

2.5.3. Methods at Other Stages of the Design Process

In later stages of the design process dialogue is also encouraged particularly in cases of designing for older adults with dementia. In these instances Tan and Szebeko, (2009) and Dishman (2003) recommend forms of storytelling to share and capture experiences. In addition to this they promote building rapport and discussion through participatory designing such as co-designing sessions (sessions of designing with older people). Similarly Demirbilek and Demirkan encourage a participatory approach in co-designing with older people. They advocate the use of quality

function deployment matrices such as their own Usability, Safety, Attractiveness, Participatory (U.S.A.P) matrix (2004,p.364) to score appropriateness of design requirements.

Traditionally, more quantitative research is conducted later in the design process to finalise and refine design requirements. The latter stages in designing for older people similarly use quantitative methods, however, they include equal if not more dialogue to create empathy and sensitivity. In task and user analysis Baskinger and Hanington support the use of narratives, documenting markers and key touch points in the use of home appliances in older people (2008). Similarly Fisk et al., suggests using "verbal protocols" (2004, p.37) such as thinking or talking aloud during task and user analysis of products.

Together with task analysis, "empathy tools" (IDEO, 2003) are seen to be an effective means to offer designers understanding of capability restrictions older people may have. This approach in testing products has been researched and implemented by companies such as Nissan and General Electric. This requires designers to conduct user tests with the simulated effects of ageing (as in Figure 2.2.) This requires for example the wearing of blurred glasses to replicate sight decline, gloves to lessen the sense of touch, wearing cotton wool in ears to simulate hearing loss or padded body suits to restrict joints and body movements. These empathy tools are not just restricted to task analysis and can be used at any stage of the design process to gain empathy.

In reviewing user centred methods and literature pertaining to older people, approaches that are truly empathetic, sensitive, and exploratory are considered most insightful. These approaches are specifically welcomed when designing for certain age related illnesses such as dementia. In these cases extremely iterative, sensitive, and exploratory approaches are required to capture user behaviours (Orpwood et al., 2004, Orpwood et al., 2008).

Figure 2.2: Task analysis within a car interior: A young engineer for Nissan in an 'age simulation suit'

Images reproduced with permission from Nissan Global © 2011

2.6.   Ethnography and Design for Older People

What has been discussed up to this point demonstrates the high levels of inclusion, empathy, and sensitivity required for methods in designing for older people. In the methods illustrated, blending design with inclusive, sensitive and empathic approaches have been shown to come in many formats. As a whole these go far beyond 'user' centred design strategies and assume a more holistic 'human' or person centred enquiry. Through these methods designers are striving in an open and ethical manner to get to the heart of older people's needs via a deep understanding.

2.6.1.   User Sensitive Inclusive Design

> "...field studies can provide valuable insights but they have not been numerous enough to be helpful in developing design guidelines. Nevertheless, sole reliance on laboratory measures is unlikely to be sufficient to understand the types of problems that older people have" (Seidel, 2009, p.144)

As design methods and processes for older people develop, there is a growing movement to continuously build on holistic and empathic enquiry. Rather than rigid laboratory tests lacking in human centricity, fieldwork is considered to be the most appropriate means of achieving this. Seidel et al., for example states that "field studies are needed to help develop design guidelines for products, services and environments with better sensitivity to older people's needs" (2010, p.1252). Newell et al., argues that design guidelines in isolation are not sufficient, neither are usability laboratory tests with older people (2007). Newell et al., cites 'design for all' as an "unachievable goal" (2010, p.256) and with this puts forward the research paradigm of "User Sensitive Inclusive Design" (p.235) when designing for older people. With a title carefully selected to reflect empathy, sensitivity, and inclusion this is a movement rich for development. With human sensitivity and understanding at its core, what has been observed is a developing need to blend open, holistic enquiries into creative endeavours. Suggested methods for this include the use of Critical Design, Professional Theatre and Ethnographies.

2.6.2. Ethnographic Methods

Using ethnographic methods in design research for older people holds many advantages:

- **Enhancing Social Inclusion.** With its birth and development in the field of anthropology, ethnographic methods contain holistic, person sensitive enquiry. Bichard and Gheerawo, offers a shared connection between ethnography and inclusive design stating that inclusive design has social inclusion at its core ethos, as so too does ethnography (2011).

- **Observing Behaviours in Context.** According to Dishman, The process of designing for older people requires "observing real people in real contexts" (2003, p.48), and that this is critical in identifying unarticulated needs. Ethnography examines behaviours in context (LeCompte and Schensul, 2010). It strives to offer truth in understanding and truth of behaviours, therefore reporting what is actually happening within a culture.

- **Sense-making of Human Complexity**. No one research method can claim to fully comprehend the human complexity of individuals and cultures. However by using methods of deeply observing and describing, ethnographic researchers go about interpreting the complexity and causality of occurrences within cultures. In complex design issues this interpretation is extensively required before any physical design work is commenced. By endeavouring to 'live their life in their shoes' so to speak, designers are cajoled into deeply understanding a culture firsthand before designing for them.

- **Designing Futures:** Ethnography holds an important role in designing future artefacts for older people. A study by anthropologists Drazin and Roberts reported that the future of design for older people lies in creating a positive sense of self and environment (2009). This study identifies that designed artefacts in the home should reflect future possibilities as opposed to creating relics of the past. Here the authors likened design ethnography to archaeology, however an archaeology of design futures not pasts.

2.6.3. Design for the Future Old

Outlined in 2.6.2 are just some points in how ethnographic methods and design for older people can be advantageous. Due to the shared human and social elements of both these research fields, the future holds many opportunities to cross pollinate methodologies and to strengthen user sensitive inclusive design. As discussed previously, in the future, research possibilities within design will broaden as the population grows. As older adults are not a homogeneous cohort, the diversity of older adult cultures and requirements will all add to the deepening complexity of what is 'inclusive design'. This complexity will no doubt test design guidelines such as the principles of Universal design. As older people's needs are diverse and complex, it will require much ongoing open, holistic and iterative research in the field of design to understand and fulfil their emerging requirements. Designing for the future old is one such area, with needs and learnt conventions continually changing. For example one could predict that in ten years time the next generation of older adults will be more technologically savvy than their predecessors.

The methods in which researchers attempt to understand future older users are in a state of development, as a result, interesting approaches are emerging. For example, ethnographic methods have been used in interpreting future requirements in Human Computer Interactions (HCI). An example of this has been demonstrated by Sayago combining ethnographic methods with traditional usability techniques to create "real life usability" (2009, p.22). Furthermore, using ethnographic research to investigate future older people's needs have been demonstrated with both the Intel digital health group in Ireland and the Helen Hamlyn Centre in the UK. In the "building bridges project" the Intel digital health group have investigated and produced technology products to prevent social isolation. This project demonstrates the strength of combining design and ethnographic methods, the depth of enquiry from ethnography meeting the practicality and creativity of design.

2.7. Older Adult Health: An Introduction

Maintaining good health and healthy lifestyles for our future older generation will be a major research challenge in the future. The role that healthy ageing plays both socially and economically is a critical one with its diverse and complex determinants. Its importance cannot be overstated. 'Health' is one of the three basic pillars of a world policy framework in active ageing or quality of life in ageing (World Health Organisation, 2002, p.45). The research agenda for health and older people is hugely significant. Globally, and specifically in Europe, wellbeing and health are seen as major research priorities in the decade ahead (WHO and SNIPH, 2006).

The importance of healthy ageing on the world's population has both far reaching implications and opportunities for the global socio-economic climate in the decades ahead. For the economy the benefits are primarily threefold, firstly in having the knowledge and experience of a healthy older workforce. Secondly, benefits lie in the new and immense opportunities that this large cohort of consumers will provide, with untapped requirements and market needs to be met. Thirdly, a healthier older population will mean less overburdened and congested health systems; many of which are already strained on a global scale. Furthermore, at a societal level, the future contribution to humanity that the older population can offer cannot be

overestimated. A valuable contribution would in the imparting of positive values, experience, and knowledge to younger generations.

The following is an older adult health review placing in context the importance of healthy ageing, with specifics pertaining to the Irish population.

2.7.1. Healthy Ageing and Health of Older People

The World Health Organisation's definition of 'Health' is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (1948, p.100). The definition of 'healthy ageing' is "the process of optimising opportunities for physical, social, and mental health to enable older people to take an active part in society..." (WHO and SNIPH, 2006 p.9) These definitions demonstrate how broad the spectrum of health and healthy ageing are. The area of older person's physical, social and mental health or healthy ageing is as complex and diverse as the older global population itself, encompassing many factors. According to the World Health Organisation, healthy ageing profiles and determinants include: genetic characteristics, gender, social class, economic, culture, and environmental conditions (2003a). With this outlined it is important to note that the process of ageing is not synonymous with ill health or disease, however certain aspects of ageing increase human vulnerabilities (Saxon and Etten, 1994).

When identifying threats to healthy ageing chronic diseases pose the greatest threat and this will inevitably grow in the years ahead. Worldwide there is and will continue to be a rise in chronic and non communicable diseases. These made up 36% of diseases in 1990 and are predicted to rise to 57% in 2020, overtaking communicable diseases which are predicted to drop from 49% to 22% in the same period (World Health Organisation, 2000). The main chronic diseases globally are heart disease, stroke, cancer, chronic respiratory diseases, and diabetes. The common causes of these being unhealthy diet, physical inactivity, and tobacco use (World Health Organisation, 2006). The effects of these conditions on the global mortality rate are vast contributing to 60% of the total reported deaths worldwide with the majority of these conditions manifesting in later stages of life (World Health Organisation, 2003b).

2.7.2. Health and Irish Older People

Since the latter part of the 1980s health research for older people has evolved slowly in the island of Ireland. However in recent times it is a growing area of concern. Research by McGill has revealed that the Irish population is living longer in ill health. This research shows expected unhealthy years at birth averaging at 17 years for Irish females and 15 years for Irish males (2010). These unhealthy years rank Ireland (north and south) as low as 13th/14th in a league of 15 EU countries for life expectancy at 65 (figure. 2.3). In self reported health, Fahey et al., found that only one in six older people considered their health to be 'very good', compared to one in two of the working population[7] (2007).

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[7] Fahey et al., classify 19-64 year olds as the working population in this report.
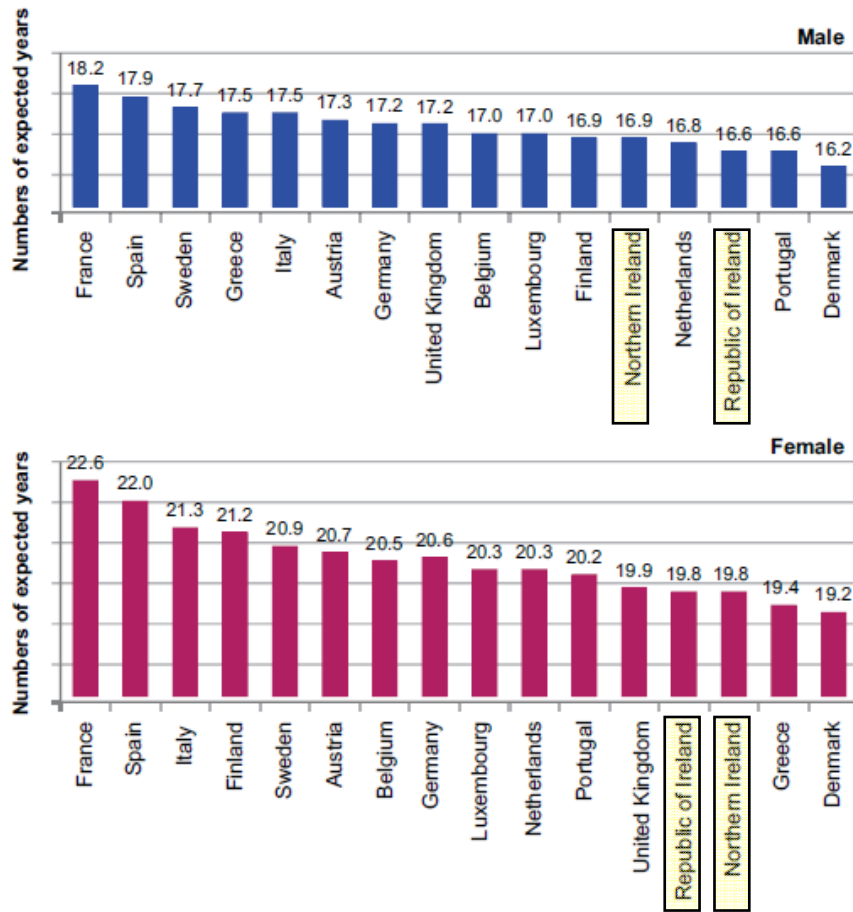
Figure 2.3: Life expectancy at age 65 in the EU 15, 2006, Republic and Northern Ireland highlighted the. (McGill, 2010)

Reproduced with permission from Paul McGill; The Centre of Ageing Research and Development in Ireland © 2010

In the future, the Irish older adult population faces potential critical health problems. Research from Balanda et al., predicts that the number of Irish adults with chronic conditions such as Hypertension, Stroke, Coronary Heart Disease, and Diabetes will increase dramatically between 2007 and 2020. This research predicts a 30% increase in Northern Ireland and a 40% increase in the Republic of Ireland with older adults in particular affected by the majority of these conditions (2010). Multi-morbidity, or persons with multiple chronic conditions is emerging as a significant problem, with

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11% of over 50's in the south and 18% in the north claiming to suffer from two or more chronic diseases (Savva et al., 2011).

With increasing age, disability is another major health issue for Ireland. With only 17.6% of persons aged 65–69 reported to have a disability in the Republic of Ireland, this increases greatly to 67% with persons aged 85 and over (Central Statistics Office, 2007). Links are now being made between chronic diseases and disability. Savva et al., found that "[Irish] people with two or more chronic diseases are nearly 20 times as likely to report disability as people with no chronic conditions" (2011, p.3).

The number of Irish people with cognitive impairments also greatly increases with age. Only 4% of the population aged between 50 and 64 are reported to have cognitive impairments, however this rises sharply to 35% with adults aged 80 and over (TILDA, 2011). Mental health issues for Irish older adults are also problematic with "...social isolation, anxiety and depression [being] important contributory factors to frailty and loss of function in later life" (O Shea, 2003, p.36). Furthermore, a report by McGee et al., (2005) stated that 21% and 22% of older adults in the Republic of Ireland and Northern Ireland respectively had significant or borderline levels of depression.

All these statistics equate to deepening difficulties for the future health of Irish people. Neglecting the research area of healthy ageing could have long term and detrimental effects for older people, health systems, and the economy of Ireland. As previously discussed, warnings have been issued specifically to Ireland in regard to the potential impact of healthy ageing on the future economy (Standard and Poor's, 2010).

2.8. Healthcare Begins at Home: Domestic Products for Older Adults

The importance of maintaining independence as we age was first highlighted following the Vienna Plan of 1982. In this, the United Nations cite independence as one of the five principles for older persons (United Nations, 1983). For quality of life, health, and wellbeing of Irish older people, maintaining independence as we age has been strategized as a key component. Insofar as it is intended that every Irish older person should have "...adequate support to enable them to remain living independently in their own homes for as long as possible" (Cross, 2009, p.7). Maintaining independence by ageing at home or 'ageing in place' is not only a goal, but a high preference for the older Irish population. McGee et al., has reported that up to 89% of Irish older adults would prefer to live at home rather than live in institutional care (2005).

The environment in which we age and live our daily lives has an immense bearing on our health and independence. The World Health Organisation cites "improving the conditions of daily life" as a priority goal within the three principles of action for improving global health. This includes "the circumstances in which people are born, grow, live, work, and age" (2008, p.49). The products and more precisely domestic products that we use in our living environment greatly assist us in maintaining these circumstances. They provide for essential living conditions and hence health and independence. Independence provided by these products promotes positive ageing in place and a higher quality of living by assisting in everyday necessary tasks.

Designers can do much to assist daily requirements and therefore increase independence of the ageing population. A study by Fisk et al., identified that more than 50% of problems older adults have with daily living could be addressed through design efforts (2004). To commence these design efforts, designers should consider products attributes which compensate for human limitations that occur with age. These should be rigorously investigated and redesigned accordingly. One study into design for independent living did this, and found that "...most of the difficulties were attributable to limitations in body postures, primarily bending/stooping" (Seidel et al., 2010, p.1239).

In the future, health care will truly begin at home. Firstly, there will be a growing need to maintain a healthy independent ageing population for social and economic purposes. Secondly, there will be a growing reliance on domestic products to help maintain this health and independence. Domestic products that address fundamental health needs, enhance wellbeing and improve qualities of life are of prime importance. Products that provide better everyday basic health care conditions require immediate attention. Most fundamental to this are products that provide nutrition and adequate environmental conditions.

2.8.1. Older Adult Heath - Provision of Nutrition and Domestic Heat

Food and heat and the adequate provision of these are basic human needs and as we get older these needs become more important in order to maintain a healthy lifestyle. This fact was reinforced in 2006 when the World Health Organisation included the areas of Environment and Nutrition as part of ten major areas for the promotion of healthy ageing. In this, environmental factors included the excesses of cold and excessive heat and the effects of extreme weather conditions on older people. From a nutritional perspective these were factors that influence eating habits in older adults (WHO and SNIPH, 2006)

In Ireland's first major study on the health, wellbeing, and lifestyle of the older population, the areas of heat and nutrition were also seen as fundamental. In this study, Fahey and Murray (1994) used the provision and preparation of food and ability to heat ones home as quality of life indicators. Furthermore, they used ownership of household durables to measure the level of deprivation that directly affects physical health. The report's findings called for the "...complete elimination of deprivation of such basic amenities as adequate heating" (p.16). For older people, deciding between providing daily food or heat is an unfortunately unavoidable issue, even in modern times. The Economic and Social Research Council of the UK found a "Heat or Eat trade-off" in older adults in the United Kingdom (Beatty et al., 2011, p.16). Here it was observed that there was a significant reduction in food spending in response to colder temperatures in poorer older adult households. Similar findings have been uncovered in Ireland; particularly moving into the winter months and with the cost of energy rising.

Providing for adequate nutrition and heat in the home are fundamental health considerations for older people, particularly on the island of Ireland where inclement weather is present yearlong. The environmental elements can have detrimental effects on older people's health; and this is where food and heat provide necessary fuel for living. Cooking and heating products address and fulfil basic health and wellbeing needs in the home by purveying nutrition and heat. The following will discuss design and health from the perspective of domestic cooking and heating products. It will demonstrate the important health functions these products assume in the home and the importance of adequate nutrition and heat for the Irish older adult.

2.9.   Design and Health - Cooking Products for Older People

2.9.1.   Older Adult Nutrition

For older people, from a physical health perspective one of the most damaging lifestyle characteristics to health are poor diet and nutrition. Poor nutritional intake in later life has serious implications and can lead to fatalities through a great deal chronic illnesses. Included are heart disease, obesity, diabetes, osteoporosis, stroke, and high blood pressure (World Health Organisation, 2003a). Furthermore, cancer, arthritis, dementia, (FSAI, 2000) and hyperthermia (Brenner and Shelley, 1998) are all linked to poor nutritional intake. Good diet is continually proven to be a marker for good health, quality of life, and lowering mortality. In addition to this, Barnett (1994) argues that dietary factors not only prevent chronic diseases but also delay the symptoms of ageing.

Nutrition has been highlighted repeatedly as part of priority research strategies for Irish older people. This was firstly reported by Brenner and Shelley demonstrating the differing dietary needs of older people and promoting adequate nutrition as a necessity for healthy ageing (1998). This was repeated in 2000 by the Food Safety Authority of Ireland with a report recommending national food and nutrition policies for older people (FSAI, 2000) again, similar initiatives were suggested in 2003 with the "Healthy Ageing in Ireland Report" (O Shea). A common consensus in all literature sources on the topic is that chronic nutritional based problems of obesity and malnutrition are major threats to health.

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2.9.2. Malnutrition and Irish Older People

In 2009 The European Parliament, with the Prague declaration, singled out malnutrition as an urgent priority for health. This declaration called for an absolute end to malnutrition particularly in vulnerable groups such as older adults (IFH and UCD, 2009). The risk of malnutrition can increase as we age; Meydani cites a decrease in food intake, an inactive lifestyle, and reduced energy expenditure as critical risk factors for malnutrition in later life (2001).

In Ireland's older adult population, there is evidence that malnutrition is a high risk problem, shown to account for an estimated 70,000 possible cases (FSAI, 2000, IFH and UCD, 2009). Detecting and preventing malnutrition can be difficult and delayed, in a study of older people in the Republic of Ireland, Corish (2006) found that 15% of men and 16% of women were under nourished when admitted to hospital. In Northern Ireland, it is estimated that four out of 10 older people admitted to hospital are suffering from malnutrition on arrival (CARDI, 2010).

The issue of malnutrition extends outside of health with the Institute of Food and Health claiming that malnutrition in older people has serious economic implications. They state that health costs calculated due to malnutrition were twice that of obesity related illnesses in Europe (IFH and UCD, 2009). Per year in the United Kingdom, the healthcare costs of malnutrition have exceeded £7.3 billion with over half this cost on people aged 65 and over (CARDI, 2010). Disease related malnutrition is shown to have a significant impact on the Irish economy. In 2007 estimations have shown to have cost over 10% (over €1.5 billion) of Irish public spending on health (Elia, 2009)

2.9.3. Obesity in Irish Older People

Throughout developed countries obesity is a modern and major growing health problem for all age groups. It is now seen as a global epidemic with an estimated 1 billion adults overweight with at least 300 million of these considered clinically obese (World Health Organisation, 2003c). This holds significant risk to the older population, directly and indirectly being a major cause of chronic diseases. Obesity is linked to diseases such as heart disease, stroke, diabetes, and hypertension in

addition to other health issues (World Health Organisation, 2003b). Poor eating habits together with sedentary lifestyles are the major contributors to this; however, other factors include anxiety, mental illness or grief. (Saxon and Etten, 1994). In Ireland excessive alcohol and salt intake are also included as major contributors to obesity in older adults (FSAI, 2000).

Similarly, as with cases of malnutrition, financial health costs are exceptionally high. Obesity related cases are reported to be estimated at €170 billion in the European Union alone (Elia, 2009). This is a significant problem for Irish older adults, first highlighted by Fahey and Murray in 1994, at the time reporting that half of males and close to half of females aged 65-74 were either obese or overweight (1994). This figure is steadily growing, in a nutritional assessment of Irish over 65 year olds Corish and Kennedy found that 69% of men and 61% of women were overweight or obese (2003). Latest figures (released May 2011) suggests an upward continuation to this trend, with three quarters of the total Irish older adult population being overweight or obese (TILDA, 2011).

2.9.4. Domestic Cooking Products for Older People

Daily access to nutritional foods is essential for older people in maintaining a healthy lifestyle. Together with this, the preparation and cooking of these foods is fundamental, both in the control of dietary intake and in maintaining autonomy and independence in the home. This autonomy and independence is heavily reliant on the domestic products and appliances that older people use. According to the Food Safety Authority of Ireland, adequate housing is a basic health requirement for the older population. Essential to this is the provision of basic kitchen equipment such as refrigerators, cookers and ovens all required for food preparation and storage (FSAI, 2000). However 13% of Irish older people are known to lack basic food preparation facilities in their homes (Cullen et al., 2007). It has been identified that research is ongoing to design and provide for dietary needs and nutritional supports in the home. Since 2010, in Philips healthcare™, research has been undertaken to develop a computerised system of personalising meal recommendations for older people's homes (Geleijnse et al., 2010).

A review of recent research into the design of cooking products for older people reflects the physical and cognitive effort required in using these products. In addition to this is the desire for products to be designed to support and compensate for this effort. In a study into the design of kitchen products for the American older population (including cooking products), Baskinger and Hanington summarise five key areas in need of development. These are: performance, comfort, access, safety, and ease of use of products (2008). A study by Seidel et al., identifies cooking as one of the most physical tasks in the home for older people. This research shows that the body postures involved in cooking are made up by 64% standing, 29% reaching, and 7% bending, with bending and stooping accounting for 45% of the difficulty in the task (2010).

For older people with dementia, Wherton and Monk have highlighted many difficulties in preparing foods and operating cooking products in the home. In addition to general problems such as turning an appliance on and off, they identify sequencing problems and unnecessarily repeating tasks (2010). This difficulty in operating cooking products is emphasised by Lewis et al., and not isolated to dementia sufferers. They show that slower cognition in the use of microwave oven controls increases with age. Additionally, they demonstrate that more modern interfaces such as touch button interfaces increase the complexity and time it takes to complete a task (2007).

2.10. Design and Health - Heating Products for Older People

2.10.1. Temperature and Built Environment Conditions

Our physical environment and the conditions that we live in greatly influence our health and quality of life. There is increasing evidence that built environmental conditions have serious effects on physical, mental, and social health. For instance poor environmental conditions are known to be influential in a range of illnesses from cardiovascular diseases, obesity, and chronic depression (World Health Organisation, 2003d). Globally the impact of the built environment on health is a growing area of concern to such a degree that it has been chosen as one of the three recommendations of improved social health. The World Health Organisation has

entitled this "Improvement of Daily Living Conditions" (2008, p.3). There are many components to this effect which the built environment has on health. Lavin et al., outline these as: temperature, humidity, noise, light, safety, space, accessibility, immediate surroundings, and the design, availability, and maintenance of these components (2006).

Indoor and household temperatures have major affects on health and more importantly, mortality. A report by the World Health Organisation states that "Extreme high and low temperatures [are] an underestimated cause of ill health and premature death in many countries" (World Health Organisation, 2001, p.12). Factors such as poor mobility and health issues can confine older people indoors for longer. Therefore as we get older, indoor temperatures have more serious implications for health and mortality. Firstly temperature extremes e.g. from cold to hot indoor temperatures, are known to lead to more accidents and personal injuries in the home (World Health Organisation, 2001). On a more serious level, in the United Kingdom, indoor temperatures were shown to cause an additional 40,000 deaths in winter months in comparison to other months of the year (Wilkinson et al., 2001). Furthermore, findings from this study show that colder indoor temperatures are the main cause of winter mortality, causing cardiovascular and respiratory disease with older persons at greatest risk. In a further study by Wilkinson et al., (2004) examining this rise in mortality, concluded that an upward adjustment in indoor temperatures lowers levels of vulnerability and mortality (Liddell and Morris, 2010, McAvoy, 2007).

With an estimated increase of 21% in winter months, Ireland (North and South) are within the highest rankings of excess winter mortality in Europe (McAvoy, 2007). A yearly sample of this was documented in 2005, when an extra 1950 deaths during winter months compared to summer months was detected (SEAI and Combat Poverty Agency, 2009). Safe indoor temperatures for older people are recommended by the British Geriatrics Society as 21°C in winter and 18°C for a minimum comfort level for most people (Lowry, 1989). The control of this indoor temperature could have serious implications on the health of older people. A study by Morgan et al., (1996) showed that colder indoor temperatures result in increases in hospital admissions in older people. More importantly Bhaskaran K. et al., discovered that a 1° Celsius reduction in temperature can equate to approximately 200 extra heart

attacks, with older people most vulnerable to this effect of temperature reduction (2010).

Poor indoor temperature in homes can have many knock on effects to ill health. An example of this lies with damp and mould in homes, with the probability of occurrence rising with poorly heated dwellings. The existence of indoor damp and mould cannot be underestimated. It has been known to have physical ill health side effects such as, heart attack, hypertension, respiratory problems, and increasing the risk of stroke. Furthermore, the occurrence of damp and mould in the home has also been linked to mental health issues such as depression (Shenassa et al., 2007).

2.10.2. Fuel Poverty and Health

Maintaining adequate temperatures in the home can be difficult for many reasons. Firstly, poorly maintained and older housing are generally less energy efficient. Secondly, increasing energy costs pose a massive threat to controlling consistent healthy temperatures in the home. For poorer sections of the population the cost of energy can be an obvious financial burden. This can result in individuals avoiding heating their home to reduce energy costs. Poorer parts of the Irish population have been identified as living in "fuel poverty" or to be "fuel poor". It is estimated that 34% of households in Northern Ireland and 7% in the Republic fall within this category (Liddell and Morris, 2010).

For Ireland's older people who are financially poor "fuel poverty" is their leading economic challenge (Walsh and Harvey, 2011). Officially, fuel poverty is said to arise "...as a result of the relationship between household income, energy efficiency of the dwelling and fuel prices" (McAvoy, 2007, p.2). Fuel poverty has also been defined as persons who spend more than 10% of their total income on household fuel (Liddell and Morris, 2010). There is a direct correlation between fuel poverty and poor health, it is reported that one in five Irish people living in fuel poverty have long term illnesses (McAvoy, 2007). Being fuel poor is not isolated to older people and can affect all age groups. However it has significant impacts on the health of the older population meaning greater susceptibility to chronic conditions.

2.10.3. Domestic Heating Products for Irish Older People

Older people require efficient and reliable domestic heating products and systems more than any other demographic. Divided into two factors, Morgan et al., claim that older people have a greater requirement for domestic heating. Firstly, because of the longer periods of time they spend at home, and secondly, because of the deterioration in body thermoregulation as an occurrence of ageing (1996). Irish older people generally stay indoors for longer due to environmental and weather conditions. Ireland's climate is traditionally cool with an average yearly temperature of 9° C. Not traditionally prone to temperature extremes, Ireland's air temperatures are shown to fall below 0°C on average 40 days of the year. Generally a wet climate, days with rainfall in Ireland average up to 225 days a year (Met Éireann, 2011). These conditions greatly heighten the need for reliable and adequate home heating products and systems; however there are still a considerable amount of dwellings in Ireland with inadequate heating.

Inadequate home heating systems are seen as a major problem area for ill health and mortality. Wilkinson et al., (2001) claim that poor home heating is a key determinant of winter death. Furthermore Lavin et al., cites inadequate domestic heating in Ireland for chronic illnesses in older people by causing humidity and damp air (2006). The complete absence of a heating system in a home has been shown to greatly increase the instance of ill health, particularly increasing the instances of respiratory problems (World Health Organisation, 2001). Interestingly, research has shown that that even in modern times there is a substantial amount of Irish older people without the basic heating facilities in the home. Cullen et al., calculated that approximately 25% of Irish older people do not have a central heating system in their home (2007). Fahey et al., discovered that this is most prevalent in rural Ireland with one in five older people without a central heating system compared to one in 11 of the rural working age group (2007).

Chapter Summary

The worlds ageing population is a major achievement for humanity, however it will bring with it real systemic problems for the future. The success and prosperity of the

ageing population lies deeply in the health of its individuals. The future role of the design researcher and practitioner is paramount in this regard. For health, economic, and social reasons this chapter identified that future health care will begin at home. The domestic products that we use every day will greatly assist in our health needs. For older people, fundamental products such as cooking and heating products need to be designed to fulfil future health requirements. In maintaining a healthy older population, the designer's role is required to become more important and this can be achieved by way of the approach and methods used in gaining insight. Multiple literature sources suggest that designers will need to become more sensitive and empathetic in these methods and approaches. This chapter demonstrated that ethnographic methods can provide this empathy and sensitivity in future design research.

Chapter 3.
Research Questions, Approach and Stages

3.0. Research Questions, Approach and Stages

Chapter Overview

This chapter firstly reviews and synthesises the previous two chapters in order to define the research area. Following this a personal story from the researcher's industry experience is discussed to further understand the context of the research. Two main research questions are then identified. The research approach in answering these questions will be discussed in two stages. The first stage will be conducted through ethnographic fieldwork and reflection, the second stage through design and reflection. In addition to this, pre-fieldwork assumptions, bias, and limitations are also identified.

3.1. Discussion of Preceding Two Chapters

To define the research area, and to offer significance to the research approach and questions, the preceding chapters will be summarised. In short, the previous two chapters dealt with the following:

a. Chapter one firstly outlined the evolution of design practice and the design of cooking and heating products in respect to Ireland. The broadening role and changing face of the design practitioner through design thinking was also discussed. It continued by highlighting the emergence and combination of design and ethnographic methods as an important future aspect of this movement. Illustrated with particular importance was the role of designer acting as ethnographer rather than ethnographer feeding into design disciplines within this movement.

b. Chapter Two presented an overview of the global growing older population. Specific to Ireland, It detailed the emerging demographic and research agenda relating to this cohort. It discussed the methods in the process of designing for older people and the appropriateness of ethnography in the future of design research. Finally the chapter explored the concept of

designing for health, focusing on nutrition and the built environment for Irish older people. This demonstrated a key requirement for designing cooking and heating products for this cohort.

3.1.1. Defining the Research Area

There were a broad range of research possibilities and questions deriving from the considerations and associated literature of the previous chapters. The core areas that primarily presented themselves were within the areas of:

i. Designing domestic products for future older adults, specifically for Irish older adults.

ii. Developing methods and processes in designing for older adults.

From the literature reviewed there were large research spaces to be explored within these two areas. Indeed, due to the relative youth of both design and ageing research there were vast spaces to be explored within any specific domestic product for older people and any specific method in designing for them. Cooking and heating products however were shown as fundamental requirements for health, 'age in place' and wellbeing in the domestic environment. Furthermore, they were identified as being in need of priority design attention.

Through the literature, ethnography, with its user sensitive, inclusive, and empathic approach was demonstrated as an appropriate accompaniment to the design process for older adults (Newell et al., 2010, Dishman, 2003, Seidel, 2009). With its approach based on fieldwork rather than laboratory based it is a desired future research method in design. Its specific appeal to designers lay in deep enquiry by means of truly understanding people and cultures at early stages of the design process. In this regard, literature showed that designers needed to develop methods and process by practice in which they adapted ethnographic methods to meet design needs. By doing this it is believed it will benefit both the fields of design and anthropology.

3.2. Personal Story: The Need for Empathy over Ego

In addition to the literature reviewed it is important at this point to further understand the context of the research study. To that end, one needs to understand the researcher's personal standpoint and industry experience. Designing cooking and heating products for Waterford Stanley Ltd™ and AGA Rayburn™ had substantial influence on the research approach, interest, direction, and questions. A specific turning point during this experience prompted the direction of this study. This turning point is narrated through the following personal story:

Whilst working within the research and development department of Waterford Stanley Ltd, I was given the reasonability of product styling for existing and future product offerings. Being from an Industrial Design background by education and previous work experience, this greatly complemented my personal approach and interest in design. This interest and approach was of creating products that had a novel appeal primarily by means of visual aesthetic. For Waterford Stanley this visual aesthetic was created by combining elements of retrospective design with modern styling to produce a contemporary yet classic appeal. This also complemented the corporate brand styling which was to attract primarily homeowner's within the 25-45 age groups.

What is now seen as a turning point in my design career occurred during the redesign of the Waterford Stanley product the 'Brandon™' range cooker. My role at a particular point in this project was to redesign a door handle set for the product. Following much thought, conceptualisation, material, and aesthetic consideration, together with liaising with the marketing department, five illustrated concepts were produced. These were quickly evaluated by the department and one concept was chosen for development through plastic prototyping. This concept (shown in figure 3.1) to my mind, offered the consumer a sophisticated, sleek, and streamlined solution in keeping with contemporary living. With a high gloss black finish and flowing chrome detailing (reflecting the company brand identity) I felt the solution covered ..continued...

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all aspects of the design requirements. A working plastic prototype was engineered and reviewed in situ by internal teams and this was initially received positively. However a fleeting comment from the managing director in regard to the design quickly deflated this positivity and exposed a fundamental flaw. His sole comment was-

"My 90 year old mother would not be able to use this handle set- especially as she bakes a lot; when she bakes, she usually has flour on her hands making it more difficult for her to use"

With this comment I realised I was indirectly and unknowingly creating an act of discrimination through design. This resulted in a period of reflection, both on my approach in 'designing for people' and also the 'power' for change that designers can hold. Designers can create positive experiences but can also frustrate, confuse, and create negative experiences for the end user. Furthermore designers can propose ideas that can invariably isolate or include people in everyday life. It is true to state that designing can at times be an insular process; an individual challenge to decipher what the consumer needs. However neglecting to consider or even to talk to possible end users can have detrimental affects both for the success of the product and user sentiment. In many respects the profession of designer can assume an egotistical role, having the influence of creating objects that reflect a personal style rather than what the user may need or desire. This commenced a personal interest in the role "empathy" played in design, specifically empathic over egotistical approaches (White and Devitt, 2009).

Figure 3.1: The concept display board for the redesign of the Stanley Brandon handle set.

Image selected from author's design portfolio, © Waterford Stanley Limited 2007.

3.3. Research Questions

Within the core areas described previously and the literature reviewed, it was now possible to define two specific research questions.

Question 1: What are the requirements or needs in cooking and heating products for Irish older adults?

This question was to be answered from a designer's perspective through utilising ethnographic methods. From deep and sustained ethnographic enquiry, the research intent was to understand requirements and then respond to them by designing according to those requirements.

To answer this question the research approach was firstly:

- To enquire deeply into the Irish older population in regard to their everyday life, particularly their daily domestic lifestyle and culture.

- To enquire holistically into the user needs and requirements for domestic products.

- To understand profoundly how the older Irish population utilise cooking and heating products in their homes, how they cook and provide food for themselves and how they heat their homes.

Secondly by conducting this enquiry to:

- Develop theories or insights for use in constructing product requirements for cooking and heating products for this population.

- Utilise traditional design methodologies to discover how requirements built from ethnographic methods can be utilised by designers and embodied in design concepts.

This point links to the second research question:

Question 2: What is the distinctive nature of design ethnography practiced by designers? And what methods and processes can facilitate its application?

Once more this question would be addressed from a designer's perspective when utilising ethnographic methods. The research was designed to conduct field ethnography and apply this for the purposes of design practice. By doing this the researcher would reflect, report, and inform on the process of design ethnography.

To answer this question the research would firstly:

- Conduct a design ethnographic study, with the intent of enhancing the everyday health and wellbeing of older people by reporting on the domestic products they use.

Secondly:

- Identify and construct a design ethnography epistemology[8] and methodology that is distinct from, while respectful of, that of anthropology. Thereby

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[8] Epistemologies according to Le Compte and Schensul "define the kinds of evidence needed to substantiate the validity of facts"(2010, p.57)

building links between design and ethnographic methods. The researcher will reflect on methods and processes to inform future design ethnographers.

- In addition, this would inform and contribute knowledge and methods to the user centred design process, specifically design ethnography, together with the broader context of qualitative methods in design disciplines.

- By reflecting on the process of transferring theoretical data into design practice, this research would inform best practice methods in the disciplinary transition between design and ethnography, e.g. through models templates or procedures.

3.4. Research Approach and Stages

The research approach can be viewed in two stages. The first stage was one that was immersed in people and culture or put fundamentally as 'person and artefact centred'. This was approached by conducting field ethnography with older adult participants in their own homes. The second stage of the research was design led, or 'practiced based', approached by empirically acting on the ethnographic fieldwork theory/findings through traditional design approaches. The following will offer an outline of the approach to the field study and design methods prior to and during the study. A detailed account of data collection methods during fieldwork will be discussed later in "4.5. Data Collection Methods" together with a detailed account of design activity outlined in Chapter 8.

3.4.1. Stage 1: Designer as "Ethnographer"

Chapter one discussed the importance of designers conducting ethnography for the future of design ethnography. Summarised was that the designer ethnographer had differing objectives to anthropologists conducting field studies. It was concluded that as a result of this, the particular principles, methods, and understanding of design ethnography have not been fully elucidated for use by professional designers. With this in mind it must be stated that many professional designers within industry

(outside of academia) do not have vast experience with in-depth, protracted field studies particularly with the rigour required for ethnographic purposes.

For the first stage of the research- ethnographic fieldwork, it is appropriate to state explicitly the position of the researcher, moreover the experience of the researcher prior to conducting field ethnography. Having seven years of industry experience in product design, the researcher had previous experience in conducting statistical market research prior to design practice, however, was inexperienced in qualitative deep user enquiry. Nevertheless the inexperience of the researcher can be viewed positively in this regard. There is a distinct lack of 'designer ethnographic' studies, therefore reporting from an inexperienced perspective would offer, rich, sensitised viewpoints. From one perspective, this stage of the research takes on the mantle of a case study with the researcher as subject, using reflection to record developed process.

3.4.2. Approach to Ethnographic Fieldwork

Ethnography is described as the "art and science of describing a group or culture" (Fetterman, 1989, p.11). Ethnographic fieldwork allows researchers to learn and to understand cultures deeply, firsthand from culture itself. By its very nature as an anthropological approach, it views the study of humans as central to its methodology. According to Robson ethnographic field methods seek "...to capture, interpret and explain how a group, organisation or community live, experience and make sense of their lives and their world" (2002, p.89). This process of capturing, interpreting and explaining is iteratively built from the experiences of the researcher in direct contact in the participant's environment, while experiencing naturally occurring behaviour. Ethnography is a process of building an understanding and evolving theories around people and cultures. Described by Spradley as

> "...a culture studying culture...seek[ing] to build a systematic understanding of all human cultures from the perspective of those who have learned them" (1979, p.9-10).

From a methodological perspective Genzuk believes an ethnographic study requires

these three principal parts: *Naturalism, Understanding* and *Discovery* (2003). To summarise Genzuk:

- **Naturalism** in ethnographic research concerns the aim of capturing the character of naturally occurring human behaviour. This naturalism can only be achieved by direct contact with subjects and avoiding inference in approach, similar to which that may occur in artificial settings such as laboratory experiments. This requires adopting the stance of an onlooker in the field, observing, not interfering in the natural setting of the study or in the context in which actions occur.

- **Understanding** is not assuming what we know to be the truth; or that as researchers we gain true understanding through participant's views and reactions. We gain this true understanding through participant observation and open rather than structured and rigid interviews. Acquiring broad and true understanding directly from the culture itself requires empathic approaches as so too does *discovery*.

- **Discovery** is freely learning from and about the participant's in the study. Discovery implies not being constrained by assumptions or suppositions, and allowing oneself to learn and be open to unforeseen outcomes. Therefore, the ethnographic researcher should welcome and be open to new and emerging phenomena whilst involved in the field of study.

3.4.2.1. Naturalism in this Research

Ethnography in this study was a means of immersion into the older population, within their natural domestic settings. In ethnography Fetterman believes the closer a study comes to understanding the participants point of view, the more improved the study becomes (1989). To ensure naturalism and proximity to the participants of interest, field research was conducted within 'natural surroundings', in this case the domestic environment and homes of the participant. The participants within this study were members of the Irish older adult population over the age of 65 years with the primary purpose being to document daily product utility and interaction.

Prior to the study it was noted that the natural setting of interaction with products core to the research would be in different parts of the home. In the instance of cooking products, these would most commonly be situated within the kitchen setting alone. Heating products on the other hand could be situated throughout the home therefore it would be necessary to move with the natural location of these products. In using ethnography in design research Blomberg et al., informs that interviewing within familiar environments allows the participant to "reference artefacts in the environment that play an integral part of their activities" (2003, p.971). This being particularly important when researching with older people, where actual interaction within their own home can be "full of perceptual cues that help jog the not so perfect human memory" (Blomberg et al., 2003, p.971).

Patton states that naturalist research is conducted in real world settings where the researcher does not attempt to manipulate the phenomenon of interest to the researcher (2002). Prior to research it was considered that threats to achieving naturalism lay with both the stance and acts of the researcher in the field where manipulation or obstruction of naturally occurring phenomena could indirectly occur. The acts of on-looking, observing, and participating in activities could also interfere with what would 'actually happen' in the natural environment.

During fieldwork common threats to a naturalistic environment occurred from the participants end rather than the researcher's involvement. This typically arose with the participant unwittingly 'staging' certain 'unnatural' scenes. One common event was the act of cleaning the house or more directly cleaning the cooking or heating product for "the visitor". Although it would be explained to the participant prior to the research that naturalism was preferred, this cannot be forced and acts of pride such as cleaning and altering the environment should be respected. Awareness of this at each field location was of utmost importance in order to maintain as natural and informal a structure to the fieldwork as possible (see Chapter 4; 4.5 Data Collection Methods). With this outlined it was concluded that to maintain true naturalism throughout the study was unfeasible. However, it was the role of the researcher to limit the amount that could be 'staged' by the participant and to enquire continually as to the naturalistic state of the environment.

3.4.2.2. Understanding and Discovery in this Research

This research was a deep enquiry to attain understanding into the Irish older population and to freely discover or uncover their product requirements. Its aim was to develop meaning from the field and to make sense of activities and phenomena within Irish older adult cultures and individuals within this culture. In addition, the aim was to understand older adult and product relationships, product utility, and functional needs. It achieved understanding through in-depth and naturalistic enquiry into the role and utility of domestic products within the home. Understanding of the older population was constructed through multiple in-depth interviews and observations in the field. Developing a deep understanding lead to discoveries both into the cultural context of the population and the role fundamental products played in their lifestyles.

A core aim of the research was to extract truths from the field, as Hammersley and Atkinson label "true accounts of social phenomena" (2007, p.209). These 'truths' were accounts of specific requirements from a growing population, and specific needs that are apparent within the population. Requirements and needs that were shared with other population cohorts and those that were unique to older people. In developing understanding, the researcher attempted to negate any bias of the older population that may have been held. Demystifying cultural differences between the researcher and participant helped to prevent any developing assumptions. In ethnographic field studies being aware of any assumptions or biased judgments is of utmost importance to truly discover and understand. Agar states that as a researcher one must be conscious of as many biases as possible and deal with these as part of the research methodology (1980). The strongest issue of bias in this research was held in the assumption that the researcher could be seen something of "an outsider" (i.e. not in the participant's age demographic) (see 3.4.3 for more details on bias)

'Discovery' occurred though observation, participation, and interview in the field. The stance of the researcher was free and open through enquiry, adapting a naive outlook to what was occurring, observed, and heard. Spradley describes this naïve but open outlook to an enquiry as expressing interest and cultural ignorance in what is occurring (1979). Discovery was also attained by the researcher tapping into the tacit knowledge of older adults; by doing this, the researcher was attempting to uncover latent or unknown utility in domestic artefacts.

3.4.2.3. Grounded Theory

Prior to fieldwork when considering appropriate research methods to elicit truth, understanding, and discovery, Grounded Theory offered many open possibilities. In this instance grounded theory methods offered the researcher the opportunity to generate "reality" and theory as the fieldwork emerged. Grounded theory according to sociologists Strauss and Corbin is:

> "...theory that was derived from data [that is] systematically gathered and analysed through the research process. In this method, data collection, analysis, and eventual theory stand in close relationship to one another" (1998, p. 12).

The purpose of this research approach was to construct truths and theories as they developed in the field and in analysis. It is argued that Grounded Theory methods by their nature, construct truths rather than assuming what is considered to be true. According to Strauss and Corbin

> "...theory derived from the data is more likely to resemble the 'reality' than is theory derived by putting together a series of concepts based on experience or solely on speculation" (1998, p. 12.)

Building strong and rigorous theory was the main objective in this research, according to Sutton and Shaw this is theory that "delves into underlying processes so as to understand the systematic reasons for a particular occurrence or non occurrence" (1995, p.378). Building theory through Grounded Theory and ethnography utilises inductive rather than deductive processes. Inductive processes according to LeCompte and Schensul identifies specific and concrete data then structures it into general abstract ideas and explanations of phenomena offering theories on why it occurs (2010). According to Patton, analysis and theory building through the inductive process starts with specific observation and develops towards general patterns themes and categories in the data (2002).

The approach of the researcher in the field therefore could be best seen as phenomenological, focusing on the subjective experiences of participants being studied (Robson, 2002) and accepting "multiple realities" (Fetterman, 1989, p.15).

This subjective reality is where:

> "people act on their individual perceptions, and those actions have real consequences- thus the subjective reality each individual sees is no less real than an objectively defined and measured reality" (Fetterman, 1989, p.15).

Phenomenology falls within the interpretivist paradigm in which LeCompte and Schensul state that the researcher takes on the role of empathic participant and observer "develop[ing] shared understandings and meanings with participants" (LeCompte and Schensul, 2010 p.80).

3.4.3. Pre Fieldwork Assumptions and Bias

Silverman cites that "in many qualitative research studies, there is no specific hypothesis at the outset. Instead hypothesis are produced (or induced) during the early stages of the research" (2005, p.99). As discussed, Grounded Theory utilises this inductive process to build theories throughout the process of fieldwork. Following a divide in methodology by its creators, (Glaser and Strauss) Grounded Theory has since developed differing approaches. Originally Grounded Theoretical methods urge not to construct theory prior to fieldwork to prevent certain predefined notions or biases (now seen as Glaserian approaches) (Glaser and Strauss, 1967). However, Strauss later notes that "....it is not possible to be completely free of bias" (Strauss and Corbin, 1998, p.97).

For this reason, Fetterman suggests that ethnographic researchers must make any bias explicit to alleviate any negative effects it may have on the outcomes (1989). Certain assumption and biases are consequently a natural occurrence for the qualitative researcher. Therefore, the researcher is obliged to document these clearly prior to conducting fieldwork. Such documentation validates strength of the research through process rigour and transparency.

There were two main points that could have lead to assumptions and bias in the research:

- Firstly, it should be noted that there was a generation gap between the researcher and the participants (in many cases an age gap of 50 years). The researcher had certain pre-conceived notions of product requirements older people may need. These somewhat more 'obvious needs' had been considered anecdotally, through reflection, and through past experience of designing products.

- Secondly, literature had been reviewed prior to conducting the fieldwork. This literature, in regard to the demographic of older people, was necessary to be reviewed to reach valid research questions.

Therefore prior to fieldwork a certain picture had been constructed of the Irish older adult and their needs in regard to cooking and heating products. To note these prior to fieldwork, it was assumed that the participants interviewed would show requirement in the areas of:

- Personal health.

- Wellbeing and Safety.

- Independence in the home.

- Ergonomic needs - To adapt to the decline in "ageing and sensory modalities" (Fisk et al., 2004, p.14). These could be loss of smell sight, hearing, cognition and movement.

These documented, it was also believed that their needs would extend beyond these areas with the intent that ethnographic research could tap into their true needs, as diverse as they may be.

3.4.4. Stage 2: Design Practice and Reflection

3.4.4.1. A Practice Based Approach

Design disciplines are traditionally practice based. None more so than Product Design, whereby designers undertake acts of design practice to create, learn, iterate, experiment, and improve artefacts. To complete design ethnography in this research

therefore, practice based elements played a fundamental role in answering research questions. Firstly, in answering question 1, they identified requirements in cooking and heating products. Secondly, and perhaps more importantly, practice greatly informed the answer to question 2; by uncovering the distinctive nature of design ethnography practiced by designers and acquiring methods and process to facilitate its application.

As discussed in Chapter 2, User Centred Designing continually utilises elements of practice when designing for older people. These can be used at early stage designing through methods such as co-designing, or later, for example in ergonomic testing for validation purposes. Practice based output, whether it is sketch concepts or prototypes offers instant visual and visceral understanding of the designer's intent and therefore a more efficient means of attaining valuable user feedback. In this research, practice based approaches were essential in obtaining knowledge in the process of designing for older people.

The practice based element directly followed the understanding and discovery from the ethnographic field work. This in accordance with Rust et al., stating that:

> "...a rigorous practice-based approach will always be informed by an understanding of the whole range of problems experienced by the potential beneficiaries of the research" (2000, p.8)

For this reason, strength in the practice based approach lay heavily on the rigour and strength of the ethnographic fieldwork. It was extremely important then, that the researcher was directly informed by participants from the field prior to designing. Only then would practice play a role in answering research questions.

Design practice in the past has acted as an essential approach to allow PhD design researchers answer questions. Examples include PhDs completed by Pedgley (1999), investigating Industrial Designers attention to processes and materials, which demonstrated this through the design and development of a polymer guitar. O Conchubhair (2004) utilised practice based approaches to test ergonomic principles for orchestral seating through conceptualising and prototyping. Similarly Bowen utilised practice based research to investigate the role of critical design artefacts in innovation (2009).

In academic research, Bowen, paraphrasing Archer (1999) suggests that there are three ways in which research can be achieved through practice, these being:

> "[1.] Research *about* practice – enquiry focussed on practice; [2.] Research *for the purposes of* practice – enquiry to inform or provide material for practice; [3.] Research *through* practice – enquiry achieved via practice" (2009, p.35)

This research used the latter two approaches to practice based research.

3.4.4.2. Research Through Practice

Research through practice was conducted primarily to answer question 1: identifying design requirement. This practice based approach was one that was very familiar to the researcher who had experience as a product designer. Therefore this approach contrasted with the inexperience of ethnographic field methods in the first stage. Prior to research it was difficult to predict the exact practice based methods to be utilised. However research through practice methods could include elements of brainstorming, ideation/conceptualisation, co-designing, and different forms of prototyping.

3.4.4.3. Research for the Purposes of Practice - Reflection

Using Bowen/Archers definition, research for the purposes of practice is "enquiry to inform or provide material for practice" (2009, p.35). This applies primarily to answering question 2: uncovering the distinctive nature of design ethnography practiced by designers and acquiring methods and process to facilitate its application. This was used as an approach to reflect on the act of practice, informing future practicing designers of methods and process of design ethnography.

This approach is aligned with Schön's view of *Reflection-on-action* whereby we think "....back on what was done in order to discover how our knowing-in-action may have contributed to an unexpected outcome" (1987, p.26). To achieve this, the researcher acted as would an industry designer practitioner, e.g. given requirements and instructed to create or develop product offerings from them. This approach was

chosen to reveal once more, (similar to the ethnographic field work) truth in how designers deal with specific situations.

Reflecting-on-action was particularly appropriate in terms of the process of designing. For example, designers traditionally deal with uncertainty as well as certainty as part of the design process. Each design project is different. In any given project the designer not only designs but grapples with making sense of particular situations, processes, and methods. In this, Schön states the following:

> "In real-world practice, problems do not present themselves to practitioners as givens. They must be constructed from the materials of problematic situations that are puzzling, troubling, and uncertain. In order to convert a problematic situation to a problem, a practitioner must do a certain kind of work. He must make sense of an uncertain situation that initially makes no sense" (1983, p.40)

According to Bousbaci, reflection has been an important component of design thinking since the early 1980s, and a major contributor to the means in which it has evolved. Highlighting the role in which reflection plays in the design process he states it "...obtain[s] greater insights and an improved understanding of design phenomenon" (2008, p.39). Noted however were the similarities of this approach to *Action Research*. According to Robson, central to action research is the involvement, improvement, and understanding of a practice (2002). However, there was a difficulty in labelling the present research approach directly as action research. This, similarly to Bowen, who viewed practice based approaches for design practice dissimilar to action research because of "... its application [being] often of a more rigid and formulaic form than is compatible with design practice" (2009, p.38). However, similarly, the research approach *"....shares features* with Action Research and can therefore make similar claims for rigour" (Bowen, 2009, p.38).
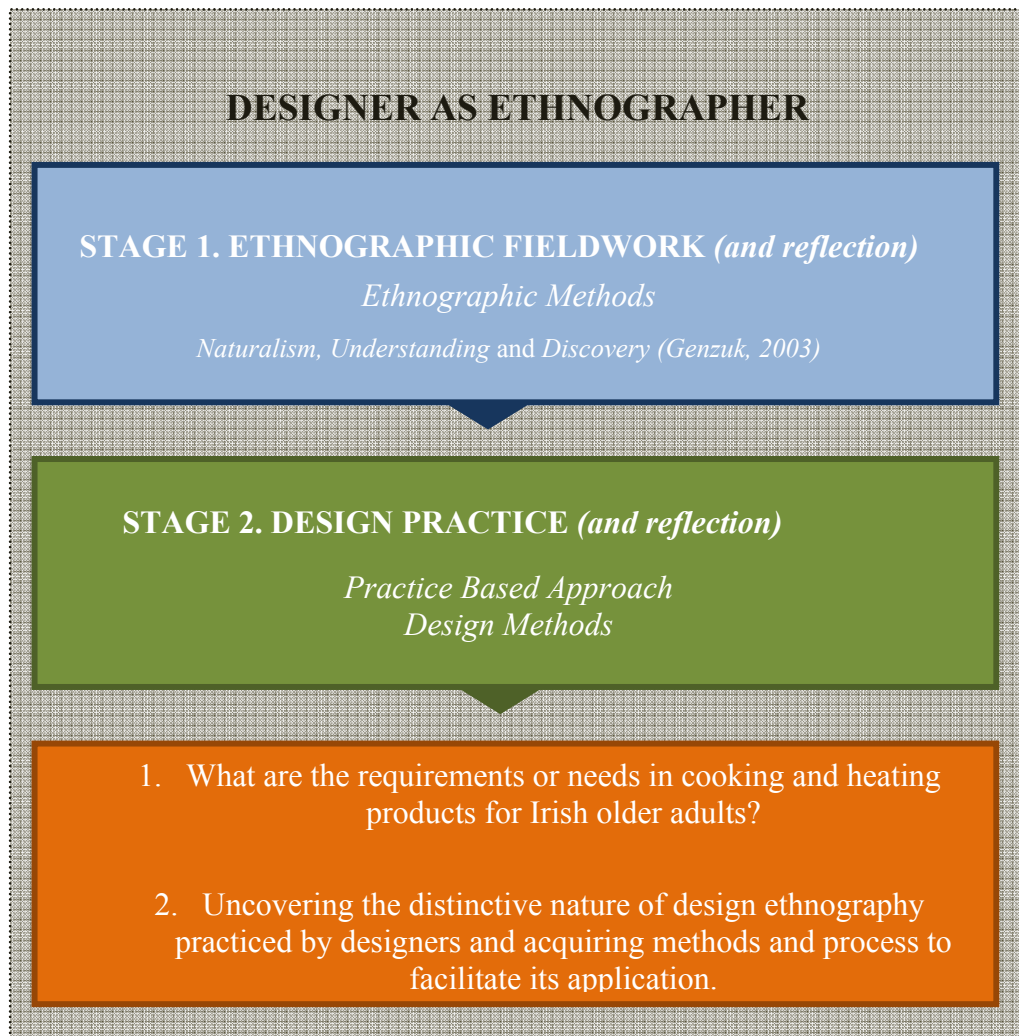
DESIGNER AS ETHNOGRAPHER

STAGE 1. ETHNOGRAPHIC FIELDWORK *(and reflection)*

Ethnographic Methods

Naturalism, Understanding and *Discovery (Genzuk, 2003)*

STAGE 2. DESIGN PRACTICE *(and reflection)*

Practice Based Approach
Design Methods

1. What are the requirements or needs in cooking and heating products for Irish older adults?

2. Uncovering the distinctive nature of design ethnography practiced by designers and acquiring methods and process to facilitate its application.

Figure 3.2: Overview of the research approach in answering research questions

3.5. Limitations of the Study

Whilst the research strived to obtain a rigorous and robust account of the experiences of a designer ethnographer and design requirements, it did however have limitations. Two main limitations were as follows:

- The research was confined to Irish older adults, specifically older adults in the Republic of Ireland as a result of the geographic and time constraints of the study.

- Design practice was confined to early stage design methods crossing the threshold from theory to practice. The research does however facilitate and offers opportunities for further design and development from this early stage.

Chapter Summary

This chapter defines the focus of the research by synthesising the literature reviewed in the two previous chapters; in doing this it reveals the two main research questions. These questions deal with both product design requirement in cooking and heating products and methods in design ethnography. Outlining the stages of the research approach through ethnography and design practice, this chapter constructs the approach and stages of the researcher prior to and during research. Discussed was how naturalism, understanding and discovery informed the field research. Using grounded theory, the researcher inductively produced theories in the field and transferred theses into practice by design methods, while simultaneously offering a reflection on this account.

Section B: Research and Fieldwork

Chapter 4.
Design Ethnographic Fieldwork and Participant Profiles

4.0. Design Ethnographic Fieldwork and Participant Profiles

Chapter Overview

This chapter describes the ethnographic studies conducted and reflects on the role of designer as ethnographer in the field. It firstly describes the ethical considerations prior to conducting fieldwork, and the actions leading to ethical approval. It outlines the strategy for the construction of the participant sample, prior to, and during the fieldwork. It offers a detailed account of the researcher's fieldwork approach including the preparation for, and the techniques used in conducting the research. Furthermore, it details the final sample used and fieldwork data collection methods. Finally, to clearly illustrate the design ethnographic fieldwork, it outlines and describes each participant profile in the study, illustrating the diversity of participants interviewed.

4.1. Ethical Considerations and Approval

To commence any research study, ethical factors must be considered seriously and as a priority to protect participant's privacy, civil, and human rights. Ethical considerations for a design related ethnography are no different. Full disclosure to participants of research methods and how the study would be conducted is of utmost importance. In this disclosure the participant must be made explicitly aware of any possible risks to safety and confidentiality during the study. To ensure this, approval by fully informed consent is of importance prior to the commencement of any such research study. The participant must be fully aware of the study, what it entails, why it is being done, why they were chosen to participate, what is going to happen with the possible risks/ benefits the research will have. To start considering appropriate ethical principles in design ethnographic research for older people, it is useful to draw comparisons in similar fields such as developing technologies for older people. Borges outlines key ethical principles that should be considered, these include

autonomy, consent, beneficence, justice, avoiding harm, and respecting decisions, dignity, integrity and preferences (2008).

The purpose of this field study was to collect naturally occurring data and insights through documenting conversation, and in the observation of human behaviours. The objective during the course of interviewing was to maintain a comfortable and natural environment within which the participant was relaxed. The researcher would conduct an enquiry that was as close to natural circumstances as physically possible. This present study was considered to have a low risk of infringing ethical principles. However, occasionally the study and its methods might encounter sensitive points that could impinge on the confidentiality of the participant. Therefore the researcher was obliged to prepare himself and to explicitly sensitise himself to the privacy and protection of the participant. This arose particularly in data collection and interview enquiry.

4.1.1. Ethics in Data Collection and Storage

Data collection for this study had particular privacy implications due to its setting i.e. conducted within the domestic living environment of the participant. This data was recorded, collected and taken from the field for the purposes of analysis and development. Considering its confidentiality, discretion would lie with the interviewer, and protecting data collected would require careful prior planning. Data collection methods such as voice recordings, photographic data, and note taking, would easily contain sensitive data gathered unintentionally and collateral to the main data of interest.

Audio recordings could hold sensitive personal details such as medical, family, and financial information, particularly in instances where they may have unintentionally been disclosed. Similarly, in the act of collecting visual data, photographs could contain confidential information unnecessary for the use of the research. In the case of displaying or sharing visual data for future analysis, appropriate post interview editing was done. This entailed editing, deleting, cropping or blurring of data to avoid disclosure of confidentially sensitive information. The storage of collected data post fieldwork was also decided prior to fieldwork. All data was to be stored on

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the researcher's personal computer alone with one other hard copy backup file. By editing, anonymity was guaranteed in storage and when sharing data with others. Additionally, all data was used for the purposes of this study alone.

For fully informed consent, and to make participants aware of data collection methods, informal 'information giving' sessions were conducted prior to fieldwork. These sessions described the process of consent by talking through a paper version of the ethical consent form. Following this the participants were shown the equipment used in recording the study i.e. the Dictaphone, digital camera, and field notebook. It was also disclosed how and why these were being used. Where at times electronic equipment was unfamiliar to the participant, its operation was demonstrated.

To prevent harm to informants, Pink suggests: "a collaborative approach to visual research and joint ownership of visual materials" (2001, p.42). Joint ownership by participant and researcher was used as a means of sharing and editing the photographs taken. The preview screen on a digital camera was used for this, as a sample photograph could be taken and displayed for the participant. This was typically repeated as the data was collected. This informed and instilled peace of mind through the course of an interview.

4.1.2. Ethics in Interview Enquiry and Conversation

Prior to interview, the researcher informed the participant why their experiences were of interest to the study. The researcher was conscious that behaviour and tone could cause or relieve stress or anxiety. Central to this was sensitivity in interview enquiry and in how the questioning would be conducted.

Occasionally, private and personal information was disclosed in conversation. Care was taken to treat such information in a manner that was respectful, protecting the privacy and autonomy of the participant, the participant's family, and persons mentioned within conversation. It was also important to be aware of certain routes of conversation enquiry particularly when personal details may cause informants to feel exposed or vulnerable. Body language and noting sharp or gradual changes in mood informed the appropriate directing of questioning. It was important to be continually

aware of the emotional feedback in conversational flow; avoiding inappropriate probing questioning and to be aware of when conversation leads were exhausted.

4.1.3. Ethics and Involving Gatekeepers

Ethical approval was required from the university in this study primarily to protect the participants. Ethical approval however was also an essential tool in building integrity in the researcher/designer, research and participant relationships. Other stakeholders were kept informed of the study at all times. Most commonly these were carers and family members, and their role as 'gatekeeper' was important and influential in building confidence in acquiring informed consent. A gatekeeper is defined by Silverman as " someone who is able to grant or refuse access to the field" (2005, p.378). Involving gatekeepers and making them aware of research activities had many benefits to the study, including the suggestion of specific approaches and the informing of individual participant requirements during course of interview. Additionally, the importance and influence of gatekeepers is highlighted in consent for sensitive cases e.g. where the participant may have, or be at the early stages of dementia (Hellstrom et al., 2007).

Gatekeepers will be discussed further in 4.2.5 Preparation Prior to Field Research.

4.1.4. Ethical Approval Procedure

Ethical approval was granted by the university subsequent to completing a 'Participant Information and Consent Form' (see Appendix A). This form contained:

a. Participant information: This was information pertaining to confidentiality and informed participants of what was going to happen during the interview process. It stated why they are being asked to participate, detailing the benefits of being involved in the study and confirmed that there were no risks involved in taking part.

b. Consent and signed declaration: This outlined the permission received from the university ethics committee. It asked for the participants consent to conduct the

research by signing the declaration. This also contained contact details of the researcher if required.

The consent proposal form was supported by a letter of application for 'Ethical Approval of a Research Project' from research supervisors (see Appendix B). These documents were forwarded to the NUI Maynooth research ethics committee. The research was formally awarded approval with a letter stating this (see Appendix C) received on the 23rd of February 2009.

Prior to engagement with the study, each participant read this form and signed it in the presence of the researcher and or carer. Research would not start until the form was fully understood and any questions answered. A paper copy was given to the participant for viewing post interview if required. Paper copies of the consent form also acted as a 'paper trail' for carers and family members unfamiliar with the study. This informed them of the visit, making them aware of what was researched and how it was conducted.

4.2.   The Participant Sample Strategy

The objective of this design ethnography was to elicit insight from older participants that were "information rich" (Patton, 2002 p.242) and were open to sharing their experiences. To recruit an information rich representation of the older adult population it was firstly important to construct boundaries to define aspects of the sample (Miles and Huberman, 1994). To do this for an ethnographic study Blomberg et al., suggests the researcher should ask two questions. 1. "What types of participants best suit the research objectives?" and 2. "...how many participants should be included in the study to achieve the research objectives?" (2003, p.968)

In answering these questions boundaries or "units of analysis" (LeCompte and Schensul, 2010, p.169) were identified to the group of participants to be included. Selecting participants that would provide a trade-off between 'breadth' and 'depth' to the study is advised (Patton, 2002). From observing similar ethnographic studies such as Sheehan et al., (2008) and Paulson (2008) it was provisionally decided that a number of thirty older adults over the age of 65 years would be interviewed. These participants would be living in Ireland, but not necessarily of Irish nationality. Due

to the nature of the research (insight into heating products, cooking products, and the design ethnographic process) further sample framing was necessary. Dividing the study equally by gender was one such decision, as was distributing the interview sample over a period of time. This was of interest especially in the use of heating products, thereby, observing the differing seasonal utility. To accommodate this it was therefore decided that the research would be conducted within a space of eight to nine months with a preference of January to August/September.

Prior to the fieldwork, two aspects of the sample were undecided 1. Should the sample be from varying socio-economic classes? 2. Should the sample be divided equally over an urban and rural geographical spread? These decisions were made in the field, as interviewing progressed, in order to obtain a balance in the study. It was decided prior to fieldwork however that differing forms of domestic settings would be investigated e.g. houses, (terraced, bungalow etc,) apartments, care home settings, and retirement homes. Deciding on a diverse range of settings to enable the design ethnographer to view comparative and contrasting product usability.

It was decided that developing a 'purposive sample' would generate necessary boundaries and a representative sample for this design ethnography. Silverman describes this method thus: "Purposive sampling demands that we think critically about the parameters of the population we are studying and choose our sample case carefully on this basis" (2005, p.129). However, it was also important that purposive sampling did not limit the study in any way. The framing selection needed to be sufficiently broad as to facilitate the development of emerging theories, allowing for appropriate movement between participants as the study progressed. Therefore it was determined that further construction of the sample would be decided and shaped by developing theories within the field. For this it was planned to construct approximately six interviews purposefully and decide on emerging participants after this. Methods of sample construction were utilised both prior to and during the research. Freedom to move with developing theories within the field was an important aspect of the design ethnography. Rather than being limited to a rigid framed sample, this allowed freedom to explore and enquire as fieldwork progressed.

4.2.1. Constructing the Sample Prior to Starting Fieldwork

Recruitment of potential participants in the first instance involved contact with older adults and gatekeepers across twelve counties. This included the southeast, east coast, southwest, and midlands of Ireland. Participants were initially sought through email, telephone, and written letter correspondence. The first point of contact in recruitment was primarily gatekeepers, as this could to lead to a rich vein of informants. These gatekeepers were found among occupational therapists, (both private and public representatives), managers within care homes, carers, community leaders, and community board members. Formal written letters of consent (Appendix D) were sent to known and unknown gatekeepers. These letters introduced and outlined the scope, intent, and details of the research.

In reaction to feedback from gatekeepers it was decided to design a "concise and easy to read" information/advertisement flyer (Appendix E). This flyer acted as a basic information document to be handed to possible participants by gatekeepers. Its purpose was threefold. It was designed to quickly communicate the intent of the research in an informal way; it also offered the gatekeeper a visual prompt to talk over in detail with the participant. Thirdly, its purpose was for the personal information of the participant, to review at a later stage and to assist in the decision whether to participate. Emails were sent to gatekeepers with the information flyer attached. These were followed up a week afterwards with a telephone call. The greater part of first instance contact was through the medium of email, however, the response rate was considerably higher with a physical posted letter and flyer. Further recruitment prior to the study involved 'word of mouth' which would lead to family or friend referral.

To speak to gatekeepers in person, informal pre organised and cold call visits were conducted in care homes, day care centres, and retirement villages. At times this approach required group information announcements to potential participants. These occurred mostly at group gatherings such as dinner events in a day care centre or an activity day in a retirement village. At these events it was occasionally required to have smaller group briefings of 4-5 older people to provide more information of the research intent, or individual meetings in the presence of a caregiver. This proved helpful in offering prospective participants an informed view of the research and the opportunity to decline or consent to participation. Sample recruitment prior to

research yielded six organisations (care homes and retirement villages) willing to be involved providing ten participants for the study.

4.2.2.   Constructing the Sample During Fieldwork: 'Sub-Gatekeepers'

Further recruitment was conducted and participant consent obtained during the process of field work. Recruitment in the field required assistance from both gatekeepers and participants. Recruitment through gatekeepers involved prior or post interview conversation to identify other possible informants within the community. This process of recruitment worked particularly well with directors of retirement villages, managers of day care centres and village community leaders. Asking gatekeepers to recruit participants regularly lead to a rich vein of informants. However, building informants occasionally had negative outcomes. These participants almost always came with a time constrained window for interview. For example in the case of early in the fieldwork process, gatekeepers could organise three interviews successively per day. This would result in interviews running over time and inevitably cancelling some interviews and losing out on possible information rich informants.

Recruitment through participants typically developed through 'word of mouth'. Through the course of the research it became clear that communities of older people contained another 'level' of gatekeeper other than that of carer family member or manager. This gatekeeper or 'sub-gatekeeper' would assume the role of a spokesperson, representative or organiser and someone held in high regard within a community. Sub-gatekeepers were usually the first participant to be interviewed within the community. Once an interview was successfully completed with a sub-gatekeeper, referral would be put to a number of friends or neighbours. Word would proliferate within the community in regard to the study and consent would be granted in the field or by informing gatekeepers of intent to be interviewed. This process of recruitment was informal and developed organically, and was very beneficial in gradually building a community's trust and confidence. This construction of a sample was a form of chain or snowball sampling and allowed quicker and easier access to participants. Robson notes this as a useful process when attempting to reach "clandestine groups" or in situations where it is "difficult in

identifying members of the population" (2002, p. 226). It also affords the design ethnographer the freedom to move with developing theories and to choose suitable participants to interview as they occur.

4.3.   The Final Sample of Participants

The final sample was spread over urban and rural locations throughout the Republic of Ireland, with participants coming from differing socio-economic backgrounds. Participants from eight counties were interviewed these were: Dublin, Kildare, Waterford, Kilkenny, Tipperary, Carlow, Laois and Wexford. Over the course of the research the final sample was built purposefully by age, gender/ cohabitation status, geographical spread and by season interviewed (illustrated male/female, urban/rural in Figure 4.1). Forty participants were interviewed in total, the final sample of participants consisted of 15 male, 15 female and 5 male/female married and cohabitating couples. Each participant was over the age of 65 years and of varying health status. Both older adult (+65) and older old adult (+85) cohorts were included in the study. These were all of varying independence. The majority of participants in the study were over 70 years of age (see Figure 4.2 for details).
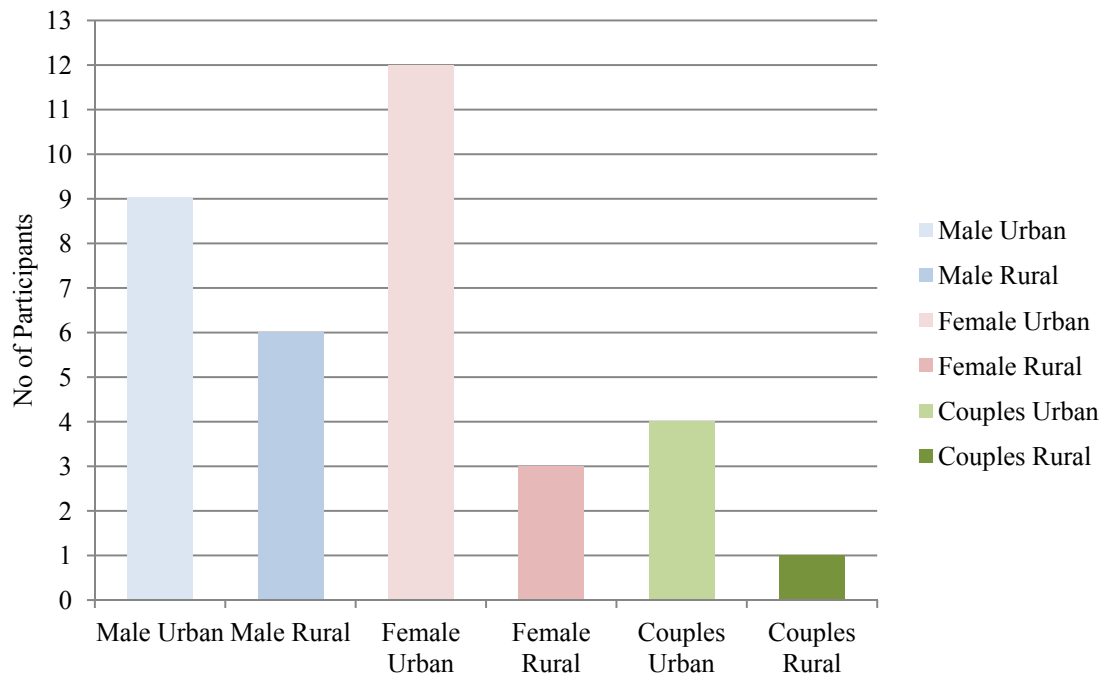
Figure 4.1: No. of participants Male/Female, urban/rural in the final sample.
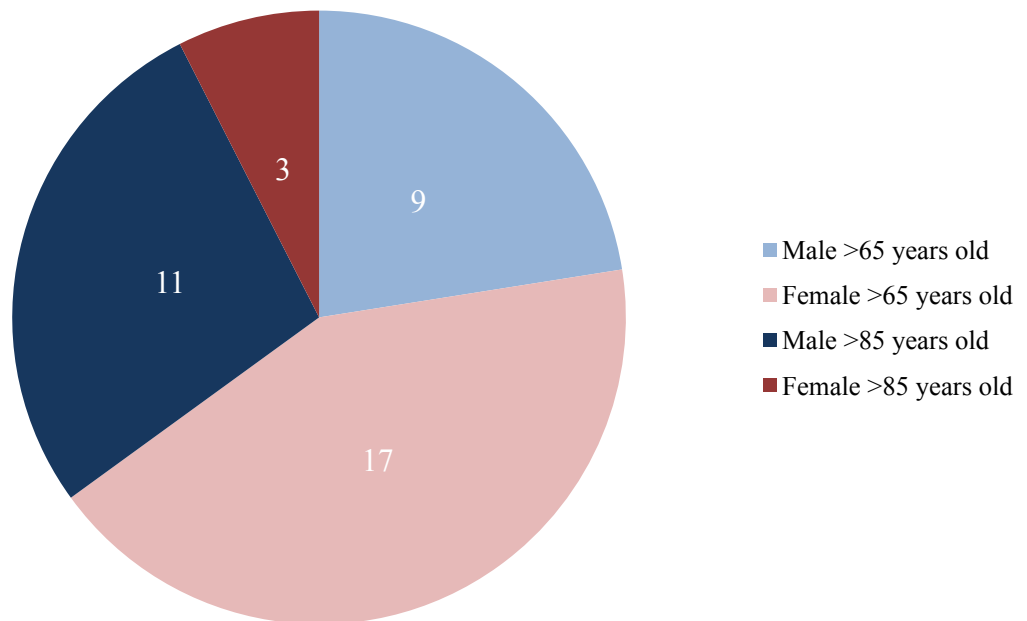
Older Adult participants: >65 years old, Total #26

Older old participants: >85 years old, Total #14

Figure 4.2: Male/ Female age groups in the final sample

4.4.   Field Research

Design ethnographic fieldwork was conducted with all forty participants within the domestic environment. As previously mentioned, to achieve a balanced view of the population, a variety and diversity of participants were included. To achieve diversity, the researcher specifically identified 'extreme' or isolated cases of older people to add depth and breadth to the research. Miles and Huberman refer to these as deviant participants (1994). Recommending to:

> "...be sure to include dissidents, cranks, deviant, marginal's, isolates- people with different points of view from the mainstream, people less committed to tranquillity and equilibrium in the setting" , p. 266.

Several 'deviants' were discovered and interviewed during the study adding to the richness and diversity of the sample. These deviant participants forced the researcher to rethink theories, making the fieldwork experience at times complicated and thought provoking. Deviants are important for design ethnographies as they can challenge certain emerging theories and make the researcher reflect more on the culture and how they use products, particularly early in the research. Identifying deviants for the study typically occurred through conversations with gatekeepers, and when choosing possible participants for the study. Gatekeepers would offer a character description and the researcher would decide if they had deviant characteristics or not in contrast to the participants already interviewed. Identifying deviant characteristics became easier later on in the study as understanding of the population grew.   However some deviants or deviant characteristics were not identified until fieldwork was completed and analysis began.

The process of fieldwork took longer to complete than anticipated prior to fieldwork. This was due to varying factors, mainly because developing theories required further investigation as they emerged from the field. Additionally, there was an underestimation of the degree of delays in participant responses and the protracted period of time it took in constructing a sample. Several issues were unforeseen; seven potential participants changed their mind on the day of interview, forgot the arrangement for interview, or were unavailable at short notice.   Two participants were interviewed outside of the domestic environment due to last minute

insecurities. Two interviews had to be terminated as guests arrived during fieldwork. As a result none of this data was included in the study

Originally 30 participants were targeted across a period of 6-9 months. The final study was conducted over 12 months throughout spring, summer, autumn and winter of 2009, which held advantages. Principally it allowed for the recruitment of a broader sample of participants and greater time for recruitment following emerging theories through field work. From a design and product observation point of view, an extended period allowed the researcher to view contrasting seasonality, and the contrast of use of products within these seasons. Following approximately 32 interviews the research reached what Glaser and Strauss describe as "theoretical saturation" (1967, p.61, 2008, p.263). Theoretical saturation is when the researcher "...sees similar instances over and over again...[and] becomes empirically confident that a category is saturated" (Glaser and Strauss, 1967 p.61).

Each interview lasted approx between 1-4 hours with the objective at each interview to remain in the field as long as possible. In many cases this required reading the participant's body language, tone and direction of the interview throughout to judge an appropriate duration to continue. For example, noting when participants were getting tired, and respectfully deciding when the study should be terminated.

4.4.1. Preparation Prior to Field Research

Following the ethical approval and the construction of pre- fieldwork participant sample, interviewing commenced. After participant consent was given it was important to maintain momentum and interview informants as soon as possible. This involved being prepared to act promptly on participant leads at short notice, both going to the field to conduct the research, or informing them of a specific date that the fieldwork could be conducted. This was necessary as it was noted early in the research that possible leads to informants would be quickly lost if the period between contact was protracted. When discussing times and dates for field visits, flexibility from the researcher was demonstrated, allowing participants to provide an opportunity to confirm a suitable schedule. Otherwise a time and date was arranged through a gatekeeper and relayed back to the researcher. Moving closer to the arranged date of fieldwork, typically a day in advance, a courtesy telephone call was

made to the participant or gatekeeper. This served several purposes mainly acting as reminder of the study through confirming time, location, and directions to the site. This call also gave the opportunity to reaffirm what research was to be conducted on the day and answer any additional questions they had prior to the study.

On the day of field work, and arrival on site, the first important step was to instil a sense of informality and familiarity with the participant from the start. One technique to instil informality was to be introduced through a known gatekeeper of the participant. This meant the researcher and participant were introduced through informal dialogue, confirming the informality of the study. For the design ethnographer, maintaining the purpose of the study in this informal dialogue is necessary. An example of informal dialogue from a gatekeeper relating to this would be: "....he's [the researcher is] here to have a look at your cooker and heating system and to have a chat with you about it..." This informal approach acted as a conversation starter reinforcing trust in the researcher both from the perspective of the participant and the gatekeeper. The act of walking into a participant's home with a known gatekeeper in informal conversation ensured a smooth transition into the study.

Speaking to gatekeepers prior to a study was essential in order to obtain information about any particular requirements or impairments on the part of the subject during the process. These could be physical impairments such as hearing and vision impairments. Awareness and accommodating for these was essential for a successful interview. When a gatekeeper was not present for introductions it was useful to offer what Hellstrom et al., describes as "icebreakers" (2007, p.616) to introduce informality. These icebreakers were in the form of generic gifts to offer the participant on arrival.

4.5.   Data Collection Methods

As discussed in Chapter 3, the overarching approach of the design ethnographic fieldwork was to achieve Naturalism, Discovery, and Understanding. To fit the purposes of design related ethnography the following ethnographic data collection methods were used in the field: Informal conversational interviews, Participant and

Artefact Observation, and Participatory Techniques. These three methods were interspersed together in the field, combined in what Blomberg et al., describes as "Contextual Interviewing" (1993, p.135). (Figure 4.5 later in the discussion plots the field data collection methods in relation to academic ethnography)

Using these methods the researcher adopted the stance of "participant as observer" (Robson, 2002, p.317) where the role of the researcher as an observer was known to the participant from the start, and where observation was secondary to participation (Creswell, 2003, Robson, 2002). Additionally, the stance of the researcher was one of empathetic observer and interviewer, with an awareness throughout not to be over empathetic. Patton posits the role of field research to be that of "empathetic neutrality" (2002, p.50). Described as being the half way point between being overly involved and too distant from the participant. Therefore the researcher positioned himself towards an empathetic approach.

Rather than as structured protocol to fieldwork, the three data collection methods were introduced when appropriate and necessary. However, as fieldwork progressed, a better understanding of appropriate methods emerged, together with how best to use these for design purposes. Consequently a better knowledge emerged of what was of direct interest to the study. Therefore, as fieldwork progressed, the researcher introduced a broad structure in using data collection methods to make the best of time in the field. This aligns with Anderson who recommends that design ethnographers bound "horizons of interest quite tightly and to try to manage events only within that bound" (1994, p.171).

4.5.1. Informal Conversational Interviews

> "[Ethnography]... is interactive and it must include conversations with actors or in the situation. [It involves] unique relationships with key individuals in the study site" (LeCompte and Schensul, 2010, p.39).

The interviews were informal and conversational in nature. Agar states that informality relies on semi-structured questioning suggesting that researchers:

" [do not have] a list of written questions. Rather have a repertoire of question - asking strategies from which you draw as the moment seems appropriate.... not taking on the formal role of interrogator" (1980, p.90).

To avoid an interrogatory approach to interviewing, it was firstly important to ease the participant into relaxed discussion. This allowed for a more comfortable discussion, and for understanding to develop through deep and personal viewpoints. Interview questioning was mainly achieved by semi-structured open ended enquiry, extracting information from participants whilst not interfering with natural flow of insight. This method allowed for both naturally flowing conversation, and narrative to develop, and using subtle probing dialogue if required. Introducing an informal, semi- structured and conversational format from an early stage helped build confidence and rapport through the duration of the interview. Questioning probes were subtlety used to draw out and direct the flow of discussion. Questioning probes are important to the design ethnographer to direct discussion to specific design related enquiry e.g. product usability or interaction.

4.5.2. Semi Structured Questioning Onsite

'Information-giving sessions' were conducted before interview commenced. This involved explaining the process of design ethnographic fieldwork, reviewing and signing the consent form, and showing the participant equipment used in documenting the study. Interviews would typically be conducted in the participant's living room, sitting room, or kitchen, with movement between all rooms in the home when appropriate. The interview would commence with broad informal conversation, this would offset any possible formality created by signing the consent form. This initial conversation could be in relation a topical news story to increase confidence and informality, and this would be continued until exhausted. Following this, conversation would be steered more directly depending on conversation flow, maintaining informality whilst interspersing direct questioning when required. More direct questioning would be firstly used to help build a profile of the participant and gain a deep sense of personal and a cultural background. Direct questioning would further be used when enquiring into product usability. Spradley divides ethnographic questioning into descriptive, structural, and contrast questioning (1979). These were

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used freely at various points when interviewing. In addition to these techniques, storytelling or discourse through "oral histories" (Plowman, 2003, p.33) was encouraged. These forms of questioning complement design ethnography as they can be used for general or specific product and human enquiry.

Throughout questioning, these techniques were used in a casual sense, used when and if required, rather than strictly adhered to in interview. In interview the researcher adopting the role of listener rather than talker, ensuring conversation flow without interruption. Continually listening and understanding the participant's point of view, and reading the body language of the participant to interpret the flow of conversation.

- **Descriptive Questions**

Descriptive questions were the most commonly used in interview, and the most straightforward to use in conversation. They allowed expressive conversation to describe and explain events in the participants own language. These could be for example "Could you explain" or "Can you describe …" questions (Spradley, 1979). This questioning is useful in design ethnography when understanding and in discovering general lifestyle activities and how products interacted with this lifestyle. An example of this could be- "Can you describe a typical day in the life" and "Can you describe a typical week, day by day?"

- **Structural Questions**

Structural questions were more specific, allowing discovery to certain areas of direct enquiry. For example "What are…" questions, for instance "Can you tell me any other variations of meals you may have had during the week". This structural questioning was effective at quickly building both broad and specific profiles of participants. For example, where the participant was originally from and how long they lived in their current home. This proved additionally appropriate when enquiring into social back ground, family, friends, and careers.

- **Contrast Questions**

Contrast questioning was used less frequently, primarily as enquiry questioning. Instances of these would assist the researcher in understanding differences in

language meaning within the older population. Specifically to determine meaning of certain regional terms for example-"What do you feel is the difference between supper and dinner?"

- **Storytelling and "Oral Histories" (Plowman, 2003, p.33)**

Further informality was added to interviewing by encouraging stories, storytelling and "oral histories" (Plowman, 2003, p.33) within interview content. This allowed the participants to express individual and cultural and product experiences, nostalgic or otherwise, in a relaxed personal and narrative fashion. This format was used successfully in an ethnographic study conducted by Sheehan et al., on Irish older adults and their experiences of falls in the domestic environment (2008). This particular study used both broad and narrow story directions to elicit information. Using storytelling allowed older people to describe the broad cultural aspects of growing older in Ireland, coupled with specific stories of perceived challenges and coping strategies with falls in their homes.

4.5.3. Participant and Artefact Observation

According to Wolcott participant observation is at the core and at the heart of all qualitative enquiry (2009). Described by Agar as learning views of reality by observing and talking to people whilst being involved directly in the community (1980). Observation forms an extremely important function in design ethnography. In this study, observation was used to visually collect data relating to the material world of people - domestic environments, artefacts, and humans. Participant and artefact observation constructed a holistic and true visual repertoire of the older adult culture, their surroundings, and artefacts.

This study was designed to obtain data that was a true representation of the population and their design requirements. This was achieved by observing interaction and maintaining a naturalistic environment. The proximity or distance to the participant is an important consideration in participant observation. Fetterman states:

"Participant observation combines participation in the lives of the people under study with maintenance of a professional distance that allows adequate observation and recording of data" (1989, p.45).

An awareness of this distance is important in design ethnography particularly with the approach of both interviewing and observation at the same time. With this Blomberg et al., warns that observation can interrupt the flow of interviewing and influence the stream of activity (1993).

4.5.4. What to Observe

To obtain rich and descriptive data in observation, Spradley cites nine dimensions to be considered: Space, Actors, Activities, Objects, Acts, Events, Time, Goals and Feelings (1980). These dimensions according to Robson, describe the setting, the people and the events that are taking place (2002, p.320). Descriptions of these dimensions are as follows:

Space	Layout of the physical setting; rooms, outdoor spaces, etc
Actors	Names and relevant details of the people involved
Activities	The various activities of the actors
Objects	Physical elements, artefacts
Acts	Specific individual actions
Events	Particular occasions e.g. meetings
Time	The sequence of events
Goals	What actors are attempting to accomplish
Feelings	Emotions in particular contexts

(Robson, 2002, p.320) adapted from (Spradley, 1980)

Observing all nine of these dimensions are important to design ethnographies specifically Actors, Objects and their acts between. In this research observation of *objects* was important in understanding the arrangement and schematic together with

the real and "perceived affordances" (Norman, 1988b, Norman, 2004a) of cooking and heating products. In product observation or "artefact analysis" (Blomberg et al., 2003, p.972) "cultural inventories" (Collier and Collier, 1986, p.45) were collected and constructed by the use of photography. Examples of cultural inventories were: the style of the environment, aesthetic of the décor, activities of the household, the character of order of the household, and signs of hospitality and relaxation (especially in and around products) (Collier and Collier, 1986). Collecting these cultural inventories are very much of interest in design ethnography as they help visually construct rich observational snapshots of cultural and artefact activity (Figure 4.3).

Figure 4.3: Examples of visual cultural inventories collected from the field

Observation extended to the *activities* older people had in usability and interactions with the *objects* within their *space*. Of particular interest was observation and understanding of *acts* within cooking and heating products and the *goals* participants were attempting to achieve. Understanding what their *feelings* were towards these *objects*, and being aware of participants feelings across different events both during fieldwork and when mentioned in conversation. Through the course of the study the researcher continually constructed patterns and themes as the fieldwork progressed. Wolcott recommends that ethnographers should include and be aware of patterns both of what is happening and what is not happening (1995). Therefore, these patterns and themes were both holistic (observing what was indirectly occurring) and

detailed in nature.

As in interviewing, developing descriptive scenes through observation required an awareness of Spradley's 'structured' nine dimensions. However, ultimately, observation was conducted unstructured, freely, and openly. This was coupled with a more structured predefined means of observation when using participatory techniques (discussed in 4.5.3). Observational data was collected and collated by photography, and, with a hand written note book to a lesser degree. In anthropology Collier and Collier promotes the use of a camera in the ethnographic process to record patterns, relationships, and specific evidence relating to the goals of the research (1986). Using digital photography for this design ethnography was a means of quickly capturing and collecting the most 'information rich' product and human observations. Additionally digital images acted as a useful means of analysing visual data away from the field and sharing data with the participant (as outlined in ethical approval). Design ethnographies are very much visually dependant and it is for this reason that a digital camera is an essential tool. Designers require deep knowledge of physical product interaction and human behaviours in products. It is this deeper understanding of product interaction that makes it distinct from pure ethnography. Pink states that:

> "There are no fixed criteria that determine which photographs are ethnographic... [As the] meaning of photographs are arbitrary and subjective; they depend on who is looking" (2001 p.51).

When not upsetting the flow of conversation, photography was freely used during observation. To maintain this flow, photographs were taken during conversation following advice from experienced ethnographer and Anthropologist Dr. Adam Drazin early in the research. Taking photographs in the flow of conversation lessened the distraction of the camera during documentation. Using a digital camera affords the design ethnographer many advantages, mainly by providing the ability for stock to be editing both in and away from the field. A quantity of images can be quickly taken, stored, shared, viewed, and edited at a later date while not interrupting the flow of interview.

In using methods of observation in a design ethnography it must be noted the obtrusiveness of this. Whilst the researcher is trying to observe what is naturally

occurring, temptation can occur in "surreptitious observations" (Wolcott, 1995 p.152) or observation by stealth. Curiosity can lead a researcher to come in contact with data of confidential nature. In using observation, it was important to continually reinforce and reiterate ethical consideration. An example of this was used in an ethnographic observation study of older people and beauty therapy; here Paulson used what she cites as "Open ethnography" (2008, p.258). In open ethnography the researcher reaffirms that "the research subjects were continually aware of the purpose of the study for which they were being observed and gave their verbal consent" (2008, p.258). This required the researcher to be conscious of when the participant did not want to be photographed, this occurred at many occasions. Most notably with 'gestures of pride' e.g. in cases where a participant did not want a photograph taken of an area in which he/she considered unclean.

4.5.5. Participation and Participatory Techniques

A design ethnographic enquiry relies heavily on understanding artefact and human relationships, and it is essential to experience this relationship firsthand. This was achieved through active participation and the use of participatory techniques. Participatory techniques were used to gather data by using products in context during interview. Participation was used to observe product interaction within the true context of use, to gain insight and empathy into usability acts. Furthermore, participation was used to offer rich description to physical acts that could not be communicated by any other means. Participation and participatory techniques allowed for the construction of thicker descriptions of occurrences, ones that could not be achieved without physically participating with or interacting with objects.

Participatory techniques were used to observe artefacts and activities and acts between these (Figure. 4.4), and also to document theories in relation to how participants perceive products and the researcher's perception as an observer. Patterns and behaviours of actual use were documented, from these, theories were formulated. For participatory techniques in ethnography and design, Sperschneider and Bagger utilise three methods. These are: "Acting out", "researcher acting as apprentice" and "shadowing" (2003) (Shadowing also used byWasson, 2000). These procedures were actively used during fieldwork. The researcher only allowed

participation techniques to occur if and when appropriate with the smooth flow of the interview.

- **Acting out**

  'Acting Out' involved the use of scenarios, allowing the participant to demonstrate the 'normal procedures' in use of products. Allowing the participant to act out or re-enact normal routines or scenarios within the natural setting while being observed and recorded. Examples of this included thermostat operation and exploring barriers which a user found when experiencing difficulty or failure to use a product. The participant was firstly allowed to give personal verbal understanding of what was occurring followed by operating the product or 'talking aloud' so as to describe how it was operated.

- **The Researcher Acting as Apprentice**

  This method involved the participant adopting a role of 'teacher' and the researcher of 'apprentice' to the participant. The researcher stepped into the role of the participant (or user) and delved into 'the insiders' perspective. It involved the researcher 'doing it himself' this method was coupled with 'speaking out loud' the operation steps or thoughts involved in operation. During this method the researcher also introduced co design or participatory design sessions by questioning and collaborating with the participant into how artefacts could be hypothetically redesigned.

- **Shadowing**

  Shadowing was used in the fieldwork freely throughout, allowing the researcher to walk with the participant and broadly observe their daily routine.

Methods adapted from: (Sperschneider and Bagger, 2003)

When using participatory techniques in design ethnography it is important to be cognisant of two negative points of use. Firstly these can easily interrupt natural flow of conversation and interview. In some instances interactions were discussed by questioning alone to avoid interrupting flow. For instance, if describing the use of a

product occurred within conversation, the researcher would question hypothetically "how they might use these products" or "how they might approach a situation". Spradley refers to these as "Mini tour questions" (1979 p. 66). Promoting the use of these, he states they place the participant hypothetically at the scene of interaction and offer detailed descriptions expressed in participants own language (Spradley, 1979). Detailed descriptions through mini tour questioning are advantageous as they can depict scenarios through natural narrative.

The second negative application of using participatory techniques was in 'skewing naturalism' of a given situation. Both the physical presence of a researcher and implementing participatory techniques in design ethnography reduces the reality of a given situation. However, the purposes of participatory techniques are there to offer as clear as possible a picture of interaction; therefore a trade off between naturalism and participation has to be obtained for this. The ability of the design ethnographer was required to maintain or re-enact as natural a situation as possible, and to avoid situations that were 'staged' or forced.

Figure 4.4: Fieldwork images of participatory techniques involving cooking and heating in the domestic environment
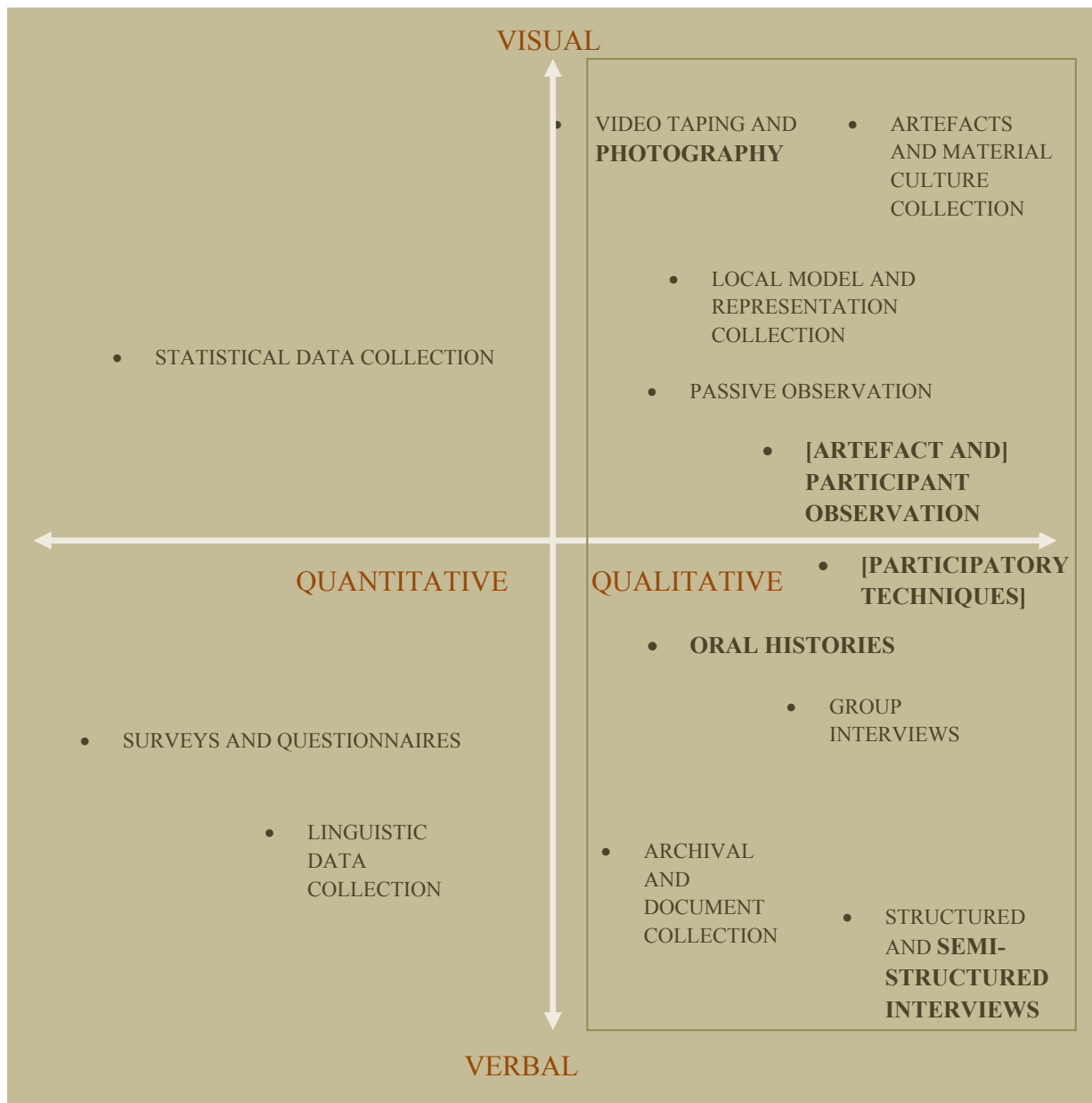
Figure 4.5: Plotting field data collection methods in relation to Plowman's "Research tools for conducting academic ethnography" (2003, p.33). Author adaptations in [ ]s.

This research fieldwork remained within the qualitative quadrants of this diagram, spanning both visual and verbal techniques. Specifically using the tools of Participant Observation, Photography, Oral histories, Semi structured Interviews, and Participatory Techniques.

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4.6.   Participant Profiles

The following outlines each participant profile as interviewed in chronological order. It narrates each profile and offers individual human insight, in addition to detailing the place, time, and conditions of each interview. It demonstrates the journey of the fieldwork sampling process mapping the diversity of participants. Note: Personal details have been altered to protect identities.

Participant #1, Female, Aged: 76

Location: Urban, Waterford City Centre, Date: 10th of February, Time: 14:00, Weather: Mild 10 °C.

Anne lives independently in a mid terraced two-storey town house in the centre of Waterford City and has lived there all her life. Her mother and father passed away when she was in her thirties and her only brother died when he was 16 years of age. She has been living independently for over 40 years and has never married.

Participant # 2, Male, Aged 89

Location: Rural village, Co Kilkenny, Date: 20th of March, Time: 12:00, Weather: Cloudy 11 °C

John lives independently in a bungalow within a retirement home in a rural village north of Waterford city. He is a native of Scotland living in Ireland since 1994. Separated from his wife for 20 years and with no immediate family living near him, he keeps socially active by involving himself in his pastimes and being actively involved in his village.

Participant # 3, Female, Aged 87

Location: Rural village, Co Kilkenny, Date: 20th of March, Time: 15:00, Weather: 11 °C cloudy

Mary lives independently in a one bed bungalow within a retirement village in the rural village north of Waterford city. She has lived there since her husband died in 1994. She has one son and grandchildren that live abroad and sees once a year. She

has a carer who visits her twice a week. Previously she lived on, and operated a farm two kilometres away from where she lives now. Before meeting Mary I was told that she "was a glass half empty kind of person" and "can be quite pessimistic at times".

Participant # 4, Male, Age: 90

Location: Rural, Co Kilkenny, Date: 21th of March, Time: 10:00, Weather: 10 °C, Mild Dry

Jim is a bachelor farmer who lives independently on his family farm 3 kilometres outside a rural village on Co Kilkenny. He has lived there all his life and loves nothing more than being a farmer which he still works at, but "not as much as he would like to". Recently his Nephew has renovated a house on his land and Jim resides in a small flat at the back of this. The house in which Jim grew up in lies adjacent in disrepair.

Participant # 5, Male, Age: 88

Location: Rural Village, Co Kilkenny, Date: 21th of March, Time: 15:00, Weather: 10 ° C, Mild Dry

Seamus lives independently on a large detached house in a rural village 8 kilometres north of Waterford City. His wife died in 1999 and he has lived alone ever since. He was married in 1947 and has 5 children. Although living in the village 63 years and still jokes of being a "blow in". He is a retired successful businessman and has sixty years involvement in local charities. Seamus likes "doing his bit for the elderly" in his spare time.

Participant # 6 and 7, Couple, Male and Female Age: 76 and 77

Location: Urban, Waterford City Centre, Date: 9th of April, Time: 11:30, Weather: 9 ° C rain

Simon and Katie are partners and live in an apartment block in a care for the aged facility. The facility consists of old and a newer block of apartments, Katie and Simon live in the older block. Katie has lived in her one bed apartment for 12 years. Her husband died 5 years ago. Simon's wife died 7 years ago. They are both content and happy to be living there and feel safe and secure in their surroundings.

Participant #8, Female, Age: 89

Location: Urban, Waterford City Centre, Date: 9th of April, Time: 15:30, Weather: 9 °C rain

Margaret lives independently in a small 1 bed apartment in a care for the aged facility in Waterford City. She lives in the newer block of apartments which were built ten years ago. Margaret is originally from England and has been living outside Waterford City for 13 years before moving into her current apartment 7 years ago with her husband. Since his death, shortly after moving in, she has been finding it difficult to cope with everyday life.

Participant # 9, Female, Age: 73

Location: Urban, Co Tipperary, Date: 16th of June, Time: 13:30, Weather: Dry Warm 19 °C

Grace lives independently in her small one bed room apartment in an urban setting in Tipperary. She lives in a social housing development containing 12 apartments run by the Respond group; she is living here 3 years now. Her Husband died 12 years ago and has a sister in London who she visits when she saves money. She has a son daughter and one grandchild. She enjoys the community spirit of her surroundings, her apartment is small but "has everything she needs".

Participant # 10, Male, Age: 72

Location: Urban, Co Tipperary, Date: 16th of June 2009, Time: 16:30, Weather: 19 °C warm sunny

John lives independently on his large one bed room apartment in an urban setting in Tipperary. This housing development contains 12 apartments and is managed by support workers who look after the inhabitants needs. John was married but is separated with one daughter. He has worked abroad for most of his working life. He returned back to Ireland to retire in 2000 but found this a difficult experience socially.

Participant #11, Male, Age: 75

Location: Urban, Co Tipperary, Date: 17th of June 2009, Time: 10:00, Weather: 12 °C rain

Patrick lives independently on his medium sized one bedroom apartment in an urban setting in Tipperary. He has lived here for four years since he came back from England where he lived for over 40 years. He worked at many jobs while in England including being a carpenter and a chef. In looking around his apartment, his experience of being a carpenter is very evident as nearly every item is hand made by himself in his conservatory. Patrick has gained a new lease of life from doing a course about computers and the internet.

Participant # 12, Male, Age: 75

Location: Urban, Waterford City, Date: 22th of June, Time: 10:30, Weather: 18 °C Sunny

Larry lives independently in his small one bed room apartment at an enclosed social housing complex just outside Waterford City. This contains a mix of apartments and houses with a Dining hall, mainly for elderly persons. Larry has been living here for three months having had to move house due to a bad flooding. His wife died 17 years ago, and he has five children, three boys and two girls. He is a reformed alcoholic, nevertheless he likes to go to the pub to play cards with his friends. Larry works as a volunteer visiting elderly person's homes each day for a chat.

Participant # 13, Female, Age: 75

Location: Urban, Co Tipperary, Date: 23th of June, Time: 11:00, Weather: 19 °C, sunny.

Sheila lives independently in her large one bed apartment in an urban setting in Tipperary. She has one sister who lives 80 kilometres away whom she visits often. She is living in her apartment 3 years however it only now beginning to feel like home as she was diagnosed with a tumour on her kidney just after moving in. She is in the process of making the apartment "home" by personalising her space.

Participant # 14, Female, Age: 69

Location: Urban, Co Tipperary, Date: 22nd of June, Time: 14:30, Weather: 19°C sunny.

Patricia lives independently in her large one bed apartment in an urban setting in Tipperary. She lives next door to Sheila and is living here 4 years. She has two sons who are both married and live locally. They visit her every week and help her with everyday tasks. She underwent major surgery early in the year and now suffers with very poor mobility. She has a carer who visits her every morning to help her with everyday domestic tasks

Participant # 15, Male, Age: 79

Location: Rural, Co. Carlow, Date: 25th of June, Time: 10:00, Weather: Bright, humid 20° C

Brendan lives independently in a small one bed apartment in a social housing development in Co Carlow. The development contains a mix of apartments and houses mainly for elderly persons. Brendan lived in England for 40 years returning home in 1994. He has been married twice and separated from his second marriage one year ago, since then he has moved out of the family home and into his current apartment in which he has being living for three months. Gaunt and underweight in appearance, his apartment is bare and empty with only the essentials to keep him company

Participant # 16, Female, Age: 73

Location: Rural, Co Laois, Date: 25th of June, Time: 15:00, Weather: Bright, humid 20° C

Brigid lives independently in a large one bed house at a social housing estate in Co Laois. She has been living here two years. She grew up on a farm in Co Kilkenny which she took over with her brother when she was 18 and her mother died. She never married but has "...a lot of nieces and nephews that spoil her...". She has retired from fulltime employment but works in a charity shop three days a week and in a Bingo hall at the weekends which she says "gets her out of the house".

Participant # 17, Male, Age: 75

Location: Urban, Co. Kildare, Date: 26th of June, Time: 11:00, Weather: 15° C mild

Peter lives independently a medium sized one bed house in a social housing development. He has been living here two years, since separating from his wife, a process in which he feels "the shirt was taken of his back". Nevertheless, he feels he was fortunate to find his new home. He was a business man all his life, and a member and founder of charity organisations. Peter is large, tall, and strong in appearance, he has a keen interest in sports especially rugby and golf.

Participant #18 and 19, Male and Female, Age: 77 and 75

Location: Urban, Co. Kildare, Date: 26th of June, Time: 13:00, Weather: 15° C mild

Richard and Maura live in a medium sized one bed house in Co Kildare. They are both from Dublin originally and have been married 46 years. They have five children; they also have 15 grandchildren and one great grandchild. They have been living in Kildare for two years, and they like being close to town and a walk away from amenities. Both Richard and Maura suffer with arthritis which frustrates them both as the both feel quite young. Richard suffers with mild dementia and can be forgetful. He enjoys going for walks on his own during the day, however, Maura and their children worry about him doing this.

Participant # 20, Female, Age: 78

Location: Urban, Co Kildare, Date: 27th of June, Time: 13:00, Weather: 15°C Mild

Marie lives independently in a medium sized one bed house in a social housing development in Co. Kildare. She has been living here three years and lived with her son before moving in. She has nine children and her husband died 16 years ago. She has someone visiting her every day and states that she is her "own master here" in terms of independence. She recently underwent a serious heart operation for which she now is on a heavy dose of medication. After her operation she has been stiff on her feet and has developed a fear of falling.

Participants # 21 and 22, Age: 74 and 75

Location: Urban, Co. Kildare, Date: 2nd of July, Time: 11:00, Weather: 12° C rain.

Marty and Rose live in a medium sized one bed house at a social housing development in Co Kildare. They have been living here for five years now. Marty is originally from Wicklow and Rose from Tipperary and they lived in England for "a good few years". Their house is spotless and a lot of effort is given to the appearance and decoration of the interior. They enjoy the security and safety of their environment.

Participant # 23, Male, Age: 88

Location: Urban, Co. Kildare, Date: 2nd of July, Time: 15:00, Weather: Raining 12° C

Frank lives independently in his medium sized one bed house at a social housing development in Co Kildare. He is originally from England and has been living in Ireland for 28 years now, five of which in his current house. His wife, whom he "misses terribly", died of cancer six years ago they never had any children. Frank feels life gets lonely and monotonous at times but has some friends that visit him. He broke his hip 17 months ago, but walks regularly now and gets out of the house nearly every day for a walk around the shops.

Participant # 24, Male, Age: 86

Location: Urban, Co Laois, Date: 5th of July, Time: 13:00, Weather: Rain 12° C

Stephen lives independently in his medium sized one bed house in a social housing development in Co Laois. He is living here for two years and decided to move here "to live and see out the rest of my days". He has two sons and one grandchild, all living abroad. He visits them whenever he can, but claims that he is "not good at travelling now a days" Stephen was a private in the army and fought in World War II. He likes to go out and have a drink in the local pub, but says he is getting less motivated these days, so he drinks most evenings on his own in his house.

Participant # 25, Female. Age: 75

Location: Urban, Dublin 4, Date: 6th of July, Time: 15:00, Weather: Mild 15°C

Carmel lives independently in her large two bed apartment in affluent Dublin 4; she has lived here for the last 30 years. She moved at the time, as her mother had mobility issues, and is glad she did as she now too has mobility issues. She retired from work due to issues stemming from a car accident nine years ago. Additionally, two recent falls in her bathroom have confined her to her apartment and she now feels she is losing mobility bit by bit every year. She is delighted that she can afford home care and has a carer that calls for an hour every day. Religion is a strong part of her life.

Participant # 26, Male, Age: 92

Location: Urban, Waterford City Centre, Date: 7th of July, Time: 14:30, Weather: Sunny 17° C

Joe lives with his wife Francis in a terraced town house in the centre of Waterford City. He has lived here 70 years and this is where he brought up his five sons. Joe is now confined to the bottom floor of his three storey house. He spends most of his time in his bedroom since a hip operation. He has a carer who visits him two days a week during the day. His wife suffers with Alzheimer's and attends day care five days during the week. Joe is very religious, he loves music, woodwork, and art, his house is full of his work.

Participants # 27 and 28, Couple, Age: 74 and 83

Location: Rural, West Co. Waterford, Date: 8th of July, Time: 12:00, Weather: Mild 15° C

Elizabeth and Alf live in a medium sized one bed house in a retirement village in West Waterford. The village contains a mix of apartments and houses with a communal hall. They are originally from America and they have been living in Ireland for 18 months. Their sons live nearby in Cork. Elizabeth receives daily radiotherapy treatment for cancer for which she travels 50 km by bus. Alf suffers with a heart condition and therefore doesn't get out much.

Participant # 29, Female, Age: 95

Location: Urban, Wexford Town, Date: 15th of July, Time: 12:00, Weather: heavy rain, 13° C

Eileen lives independently in her medium sized one bed house in a social housing development in Wexford town. She is originally from a farming background and has been living in her current home for 15 years. She had seven children and her daughter comes up every week to do her shopping and helps her with her housework. Growing up she had eight siblings. Her mother died when she was six years old leaving her with six young children to look after. Although in her mid nineties, she is very proud to be independent and happy to have her "full memory".

Participant # 30, Female, Age: 73

Location: Urban, Wexford Town, Date: 15th of July, Time: 16:00, Weather: light rain, 13° C

Joan lives independently in a medium sized one bed house in a social housing development in Wexford town. She is divorced from her husband 5 years and she mentions that she doesn't think she will ever get over her broken marriage. She has four sons and grandchildren living nearby that visit regularly. She is living in her current residence for four years, having had to move from a two storey house due to arthritis and difficulty with climbing stairs. She found the urban environment difficult to adjust to at first but has settled in now. She admits to getting lonely living on her own.

Participant # 31, Male, Age: 86

Location: Urban, Co Kildare, Date: 27th of October, Time: 16:00 Weather: 2° C dry

Christy lives independently in a medium sized one bed house in Co. Kildare. He is originally from Co. Clare. He is a retired horse trainer, living in Kildare 60 years. He is living in his current home seven years and loves the serenity and spaciousness of his environment. He also enjoys going down into town for "a few pints and placing

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the odd bet on a horse". Since a hip operation he requires "a helper", she visits him for an hour every Friday.

Participant # 32, Female, Age: 74

Location: Urban, Co Kildare, Date: 26th of November, Time: 10:00, Weather: 2° C dry

Mary lives independently in a medium sized two bed house in a social housing development in Co Kildare. Mary had just moved in 4 weeks previous to interviewing. She moved out of her old home due to being broken into 3 times. She lived in England for 44 years. She feels lonely being new to the development, but is trying her best to get involved in activities and to make new friends.

Participant # 33 and 34, Male and Female, Age: 80 and 74

Location: Urban, Co. Kildare, Date: 26th of November, Time: 14:00, Weather: 3° C dry

Dennis and Marie live in a three bed mid terraced town house in Kildare. Their house lies within walking distance of all amenities and shopping departments. They live with one of their daughters (a carer for Dennis). Dennis has suffered two strokes in the past five years and is now confined to a wheel chair. Since then it has been a tough five years for the family and their home has been adjusted to Dennis's needs. Marie leads an active life, working for the parish centre; she tries to get out a lot and is involved in various community based activities.

Participant # 35, Female, Age: 74

Location: Urban, Co, Kildare, Date: 27th of November, Time: 12:00 Weather: 2° C dry.

Margaret lives independently in her Medium two bed house in Co Kildare. She has been living here for 6 years now; she is originally from Donegal but lived in Kildare since 1960. Her husband died 15 years ago. Margaret had an accident in which she broke her back two years ago. This resulted in austio-arthritis. She "gets around" by using a walker and has a carer who works with her every week day.

Participant # 36, Male, Age: 85+

Location: Urban, Laois, Date: 10th of December, Time: 15:00, Weather at time of interview: 2 degrees C dry

Peter lives independently in a medium sized two bed roomed mid terraced town house in Laois. He is originally from Monaghan but has been living in his house in Laois for nearly 18 years. He now spends most of his time reading and writing stories. He is on a list of daily medication and suffers with angina, arthritis, and his peripheral vision is poor. He remains mostly on the ground floor of his home due to mobility and has a mobility scooter. He has a home help who visits three days a week; she does some cooking and cleaning for him. He enjoys going to the local day care centre everyday for eleven o clock to get something to eat and to socialise.

Participant # 37, Male, Age: 86

Location: Urban, Kildare Town, Date: 11th of December, Time: 10:00, Weather: 2° C dry

Jeffery lives independently in a medium sized three bed roomed end of terraced house in Kildare. Jeffery has lived here for twelve years now. He taught in England for 50 years and returned home to retire. He goes to Morocco for four months of the year to "get away from the Irish weather". He believes that "good neighbours are so vital" and brings his neighbour's dog for a 3 hour walk every day. He recently moved his bed into his kitchen for convenience. He goes to the local day care centre everyday at eleven to socialise and have a cup of tea.

Participant # 38, Male, Age: 73

Location: Rural, Co Tipperary, Date: 11th of December, Time: 14:00, Weather: 2° C dry

John lives independently in a 2 bed roomed cottage/farm house in rural Co Tipperary. His tillage farm occupies 3 Acres with hay barns and sheds at the rear. Michael was born and was brought up here. He has a brother in Wicklow who visits him once a week. He goes to the day care centre by bus twice a week to get

something to eat, socialise, and to say the rosary. He has being doing this for eight years now. Most days he keeps himself busy by working on his farm. Michael has a home help who comes twice a week and cooks him dinner.

Participant # 39, Female, Age: 81

Location: Rural, Co. Carlow, Date: 15th of December, Time: 16:30, Weather: 2°C dry

Julia lives independently in a two bed roomed country cottage where she was born, grew up and raised her family. Her husband died of cancer shortly after their marriage leaving her with three children. She goes to the day care centre by bus every week day to get something to eat and to socialise. She says she never gets lonely as she is "comfortable with her own company." She gets a visit from one of her daughters or her son every week night, and she shares her home with her dog and cat.

Participant # 40, Female, Age: 74

Location: Urban, Carlow Town, Date: 19th of December, Time: 12: 30, Weather: 1° C dry, with frost.

Kathleen lives independently in a two bed two storey town house in Carlow. She has been living here for 30 years now. She is a retired nurse and mentioned that retiring was like a "bereavement" in her life. Last year she sustained a fall that required her to stay in hospital for two months. As a result she has only begun to venture out of the house in the last three months and she doesn't use the upstairs of her house anymore. She has a home help who calls in every week day to help her with everyday chores.

Chapter Summary

This chapter paths the researcher's journey as designer ethnographer in the field. It discusses the methods and process of conducting this from ethical approval through to the profiles of the participants involved. Firstly it highlights that successful participant by-in is heavily reliant on researcher-participant trust and gatekeepers. In

developing a participant sample, allowing the design ethnographer freedom to move with developing theories was shown to be important, as was identifying deviants to challenge these.

Noting the obtrusiveness of the enquiry process, consideration of data collection methods is an important aspect of design ethnography. Data collection methods for design ethnography were described through semi-structured interviewing, participatory techniques and participant observation by collecting visual data from the field. As distinct from anthropologists conducting ethnographies, methods appropriate for design ethnographies were identified, e.g. constructing cultural inventories and forms of questioning. It demonstrated that due to the depth and breadth that design ethnography offers it ensures that people and cultures are central to design research.

Chapter 5.
Analysis of Fieldwork Data

5.0. Analysis of Fieldwork Data

Chapter Overview

This chapter details a process of analysing design ethnographic fieldwork, from the documentation and management of field data further to 'sense making' through coding processes. It promotes the adaptation of data reduction and data display in design ethnographic analysis. It illustrates synthesis or data reduction through developing core categories and taxonomies. This data reduction is culminated in data display, the process of representing findings for design use.

5.1. Documentation of Fieldwork

5.1.1. Data Management

Fetterman states that in ethnographic research "fieldwork ends when the researcher leaves the village or site, but ethnography continues" (1989, p.10). The time required to complete ethnographic research (post fieldwork) can be equal to or more than the field work itself. Post fieldwork, the next steps for continuing ethnographic research is in the collation, formal documentation and analysis of collected data. Together with the physical organisation and documentation of field data, the designer must holistically reflect, synthesise, and rigorously analyse what actually occurred in the field.

To obtain a true and detailed account of field occurrences, documenting fieldwork as soon as possible, post fieldwork is required. This documentation is most important for non-textual or non verbal assets collected during interview. Physical source data such as audio and images can be captured and stored for posterity allowing them to be continually replayed or reviewed. However, important indirect details such as memories, mental notes, and sensory details naturally fade in their richness with time therefore these required priority documentation.

Managing and organising physical 'source data' was the first step in data management. Physical source data consisted of MP3 audio recordings, photographs, and sketches and to a lesser extent, collected artefacts. The greater amount of

physical source data consisted of digital photographs and audio material. In total, this accumulated to over one thousand digital photographs and approximately 80 hours of audio. Due to the quantity of this collected data and the breadth of its content, a process of attaining primary understanding was required. Firstly the data was explored to arrive at a first-level, overview understanding of its key messages and structure. The data was 'cleaned' or broadly edited, then organised into manageable and apparently coherent chunks. Further 'fine' screening and editing of audio and photographic data followed this. This process typically occurred within 48 hours of an interview to ensure all data had been captured whilst fresh to the researcher.

5.1.2. Screening and Editing of Audio

Field interviews were recorded in their entirety, or, in part, via digital dictaphone when consent was given to do so on-site. Editing of audio occurred off site, firstly by listening through the individual interview in its entirety and deleting any large non-essential voids e.g. silence in the file. These edited recordings were then replayed and transcribed verbatim into an individual Microsoft Word document per participant. The process of replaying, listening, and transcribing notes was a recursive and iterative one, replaying and listening to audio multiple times whilst understanding the context and meaning of dialogue. Some dialogue was considered non-essential, e.g. introductions, or 'light' conversation such as 'small talk'. Such excerpts were not included or edited in these transcripts as the audio data was replayed.

5.1.3. Editing of Photographs

Digital photographs were taken in the field for the purposes of documenting observations. The overall approach to photography was primarily to attain quantity rather than quality of images with the intent of editing this stock post fieldwork. Photographic observations could be divided into (i.) Observations of direct interest to the study. (ii.) Observations of possible relevance to the study. The latter group of photographs were general and sometimes arbitrary in nature, the purpose being to obtain a general sense of the participant and the environment. These observations

were for the purposes of perusal later, without knowing their relevance at the time, and whether meaning was attached to them or not. For instance, these could be photographs of the overall layout of the home, consisting of one or two quality information rich photographs, and with the intention that they could be observed and edited in detail off site. These images could for example be edited into separate images, examined and magnified for details unseen in the fieldwork, possibly resulting in different meaning.

As outlined in Chapter 4, editing of photographic stock data commenced in the field by informing participants of what was taken and deleting or reshooting when appropriate. Off site, all photographic data was firstly filed and edited based on quality of images and image replication. The screening and editing process was similar to that of the audio data whereby photographs were viewed multiple times in detail and edited on the relevance to the study. This process included scanning the foreground and background of images for what was considered 'interesting' information, either specific to a participant or of a reoccurring trend in the fieldwork. Concise notes were taken of images in the form of short memos, a process conducted soon after the study to document why the photograph was taken, and its perceived relevance, including any early broad theories attached to it.

5.1.4. Fieldwork Documents

The documentation and writing of the fieldwork was the first step in making sense of occurrences in the field. This was achieved by organising and placing data into order so as to ascertain sense and meaning, and to document a true and fluid account of proceedings. Synchronising both the audio and photographic data into manageable and meaningful order relevant to the interview was the most efficient and evident means of doing this. Through this process, a human dimension to the enquiry is essential, in contrast to a rigid interpretation of occurrences. Emerson et al., highlights this, stating that in writing up ethnographic research "[an] ethnographer's central purpose is to describe a social world and its people" (1995, p. 68). They recommend describing and characterising dialogue from the fieldwork to achieve this. For the purposes of design ethnography, it is important to describe and characterise fully its people and *their interaction with artefacts.*

In writing field documents, the first action was to characterise the participants. A profile of the participant and the environment in which they lived was constructed. Descriptions of 'who they were' were included for example demographic details, daily routines, and all details that gave a descriptive construct of or introduction to the participant. Following this, a transcription of the interview was accounted, this was sequenced rich descriptive text, or what Emerson et al., cites as "in-process memos" (1995, p.105) and dialogue from the field. This description and dialogue is a construct of both the participant's actions along with narrative and the researcher's views and interpretations of occurrences. Once a first draft of these documents was produced, they were printed and read line by line. Brief handwritten annotations and mental notes were documented as "description codes" (Saldaña, 2009 p.3). This was an early attempt to make sense of emerging data without rigid classification, See Figure: 5.1. Further acts of coding will be discussed in greater in section 5.2. Coding.

To put physical order to field documents, transcripts and text were firstly placed in sequence relevant to the direction of the interview. Relevant photographic data was then positioned in sequence within this transcript and text. This resulted in a concise and visual documentation of all fieldwork source data, text and photographic data acting as descriptive memory triggers of the fieldwork.
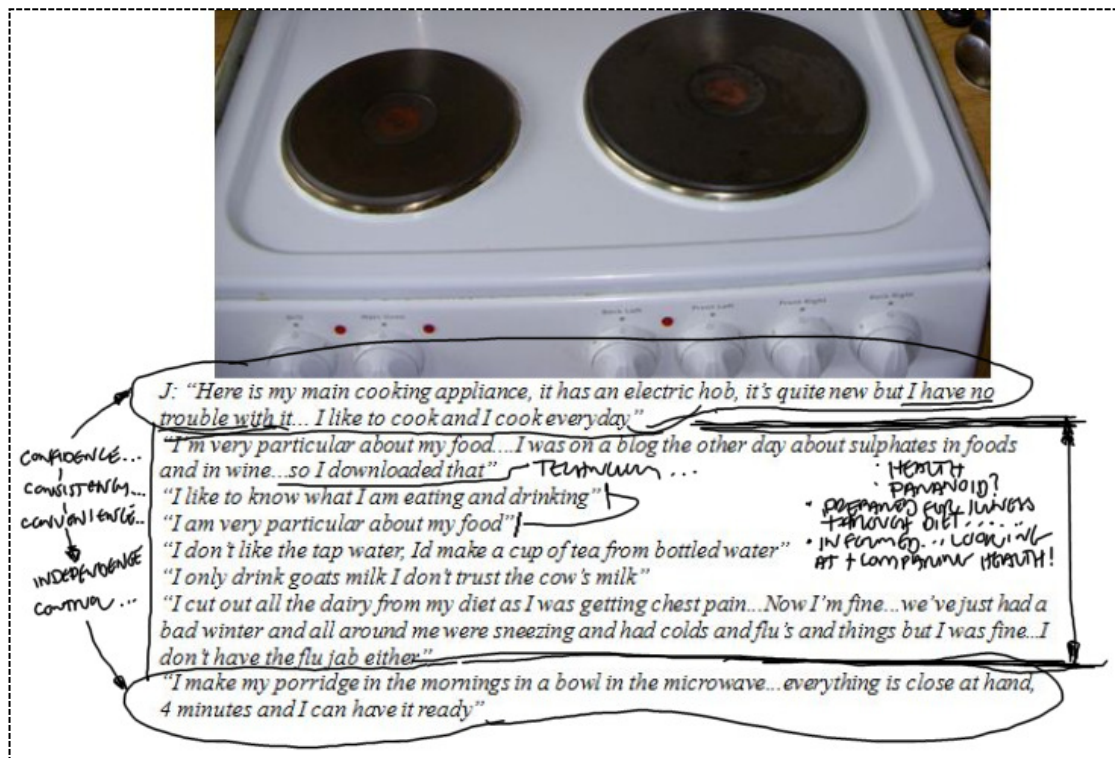
Figure 5.1: The act of transcription showing rough work descriptive codes in progress.

5.2. Coding and Grounded Theory

In its most simplistic form, qualitative data analysis is described as a process of collecting things, noticing things, and thinking about things (Seidel, 1998). This definition of analysis should not be considered a simplistic exercise, rather a statement of the researcher's personal role in the process. Broadly speaking, in qualitative analysis, the researcher endeavours to seek out reoccurring themes to form valid theory from field data. Fetterman asserts that in ethnographic analysis, researchers "look for patterns of thought and behaviour... [with] patterns [being] a form of ethnographic reliability" (1989, p.92).

To rigorously analyse, and to develop true patterns and theories from the fieldwork, a structured approach was used in interpretation of all fieldwork documents. Charmaz and Mitchell, recommend a grounded theory approach to ethnographic analysis, stating that this "can sharpen the analytic edge and theoretical sophistication" of the research (2001, p.161). Here they argue that grounded theory

offers the required analytical structure whilst remaining true and open to developing humanistic narrative and theory. Grounded theory uses analytical processes to review data into patterns, categories and themes. A fundamental process in grounded theory is process called 'coding' described simply by Corbin and Strauss as "deriving and developing concepts from data" (2008, p.65)

In the process of coding the researcher reads, understands, and identifies important phenomena within the collected data, and goes about attaching codes to phenomena with the view to making sense of the data. Miles and Huberman define codes as "tags or labels for assigning units of meaning to the descriptive or inferential information compiled during the study" (1994, p.56). Open coding is the first step in analysis, in which the researcher creates initial categories of the phenomenon within the collected data (Robson, 2002). Open coding according to Corbin and Strauss, is "breaking data apart and delineating concepts to stand for blocks of raw data" (2008, p.165)

5.2.1. Manual Open Coding Process

The act of open coding data in this research gradually evolved following the transcription and documentation of approximately eight interviews. In an attempt to maintain coherence and generic order to fieldwork documents, data was positioned in meaningful portions within a semi structured fashion on each document. This structure was iteratively 'tightened' as interviews progressed, with the researcher developing a more refined means of eliciting information and through building developing theories. Through this organisation of data, 'descriptive codes' as previously mentioned were edited according to this emerging theories. Final field documents were ordered into the following chunks:

i. The character profile of the participant

ii. Details of their environment

iii. All other transcription

iv. Specifics on cooking and heating products.

Following this organisation of field documents, a process of manual open coding ensued. Manual coding was chosen as the most rigorous method to code the collected data. This approach was chosen to enhance the researcher's knowledge of the phenomena and data first hand by reading and re-reading. Qualitative software packages such as *NVIVO©* were considered at this time, however, due to the amount of photographic data contained in the transcripts, it was concluded that the researcher's naked eye was required for full interpretation

5.2.1.1. Colour Coding and the Colour Coding Thematic Framework (C.C.T.F.)

To commence manual open coding, text within each document was carefully read and re-read line by line, with each image interpreted for further meaning. In the process of doing so, text and images were repositioned accordingly, and hand written notes fully transcribed. Coding in detail commenced in this process of reading and interpretation, with emerging categories and sub categories assigned. Several coding strategies were explored and attempted at this stage from axial coding to further descriptive coding.

Ultimately a colour coding strategy was developed as the most appropriate method. Its principal virtue being the clear visualisation and illustration it provides for the design ethnographer. Colour codes were commenced firstly to distinguish between emerging categories and themes and the relationships between. When progressed through several documents it offered a highly visual representation and an uncomplicated 'at a glance' appraisal of emerging themes. Similarly Saldana recommends that designers code qualitative data in a format that has instant visual impact or for visual classification (2009).

Colour coding was achieved in the word processing package Open office™, with text coded using the highlighter pen and the colour pallet available within the software package. Simultaneously a 'Thematic Framework' was drafted in a separate excel sheet to record colours and themes emerging. This firstly comprised of a grid with two columns; column 1: Colour legend and column 2: Theme, with the colour code in the field document coinciding with the thematic framework. As colour coding of field documents progressed from participant #1 through to participant #40,

four revisions of the coding thematic framework were evolved (see Appendix F: 1-3 for older revisions). These revisions were achieved by revising, adding, and creating new codes and categories as the reading and interpretation progressed. Where it was possible, similar shades of colour were used from the colour pallet to coincide with similar categories and themes.

- Revision 1 of the Colour Coded Thematic Framework was created after two interviews were transcribed. It consisted of seven main emerging categories, personal data, environmental data, ergonomics, heating products, cooking products, other products and health. (see Appendix F: 1).

- Revision 2 of the Colour Coded Thematic Framework was created after 12 interviews were transcribed. Building on the main emerging categories from revision 1, it had an additional theme of "Mobility". These were sub categorised into 37 emerging themes. (see Appendix F: 2).

- Revision 3 of the Colour Coded Thematic Framework was created after 22 interviews were transcribed. It consisted of the main emerging categories from revision 2 sub categorised into 41 emerging themes. A detailed description column was also added in this revision (see Appendix F: 3).
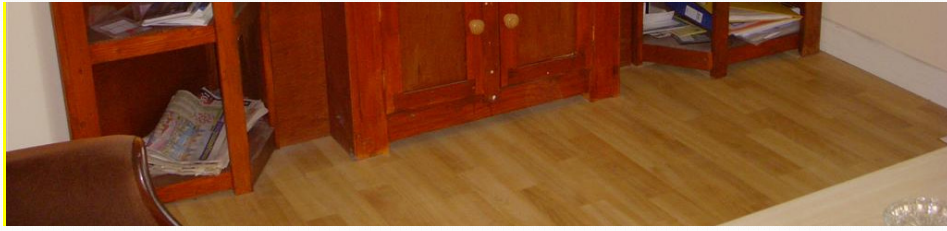
Figure 5.2: An example section of colour coded transcript
(For completed colour coded transcript documents of all 40 participants see
Appendix G).

The final revision of the framework was created after transcribing 32 interviews. At
this stage the researcher reached what we can refer to again as "theoretical
saturation" (Glaser and Strauss, 1967, Corbin and Strauss, 2008) in the data. New
categories or phenomena no longer emerged in the data and reoccurring or similar
categories had been coded and categorised within the framework satisfactorily. This
resulted in a detailed and concise record of emerging themes within categories and
subcategories.

The final revision of the Colour Coded Thematic Framework (Table: 5.1 and Table: 5.2) consisted of three columns. The tables consist of two "central or core categories" (Corbin and Strauss, 2008, p.104) which were 'Person data' and 'Product data', these contained three sub categories:

i.   Person data table: consisting of 'Character profile data', 'Environment' and 'Health' data. (Table: 5.1)

ii.   Product data table: consisting of 'Cooking product' data, 'Heating product' data and 'Other product' data. (Table: 5.2) (White and Devitt, 2011c)

Highlighted Colour Legend	Sub-Categories	Description	
PERSON DATA			
	1.1 Character Profile		
Light Magenta	1.1.1 Personal	Age,/General demographic, Family, Friends, Stakeholders/Work/Profession	
Magenta 1	1.1.2 Religion	Spirituality, thoughts on religion, death, religious possessions, relics	
Orange 3	1.1.3 Pass-times	Hobbies, Daily recreation, Music etc.	
Orange 2	1.1.5 Money	Wealth, Financial status	
Orange 4	1.1.6 Pension	Pension money	
Brown	1.1.7 Pets	Domestic pets, Animals, (stories of)	
Salmon	1.1.8 Independence	Statements of independence importance of independent status.	
Chart 10	1.1.9 Socialising	Socialising, Getting out and about.	
Orange1	1.1.10 Loneliness/Isolation	Loneliness/Isolation	
Brown 1	1.1.11 Holidays/getting away	Why, where, when, how	
Brown 4	1.1.12 Public Transport	Why, where, when, how	
Brown 3	1.1.13 Private Transport	Why, where, when, how	
	1.2 Environment		
Light Cyan	1.2.1 Environment-Home	House/home/ extended living environment	
Turquoise 5	1.2.2 Weather/ seasons	Weather	
Violet	1.2.3 Safety in Environment	Safety	
Turquoise	1.2.4 Possessions	Material possessions, Ornaments, (meanings of)	
Magenta 7	1.2.5 Lighting	Lighting in context, locations, Usage	
Magenta 4	1.2.6 Household chores	Domestic chores, Washing up, Cleaning, etc.	
Blue	1.2.7 Ergonomics	Posture, Reach issues etc / Designing the Environment	
	1.3 Health		
Green	1.3.1 Injury	When, where the injury happened, Falls, burns, operations, hospitals	
Light green	1.3.2 Good health/ Illness/medical conditions	Type of illness, medication usage	
Green 6	1.3.3 Forgetfulness/Cognitive functioning/Memory	Any mention of memory/loss dementia	
Green 3	1.3.4 Orthopaedic issues	Hips, knees, breaks, surgery, operations.	
Green 2	1.3.5 Sleeping Habits	Sleeping Habits	
Green 5	1.3.6 Cigarettes/Alcohol	When, Where, Why	
Green 4	1.3.7 Physical Abilities	Mobility issues, Getting around on foot/ Mobility aids	

Table 5. 1: The Colour Coded Thematic Framework (C.C.T.F.) of the core category: Person Data

PRODUCT DATA			
Highlighted Colour Legend	**Sub-Categories**	**Description**	
	2.1 Heating		
Yellow	2.1.1 Heating Products	Stoves, Radiators, Blow heaters, Timers, Open fires, etc.	
Yellow 6	2.1.2 Water/ Shower/Bath	Showers, Baths, Means of heating water, Hygiene.	
Yellow 4	2.1.3 Clothes Drying	Dryers, Clothes lines, Means of drying	
Yellow 2	2.1.4 Fuel Heating Cost	Types of fuels, uses and opinions. Bills and payments	
	2.2 Cooking and Food		
Light Red	2.2.1 Cooking Products	Cookers, Microwaves, Stoves, Pots, Pans, Utensils	
Red 1	2.2.2 Food/ Drink/Meals	Breakfast, Dinner, Lunch, Tea Supper, Eating habits.	
Red2	2.2.3 Cooking/Baking/ Grilling/ Frying	Any means of cooking, why, when, and how	
Red 3	2.2.4 Eating out	Dining outside of the home, why, what, how, and with whom	
Red4	2.2.5 Shopping/ Cooking/ Food Cost	Shopping habits- where, how, why, costs	
Red 5	2.2.6 Meals on Wheels, food centres	Meals on Wheels, opinions etc	
	2.3 Other Products		
Grey 30%	2.3.1 Television/Radio	Television/radio usage- what is watched when, where why how often etc	
Grey 10%	2.3.2 P.C. Internet	Internet usage- when, why, where how often, opinions	
Grey 20%	2.3.3 Phone	Phone usage- when, where how often, house/Mobile	
Grey 40%	2.3.4 Refrigerator/ freezer	Fridge usage- when, where how often, what is stored	
Grey 60%	2.3.5 Other Products/gadgets	Other Appliances/Products/gadgets	

Table 5.2: The Colour Coded Thematic Framework (C.C.T.F.) of the core category: Product data

5.3.   Data Reduction

Once open coding was finalised, and the thematic framework completed, all source data was fully and formally organised into manageable categories. However categorised, the data set remained large in volume. To continue with analysis a process of data reduction was required. Data reduction is a central requirement if results are to be created from qualitative research. As a process, Miles and Huberman demonstrates its importance by placing it within the three main components of qualitative data analysis, together with the processes of 'displaying data' and 'drawing conclusions from data' (1994).

However essential and core to the analysis process, data reduction held difficulties for the researcher at this point. The main difficulty was with reducing data while retaining the many essential and nuanced insights within the categories. It was felt that reducing data would lead to losing real subjective human insights, where one would prefer (albeit unrealistically) to retain all insights collected. Additionally it was considered that all non essential data was removed during the transcription phase, adding to the difficulty in reducing data further. Objectively though, a form of data reduction was essential both to make data manageable for further analysis and to arrive at the core issues pertaining to design. To continue reducing data, an iterative process was required to address the concerns outlined, to do so, the following steps were implemented.

5.3.1. Deciding on a Core Category - Selective Coding

Reducing data brought to light critical questions: what data is core and essential to the research? Which overarching categories should not be reduced or reduced the least? In answering this, the obvious core category of 'people' particularly 'older people' emerged, with the conclusion not to compromise their value in the research. To achieve this it was important to protect the essential older person 'profile' when reducing data, maintaining the human essence and not to dilute or to cut any essential elements of their culture when doing so.

Therefore, here, the process of selective coding was appropriate to be used. Selective coding is selecting the central category within the data and relating all other

categories to it (Silverman, 2006). According to Charmaz and Mitchell selective coding "...not only serve[s] to synthesize large amounts of data, but also to organise earlier codes into a coherent framework" (2001, p.167). Within this method one may adopt a solution whereby data reduction occurs, while maintaining the human centric approach of the research.
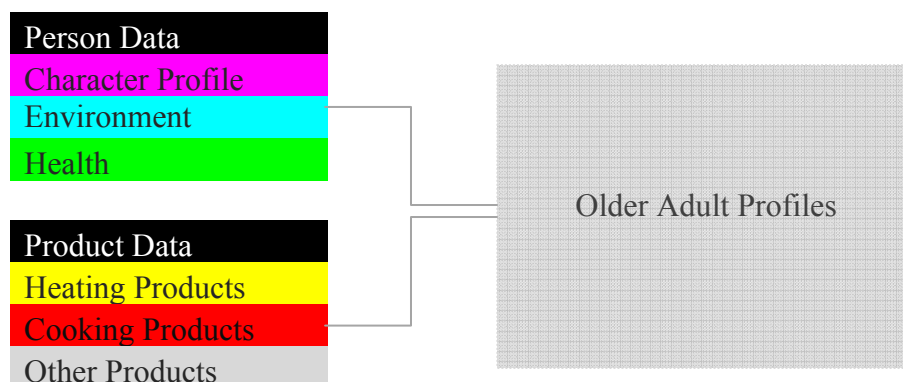
Figure 5.3: Proposed means of data reduction through selective coding

The researcher decided on the core category of "older people profiles" requiring a means of placing and reducing the previously open coded categories into this core category Figure: 5.3. The following steps of 1. Creating memos and 2. Creating taxonomies were used to do this.

5.3.2. Creating Memos of the Coded Source Data

To create the core category of older adult profiles, a separate method was required to further reduce coded data in the thematic framework. Source data was condensed into the 'main personal insights' from each participant.   These insights were documented by using bullet pointed short memos on a separate word document. This consisted of extracting a list of:

i. Core personal insights per participant.

ii. Core issues a participant had in daily life.

This list also included phenomena and or causal conditions where appropriate. For the purposes of reduction and concision, each participant memo list was restricted to one A4 sheet. (See Appendix H for example)

5.3.3. Creating Taxonomies

Reducing the data into profiles representative of the participant sample required an appropriate means of categorising the participants into certain classifications. In Spradley and McCurdy's book *'The Cultural Experience- Ethnography in Complex Society'* the use of "taxonomies" of people in society are discussed to gain meaning of a culture (1972 p.64). In developing a core category, grouping all the participants into similar categories or taxonomies facilitates in both data reduction and in portraying a rich description of the culture. The development of taxonomies in this instance was a further coding exercise, one which clearly classified participants into cultural archetypes.

To create taxonomies, the created memo lists were firstly collated and categorised into broad category files; firstly split into 3 categories: i. Male, ii. Female, iii. Couples. The researcher proceeded in building taxonomies within these groups, seeking to uncover main archetypal profiles. Participant memos were compared and contrasted in turn to identify similar character traits in participants and these were grouped and regrouped accordingly. Seven main taxonomies with similar character traits emerged; seven archetypal profiles representative and reduced from the 40 participants interviewed.

These were then categorised into the following taxonomy "cover terms" (Spradley and McCurdy, 1972, p.64) or profiles:

- **Taxonomy #1:**   **Dependant couple profile**

  Taxonomy Characteristics: Older couples with a good support network with certain dependencies on this network.

- **Taxonomy #2:**   **Capable male profile**

Taxonomy Characteristics: Independent males capable of managing most elements of their lifestyle. Male participants with some, but no major health concerns.

- **Taxonomy #3:** **Capable female profile**

Taxonomy Characteristics: Independent females capable of managing most elements of their lifestyle. Female participants with some, but no major health concerns.

- **Taxonomy #4:** **Housebound profile**

Taxonomy Characteristics: Male and female participants displaying high levels of dependency on others. These participants remain indoors for long periods, display serious health concerns and may be socially isolated.

- **Taxonomy #5:** **Rural profile**

Taxonomy Characteristics: Male and female participants living in rural environments, or participants from an agricultural background.

- **Taxonomy #6:** **Socially isolated profile**

Taxonomy Characteristics: Male and female participants that are largely socially isolated, typically with a very small support network.

- **Taxonomy #7:** **Affluent profile**

Taxonomy Characteristics: Participants that are financially comfortable, high levels of independence with a good support network.

Housebound Profile	Rural Profile	Capable Male Profile
Participant 3	Participant 1	Participant 2
Participant 14	Participant 4	Participant 11
Participant 25	Participant 29	Participant 12
Participant 26	Participant 36	Participant 17
Participant 35	Participant 38	Participant 23
Participant 40	Participant 39	Participant 31

Capable Female Profile	Isolated Profile	Affluent Profile
Participant 9	Participant 10	Participant 5
Participant 13	Participant 15	Participant 8
Participant 16	Participant 24	Participant 37
Participant 20	Participant 30	
Participant 32		

Dependant Couple Profile		
Participants 6&7		
Participants 18&19		
Participants 21&22		Colour Legend
Participants 27&28		Male Participant
Participants 33&34		Female Participant
		Couples

Table 5.3: The 'genetic' makeup of participants within the seven taxonomies

5.4. Data Display: Design of Personas

Following the qualitative methods of Miles and Huberman, the step following data analysis is "Data display" (p. 11). They define data display as "...an organised, compressed assembly of information that permits conclusion drawing and action" (1994, p.11). This definition represents its importance as a stepping stone in finalising analysis. Further to this, Silverman describes data display as a stage where the researcher is further analysing to demonstrate how coded elements are linked together (Silverman, 2005). To move forward and draw conclusions, and, in a further step to link codes and achieve results from the data, a succinct data display is required to visually share and communicate data. Data display plays an intrinsic role in grounding research and interpretation. It is important to note that up until this point interpretation of data in coding has been from the researcher's point of view

only. For reliability and validity in the analysis other viewer's interpretations are required. For these purposes, it was important to design a display that was highly descriptive and visually representative of the taxonomies created. Reinforcing this Wolcott believes that:

> "a graphic presentation offers an alternative to prose, not only for conveying information but for dramatising or emphasizing particular aspects of the study" (1994, p.31)

In creating a data display for these findings it was important to reassess the proposed output of the study. This output was to be used in artefact creation and designing, with results of the ethnographic study directly feeding into design practice. Creswell, suggests that qualitative results should be "presented in a descriptive, narrative form rather than a scientific report" (2003, p.205) Similarly design results should be descriptive and narrative based in addition to being *visual*. For design output, the visual nature of a display is extremely valuable in its ability to share, communicate and allow for data findings to be interpreted and understood. On this point Goodman et al argue that information findings of a visual nature are "more likely to be used" by conveying data in the "language" of the designer (2006, p.1)

In designing a display for the data, a list of functions of the 'data display' was drawn up, these were:

i. To display the core category of older adult profiles (the seven predominant taxonomies developed) in a true and insightful fashion.

ii. To be visual in nature: that photographic data from the study be included in a format to visually communicate to designers and other viewers for interpretative purposes.

iii. To be descriptive in nature: that the data display communicates and describes deeply the phenomena of the study through narrative and commentary.

Blomberg et al., suggests useful methods of communicating findings from ethnographic studies for design output. One method outlined is creating profiles by means of 'personas' to represent and communicate data (2003). Personas are representative 'characters' of end users, according to Cooper "Personas are not real

people, but they represent them throughout the design process" (1997, p.124). In past ethnographic studies these were also known as "composite characters" (Scheper-Hughes, 1979, p.19), usually a representation of a population made up of multiple characters.

Personas can satisfy the functions required of the data display. Using the persona approach to collate and represent data for analysis is advantageous to designers for many reasons:

1. **Human centricity:** Developing and displaying hypothetical users for future products preserves the human centricity to the data. Representing them in a true, personal, and humanistic format.

2. **Making sense of complexity:** Personas convey complex cultural archetypes with deep idiosyncrasies in a succinct manner.

3. **Data reduction:** Creating personas aids further in data reduction, coercing the researcher to place data in an organised nature into profiles. Therefore not reducing the essence of the core category of older adult profiles.

4. **Maintaining focus**: To create theory it is important that the data is reduced to actionable insights. For this, maintaining focus on the actual insights rather than digressing off topic, in this case, maintaining focus on the "user". Goodman et al., suggest that presenting end users as personas helps a designer to focus attention directly on end users and thus creates empathy with them. It is a use cited as particularly effective for older users and people with disabilities (2006). Furthermore, Pruitt and Adlin assert that personas engage product design and development teams by maintaining a meaningful and deep focus on the important users in a project (2006).

5. **Transition steps to designing:** It is appropriate to see the creation of personas as the first step in the act of designing. In a way, 'designing' the end user before designing products for them.

6. **Validity and Reliability:** It is important for the purposes of validity and reliability in the analysis to share finding and gain other interpretations and

points of view from the data. Using personas in this regard focus other viewers to understand and interpret needs.

7. **Confidentiality:** Creating fictional personas from the data conceals actual individual identities.

8. **Reuse:** Personas do not need to be disposed of after data display; they can be easily re-used throughout numerous other stages of the design process. Personas can be an invaluable source of inspiration and grounding in design phases such as ideation, conceptualisation, user testing, and marketing.

5.4.1. Designing Personas from Taxonomies

The taxonomies collated in selective coding were used as the foundation of the design of these personas. Firstly it was required to reduce and 'clean' data within each taxonomy group, this was achieved by comparing and contrasting memos within each grouping, and merging them into the colour coded categories of Character Profile, Environment, Health, Heating Products, Cooking Products, and Other products. These memos were reduced by iterative merging, deleting and editing reoccurring themes and memos into concise order (See Appendix I for the 1st revision of "Capable Male Profile").

For realistic personas, the researcher constructed profiles and scenarios from the memos through hypothetical 'representative' characteristic traits of the persona. This involved using both the data collected and the researcher's tacit knowledge of older adults learnt from the study. It also involved continually questioning the profile construct of each persona using hypothetical questions such as: would this persona do or say this? or; is this an archetypal characteristic of this persona? If certain memos clashed in terms of characteristics, or could not realistically fit into an archetypal trait of a persona, it was stored and assigned to an appropriate persona profile at the end of the process. To protect identities and to construct realistic profiles, memos from up to four participants were blended. Additionally, fictional pseudonyms were assigned to each taxonomy, reflecting their 'personality', and geographically where the persona 'lived' in Ireland. This was done to add humanistic

and realistic qualities to each persona. The following taxonomies where assigned the following names:

Taxonomy #1: Dependant Couple Persona(s): Billy and Margaret Molloy.

Taxonomy #2: Capable male profile Persona: Tony Ryan.

Taxonomy #3: Capable female profile Persona: Mary Brown.

Taxonomy #4: Housebound profile Persona: Joanne Bishop.

Taxonomy #5: Rural profile Persona display: Brendan Murphy.

Taxonomy #6: Socially isolated profile Persona: Declan Allen.

Taxonomy #7: Affluent profile Persona: Fiona Rodgers.

5.4.2. Designing the Persona Displays

The persona displays aimed to fulfil two main roles. They were a representation of synthesised data from the field and, secondly, they facilitated further data analysis and interpretation therefore further data reduction. The physical appearance and organisation of the persona display was very important to convey a realistic and rich representation of the persona. In interpretation of data, Patton states that "sufficient description and direct quotations should be included to allow the reader to enter into the situation and thoughts of the people represented" (2002, p.503). To place the viewer in this position, a rich description was required. Following Patton, the fundamental construct of the persona displays were 'description' through direct quotations and imagery from the field. Within this construct for text and images, the purpose of the displays as a whole was to create an experience of the lifestyle of the persona. Figure: 5.4 illustrate the template design of the persona display, it relates to the following:

1. Rows containing detailed descriptions of the core category 'Product data' consisting of sub categories: Cooking Products, Heating Products and Other products.

2. Rows containing descriptions of the core category 'Person data' consisting of sub categories: Personal, Environment, and Health.

3. Column containing description, narrative, and scenarios of the persona

4. Column containing a main descriptive image of the persona relating to each of the sub category rows

5. Column highlighting an informative direct quotation from each of the sub category rows

6. Secondary images in a montage relating to the sub category
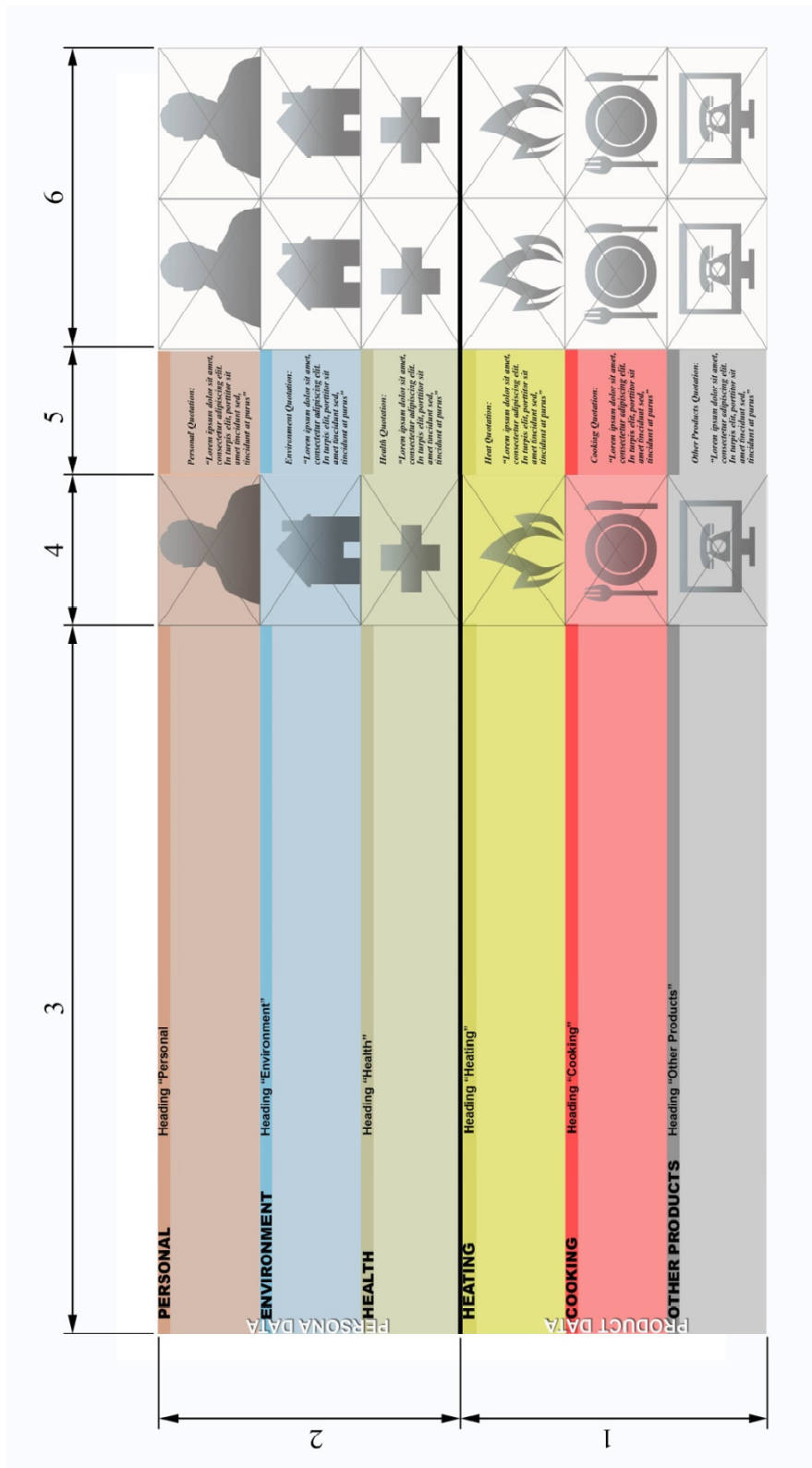
Figure 5.4: The persona template

The personas displays were constructed from the sub categories of the Colour Coded Thematic Framework. The display was designed to be easily understood by quickly reading the headings and observing the photographs on the display; so that the viewer could comprehend an overall sense of the characteristics of the persona without reading all of the descriptive text. Before placing photographic data into the display, these were edited for confidentiality purposes. In persona creation, Pruitt and Adlin believe that photographs are critical and extremely influential in helping viewers believe, understand and greatly affect how a persona is perceived (2006). Essential therefore was the main profile image of the persona. One consideration was to use illustrated fictional characters as the main profile image. However a study by Long suggests that illustrated (hand or digitally drawn) personas are less effective with a lower level of empathy ascribed to them, in contrast to a photographic persona (2009). Therefore stock photography was used to represent each character. Using stock photography has some disadvantages with Pruitt and Adlin (2006) arguing that these can appear to be too polished, too professional, less realistic, and less 'approachable'. However with this in mind, stock photography was carefully considered, matching an appropriate image with each persona.
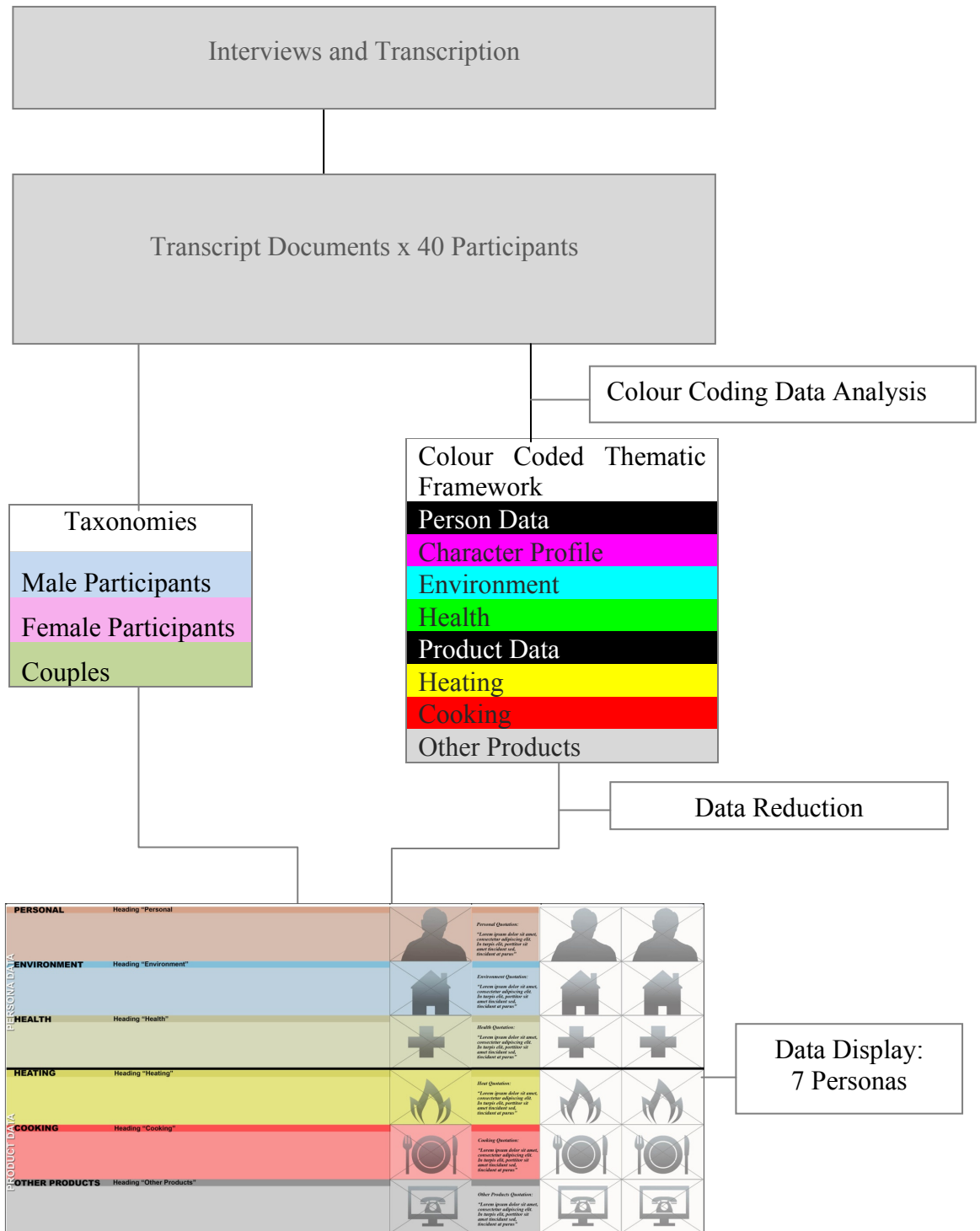
Figure 5.5: The process of data analysis from interview to personas

Chapter Summary

In this chapter design and qualitative research are brought together, demonstrating the importance of data reduction and data display in analysing design ethnography. The researcher suggests design ethnographers use traditional qualitative methods of analysis combined with design visualisation methods in order to execute analysis of data for optimum effect. It is established in this chapter that the colour coding process and the 'Colour Coded Thematic Framework' act as an analysis tool and a classification/ organisation tool for design ethnographies. It was demonstrated that data reduction may be achieved in a person centric manner by the above means. Further, archetypes or taxonomies of participant's may be created by way of personas. These personas act as data displays for reduced data, representative of all participants interviewed, where designers may act upon, relate, share, and analyse data further.

Chapter 6.
Persona Displays and Validation

6.0. Persona Displays and Validation

Chapter Overview

This chapter will present each of the seven designed data displays or 'personas'. It will narrate each persona divided into the core categories of 'Profile', 'Environment', 'Health', 'Heating', 'Cooking' and 'Other products' developed in Chapter 5. As distinct from 4.6 Participant Profiles, it will demonstrate the results of synthesis achieved during coding, data reduction, and data display. Thereafter, this chapter uses peer validation to verify the accuracy of findings and to define the focus of the study for design application.

6.1. Persona Display 1: Billy and Margaret Molloy
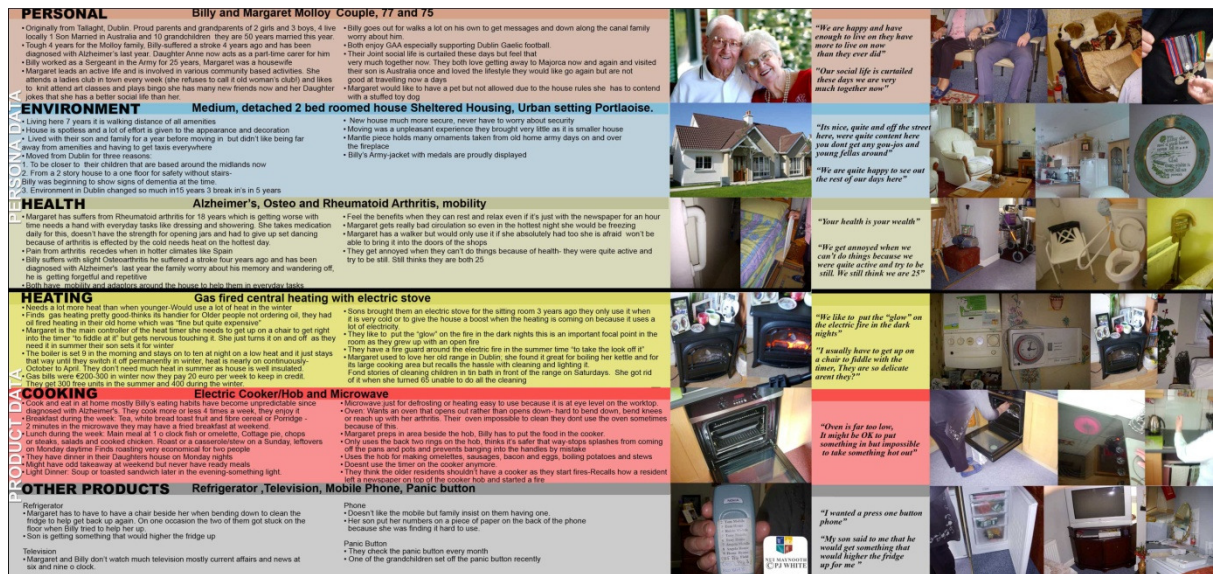
Figure 6.1: Persona Display 1. Billy and Margaret Molloy
(Large scale Persona Display Board located in Appendix J1)

6.1.1. Profile

Billy and Margaret Molloy are originally from Co. Dublin. 50 years married, they are proud parents and grandparents of 5 children, 4 of whom are living locally. It has been a tough 4 years for the Molloy family, in which Billy suffered a stroke and has

been diagnosed with *Alzheimer's*. Their daughter Anne now acts as a part-time carer for him. Billy worked as a Sergeant in the Army for 25 years and Margaret is a housewife. Margaret leads an active life and has been involved in various community based activities since moving into her new home, so much so, that her daughter jokes that she has a better social life than her. Their joint social life has been curtailed recently; however they feel very much together at home now. They both enjoy sport, especially supporting the Dublin Gaelic football team. Margaret would like to have a pet but is not allowed due to house rules.

6.1.2. Environment

Billy and Margaret live in a medium sized detached two bed house in a sheltered housing complex in the Irish midlands. Before moving in they lived with their son and his family for a year. Living here seven years, they moved from Dublin for three reasons: firstly to be closer to their children, secondly for safety reasons: Billy was beginning to show signs of dementia and a ground floor home was more appropriate than their two storey house. Thirdly, for security reasons: their living environment in Dublin had changed greatly and they had endured 3 robberies to their home in 5 years. Their house is spotless, and a lot of effort is given to the appearance of the interior. Moving home was an unpleasant experience with the upheaval and having to leave personal possessions behind.

6.1.3. Health

Since Billy's *Alzheimer's* diagnosis last year, his family worry about his memory; he is getting forgetful, repetitive, and at times wanders off on his own. Margaret has suffered with rheumatoid arthritis for 18 years and says this is getting worse with time, requiring help with everyday tasks. She takes medication daily for this, and is affected by cold; she feels heat eases her pain. They both have mobility aids and adaptors situated around their home to help them in everyday tasks. They feel the benefit of rest and relaxation even if it's just sitting to read the newspaper. They both get annoyed when they cannot "achieve things" because of health as they both still feel like they are 25 years old.

6.1.4. Heating

They both state that they require a lot more heat now that they are getting older and would use much more heat in the winter months. They find gas central heating easier to use and manage rather than oil heating because of ordering and cost. Margaret is the main controller of the heating timer in the home; however she gets nervous operating, it and needs to climb up on a chair to operate or "to fiddle at it". Heat is almost continuously on in their home resulting in high energy bills, they pay 20 euro per week to keep in credit. 3 years ago their sons bought them an electric stove for their sitting room which they only use when it is very cold or to give the house "a boost" when the heating is coming on. They like having "the glow" on the electric fire in dark nights, and they feel it is an important focal point in the room. Margaret loved her old heating range in her old home; but recalls the inconvenience with cleaning and lighting it, and replaced it when she was 65.

6.1.5. Cooking

They cook and eat in at home the majority of the time, as Billy's eating habits have become unpredictable since his *Alzheimer's* diagnosis. They look forward to having dinner in their daughter's house on Monday nights. They have their main meal at 1 o clock consisting of meat with two vegetables and they find that roasting is very economical for two people. They would have a light meal in the evening which would consist of soup or a toasted sandwich. Margaret's electric oven is positioned low to the ground and she sometimes finds it difficult to bend down, reach up, or to clean with her arthritis. When cooking, they only use the back two rings on the hob to prevent splashes of food and banging into the handles inadvertently. They both like using their microwave as it is easy to use and is at the correct postural level on their worktop.

6.1.6. Other Products

Margaret requires a chair to be positioned beside her when bending down to clean her refrigerator and to help get back up again. As a result of this, their son is getting

something made that would position their refrigerator higher. Margaret and Billy don't watch much television, mostly only current affairs and news programs in the evening. Margaret doesn't like her mobile phone but their sons insist on them having one. As she was finding it difficult to use, her son affixed a piece of paper to the back of the phone and put her important numbers on it.

6.2. Persona Display 2: Tony Ryan

Figure 6.2: Persona Display 2. Tony Ryan
(Large scale Persona Display Board located in Appendix J2)

6.2.1. Profile

Tony Ryan, 77, is a widower living independently. His wife died 17 years ago and he admits that he misses her every day. He has family living locally, 5 children, and 6 grandchildren that visit him regularly. Before he retired he worked as a carpenter and continues to be resourceful and creative with wood. Tony leads an active social life with a positive outlook on life, and now works as a volunteer visiting elderly persons homes each day for a chat. Tony admits to getting lonely at times living on his own, but has many friends and enjoys going down to the local bar for a pint and a game of cards. Tony also loves golf and has been caddying and playing since he was 7 years old. He gets out of the house every day for a walk around the shops; this, he

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says prevents him from "sitting around all day and moping". He has a car that he uses occasionally, since moving to his current home he is driving less because of better public transport.

6.2.2. Environment

Tony lives in a medium sized 1 bed house at a retirement village in Kilkenny City. The village consists of 20 apartments and houses with an activity centre. He moved in after selling his home 5 years ago. He is happy and secure in his environment; however, he is always anxious about the possibility of intruders. He is good friends with Mary who manages the village. His home is tidy and compact, and he finds it easy to manage. He is proud that he has developed his living environment to suit his individual needs. Tony likes to help and organise around the village, for example putting the bins out every week for infirm people. To relax he spends lots of time in the conservatory reading his books and newspapers. His house is covered with his golf mementos, awards, and his mantle piece is full of old photographs and possessions handed down from his parents.

6.2.3. Health

Tony has a hearing impairment and finds that his hearing aids are very sensitive and this can be nuisance at times, especially when out for a drink with his friends. Recently he burnt his hand badly after boiling his kettle and getting a fright when his phone rang. He had a hip operation two years ago and feels much better and more able now, so much so that he now looks forward to getting his other hip replaced.

6.2.4. Heating

Tony's home has gas fired central heating, an electric fire (replacing an open fire) and an old portable oil heater. For his central heating he spent time on studying how his timer worked and now he uses it regularly. He feels he is in control of his energy costs as he uses a "gas card" to keep him in credit with his bills. Tony loves his old

portable oil heater as it is mobile, it has a thermostat, and he can dry his shirts and socks on it. This is the most used source of heating in his home. He chooses only to use his electric fire if it was very cold inside or if he wanted to heat rooms in a hurry, mostly because he dislikes the dry air that it emits. However, he likes using the "glow" from the electric fire to make the room "comfortable and warm". He thinks open fires are "hard labour", preferring not to clean ashes every day.

6.2.5. Cooking

Tony has been cooking for 17 years since wife died, he cooks his own food four days of the week and claims that he is "not an expert but gets by on simple methods of cooking". He says he has two good meals a day, and his son joins him sometimes for dinner on a Monday. He doesn't like going to the dining hall in the village for dinner "because of all the women there" and he would like to maintain his independence. To cook, Tony uses an electric cooker, electric worktop cooker, microwave, 'George Foreman grill™', and he also steams food frequently. He very seldom uses his microwave as he believes there are too many "no no's" in its cooking methods. His small worktop oven was the "greatest thing he ever bought" and has inspired other men in the village to buy one. He loves using it as it is at the correct eye level so he can see his food cooking and he can also understand its dials. For simplicity he also enjoys using his grill.

6.2.6. Other Products

Bending down is an issue for Tony; he recently built a cabinet to place his refrigerator higher for comfort and to keep his food at eye level. In the future, he hopes to get a worktop mounted freezer. Tony likes to watch football, golf, and news on television, mostly in the evenings and more so in winter. He is planning to get a bigger digital screen for next winter. He also watches videos and DVDs from time to time. He has completed a basic computer training course, and has gained a new lease of life from using the internet; however, it does require a lot of patience from him. He has just bought a laptop and is now learning to Skype. He particularly loves his

"hand grabber" aid, recommending them for older people having difficulties in bending down.

6.3. Persona Display 3: Mary Brown

Figure 6.3: Persona Display 3. Mary Brown
(Large scale Persona Display Board located in Appendix J3)

6.3.1. Profile

Mary Brown, 78, lives independently and has 2 Sons, 1 daughter and 2 grandchildren, her husband passed away 12 years ago. Originally from a farming background, she works in a charity shop part time "just to socialise and to get out of the house". She has regular visitors mostly her children, and Sarah her support worker who "looks after her every need". Mary is very religious, her 'Sacred Heart' picture frame is her pride and joy and is placed over her cupboards with her other treasured ornaments. As a pastime he loves to knit and she makes clothes for her grandchildren. She also enjoys getting out for at least an hour a day usually to travel to town on the local bus.

6.3.2. Environment

Mary lives in a one bed apartment in a social housing development in urban Tipperary. The development contains a mix of apartments and houses where she has been living for 18 months. She found it difficult and lonely being new to the development at first, and is only now feeling that she is fitting in and making a home for herself. Turning her house into a home is a work in progress for Mary, her new home was empty when she moved in, and she is only now getting around to decorating it in her own style. Having to leave some of her possessions in her old home (as they were too large to transport) she had to purchase many new products and appliances. Mary owns a doll collection and receives dolls as presents regularly, she also loves Elvis Presley, and this is very evident in her home as pictures and albums of him take priority on her wall.

6.3.3. Health

Soon after moving into her new home Mary underwent a serious heart operation, and because of this is on a heavy dose of medication of 15-16 tablets daily. Post operation she has been stiff on her feet and now her biggest fear is of falling over. Since her operation she finds even easy tasks difficult to do, for example putting on shoes or bending down. She now finds she gets out of breath easily.

6.3.4. Heating

Mary uses gas central heating, a gas insert fire, and an electric heater to heat her home. She cannot properly use her heat timer, choosing to switch the heat on and off when needed, and getting someone to set it for her when the weather changes. She pays approximately €150 every 2 months for her gas heating bill and for this puts money aside every month. She uses her electric heater occasionally, but only for ten minutes when it is cold in winter. She dries clothes on the radiators when wet outside, and she would prefer more internal clothes drying facilities. She sometimes finds her gas fire difficult to use, having to bend down to operate it. Using her

fireplace now only as a focal point for possessions and photographs, she misses her "homely" open fire as it reminded her of growing up on the farm.

6.3.5. Cooking

Mary has a long association with cooking for her family, taking on the role of provider at an early age after her mother died. She has an electric cooker which she uses frequently, especially for dinner during the day. At one o' clock she would typically have a meal of potatoes with bacon cabbage or fish. In the winter time she makes stews. She has a light meal in the evening such as scrambled egg on toast with tea. Mary still enjoys cooking for, and having meals with her family. She also likes to cook for her grandchildren when they visit, and she goes out to eat once a week with her daughter. She used to bake a lot for family and friends, however, she would now only bake on special occasions. Mary owns a microwave but dislikes the possible effects of using it or what she calls "the rays" emitted from it. Additionally, she has a fear that she may break or do damage to it if she started using it.

6.3.6. Other Products

Mary loves watching television from her comfortable chair, claiming that she "watches too much of it". She watches soap operas religiously every evening. She also loves old black and white movies, and if she cannot sleep at night they help her relax. Mary believes it's best to keep an active mind as you get older. She recently obtained a certificate for basic computer training, a course they ran at her development. Thanks to this she has a desire to obtain more computer training. Mary cannot fully understand her mobile phone so her son helps her with it regularly. She can only receive calls on her mobile phone, preferring to use her landline house phone to keep in contact with people.

6.4. Personas Display 4: Joanne Bishop

Figure 6.4: Persona Display 4. Joanne Bishop
(Large scale Persona Display Board located in Appendix J4)

6.4.1. Profile

Joanne Bishop, 72, has been living independently since her husband passed away in 1994. Having no children, she admits to getting quite lonely spending most of her time alone in her house. She returned home from England 30 years ago and has been working as a civil servant from which she retired 5 years ago. She has a carer who comes in for an hour every morning; she washes the dishes, prepares breakfast, collects messages and prepares Joanne for the day ahead. Religion is a strong part of Joanne's life. Her local priest delivers communion every Monday as she can no longer make it into Sunday mass anymore. She loves music and especially misses singing in the church choir. Her main pastimes now are art and calligraphy and her house is decorated with her own handiwork.

6.4.2. Environment

Joanne lives in a two story town house in south Dublin. She is now confined to the ground floor of her home due to mobility issues; this consists of sitting room, kitchen, and bathroom. As she cannot go upstairs anymore, some rooms in her house

have become very damp and cold; she now only uses them for storage. Her independence is very important to her as is living in her own home. Recently she moved her bed down stairs into the sitting room. This bothered her at first as she was worried about what people thought. Joanne has designed her environment around her needs. In her sitting room she has built a reading station around her which she calls her "office" and in her kitchen she has laid out all appliances so they are close at hand. To prevent her from falling at night she needs to leave a light on continuously.

6.4.3. Health

Joanne struggles with osteoarthritis, osteoporosis and poor mobility due to injuries sustained in a car accident 5 years ago. Since then she has noticed her health deteriorate each year; because of this she takes a heavy daily dose of medication. In the last 3 years she has had a series of bad falls breaking her wrist in her bathroom on one occasion. These falls have resulted in Joanne giving up driving, limiting her independence, and leading to regular bouts of depression. Requiring aids for mobility purposes; Joanne dislikes her wheel chair and walker, as she associates them with her long stay in hospital. She now tries to get around using only walking sticks and only using a wheelchair if absolutely necessary.

6.4.4. Heating

Joanne has gas central heating in her home with an electric insert fire in her sitting room. She spends most of her time in the sitting room seated beside a radiator. Last year she decided to turn off the heat in some of the rooms upstairs to save money as they are not in use anymore. Joanne's carer would like her to start using her heating timer but feels she has more control over the central heating by just turning it on and off as required. She had a gas fire insert in her sitting room but had to change it to an electric model as she couldn't bend down to reach the controls to operate it. She dislikes the dry air from her electric fire as this sometimes hurts her eyes. To prevent this she places a bowl of water in front of the fire. At bedtime Joanne fills a hot water bottle for warmth and company.

6.4.5. Cooking

Joanne cooks very little now. She has 'Meals on Wheels' delivered to her 4 days a week, and would have a ready meal, takeaway, or leftovers from friends on other days. She doesn't always enjoy these meals, so her carer makes sure she has plenty of frozen meals in her freezer. She used to enjoy cooking regularly for friends at her house however this had to be curtailed due to her disabilities. She rarely uses her oven and hob now, because she is having problems carrying and lifting hot heavy items. She now cooks practically everything in her microwave, which she has highly decorated in fridge magnets.

6.4.6. Other Products

Joanne enjoys television and has set programs she watches every day, in particular game shows and soaps. She also enjoys listening to CDs and never misses Sunday Mass on the radio. Joanne has a laptop but doesn't use it much because of declining typing skills. She believes an electric kettle is a very safe product for older people to use and she can use it with one hand. She admits to using it regularly as she is a self confessed coffee addict. As a result of her disabilities she finds cartons and jars very difficult to open. Her carer bought her an automatic jar opener to assist her.

6.5. Persona Display 5: Brendan Murphy

Figure 6.5: Persona Display 5. Brendan Murphy
(Large scale Persona Display Board located in Appendix J5)

6.5.1. Profile

Brendan Murphy 83, is a bachelor who lives independently on a large farm in south east Ireland. Brendan loves farming and still has a daily work routine which commences at six o' clock in the morning. His nephew now runs the farm and recently Brendan has felt personally in the way of its daily operation. He has a brother who visits him once a week and a "home help" who comes twice a week and cooks him dinner, he also has a niece who helps him with cleaning. He lives with his dog 'Patch' and cat 'Blackie' and likes to have a dog around for security. Religion is a major part of Brendan's life and gets driven to the village for mass on Saturday night. Here, he takes the opportunity to chat to some of his friends about the news of the week. Every Wednesday he gets a bus to the day care centre, where he gets something to eat, socialises, and says the rosary.

6.5.2. Environment

Brendan lives in a 3 bed 2 storey farm house in remote rural Co.Wexford, he has lived here all his life. The farm consists of 4 acres of tillage and a herd of cattle. The

farm shows signs of progress, with the presence of a 4X4 quad bike, and recently his nephew built a house on the adjoining land. In his house Brendan doesn't go up stairs anymore as he feels the stairs are too steep. He gets his nephew to carry and store anything he doesn't need on the second floor and he now has two rooms full of items. His bedroom is downstairs now. In his sitting room, close friends have priority use of the chair opposite him and beside the fire for conversational purposes.

6.5.3. Health

Brendan suffered a mild stroke 9 years ago and has since lost strength and feeling in his left hand. Through his life he has had both his hips and a knee replaced, this has taken its toll on him and now mobility prevents him from going outside as much as he used to. Brendan is deaf in one ear and gets embarrassed having people repeat themselves when in conversation with him.

6.5.4. Heating

Recently Brendan had his house upgraded his with oil central heating but refused to part with a range cooker that his father bought in 1935. Brendan has a unique personal attachment to it, referring continually to it as "she". Brendan has a process of maintaining a supply of fuel, his Nephew fills his shed every few months, his home help fills his hallway weekly, and he keeps a small supply of fuel under the range. Over his range he has a self made clothes line to dry clothes and small items. His dog sleeps in front of the range, and the cat sleeps on cushions on the plate rack. Brendan is sometimes frightened to use his oil central heating as he is unsure of how it works. In addition to this his house was broken into last year and his oil money taken, ever since he seems to have a negative association with it.

6.5.5. Cooking

To cook, Brendan uses a gas cylinder cooker and his range cooker; he owns a microwave in which his home help uses to heat food. His home help visits three days a week to cook, and he gets a 3 course dinner in the day care centre on Wednesdays. He would like to attend to his own cooking, but this is getting more difficult for him with age. Brendan has his dinner during the day, and a lighter meal in the evenings. His range cooker holds many fond nostalgic memories for him, he remembers his mother cooking on the open fire, and how she would clean and polish the cooker and bake cakes on Saturdays.

6.5.6. Other Products

Brendan watches the news on television sitting at his fire in the evenings when he comes in from work. He listens to the radio in bed in the morning; this allows him to know what time it is to get up at for work. He tries not to watch any long programs on television as he usually falls asleep because of his medication and wakes up cold. He has recently bought an alarm to alert him to wake him up to go to bed when this happens. He uses his landline phone frequently and has all his important telephone numbers written clearly on the wall ready for when he needs them.

6.6.   Persona Display 6: Declan Allen

Figure 6.6: Persona Display 6. Declan Allen
(Large scale Persona Display Board located in Appendix J6)

6.6.1. Profile

Declan Allen, 81, has been living independently for 3 months. Married twice, his second wife died 12 months ago. Declan worked in England for 30 years as a builder returning to Ireland in 1994 to retire but found this a difficult experience socially. Declan is quite pessimistic about life, admitting to being a difficult person to get along with. He feels isolated and lonely and has only one visitor, his daughter, who visits "now and again". He also feels he has made no friends since arriving home from England. To get out of the house he would go for a drink on his own to the local pub, but he is getting less motivated these days, instead he goes to the off licence every day and drinks at home.

6.6.2. Environment

Declan lives in a small two bed roomed house in a social housing complex in the suburbs of Waterford city. He moved out of the house he shared with his wife after she died last year. His son in law helped him move home and buy furniture. As he is still in the process of moving in, his house is bare and empty, with only essential

items to keep him company. He plans to put in extra storage for the rest of his possessions when he collects them from his old house. Declan only cleans his house when he has too, feeling no motivation to regularly do so.

6.6.3. Health

Declan has had both his hips replaced in the last five years and this has given him a new lease of life after enduring severe pain. Declan is gaunt and underweight in appearance, he admits to drinking too much and drinking in the mornings, he is trying to cut down. He says that alcohol sometimes makes him depressed, and that alcoholism runs in his family. Declan is also a heavy smoker, smoking over 25 cigarettes a day. His wife also smoked heavily and died of lung cancer.

6.6.4. Heating

Declan has an open solid fuel fire, electric storage heating and a gas heater to heat his home. His open fire is the preferred option. He lights a fire every day in winter, and occasionally in summer. He dislikes the storage heating in his new home as he feels it is too expensive, he also finds it difficult to understand the controls. He uses a gas 'superser™' gas heater regularly as he believes it cuts down on electricity by only heating small areas. He also likes the fact that it is portable and he can bring it anywhere he likes.

6.6.5. Cooking

Declan only learnt to cook last year since his wife died, he admits to "not eating much". To cook Declan fries most foods and uses the deep fat fryer frequently. He "hates" using his microwave as he fears a possible effect from radiation from using it. He usually has only one main meal a day at 2 o' clock. This would normally be a ready meal, steak, or fish and chips made in his fryer. He eats all his meals on the couch while watching the television.

6.6.6. Other Products

Declan spends many hours of his day in front of his television, however, now he is finding it more difficult to watch with his failing eye sight.

He never learnt to use his washing machine, and gets his clothes washed in the local laundrette

6.7. Persona Display 7: Fiona Rodgers

Figure 6.7: Persona Display 7. Fiona Rodgers
(Large scale Persona Display Board located in J7)

6.7.1. Profile
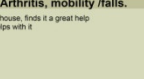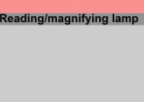
Fiona Rodgers 80, is a widow living independently. Originally from England, her husband died nine years ago. He was a successful business man and Fiona feels blessed that she can be financially comfortable in later life. She has two sons that live close by, and they now run the family business. She has an early morning routine starting at seven, which consists of going to 9 o' clock mass every weekday. Her spirituality is one of the most important aspects of her life. Fiona leads a full and active life with a diverse range of activities, interests, and hobbies. She likes to

socialise through golf and swimming, and gets involved in older person groups in her village. She proudly states that she has 50 years unbroken involvement in local charities. She goes abroad for 1 month of the year to "get away from the Irish weather". Fiona drives, but doesn't go long distances. Her sons would prefer if she did not drive at all.

6.7.2. Environment

Fiona lives in a large detached 5 bed house in a rural village in Co Kildare. She and her husband decided to build their house close to family and friends 15 years ago "to see out their days". She gets on very well with her neighbours and believes that a good relationship with people nearby is vital for older people. Fiona likens winter in Ireland "to being in jail" and she feels confined to indoors after 4 o' clock every evening. In her unused rooms upstairs the curtains are pulled to keep heat contained. On the ground floor a large collection of antiques are proudly displayed.

6.7.3. Health

Fiona likes to stay active, she goes for walks daily, and she finds that swimming helps relieve arthritic pain in her shoulders. If it was raining she would exercise indoors by walking up and down her stairs several times. After a recent fall she had to fit mobility railings in parts of her home.

6.7.4. Heating

Fiona uses oil central heating and an electric fire to heat her home. She cannot use her heating timer, so she just switches the heating on and "hopes for the best", or gets her sons to set it. She found her old open fire dirty and inconvenient for fuel storage and for bringing fuel into the house. It was these inconveniences that lead her to purchase an electric fire. She spends most of her time in her sitting room; here she has an electric portable heater positioned beside her couch. She uses heat from this to

soothe arthritic pains in her hands. Recently she had an accident with this heater getting caught up in the electrical flex and falling heavily on her shoulder and arm.

6.7.5. Cooking

Fiona says she never really cooks, choosing instead to go out for meals to the local hotel. She feels lucky to be able to afford to do so. She is well known at the hotel where she eats daily and likes to meet people and socialise over lunch. She usually has a long lunch; therefore, she would only have something small to eat in the evening when occasionally she would grill fish or meat.

When moving into her new house she had to buy a cooker so she decided to buy a small one, she rarely uses this. She also rarely uses her microwave occasionally using it to reheat foods.

6.7.6. Other Products

Fiona recently bought a reading/magnifying lamp, using this when reading her newspaper in the evenings.

6.8.   Triangulation of Personas, Building Theory for Practice

6.8.1.   Theory Building for Practice

The qualitative enquiry process is mapped in the following order- *Codes* followed by *Categories* developing into   *Themes/Concepts* and finishing in *Theory* (Saldaña, 2009). In qualitative research and ethnography the main output from a field study for epistemological purposes is theory.   The practice of designing equally requires theoretical viewpoints prior to establishing implications and requirements for design. Sutton and Shaw cite "theory" as being "about connections among phenomena, a story about why acts, events, structure and thoughts occur" (1995, p.378). Similarly, in a more simplistic definition: theory is "a way of asking (enquiring) that is guided by a reasonable answer" (Wolcott, 2009, p.75). These definitions illustrate the depth of interpretation, synthesis, and enquiry involved in the process of building theory.

The research thus far can be positioned on Saldana's 'qualitative enquiry process at the stage of 'themes and concepts' moving to building theory from the data. The personas present us with themes and concepts, offering condensed thematic displays for theoretical viewpoints to be drawn upon. To understand what form of theory is required for design purposes it is necessary to plot the future process stages. In ethnographic studies for the purposes of design, Macaulay et al., conceptualises this as the "practice-theory continuum" where the researcher is "developing understandings of problem domains and the role that future artefacts might play in them" (2000, p.42). At this stage, the research is now moving along this continuum and approaching a transition point which requires a bridge between condensed ethnographic data (personas) into design theories and further to design practice.

It is important to note that personas in isolation do not create theories or indeed implications for practice, products, or designs. Consistent with "interpretation, synthesis and further enquiry", creating theoretical output (to use both Sutton/Shaw's and Wolcott's definitions) requires further theoretical connections within the personas. For design practice, e.g. in design industry, personas are especially useful for building design requirements, as they place users at the centre of the design process by focusing designer's attention on their core needs. This person centricity is particularly important at early stages of product development; e.g. ideation and conceptualisation. Traditionally, personas are used as part of the 'creative leap'

between people and artefact to build design requirements, rather than for deep theoretical perspectives. In this research establishing theoretical output with 'depth' and 'truth' was a central purpose of the personas prior to building design requirement. At this point, when faced with creating theories for design practice from the seven personas, two particular points surfaced requiring attention:

i. The data required further aggregation and synthesis into a unitary, composite format

ii. The data required triangulation in order to assist creation of objective valid theory.

6.8.2.   Further Defining of Focus and Synthesis of Data

Although representing substantially reduced data, the current personas were too lengthy and detailed to be effective as design tools. The personas are seven differing archetypes representing the themes and concepts elicited from the field research. Further aggregation and synthesis serves to identify and develop overarching theories and thereby elicit tangible areas where products may be designed and developed. The goal is aggregation and synthesis into a unitary concise actionable format. The tangible output is written theory with direct implications for design.

6.8.3.   Triangulation of Data for Objective Theory

For the purposes of validity, particularly in qualitative research, the importance of triangulation of analysis is crucial. The greatest risk to validity at this point was the matter of subjectivity and researcher bias. Inevitably the researcher's view point was dominant in analysing, coding, and synthesising the data gathered. Triangulation processes mitigate this subjectivity and bias in qualitative and ethnographic studies. This involves using more than one method to determine whether data has been understood correctly (Bryman, 2004). 'Validation' in its qualitative definition is: " ....the extent to which an account accurately represents the social phenomena to which it refers" (Hammersley, 1990 p.57). Moreover Robson offers the definition of "establishing trustworthiness" in the study, ...concerned with whether the findings are 'really' about what they appear to be about" (2002, p.93)

Creswell suggests methods to ensure objectivity, accuracy and validity. One method applicable for design purposes is "peer debriefing" (2003, p.196). Peer debriefing is a process where an external viewer or viewers examine the data and provides input as to its accuracy. As it is a shared process, peer debriefing was pertinent at this stage not only to ensure qualitative rigour and strong theory, but also to provide input into the process of designing. In design practice the designer is rarely an isolated entity. Equally so, it is unadvisable before any creative process commences that interpretation of data is left to that of an individual designer. Interpretation from other parties unfamiliar with the research to date would add value by way of personal viewpoints and would offer the researcher fresh perspectives from the data. Additionally, as the research consisted of high volumes of visual and photographic data, differing viewers and interpretations were particularly important. Pink notes that:

> "Analysis [of photographic material] is not a simple matter of interpreting the visual content of photographs...but involves examining how different producers and viewers of images give subjective meaning to their content and form" (2001, p.95)

6.8.4. Participant Selection for Interpretation

Wolcott posits that in the process of interpretation "for every additional viewer there is an additional view" (1994, p.42). This can have both positive and negative effects on the outcome of interpretation and review. Additional views can bolster objectivity. On the other hand, too many viewers could negate the purpose of defining the focus of the data. Therefore it was important to select reviewers carefully, ensuring a balance between quantity and exploration of ideas and quality and depth of input. In sourcing suitable participants for interpretation purposes individuals were selected based on knowledge and experience from relevant fields. This required selecting participants that could offer differing theoretical lens or perspectives (Creswell, 2003), contributing richness and objectivity to the theory being developed. Chosen were participants experienced in both the fields of older adult care and design. Three participants were selected; a product design professional, an interior design professional, and a nursing professional all of whom had several years of industry experience. In order to protect the identities of the

individuals involved, all participants were unfamiliar with the personas and more importantly, the fieldwork participants.

6.8.5. The Peer Debrief Sessions

As previously discussed, the purpose of the peer debriefing session was to attain validity by way of interpretation and of defining focus in the research. To design and coordinate a peer debriefing session, it was vital that focus was maintained on the true needs of the personas presented. This would allow the viewer to 'get into the shoes' of each persona, and truly empathise with their design requirements. However, within this focus there was a requirement for creative space; space to creatively explore causality and objective meaning contained within each persona. For this and to gain appropriate interaction between the viewer and the personas, the environment and atmosphere had to be a relaxed one. Therefore it was decided to design a session with a mix of affinity diagramming or brainstorming (ensuring design and creative input) and memoing (Corbin and Strauss, 2008), (ensuring qualitative methods were present). In these sessions, ideas and interpretations were enabled to flow divergently in the style of a brainstorming session, yet were also controlled by the information contained within each persona. This allowed for the development of theories, concepts, and ideas throughout the sessions. A similar style of ethnographic interpretation for design purposes was conducted by Wherton and Prendergast (2009). In identifying opportunities for technologies for older people, ethnographic data was presented in a collaborative process involving multi-disciplinary members. In this instance all data was analysed, documented, collated, and categorised into themes.

Each session involved a facilitator and a reviewer, two participants reviewed two personas, and one participant reviewed three personas. The sessions progressed as follows:

i. Preparation

In preparation for the session, the persona displays were printed in double A2 format and applied to mounting card with an area provided on the display to add notes as the

session progressed. Post-it notes™ and markers were provided to capture and record these progress notes.

ii.   Briefing

Participants were firstly briefed on the objectives of the session namely, validity and narrowing of focus for the purposes of creating design solutions for cooking and heating products for older people. Following this, an overview of the methods used to create the personas was explained. Guidelines and rules of the session were relayed, these similar in part to that of a brainstorming session. The primary rule was that the reviewer's comments were central to the session, however, interactivity was allowed, whereby the facilitator could build on the ideas and suggestions of the viewer as the session progressed. To guide interpretation the facilitator asked these concise questions:

- What implications does this data have for the personas cooking and heating needs?

- What are the requirements in cooking and heating products for this persona?

After asking these questions the following more direct question was asked in isolation

- What features would this persona require in future cooking and heating product design?

iii.   The Session

Each session included a facilitator (the researcher) and one participant (interpreter/reviewer). To commence the session, the personas were introduced as fictional characters with fictional lives, each persona representing a category of Irish older adults from the study. Following introductions, and taking on the role of narrator, the facilitator verbalised the text from the persona display line by line. Rather than adhering rigidly to a verbatim method, narrative and storytelling was used to add a personal and 'realistic 'dimension and to strengthen empathy with the persona. Pauses in narrative were frequent to allow the participant to interpret and describe meaning (if any) from each line. Short memos were documented by both

facilitator and participant on a single post-it note and placed beside the display. This process continued until the full persona display was relayed to the reviewer, all areas exhausted, and a large quantity of post-it memos produced. If it were felt certain areas needed to be explored in greater detail, leading questions were introduced by the facilitator. Leading statements such as "how might we" were used to elicit flow and to transform insights into opportunities. (IDEO, 2009)

Figure 6.8: An example of 'in progress' images from the Peer Debrief Session

iv.   Categorisation

Each post-it note memo was categorised by grouping and regrouping into similar theme bundles. After which these bundles were assigned a theme heading. The process of grouping and regrouping was complete when each post-it memo was assigned to a theme bundle Figure: 6.9 (listed in Appendix K). These theme bundles formed the basis of prompts for theory building purposes; the development of this theory was a combination of the researcher's field experience and validation through this peer debrief session.

Figure 6.9: Categorisation of persona memos into theme bundles

Chapter Summary

This chapter presents the synthesis of a design ethnographic study through 'data display' in the form of seven personas. These were fictional composite characters that can be used as a shared means of further analysis by designers, ethnographers, and other disciplines. It is shown that personas can be a succinct, highly visual, and descriptive means to display complex and dense data derived from the field. For validation purposes this chapter describes the process of peer debriefing as a means of sharing and interpretation to verify the accuracy of findings. Furthermore, these interpretative processes are used to narrow the focus of the study for the purposes of design application.

Section C: Results and Conclusions

Chapter 7.
Theoretical Research Findings

7.0. Theoretical Research Findings

Chapter Overview

This chapter presents theory constructed from the field research. The theories are developed through the lens of the persona data displays from Chapter 6. They are developed in multiple dimensions, elucidating causality and correlation around various observations and suggesting possible solutions for redesign. They demonstrate the great complexity of considerations necessary in designing domestic products for older people. The objective is to offer concisely formulated theory to serve as a transitional path to design practice.

7.1. Introduction to Theory

The 'peer debrief' sessions offered fresh perspectives and objective views of phenomena within each persona. Some facts about these personas which were previously regarded as mundane were transformed into new insights into older person's lifestyles and product interactions. Equally, some phenomena considered important to the researcher were considered less important by peers, after balancing bias and strengthening theoretical output. The shared narrative nature of the sessions about personas maintained an empathic connection and provoked essential dialogue between facilitator and reviewer. Considering the linkage of occurrences and causality, further questions arose, and it was often necessary to broaden the scope to ensure that all avenues were explored. In effect, the multiple viewers reinforced the objectivity of the conclusions from the field data.

Many themes and insights were discovered within the seven personas, providing theory for further action. The following are an accumulation of these insights into the final major themes. These include social and emotional wellbeing, usability, ergonomics, cost and safety, with health transcending all these themes. The complexity of these themes will be described; furthermore it will demonstrate that no one theme exists in isolation, in some instances causality encompasses multiple themes.

7.2. Emotional Wellbeing

7.2.1. Introduction

Products within the domestic environment possess emotive qualities far beyond their primary functionality. This is very apparent in the cooking and heating products that older people interact with daily directly and indirectly. They hold many latent emotive connections. Their presence in the home allow for spaces of comfort and social interaction. They also serve as 'familiar allies', providing a sense of home and familiarity, greatly enhancing emotional wellbeing.

When it comes to classifying the emotional connections observed in the field, they can be aligned in part to Normans three levels of emotional state in product characteristics. These are cited as: Visceral, Behavioural, and Reflective connections (2004b, p.39). From a purely emotive stance the visceral and reflective levels were continually apparent. Rather than isolated entities, visceral and reflective levels were intrinsically linked. The 'behavioural level' was also ubiquitously present but was seen more so in product functionality. This will be discussed further in 7.6 Product Usability.

7.2.2. Aesthetics - Visceral Emotive Connections

In product design, Norman claims that visceral level or "wired in" (2004b, p.67) emotive responses relate mainly to the aesthetic values of artefacts. This was continuously observed; however visceral level responses from product aesthetics also appeared to heighten the illusion of functionality, for example physical comfort. This was strongest for heating products, with visual aesthetics enhancing the sense of warmth and increasing the physical comfort level in homes. The 'open fire aesthetic' was a preference, having a traditional open fireside visual light or 'a glow' emanating in a room providing a sense of heightened comfort. Even when heat emission was not active by heating products, this aesthetic provided comfort to relax, and offered a sense of familiarity and companionship. An 'open fire aesthetic' also encourages more activities such as hobbies within environments, providing an active and 'lively' focal point in the home. The fireplace provides companionship within

the home by offering a comforting unimposing presence; both when older people are on their own or in the company of guests.

Additionally, the humanistic qualities of cooking and heating products should be noted. While co-existing with products in the home over many years, cooking and heating products are commonly described anthropomorphically and assigned with attributes of human behaviour. Anthropomorphism is a large part of visceral emotive connections in heating products. These become referred to by personal 'nicknames' and described with humanistic metaphors such as "waking up the house" and "...it's the heart of the home". Both cooking and heating products also embody many visceral emotional experiences through family stories, shared occurrences, and watershed moments from the past. They heighten these experiences by being a sensory trigger for smells, sights, and sounds (i.e. traditional cooking, baking, and open fires). These are all positive familiar touch points of ritual domesticity.

7.2.3. Reflective Emotive Connections

Norman suggests that people have reflective emotive connections with products in many ways. Examples of reflective connections are through personal satisfaction in use, and how products can evoke memories and meaning to the user (2004b). In this definition, 'meaning' within products deals with self image and how the product 'reflects back' on the user. Reflective emotive connections from the products older people use are complex and are intertwined with visceral level connections through product aesthetics. There were two main forms of reflective connections in cooking and heating products. From an aesthetics viewpoint products are used as cues to both the past and the future. From a functionality viewpoint products are used as reminiscent and personalisation focal points in the home.

7.2.3.1.Aesthetics - Cues to the Past and Possibilities for the Future

In older people's homes, traditional and contemporary product aesthetic styles constantly coexisted. Older people did not want to feel stigmatised by 'old style products' and openly embraced modern product aesthetics within the home.

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However, a clear ambiguity or tension exists between the desire for traditional aesthetic, reflecting nostalgic tones, and contemporary aesthetic, reflecting convenience and modernity. This ambiguity existed as a desire to have cues both to the past and future within material objects displayed in the home. Modern technology with contemporary styling (e.g. laptops, flat screen digital televisions) showed visual outward statements of intent, possibilities for the future, self sufficiency and independence. Contrasted with these were traditionally styled products (some with redundant functionality). These were used specifically and explicitly as cues for nostalgia, sentimentality, and memories of positive life experiences.

7.2.3.2. Reminiscent Focal Points

The phenomenon of reflective emotive connections and aesthetics is seen further in product functionality. As a secondary function, cooking and heating products are main visual focal points in the home whereby fireplaces, stoves, cookers, and microwaves (Figure 7.1) provide affordance for displaying material possessions. These products act as congregation points for important and sentimental material goods such as photographs, awards, mementos, religious artefacts, and many others. Within this functionality there were strong connections between older adults and emotive, nostalgic, and narrative values in the displayed material items. A typical example of this is shown in Figure 7.2. In this instance a female participant's fireplace has been made redundant of its heating functionality, however, now it is used for its emotive qualities, displaying her important personal possessions. This gathering of important items for display assumes a highly emotive function for the older adult. The research suggests that these are "reminiscent focal points" (White and Devitt, 2011a) in the home. Developing these emotive functions in products further is of particular topical interest. Recent research shows that the positive effects of reminiscence and remembered experiences improves wellbeing, communication, and social contact in older people (Woods, 2010). This is particularly positive for, but is not restricted to older people suffering with dementia. Similarly, in future design technology development, research by Orpwood et al., positioned promoting reminiscence as a key issue to the quality of life of people with dementia (2008).

7.2.3.3. Personalisation of Products

The display of material items on and in the proximity of cooking and heating products provides further affordance for personalisation. Designing future products with elements of personalisation will not only promote positive mental health through acts of reminiscence, but will add to the user's comfort and familiarity within the domestic environment. Acts of personalisation were seen as distinctly important at transitional periods in later life. Instances of this include moving home in later life particularly to a nursing home environment, or when a spouse passes away and dealing with living on their own for the first time.

The concept of personalisation gives the user the ability to make the house 'more of a home', hence providing a more familiar and comfortable environment in times of radical transition. Moving home in later life is a major event on so many levels. This event is particularly emotionally distressing if a spouse has recently passed away, or if one is moving away from a home where lifelong memories are embodied. As in many cases with moving in later life, one is downsizing to a smaller dwelling therefore only essential items are selected to accompany in this change of life. The fundamental products we have in this transition and the ability to personalise these are essential to our emotional wellbeing.

Figure 7.1: A participant uses her microwave as a display focal point of memories and mementos

Figure 7.2: Female research participant uses her unused fireplace as reminiscent focal point for her important material possession

Participant quote: "My fireplace is blocked up, but I like to keep all my stuff there"

7.3. Social Wellbeing

7.3.1. Introduction

Social inclusion is a basic human need for all humans, and a need that grows as we get older. Two reports into older people in Ireland have reflected this fundamental need. Firstly the longitudinal study TILDA, simply states that with greater social integration quality of life increases (2011). Secondly, loneliness which is a result of social isolation, is reported by Walsh and Harvey as the greatest problem faced by Irish older people that live alone (2011).

Built environments, living spaces, and domestic products have substantial bearing on loneliness and social inclusion. Cooking and heating products play a vast and complex role in older people's sense of social inclusion. Observed in the field was that the ability or inability to use these products affected levels of this. Both positive and negative social experiences are derived from the inability to use products and poorly designed usability features. This leads to sometimes more, and at times, less social interaction. This research demonstrates that the social role of these products becomes more complex when associated with emotional, health, financial, and mobility themes. These products whether heating source or cooking appliance are essential domestic social touch points, fostering positive social inclusion in older people.

7.3.2. Social Emotional Hotspots

The emotional wellbeing connections discussed previously have a direct correlation with social connections involved in cooking and heating products. This correlation stems from social interactions involving these products, their users and others. Heat and heating the home has a major influence on social interaction, creating both social and emotional hotspots in the domestic environment. The previously discussed reflective emotive act of reminiscence creates an important individual/personal experience and shared/social experience. In times when older people are on their own, reminiscence is a positive reflective and comforting experience for the individual. When shared with others, it evolves into a rich social experience through sharing conversation, stories, and memories. This sharing, in many cases, becomes

part of daily and weekly routine increasing further social integration. Heating products provide focal points for this activity, they assume ideal natural gathering points for social interaction, firstly as a place where memories, stories, and events can be contained, recalled and shared. Secondly, through physical warmth, providing comfortable and healthy environmental conditions with ambiance.

7.3.3. Contained Living Spaces[9]

It was concluded from the research that these natural gathering points are not, and for future design consideration, should not be confined to fixed heating sources in the home e.g. fireplaces. In cases of older people with limited mobility, mobile or localised heat sources are necessary to create these 'social hotspots'. It was observed that limited mobility in older people leads to more confined living environments. Observed in this research were older people creating modular stations around themselves for quick access to personal and important items. For the purposes of description the researcher noted these as "contained living spaces", Figure 7.3 illustrates an example of this concept.

These spaces or 'stations' were typically constructed for functional use, however these were also utilised as 'social hotspots'. These have further design potential for emotive development. Commonly these were located around the older person and at close proximity to them. These were usually a construct of moveable furniture e.g. tables, desks. These contained living spaces were commonly located beside heat sources such as radiators and portable heat sources e.g. small electric heaters. This supports research by Liao and Chang identifying that the specific requirement for space-heating[10] increases as we age (2002).

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[9] This concept will be explored further in 7.4 Financial Cost.
[10] As discussed in Chapter 1 Space heating products are products that "...keep each room at a temperature appropriate for use" (Allied Ironfounders Limited, 1952)

Figure 7.3: An example of a "contained living space" constructed as a result of mobility issues and located near a heating source

7.3.4. Cooking - Inability and Demonstration of Ability

Dining and eating with family and friends provides one of the most effective means of social inclusion for older people. Many older people rely on this as a daily or weekly source of interaction. Whether it's visiting friends, neighbours or family, having daily meals in a communal space, or being visited in their own home, dining in company provides essential routine and strengthens sense of self and independence.

An inability to cook or to provide meals can have detrimental effects on health. This not only leads to nutritional issues (see 7.8.1 Health, Nutrition, Cooking Products) but is also strongly associates itself with older people being socially excluded. This is particularly the case where meeting friends or family for dinner is a sole social outlet. Figure 7.4 (with caption) documented this. It illustrates the unused dining space of a female research participant who, after a series of falls had sustained injuries to her wrists and cannot cook to her desired standard anymore. Prior to this her main social outlet was to entertain at dinner parties with her talent for cooking.

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She has seen a marked decline in visitors to her home since her falls and inability to cook.

The act of cooking is more than the provision of personal daily nutrition for older people. Cooking is an outward gesture of ability, a statement of independence and self sufficiency, all of which enhance social involvement and maintains pride in self. For Irish older men and women the ability to cook for themselves is a strong source of pride, and a statement of self-confidence and independence. Pride is enhanced when offered a platform to demonstrate ability rather than disability to their peers, friends and family. Cooking products should and can be designed to enhance a demonstration of ability rather than disability in the user.

7.3.5. Shared Usability Increasing Sociality

Participants in this study viewed domestic product usability as a balance between independence and social interaction and new products created should allow for this balance. Specific examples were seen both in cooking and heating products and most notably the usability of controls in these products. Strong social bonds are created through using peripheral control products such as thermostats and temperature switches. In one respect the use of controls (e.g. thermostats) are necessary for independence in the home, however, family, friend or carer interaction and involvement in the operation of these provide both social contact and peace of mind for all stakeholders involved. These controls also provide a sense of security and safety for users, family, and carers. In some situations, the inability to operate these controls is the only opportunity for social contact; typically through the intervention and assistance of a family member.

Product controls and their intuitive use remained a sticking point for older users throughout this research and this is discussed further in 7.6. Product Usability. The research introduces and suggests a concept that is real yet not explicitly recognised in the literature reviewed, a concept we have called "Shared Usability". For future design concepts with shared usability, it is proposed that usability be a shared stakeholder concern to enhance social contact, safety, and independence. By providing levels of shared control over products, levels of self sufficiency could be

achieved in use, regardless of the level of ability of the older adult. With shared usability, even at the lowest level (perhaps with an individual suffering with dementia) operation and use of products can be viewed as manageable or can offer a sense of 'perceived independence'. A significant aspect in designing concepts with shared usability would be to prevent negative stigma by way of aesthetic or function and to ensure that it does not undermine the older person's capability in any way.

Figure 7.4: Unused dining spaces

Female research participant who feels socially isolated following a number of falls in her home. Her dinner parties were her only social outlet and these have ceased due to her inability to cook.

Participant Quotation: "I miss hosting my dinner parties, after my falls I can't cook well"

7.4. Financial Costs

7.4.1. Introduction

Financial costs of energy and the usage of daily household energy was an omnipresent topic throughout this study. This occurred across the full breath of participants whether they were financially comfortable or struggling day to day with financial issues. In Ireland there are many energy price discounts available for older people together with manageable pay plans, however, it was noted that these still fall short in relieving a pervading and underlying fear of energy costs and usage. Cooking and heating products and appliances are central to this fear in usage in the home. It was also shown that cost factors have a direct knock on effect on a person's sense of social inclusion. This is heightened further when linked with mobility issues, this diminishes pride, and, more importantly, is damaging to physical and mental health.

7.4.2. Fuel Poverty, Spatial Shrink, and Mobility

Due to Ireland's generally mild and cool climate, with inclement weather not just confined to winter months, high energy costs remained constant yearlong for older people. Generally Irish older people remain indoors longer than other population cohorts. This is for varying reasons: poor mobility, not being in fulltime employment, or for numerous health issues and needs. Therefore, older people rely on cooking and heating products more and in different ways to provide warmth and nutrition. Throughout the research these were seen as products that were essential in making the domestic environment more comfortable and healthy to live in for extended periods of use.

One of these comforts was 'thermal comfort' provided by heating products, with the appropriate level of this critical in the home. The Combat Poverty Agency asserts this to be essential in supporting health and human activity in the home with the appropriate minimum temperature being 16 degrees Celsius up to 21 degrees (2008). In the field, it was noted that when internal temperatures are reduced and thermal comfort neglected, it was extremely problematic for both health and social inclusion. The main catalyst for reductions in thermal comfort was an issue of high energy

costs. This reflected findings by Walsh and Harvey showing that fuel and heat costs are the greatest financial point of pressure for Irish older people (2011). Observed continually were instances of participants dipping in and out of suspected 'fuel poverty'. Fuel poverty although complicated to measure, is cited as involving a mix of energy efficiency, household incomes, and fuel costs (McAvoy, 2007). Traditionally the issue of fuel poverty is prevalent across all age groups, however, older people, due to factors discussed previously, are most open to its hardships.

Suspected cases of fuel poverty drastically change physical domestic environments, social inclusion, and have major impacts on health and wellbeing. Older people under financial pressures particularly have difficulty heating their entire home to a desired level (White and Devitt, 2011b). As a result, a proportion of participants live in a smaller area of their dwelling, usually in the corner of a ground floor room centred in proximity to a localised heat source such as a radiator. In many cases the remaining house is left unused, prone to disrepair due to lack of use, and open to health hazards through damp and deterioration over time. This phenomenon in living environments has been cited as "Spatial Shrink" (McAvoy, 2007, p.6). This is a growing concern within cohorts open to impoverished conditions or susceptible to fuel poverty. Spatial Shrink was not just isolated to impoverished cases; it was also observed in the field in older people with mobility issues, and particularly in participants with both financial and mobility issues. Figure 7.5 illustrates this; this research participant's entire home has shrunk to the size of her living room due to cost and mobility issues. The remaining home is unheated, leaving it exposed to damp and deterioration.

Figure 7.5: Spatial Shrink: cost and mobility issues

Participant Quote: "I never go upstairs anymore because the stairs are too steep and it costs too much to heat the whole house"

The energy efficiency and quality of homes and products are a large contributing factor to high energy costs and spatial shrink. Energy efficiency is an ongoing concern for all people and built environments, one that increases with older dwellings and older products/appliances. It is not just older dwellings and poorer participants that are susceptible to this; financially stable persons interviewed also require more energy efficient means of heating their homes. In many instances homes were relatively new buildings, however large in scale. In these cases spatial shrink was again evident as a result of mobility issues. In an attempt to achieve more energy efficiency, extreme intervening actions and modifications to homes and products are being attempted (Example seen in Figure 7.6). In product selection and purchase, older people associate energy efficient use with using smaller scale appliances such as small tabletop ovens. (Discussed further in 7.6 Product Usability)

Figure 7.6: Example of a male research participant dealing with his issue of heat efficiency in his living room.

Participant quote: "I put my best blanket on the fire because of the cold that comes down the chimney; I don't light it 'cos the heat goes straight out the chimney"

With energy inefficiency in poorer homes there remained the threat of what is cited in the United Kingdom as a "heat or eat trade off" (Beatty et al., 2011). This was not noted in the extreme case of choosing to either pay for heat or food on a given occasion; however, decisions were made as to quantity of food purchased or energy used. When these decisions had to be made, health suffered either through decreasing the thermal comfort of the home, or nutritional intake.

7.4.3. Knock on effects of Spatial Shrink - Pride and Social Inclusion

In cases of spatial shrink, it is not just the occupant's physical home that is affected, peoples self confidence and pride also suffers. Pride is an ever present factor in relation to household appearance with older people; this pride is seriously diminished when an older person has to rearrange their living environment due to spatial shrink. This was ubiquitously present particularly if mobility has restricted older people to the downstairs floor of the home only. A common occurrence was

moving a bed downstairs to the ground floor (as in Figure 7.5). Participants felt deep embarrassment in using their living room or kitchen as a sleeping area due to mobility or cost issues. Albeit practical, having a private personal space such as a bed in full view of visiting guests was thought to portray personal or physical weakness. Many felt less willing to have guests in their homes because of this. Being confined to limited rooms of the home also resulted in exposing parts and objects of the home they would rather not. Examples of this were multiple mobility aids being prominent, visually communicating and heightening a sense of vulnerability.

7.4.4. Food Costs and Management

Participant's continually remarked on the financial cost of buying food as a concern, however, it was noted that older people adapt to an economical means of cooking to combat this. In many instances cooking large meals and saving portions for later in the week: e.g. roast dinners on Sundays saved for lunches on Monday. Organising weekly meals within budgets is an ongoing task, reliant at times on social eating occasions and getting leftovers from friends and neighbours. Buying food portions 'for one' is problematic, due to the difficulties in finding a balance between nutritional, cost effective small portions that will not spoil. 'Meals and Wheels' services offer an excellent solution to this balance, providing nutritional, cost effective, and manageable portions to many people unable to do so for themselves. Either by convenience of preparation or cost, older people are continually drawn by meals with poor nutritional value such as packaged frozen foods.

7.5. Product Safety

7.5.1. Introduction

This research reinforces, as priority, the requirement for Irish older people to feel safe and secure in their lives, environments and homes. Many live independently and it was shown, in line with research by (McGee et al., 2005), that they wish to stay so within their own homes for as long as possible. Unfortunately though, as we get older our independence will naturally decline due to vulnerability in illness and reduction in cognition and mobility. As a result, as we age, the more susceptible we are to security and safety being weakened. Future domestic products should compensate even at lower levels for the natural human decline through ageing. Safety feature considerations will be some of the most important design aspects for future products. These features will have to both explicitly offer a sense of safety and security to the user and implicitly offer this to other stakeholders. Findings from this research support the notion that safety is inherently linked with remaining independent for longer in later life and for the concept of 'ageing in place'.

7.5.2. Watershed Moments: Accidents in the Home

At any age in life, everyday domestic products possess some level of danger to users either by misadventure, misuse, or product failure, heightening this danger is age related decline. Cooking and heating products possess a critical danger and risk to safety in the home predominantly due to the presence of heat and open flame. Additionally there are many behavioural contexts in which accidents could inadvertently happen to the older user. Prioritising product safety and eliminating danger from tasks and behaviours in using these products is of utmost importance. Although essential in the home, these products possess a great threat to safety and independence.

The research revealed that cases of misuse or misadventure of cooking products played a major role in watershed moments in the lives of older people by restricting independence and terminating ageing in place. Examples were illustrated through stories and scenarios such as: leaving newspapers or pots boiling on an active cooker hob, being forgetful and walking away, all leading to house fires and accidents.

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These stories and scenarios lead to loss of credibility and confidence in an individual's ability to live life autonomously. This was shown to lead to life changing moments, such as a move to a care home, or having daily dependency on others. In some instances these scenarios are fully founded, and can alert carers or family members to possible cases of dementia, or that the individual needs additional attention. However, in other instances it can reflect over-negatively on individuals, leading to presumptions and rash and poorly informed decisions regarding independence.

Minor accidents in the home e.g. minor burns; also draw negative attention. Very minor hand burns for example were shown to lead to self doubt in ability to complete household chores. In more serious instances where medical attention had to be administered, extreme lack of confidence developed from being 'out of action' in household activities for sustained periods of time. This leads to people being less motivated to care for themselves.

7.5.3. Positive and Negative Behaviours and Rituals

Through an awareness of the threat of minor burns and accidents, prevention mechanisms are put in place on cooking products. An example observed with many older people was in avoiding collisions and spillages with pot and pan handles; creating a ritual of providing sufficient clearance by only cooking on the back two rings of their hob. The research also brought to light negative examples of rituals or behaviours of use whereby major accidents could occur. These behaviours, inconspicuous to users as they are practiced daily, have the capability to cause accidents leading to watershed moments in life. A prominent example of this was discovered when a respondent proudly demonstrated his daily ritual of lighting his open fire in the evenings (Figure 7.7 with caption). He revealed an example of a daily ritual practiced for over 70 years, but he was unaware of the substantial safety risks within this ritual.

Figure 7.7: Issues relating to everyday unsafe ritual in cooking and heating: a research participant's open fire is continually set, ready to be ignited.

Participant Quotation: "I put a bit of agricultural oil on it in the morning so I can just light it with a match when I come in from work in the evening"

7.5.4. Perception of Safety

The perception of safety has a great bearing on whether a product is effectively used or not. A clear case in point being the microwave oven, a product that had older people divided in a 'love hate' relationship. It was 'loved' by many for its convenience in preparing foods but equally 'hated' or feared for the safety implications of use. This was highlighted by a research participant who described strongly his fear of using his microwave (Figure 7.8. and caption)

Figure 7.8: A participant's unused microwave: Unsafe risk or product of convenience?

Participant Quotation: "I never use that thing, it reminds me of Sellafield"

7.5.5. Shared Usability - A Concept for Safety

From this research we can conclude that product safety is perceived from two viewpoints. Firstly, from an older person's viewpoint, including their perceptions of product safety and being safe. Secondly, other stakeholders (such as family members and carers) perceptions and 'comfort in the knowledge' that the products being used are safe for individuals. Future products can and should provide a sense of security and safety both for the user and the other stakeholders. For product safety functionality, the concept of shared usability (as described in 7.3.5 section of Social Wellbeing) can again be highlighted, demonstrating the benefits of exploring this concept further.

7.6. Product Usability

7.6.1. Introduction

Throughout this chapter 'usability' in products has been an underlying issue present in emotional, social and cost factors discussed. Product usability is an important and multifaceted factor for older people. From the cognitive understanding of complex systems, to the practicalities of basic functionality, this section will attempt to unravel and classify issues for design purposes.

According to Nielsen, usability in design is an abstract concept. For classification purposes he divides it into the attributes of "Learnability, Efficiency, Memorability, Errors and Satisfaction" (1993, p.26). These attributes affect all humans in successful product interaction, from learning to use a new product for the first time, to fully mastering product functionality. In later life these usability attributes are even more important. For the design of future products responsibility lies firmly with designers to ensure that usable products are the interface with complex systems and technology. The following encapsulates core usability factors and theory from the research.

7.6.2. Usability Design for Extremes

For older people, usability of emerging or existing technologies can hold major sticking points and distinct disadvantages when compared to younger users. Reasons for this are firstly due to physical abilities such as decline in cognition and motor skills. Secondly, generally, older people do not have the technological familiarity that younger people have. In ignoring usability disparities between age groups, frustration, apathy, and self doubt emerge. As a result products therefore become unused in the home. This is just a comparable example between older and younger users. Evidence from the field suggests that there is no allowance in design for the vast diversity of usability 'extremes' *within* older adult users.

Within any group of product users there will be noted differences between levels of usability: from low to high, either by experience, interest, abilities etc. Within older people there exists a contrasting range of usability extremes, with differences

between these extremes exceptionally polarised. These usability extremes presented themselves in many ways, however, mainly observed in 'experience' and 'capability' extremes. The importance of designing with these 'extremes' in mind does not just lie in improving usability of products, it also follows through to ergonomic and safety factors.

7.6.2.1. User Experience Extremes

In this research, experience extremes were 'measured' as to a participant's prior experience, knowledge, and confidence of product usability. One characteristic example of an 'experience extreme' was observed in levels of cooking experience. On one extreme, experienced cooks, usually (traditionally) women with lifelong cooking skills, in some instances over eighty years experience cooking for large numbers. In contrast to this, on the other end of the 'extreme spectrum' was the complete novice, in some instances with only six months experience (Further discussed in 7.8 Physical Health Considerations)

In later life lack of experience in using products and technology leads to negative usability experiences. Even in participants with a desire to learn, lack of experience was commonly seen to knock confidence. Observed was a mixture of fear, apathy, and feelings of being 'outwitted' when learning to use and operate products. Many occasions demonstrated that older people learning to use a new product or technology felt "foolish" and often felt outsmarted (illustrated in Figure 7.9 with caption).
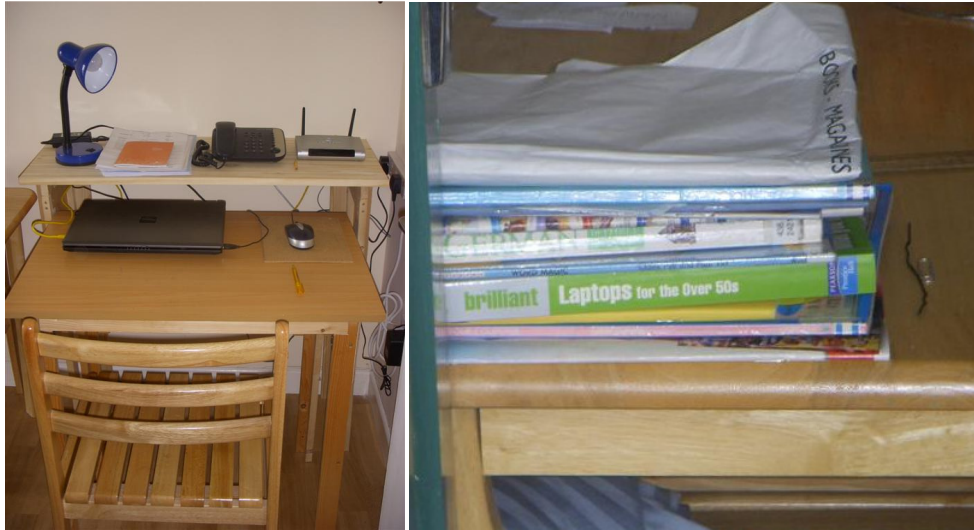
Figure 7.9: Negative experiences in learning technology: A male participant learning to use his laptop and his struggles with technology

Participant Quotation: "When I do something wrong [on the laptop] I always feel there is someone in there thinking I'm an old eejit for not knowing what to do next"

7.6.2.2. User Capability Extremes

In this research, capability extremes were 'measured' by levels of physical or cognitive capability a participant had in using a product, or in their ability to complete tasks. 'Capability extremes' were closely aligned with 'experience extremes' observed specifically in ergonomic factors of products (Further discussed in 7.7 Product Ergonomics). Contrasts in user capability extremes were typically as a result of levels of motor, cognitive decline, or mobility impairments a participant had. For example, on one end of the 'user capability extreme' older people with excellent cognitive and motor functioning excelled at product understanding and use. On the other end of the extreme were older people with very poor mobility, vision, and hearing who struggled to operate fundamental products and therefore had reduced independence.

Most evident were usability issues based on sensory responses e.g. visibility, audibility, or in the fundamental understanding of controls and interfaces. These issues of communication between products and users were especially common place with poor sensory feedback from products. It is here that usability crossed over into

emotive and cognitive streams. Norman describes these as the "behavioural" aspects of products (2004b). When a product fails to meet a sensory feedback or behavioural need, this leads to frustration, instilling negative emotions. There is a real need for cooking and heating products to act more in a behavioural sense, by communicating fully and clearly to the user, making usability and interaction an intuitive experience rather than a negative one.

7.6.2.3.Shared Usability - A Concept for Independence

The concept of "shared usability" has been previously discussed for its perceived advantages in social and safety aspects in the home. This concept has potential to offer solutions to key usability issues older people encounter in product use. As previously discussed, the concept of 'shared usability' would involve two parties, the older user and another stakeholder e.g. a carer or family member.

The concept of shared usability would provide 'levels of usability' assigned to products. This could involve an agreement by both parties as to what levels of usability are controlled by whom and assigned into a functional input on the product. To pick a scenario: in a cooking product where an older adult is dependent on a carer to cook meals every day, the carer could assign a low level of usability to the product e.g. just a re-heat facility alone. If an individual would prefer to learn more about cooking, a higher level of usability could be assigned to the product e.g. access to 4 rings of the cooker hob to gain more understanding and control of cooking.

Seen negatively, this concept could be viewed as reduced control an individual has over product use, however, with stakeholder agreement this could empower the user further. Seen positively this concept could hold peace of mind for all stakeholders, providing more social meetings, safety, and most importantly independence for the older user. If executed correctly it could allow older people maintain independence and age in place with dignity and self sufficiency.

7.6.2.4. Practical Usability Functions

Discussed to this point were the complexities in usability such as user/product behaviours and cognition. While these are extremely important to future product usability, it is equally important not to overlook the obvious practical usability functions that were continually observed by everyday use. These functions could be taken for granted, however, should not be overlooked and considered further in future design phases. These practical user functions were in some cases difficult to classify, but were frequently seen in the field. The following is a list of these with a brief description.

i. Heating Products

- Ease of cleaning and ease of maintenance: Older people require products that are both easy to clean and maintain. Products easily become unused or replaced if not so.

- Internal clothes drying: portable heaters, radiators, and fireplaces were continually used as clothes drying facilities within the home. More suitable means of internal clothes drying (from the heating systems) are required.

- Pets and heat: heat sources were a major focal point for domestic animals, in some cases the sole companions for older people (Figure 7.10)

- Local storage for utensils: An adjacent, organised area for heating product utensils e.g. cleaning brush, poker etc is a simple but essential requirement.

- Flexible control of heat: Due to Ireland's unpredictable and inclement yearlong weather, the concept of 'Seasonal control' is worthy of development. High levels of heat usage by older people occur during the months of September to May. Outside of these months there is a need for flexibility and a cost efficient means of heating the domestic environment. Within the 'seasonal controls' concept there is a need for a means of very quickly heating specific areas and spaces in the home. Participants referred to this as a localised "boost of heat". More flexibility in use can lead to more independence, allowing for older people to have a more flexible daily routine.

- Reduction of "dry air" omitted: Complaints of "dry air" being omitted from modern heating products were commonplace. Homemade solutions to this were many; most commonly, bowls of water left nearby a heating source acting as a humidifier.

ii.   Cooking Products

- Reheating Facility: A simple, manageable and convenient means of reheating food is required for older people, as discussed, microwaves had participants divided in opinion.

- A 'usable' cooker timer: A facility to time and organise the cooking of food is a simple, albeit essential one for older people. Existing cooker timers mainly (digital display) were considered over complex and frustrating to use by participants

- Hot item handling: Possibly an ergonomic requirement, however seen equally as a usability issue. Older people have difficulty in the physical handling, carrying, and transport of hot items. This is heightened when hot items are physically heavy in some extremes. To counter this, it was noted that older people eat only foods that are light-weighing and easily balanced physically (e.g. pizza).

Figure 7.10: Pets and heat: an example of pets occupying a well heated area in the home

7.7. Product Ergonomics

7.7.1. Introduction

It could be considered that all discussion to this point in this chapter concern 'Human Factor' needs (e.g. social, safety emotion factors). These all affect the subject's life and way of living. These go beyond the traditional 'scientific' meaning of human factors in design (i.e. ergonomics and fitting tasks to users). However, 'traditional' ergonomic considerations greatly influence independence in the home. In many instances the lines are blurred between the ergonomics and usability of cooking and heating products. A leading example of this was demonstrated in section 7.6 through 'user extremes' and 'capability extremes' and the successful completion of tasks. Matters involving ergonomics in this research can be classified either cognitively or physically. Within products there is a major requirement to

compensate for the physical and cognitive decline we encounter as we age. In summary: it is necessary to fit products to older users more, both in body and in mind.

7.7.2. Physical Ergonomic Needs

Traditionally the remit of physical ergonomics extends beyond just the biomechanical characteristics within product/user interactions. In fact, the main functional output of heating products – warmth, provides for essential physical ergonomic requirements in the home – thermal comfort. However in this research, from a physical ergonomic stance, it was the biomechanical and anthropometric characteristics within physical activities that were most noticeable and problematic[11].

For older people, using conventional cooking and heating products requires a great deal of physical effort. Physical effort that younger, more able users may perceive as undemanding such as bending and reaching, this becomes more challenging with age related physical decline. The physical design and ergonomics of products have a huge bearing on the difficulty level older people have in achieving everyday tasks and should not be overlooked in its importance. In a study of older people and tasks undertaken in the home, Seidel et al., found that physical acts such as bending and stooping accounted for 45 per cent of overall difficulty with cooking (2010). Evidence of the same was pronounced in the field with all postural movements being problematic.

Reaching up and bending down for product use was a central issue, as was stretching, reaching, hand dexterity (twisting, turning and grip strength), and overall mobility. Sufferers of arthritis, falls victims, and victims of stroke were most afflicted, this was noted to infringe greatly on personal independence. A telling example of this was described by a couple both suffering with osteoarthritis. While bending down to retrieve an item from her cooker, a female participant with both knees bent, could not regain a standing position, her husband in an attempt to retrieve her suffered the same fate. This resulted in both kneeling on the ground in pain unable to get up and stranded 10 metres away from their panic button. This

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[11] This is not to say that thermal comfort in environments was not a major physical ergonomic concern as discussed in 7.4. Financial Cost.

scenario occurred as a result of physical ergonomic design conditions - a low positioned oven with a deep reach inside the oven. These common design features in cooking products also provide problems in cleaning and maintenance.

7.7.2.1. Lead Users

For solutions to product ergonomic issues, it was observed that older adults adapted products and behaviours to suit posture and reach. The scenario just outlined resulted in the participant always having a chair placed adjacent to her to act as leverage in getting up off the ground after using her oven. More direct and permanent solutions were also seen, such as in Figure 7.11. This shows a solution created by a male participant in adjusting product ergonomics to suit posture, reach, and product visibility. These examples displayed characteristics of lead user activity (Von Hippel, 2005). Many examples of which were shown in adjusting the height of or 'sightline' of products. Observing lead users offered unique insights into the issues of product physical ergonomics, and design considerations regarding possible redesign solutions. Lead users acting as 'co-designers' in the study made suggestions for redesign to suit posture. One suggestion was the requirement of side-hinge oven door openings to prevent unnecessary postural extension.

7.7.2.2. Ergonomic Aids

Products that prevent postural stretch and reach, such as reaching aids (informally known as "grabbers"), were essential items in the home. Similar aids are required to be designed to assist hand dexterity: twisting, turning, and gripping, particularly for victims of stroke and arthritis sufferers. This also extends to older people with haptic impairments, for instance, touch, or an inability to feel heat or cold in their fingers and hands. Here it could be possible to design products to compensate through other sensory responses in products e.g. sight or sound. Similarly, compensating for older people with vision or hearing impairments is vital. This is another considered function for the concept of shared usability: customising products and controls to compensate for personal physical impairments. A scenario could be if a user had a slight hearing impairment and this prevented her from hearing an audible bell for her

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cooker timer; this could be compensated for by customising a bright or flashing indicator recognisable by sight.

This customisation follows through to mobility adaptors on products. The inclusion and provision for mobility adaptors are important both in the direct physical operation of products and indirect use. Firstly, cooking and heating products are used as stopping or rest points while moving through the home. Secondly they are used as leverage points, for example using a handle of a cooker or a mantel piece as a means of getting up from a chair. Mobility aids in general greatly aid ergonomic requirements and mobility in the home. The main disadvantage seen from conventional mobility aids and adaptors was that they stigmatised and reflected "disability" in both presence and aesthetic.

Figure 7.11: Examples of lead user adaptations in the home. A cupboard designed to suit posture when using a refrigerator, and a steamer stand designed to be visible at sightline.

Participant quote:"I raised my fridge up so I could see everything in it...you couldn't use it without bending down and being an acrobat every time you wanted something. I would do that to my cooker if I could"

7.7.3. Cognitive Ergonomics

Along with physical ergonomic needs, many cognitive requirements also have to be addressed for future products. Research by Lewis et al., demonstrates that our

cognitive ability to operate products decline as we age (2007). Therefore, fitting products to user's cognitive ability or cognitive perception of use is even more pertinent as we age. A broad range of cooking and heating products are completely unusable by older adults. This was not just as a result of cognitive decline but of poorly designed product features, and with non-intuitive functionality. Reoccurring examples were product controls and interfaces, especially heating thermostats (Figure 7.12 with caption). These were continually referred to as over complicated devices both cognitively and physically, difficult to read, understand, and hence operate.

Cooking and heating product complexity was to blame for many design communication failings such as the following:

- The psychological understanding of product functions not being explicit, leading to ambiguity of meaning.

- Poor layout and composition of important operational controls. Not considering design arrangement to the learnt conventions of the user or to what the user traditionally associates as the correct means of use. An example of this was the "mapping" (Norman, 1988a) of controls on a cooker hob not relating to the actual operational layout.

- Complex terminology of functions, poor graphics and semiotics, ill defined colours textures and contrasts, all lead to sensory confusion and potential to cause serious errors. Additionally, poorly manufactured products and poorly printed interfaces deteriorate with time and lose communication quality with use. For example: graphics and text fading from important controls.

- Limited sensory feedback: "Seeing is believing" was a reoccurring statement from the field. For example in oven cooking, cooking at eyelevel and having the ability to clearly view food being cooked through a glazed panel empowered users.

Figure 7.12: Cognitive Ergonomics: troublesome thermostats

Participant Quotation: "I don't understand how to use it so I just leave it on"

7.8. Further Physical Health Considerations

7.8.1. Introduction

Health has been a consistent common thread and a prominent feature through all the themes discussed. The positive role that these products play in mental health through reminiscence and social inclusion was discussed in social and emotive themes. In safety and cost, the implications for physical health were revealed as a consequence of spatial shrink in the home. Further to this, key physical and cognitive health issues inherent in these products were discussed in usability and ergonomic factors. This demonstrates the extent and complexity that these products hold in the provision of 'healthcare' in the home. This research also revealed further physical health considerations for older people. Firstly identified were nutritional considerations for future cooking products, and secondly, specific physical health considerations for heating products.

7.8.2. Health, Nutrition, and Cooking Products

The most important recurring theme affecting health was diet and nutritional intake of older people. Nutritional intake at any life stage has a huge bearing on an individual's health and wellbeing. For older people this need increases, with poor dietary habits linked to five out of the ten major fatal diseases leading to death in older people (Saxon and Etten, 1994). The reoccurring threat of this was reflected within participants in the field. Individuals with poor daily dietary intake were seen to suffer many chronic diseases, from high /low blood sugar levels and osteoporosis, to malnutrition and obesity. Poor habitual nutritional intake was particularly evident in financially poorer participants, and related directly to other negative effects such as social exclusion and depression.

Cooking products, ovens, hobs, and microwaves are an immense barrier to positive nutritional intake; central to this problem is a user ability barrier in use. To illustrate this point 'user experience extremes' are highlighted. Very inexperienced users are most at risk from diverse chronic illness from malnutrition to obesity. Leading examples of these were shown in the struggles of older men (80 years+) learning to cook for the first time after their spouse (the main cook and provider of food in the home) had passed away. This inability to cook has a huge impact on physical health in an extremely negative way. This in turn deepens the possibility of social exclusion, leading to heightened dependency on others (Figure 7:13. with caption).

Figure 7.13: An unused cooking space belonging to a male research participant whose wife died the previous year. A possibly malnourished older adult struggling to provide meals for himself due to inexperience of cooking

Participant quotation: "I only learned to cook last year I live out of the teapot mostly"

7.8.3. Healthy, Approachable, Informed Cooking For One

Maintaining health and independence should be the core objective in the design of future cooking products. For this, there is a general requirement for a more approachable and informed means of cooking for older individuals living independently. Firstly, this should include approachability in design, by way of intuitive functionality and appearance; secondly in empowering users with knowledge by allowing informed choices in use. Noted in the field were means of achieving this.

- A requirement for "Smaller" cooking products. Smaller scale products were perceived to be more manageable, both in being less complex to use and in ergonomic layout. In addition to this, most individuals living on their own preferred smaller more compact cooking products to reduce energy costs. (Discussed in 7.4 Financial Cost)

- A means of nutritional empowerment is required within products. This can be achieved by providing a flexible or tailored means of dietary information to

the user. This could inform users and stakeholders about ways to meet complex dietary needs and nutritional intake.

- This nutritional empowerment extends to informing older people how to prepare simple, convenient, and enjoyable meals. There is also a need to inform older people of food types that are nutritional, together with educating them about ways of preparing meal options that look and smell appealing, and that are easy to chew and digest.

7.8.4. Localised Heat for Pain Relief

As previously discussed, heating products play an important role in older people's health within the home. From spatial shrink to social inclusion their essential function should not be underestimated. In '7.3.3 Contained Living Spaces' the merits of having mobile or localised heat sources to create 'social hotspots' in the home was discussed. From a physical and personal health perspective, other advantages were noted in using localised or mobile heat sources, namely in pain relief for older people.

Throughout the research there were prominent links in heating product usability and pain relief associated with arthritis and poor circulation (Figure 7.14 with caption). Placing affected areas such as fingers, hands or feet on a warm surface (or a cool surface when the product was turned off) was shown to offer gradual relief of pain. The portability of mobile electric heaters provided the utility of 'moving where they want to go' and providing a 'flexibility of use'. Commonly, these were also a central means of comfort from pain when doing other activities such as viewing television, during pastimes, and relaxing in the evenings.

Figure 7.14: Portable pain relief: A research participant utilises his portable electric heater to alleviate arthritis pain in his sitting room.

Participant quotation: "At my age, with arthritis, my bones need a lot of heating"

Chapter Summary

The theoretical findings in this chapter demonstrate the necessity of cooking and heating products in the everyday lives of Irish older adults. The findings support the view that these products should provide for the basic health needs essential to older adult's (nutritional and domestic environmental). The findings report that other factors should be equally considered if independence and age in place are to be addressed. Demonstrated was that cooking and heating products encompass a complex mix of wellbeing factors: emotional, social, financial cost, safety, health ergonomic and usability. However products in existence fall short in meeting the "capability extremes" observed in this research. This chapter is punctuated with the concept of "Shared Usability" suggesting this to be a link in providing independence, dignity, social inclusion, safety, and ageing in place for longer.

Chapter 8
Designing from Theoretical Findings and Results

8.0. Designing from Theoretical Findings and Results

Chapter Overview

This chapter charts the design process from theory to practice. Firstly it will document the process of framework building from a design ethnographic research study to requirement and feature building (answering research question 1). Using 'Heating Products' as example, it reflects on the design methods and processes in the creation of concepts from a design ethnography. The chapter describes how these concepts were screened and visualised, through phases of divergence and convergence. It discusses returning to the field for validation and feedback through an older adult focus group. In conclusion, a methods and process framework is constructed for conducting future design ethnography, followed by a reflection on the full design ethnographic process (answering research question 2).

8.1. Introduction

Chapter 7 offered theoretical understanding into product requirements for older people. Based on discovery from ethnographic fieldwork and theory, it offered understanding of occurrences and details of insights from the field. It exposed areas where design intervention was critical for future products. This chapter serves as an epilogue both for the thesis and the theory developed, describing acts of design in critical areas. It demonstrates a creative leap into the design process, crossing from theory to practice in design ethnography. By utilising design methods it seeks to understand what are the physical embodiments and implications of user needs. It uncovers what new product features or new products might be achieved through a design intervention informed by the design ethnography process. This is based on the following:

a) **Design Methods and Iteration.** This chapter translates requirements gathered from the field into appropriate new product concepts. Traditional

design methods are used iteratively to achieve this. The solutions to research insights are physically embodied in new product ideas.

b) **Further Validation through Design**. This was achieved through respondent validation (Bryman, 2004) or "Member-checking" (Creswell, 2003, p.196). This was completed to further validate the study and design concepts created. To provoke feedback into their appropriateness, it discovers how these concepts created from design ethnography can benefit the user in terms of health, safety, social, emotive, cost, ergonomics, and usability.

This answers the research questions from Chapter 3:

Question 1: What are the requirements or needs in cooking and heating products for Irish older adults?

Question 2: What is the distinctive nature of design ethnography practiced by designers? And what methods and process can facilitate its application?

8.2. Creating a Framework for Designing

The shared importance of visualisation for designers and qualitative researchers has been discussed in many parts of this thesis. Visualising data has allowed large quantities of data to be shared, synthesised, and analysed in a manageable way. Additionally, by portraying data graphically, complex data could be perceived as both digestible and actionable. For generations, designers have been applying graphic visualisation for the simplification of complex systems. A notable example of this is the London underground map, designed by Harry Beck. In this instance Beck represented the geographic complexity of the underground rail system through line and colour for reduced complexity and enhanced readability.

As the theory discussed in the last chapter is to be used for design purposes, a priority at this stage was to create a form of simplified visualisation. The objective was to manage the substantial theory created, as well as to reduce the perception of complexity within this theory. A means of doing this is by creating 'visual frameworks' of the theory discussed. According to Moggridge visual frameworks in

design can bound problems and reduce complexity, thereby allowing a designer to generate many ideas leading to product solutions (2006). A visual framework is essential at this point to act as a concise visual cue, or as leverage into the first stage of designing, ideation, and conceptualisation. For the purposes of this thesis, developing a visual framework was also important in diagrammatising the theory concisely in order to offer meaning to the design ethnographic process as a whole. The following describes the design of this framework, starting with the creation of product categories.

8.2.1. Creating Product Categories

The first step in achieving an appropriate framework for designing was to establish broad product categories through which the themes outlined in theory would be best conceptualised. To do this, the results of "6.8.4 The Peer Debrief Sessions" were again referred to, particularly the question "What features would this persona require in future cooking and heating product design?" The answers to these responses were extracted and categorised, a list of features was then drawn up from these and placed into product categories (See Appendix L).

The categories collated were as follows:

  a) Heating Products: (i) Space Heating product, (ii) Fixed or stationary heating product e.g. Fireplace or Stove.

  b) Cooking Products: (i) Cooker Hob (ii) Oven

  c) Shared Usability: Cooking and Heating product functionality or controls for shared usability.

8.2.2. The Framework Design

In creating the framework, firstly, the most important overarching themes and factors were extracted and used as the framework foundation. As outlined in Chapter 7 these were health, social wellbeing, product safety, emotive factors, financial cost factors,

product usability, and ergonomics. As concluded, providing for all these themes and factors in the design of cooking and heating products would create independence, empowerment, and provide for age in place. To represent this in a visual framework a series of conceptual frameworks were sketched. This was iterated until a satisfactory framework most appropriate to the communication of the theory was produced (Shown in Figure 8.1.). Its overall form was created to imply the conceptual or visual metaphor of a machine. Funnels or silos were created to illustrate the merging of all factors into one entity of independence, empowerment, and age in place.

The framework is divided into:

a) A well-being needs 'funnel', this funnel is divided in halves, on one side we have cooking specific needs, and on the other heating specific needs. This well-being needs funnel consists of health, social, safety, emotive, and cost factors. Health is positioned on top of the funnel and is illustrated transcending all elements of the framework (shown in white outline). These factors in the funnel are conceptualised as of equal importance and do not imply hierarchy of order.

b) The ergonomic and usability factors 'funnel' is positioned on the bottom and consists of specific ergonomic and usability needs in both cooking and heating products for older adults. Seen as two complementary factors these are more direct and explicit 'human factors needs' in contrast to the 'softer' or implicit wellbeing needs. Illustrated on the framework is the mixture of both physical and cognitive elements in these two factors.

c) Where these funnels meet is the interaction point or the 'mechanics of the machine' merging all of these factors into one 'revolving entity'. This implies the creation of independence, empowerment, and age in place.
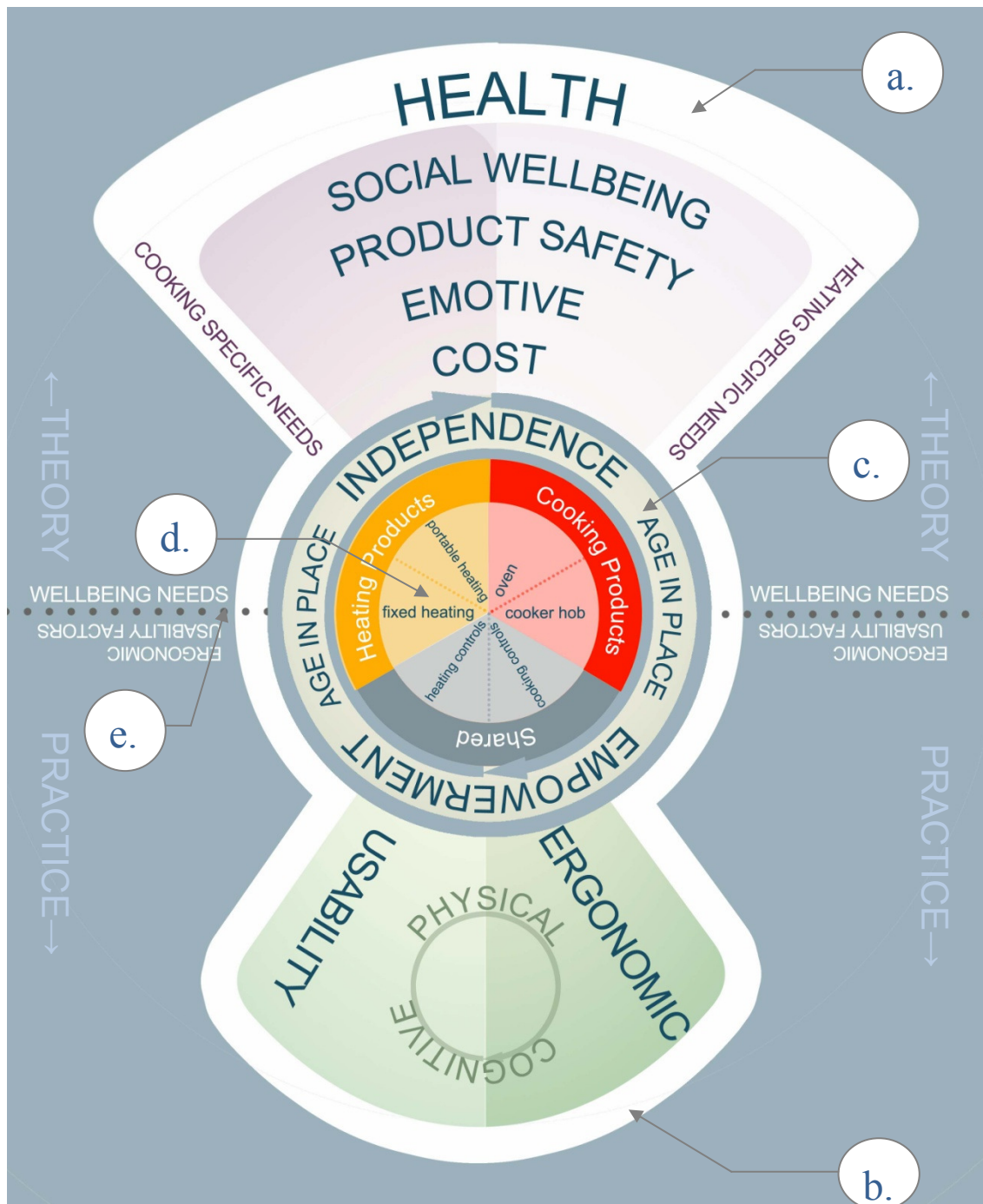
Figure 8.1: Framework design illustration

a. Wellbeing needs funnel
b. Ergonomics Usability funnel
c. Mixture of factors/needs into independence, empowerment and age in place.
d. Product categories
e. Well being needs and ergonomic/usability factors divide along the practice-theory continuum.

d) Product Categories: Positioned at the heart of the framework are the product categories of heating products, cooking products, and shared usability. It is inferred by the 'machine' metaphor that these are the physical embodiment or output of the framework.

e) Divide in the Practice/Theory continuum: A transparent divide is placed centrally on the framework. This holds two functions, firstly it acts as a natural divide between well being needs and ergonomic/usability factors. This transparent divide also communicates the primary function of the framework, and an important part of the process as a whole - the transference of theory into practice. Along the "practice/theory continuum" (Macaulay et al., 2000, p.42)

8.3.   Design Requirements and Features

Prior to any product design, requirements are needed to ground and to give direction to a project. Now visualised and concentrated into a framework, the theory discussed in Chapter 7 could offer these design requirements. To ascertain a full defined list of design requirements for progression there was a need to, figuratively speaking, 'activate the machine of the framework'. To do this, all the factors and needs were 'moved down' their respective funnels and placed within product categories. By doing this categorisation, a list of design requirements and features were drawn up in revisions. (The revisions of this can be seen in Appendix M 1-2). Final revisions are represented in Table 8.1 and Table 8.2.

To draw up these lists of requirements for the purposes of early stage designing it was important to achieve a balance of explicit and implicit meaning. It was essential to have a set of defined design requirements, without diluting the 'voice' of the end user. Reinforcing this point Ulrich and Eppinger state that design requirements should be expressed as the "language of the customer" (2000, p.80). The following two tables display the requirements list as they would appear on the framework under their assigned 'requirement or factor'. These illustrate what product category the requirement falls under, either cooking or heating. They also show if the

requirement has the possibility of 'shared usability' within these products. The final list of requirements were ambiguous in meaning in parts, this was done purposefully to allow for creative movement at conceptualisation stage. However ambiguous, these tables were a firm advancement in defining what these products should physically embody.

	Requirement/ Feature	Space Heating	Fireplace/Stove	Cooker Oven	Cooker Hob	Shared Usability
Health	**Requirement/ Feature**					
	Heating products that prevent older people living in one room of the home	•	•			•
	Mobile heat product for all rooms of the house	•				•
	Heat and cold feature for arthritic pain	•	•			
	Provision of "heat" blanket or cushion	•	•			
	Products that provide heat for pastimes	•	•			•
	Features that provide heat for comfort	•	•			•
	Features that provide heat to relax	•	•			•
	Products that provide localised heat	•	•			•
	Provision of dietary information in a cooking product			•	•	•
	Provision of a calorie counter device			•	•	•
	Products that provide healthy cooking for one			•	•	•
	Provision for a simple healthy cook book or recipes			•	•	•
	Features that aid people with limited cooking knowledge			•	•	•
Social	**Requirement/ Feature**					
	Localised heat for warm gathering points in the home	•	•			•
	Promotion of meals for social interaction/family gathering			•	•	•
	Products/features that enhance the ability of user	•	•	•	•	•
	Family/Carer shared controls	•	•	•	•	•
Safety	**Requirement/ Feature**					
	Product layout to prevent collisions/accidents	•	•	•	•	•
	Products that utilise all senses (sight, smell, taste, touch hearing)	•	•	•	•	•
	A safety shelf- for first aid items			•	•	•
	Products that aid hot item handling		•	•	•	
	Reminder beeps	•	•	•	•	•
	Carer or family safety controls	•	•	•	•	•
	Rechargeable products (no leads to fall over)	•				•
	Safety controls for dementia sufferers	•	•	•	•	•
	Products that consider child safety	•	•	•	•	•
	Cooker hob safety devices			•	•	•
	Safety off switch for hob			•	•	•
	Improving Safety perception of microwaves (safe reheating)			•	•	
Emotive	**Requirement/ Feature**					
	Display area to show personal or nostalgic items (reminiscence)		•		•	
	Personalisation of heating products	•	•			
	Warm aesthetic (e.g. traditional open fire)	•	•			
	Products/features that provide comfort in familiarity	•	•	•	•	
	Areas of cooking products that one could personalise				•	
	Youthful aesthetic	•	•	•	•	•
	Traditional Nostalgic aesthetic	•	•	•	•	•
	Nostalgia in cooking and baking			•	•	•
Cost	**Requirement/ Feature**					
	Controls that show the cost of energy	•	•	•	•	•
	Controls that show energy efficiency	•	•	•	•	•
	Auto OFF switch to save energy	•	•	•	•	•
	Small scale products to economise energy	•	•	•	•	•
	Seasonal controls (Winter/Summer controls)	•	•			•
	Food cost menu, device or display			•	•	•

Table 8.1: Wellbeing funnel requirements placed into categories

Usability	Requirement/ Feature	Space Heating	Fireplace/Stove	Cooker Oven	Cooker Hob	Shared Usability
	Clean fuel sources	•	•	•	•	
	Local storage for utensils	•	•	•	•	
	Basic on/off heat controls	•	•			•
	Heat option to quickly warm areas	•	•			•
	Room heat control	•	•			•
	Small clothes rack for drying	•	•			
	Easy clean products	•	•	•	•	•
	Non dry air from heating products	•	•			•
	Pet friendly- heat area for pets	•	•			
	Transportable heating products for transition periods	•	•			•
	Localised control over heat	•	•			•
	Styled mobility aids for non stigma	•	•			
	Control of heating all rooms, including rooms not used	•	•			•
	A cooking product for one (small scale product)			•	•	•
	Express/quick reheat function for food			•	•	•
	Shared cooking product-Carer /family member cooking			•	•	•
	Cooker timer			•	•	•
	Traditional methods of cooking			•	•	
Ergonomics	Requirement/ Feature					
	Aiding limited hand dexterity (twisting and turning)	•	•	•	•	•
	Products that prevent bending down	•	•	•	•	•
	Products that prevent reaching up	•	•	•	•	•
	Products for visually impaired	•	•	•	•	•
	Products for hearing impaired	•	•	•	•	•
	Products that are adaptable to all abilities	•	•	•	•	•
	Features for impaired touch (arthritis etc)	•	•	•	•	•
	Products with side hinge opening (e.g. doors)	•	•	•	•	•
	Products at hand height	•	•	•	•	•
	Products at human sightline	•	•	•	•	•
	Features for limited mobility	•	•	•	•	•
	Ease of cleaning-bending down, reaching, in and up	•	•	•	•	•
	Products that you can see in operation	•	•	•	•	•

Table 8.2: Ergonomic Usability funnel requirements placed into categories

8.4. Idea Generation through Sketch Conceptualisation

Idea generation for design purposes can come in many formats. For product designers, sketch conceptualisation is a traditional and effective method of creating ideas in visual formats. Sketch conceptualisation has many advantages in the early stages of creative projects and designing. Its practical advantages lie in that it is an inexpensive and universal communication tool that implies suggestions to solutions. For design iteration purposes it is a quick and exploratory method. When sharing, proposing, and provoking ideas, sketches can hold the correct levels of ambiguity required for interpretation and development within teams (Buxton, 2007).

Conceptualisation however is not a straightforward process of recording and translating formulaic information into concept ideas; it requires, and should involve deep creative rigour. To commence the process, the list of requirements referenced previously could have been used as a starting point in conceptualising. However, these requirements are condensed and concise points created from theory. If used in isolation, they could be viewed as sterile statements lacking in humanistic texture. Rather than just having a 'soulless' list of requirements to conceptualise from, the idea generation process requires humanistic inspiration points to draw upon. Visual means are often used in design processes to maintain humanistic presence e.g. 'mood boards' or 'style boards'. For this research two forms of visual 'cues' or 'prompts' were created to maintain a humanistic presence; these were: 1. 'Summary Persona Profile Cards' and 2. A 'Lifestyle Display Board'.

8.4.1. Summary Persona Profile Cards

The personas created in Chapter 6 were re-introduced to act as person centred cues in the sketch conceptualisation process. The original display boards were shortened, text was summarised into concise points and central images chosen to illustrate each persona. These were printed in 150mm x 300mm format, collated and affixed together in a bundle to form a deck of 'cue cards'. During conceptualisation this format served as quick visual and textual reminders of the most important information regarding each persona and their needs (See Appendix N).

8.4.2. Lifestyle Display Board

As an additional visual prompt for sketch conceptualisation, a 'lifestyle display board' was constructed. This was created to complement the persona profile cards in 'humanising' the list of requirements. This was also developed to create an overall visual mood for the perceived market lifestyle, by displaying considered aesthetic cues and functional needs. Creating this, the researcher wanted to visually position the product market as a whole, in both form and function. Rather than using the lifestyle display board as a rigid tool, its function assumed a more secondary role, performing as a visual or emotive stimulus in conceptualisation. In encapsulating lifestyle needs in a visual format, its role was to create an abstract or conceptual composition rather than a precise representation. The lifestyle display board communicated certain implicit feelings and added an extra emotive dimension to the conceptualisation process.

The lifestyle display board was a construct of photographic images positioned in a montage representative of lifestyle needs revealed from the field research. The selection of these images and the positioning of them was a carefully considered task to create an appropriate composition and 'feeling'. The final lifestyle display board was presented in A2 format (see Appendix O for A4 copy).

8.4.3. Conceptual Sketchbook of Heating Products

Though many design methods are now achieved more effectively through computer software packages, conceptualisation remains one that requires sustained reflection direct from the designer. The traditional method of hand sketching is still the most fluid and effective design skill to record, evolve, visualise, problem solve, and deeply understand design issues at an early stage. Conceptualisation was commenced with the list of design requirements, visual stimuli in the form of the persona profile cards, and the lifestyle display board. As usual with conceptualisation, a large quantity of ideas were created and preferred to rigorously explore a given problem. At this stage of the research project, the purpose was to explore and demonstrate a rigorous process of transforming theory based insights to design conceptualisation. For this purpose, only one category within the framework, heating products, was

chosen for progression. Both space heating and fixed heating were conceptualised with shared usability features.

To document the process of sketch conceptualisation, an A3 sketch book was used. This sketchbook was divided equally into space heating concepts and fixed heating concepts. An eighty sheet sketchbook was created comprising of approximately 1000 iterative and exploratory sketches (see Appendix P). The sketchbook, in its complete form illustrates the progression of ideas, embodying the list of requirements and creating possible physical sketch solutions from them. The process of sketch conceptualisation was fluid, flexible, and unstructured in nature; allowing for ideas to flow and to be combined serendipitously where appropriate. The list of requirements acted as a core source of ideas, with the persona profile cards and lifestyle display board supplementing this as creative and humanistic triggers for ideas. (Figure 8.2)

A large quantity of quick succession sketches were created to act on the momentum of ideas as they flowed. During sessions of sketch conceptualisation ideas were explored comprehensively, until exhausted, and then progressed by sketching iteratively on to another idea. Throughout, allowing one sketch to serve as feedback for the next. Ideas were allowed to progress in a free manner at times, and on other occasions were rigidly and strictly bounded by the requirements. These sketches varied from conservative and practical ideas to chaotic and unconventional ideas. The quality of these sketches varied in detail to allow interpretation of meaning when reviewed at a later date. Furthermore, detail could be added to previous sketches at a later date if desired.

Figure 8.2: Sketch conceptualisation in progress; showing the Persona Profile Cards, Lifestyle Display Board, and Sketchbook in use
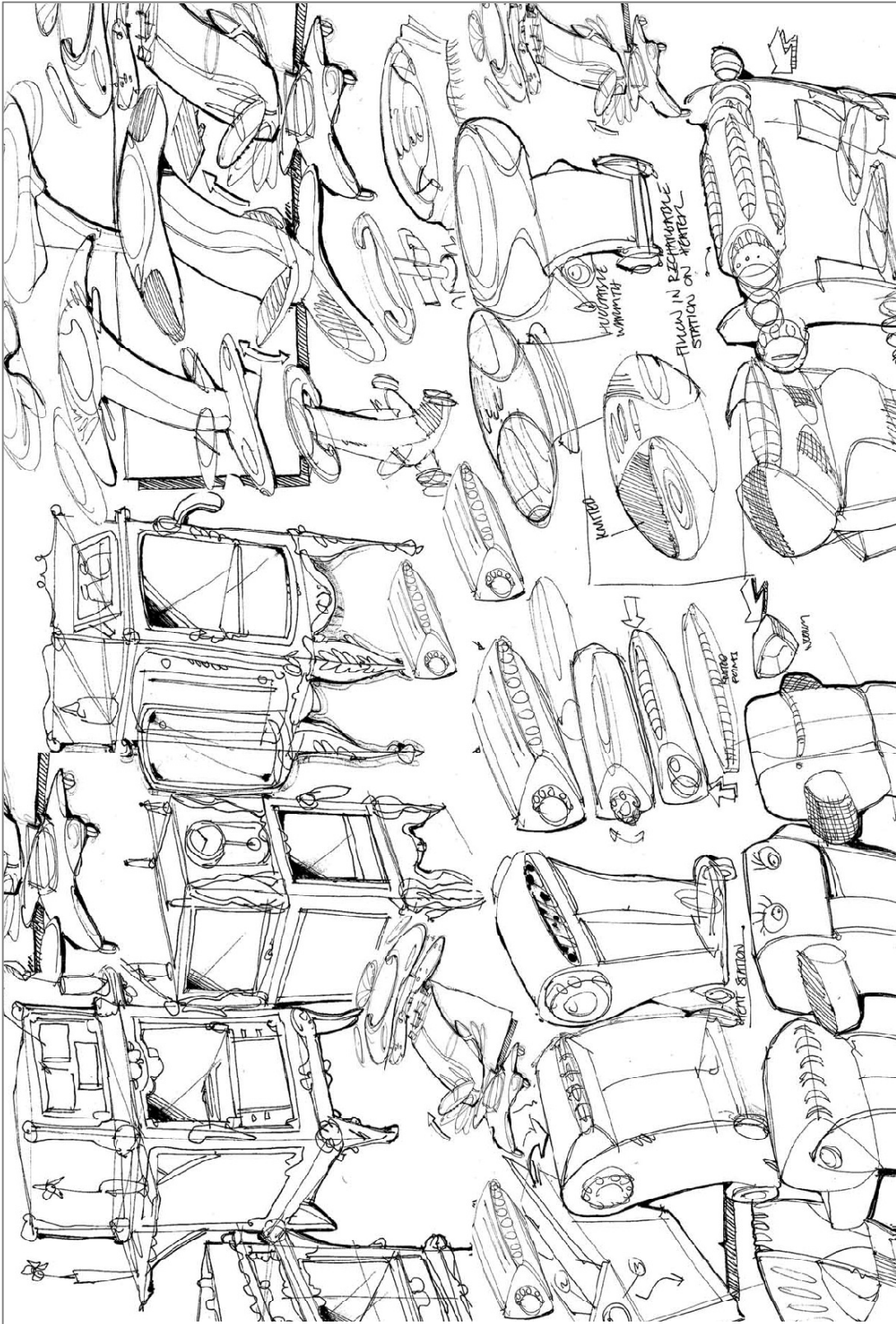
Figure 8.3: A montage of images showing a series of ideas in evolution from the conceptualisation sketchbook

8.5. Convergence: Requirement Screening Survey (Heating Products)

The process of conceptualisation is truly divergent in nature as it widens a given problem space to explore and propose ideas. It provides an open and creative period in which to consider as many solutions as possible before progressing further. Early stage designing should be focused on both creativity and quantity to tap into as many ideas and perspectives as possible and to avoid myopic solutions. By widening the possibilities of ideas, conceptualisation proposes and promotes valuable abstract concepts that otherwise might not be revealed. The more diverse or wide the ideas are at conceptualisation stage, the more opportunities there are of higher quality solutions.

Convergence is required after divergence to make conceptualisation actionable, and at this point this presented a problem to the researcher. The open and divergent nature of conceptualisation presented an unexpected obstacle. Early into the process, an excessively vast quantity of potential concepts were being produced. Although creating a quantity of ideas was a core purpose of conceptualisation, large quantities could be problematic in managing decision making further in the process. The challenge at this point was to construct a means of 'convergence' to funnel or filter these potential ideas into a hierarchy of 'most required'. However, as the process of conceptualisation had commenced, it was important to maintain creative momentum and consider this act of convergence at a later phase of process. Therefore, it was decided that a requirement filtering, or screening process, would be conducted concurrent with the process of conceptualisation.

Various screening methods were considered at this stage for example a "Pugh concept selection process" (Ulrich and Eppinger, 2000, p.144). In keeping with a user centred approach it was decided that this screening process should involve stakeholders. To achieve this, a survey was created based on the table of requirements. To screen requirements respondents were asked "How Important" these requirements or features were for older people. The survey format was based on a four level likert scale: Not Important, Somewhat Important, Important, and Very Important. In addition to these likert scale questions, the opportunity was taken to enquire and gauge interest into the concept of shared usability. The question was

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asked "would the design of a shared heating control be beneficial to an older person in terms of independence", also an area was provided for additional comments to be filled in.

As this survey was a 'rapid coarse' screening of the requirements list, only 50 of these surveys were distributed[12]. The survey was created online through the Survey Monkey™ online software. These were then distributed purposefully to older people, carers, and occupational therapists through email and posted hardcopy formats. Twenty completed surveys were collected. The scores from the heating product survey were weighted within the sections of Health, Social Wellbeing, Safety, Emotive, Cost, Ergonomics, and Usability. From the results a total of 24 out of 55 heating requirements were ranked too low in priority to be progressed. 19 out of 20 respondents agreed that the concept of shared usability in heating products would be beneficial to an older person in terms of independence. The complete results of this survey can be seen in Appendix Q (with the heating products survey screened and highlighted for requirement progression).

8.6.   Convergence through Concept Selection

Completing the process of conceptualisation involved retrieving and collating the full results of the requirement screening survey. In traditional design processes convergence involves synthesising conceptualised material (i.e. ideas and sketches) into smaller groupings of concepts. By using both the sketchbook and the survey results, the researcher had a means of commencing a process of convergence to create groupings of concepts.

Firstly, the full conceptualisation sketchbook (both fixed and portable heating product concepts) was fully reviewed using the newly screened and reduced requirement list. As a means to reduce the quantity of concepts, any sketch concept not relevant to this list was filtered and not brought forward for progression. To converge further, the conceptualisation sketchbook was then reviewed for a second

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[12] The heating products category was the only category to be progressed for conceptualisation in this thesis. For the purposes of future conceptualisation the opportunity was taken to obtain responses to both cooking and heating product requirements.

time, on this occasion to ascertain broad concept groupings that best represented all remaining requirements. In this review, an external reviewer accompanied the researcher. During which it was decided the sketchbook should be physically categorised into three overarching concept groups for progression. Selected were the following concept categories:

a) A fixed heating concept

b) A mobile space heating concept

c) A concept that provided both fixed and mobile heating functionality.

To synthesise these three separate categories further, each underwent an additional session of conceptualisation to explore an optimum visual embodiment of requirements. Three illustrated concepts were created from this. The following 'display boards' illustrate these concepts. They also communicate the stage of the process to which they are positioned. This is to say; the illustrations are of higher quality than presented within the sketchbook but were still 'sketchy' or conceptual in format, giving the impression of a 'work in progress'. This conceptual format was chosen deliberately to suggest rather than impose ideas to the viewer. It is important to add also that these concepts remained in 'critical' design style, remaining as evocative and subjective statements rather than as fully formed concepts.

8.6.1. Concept A. Description
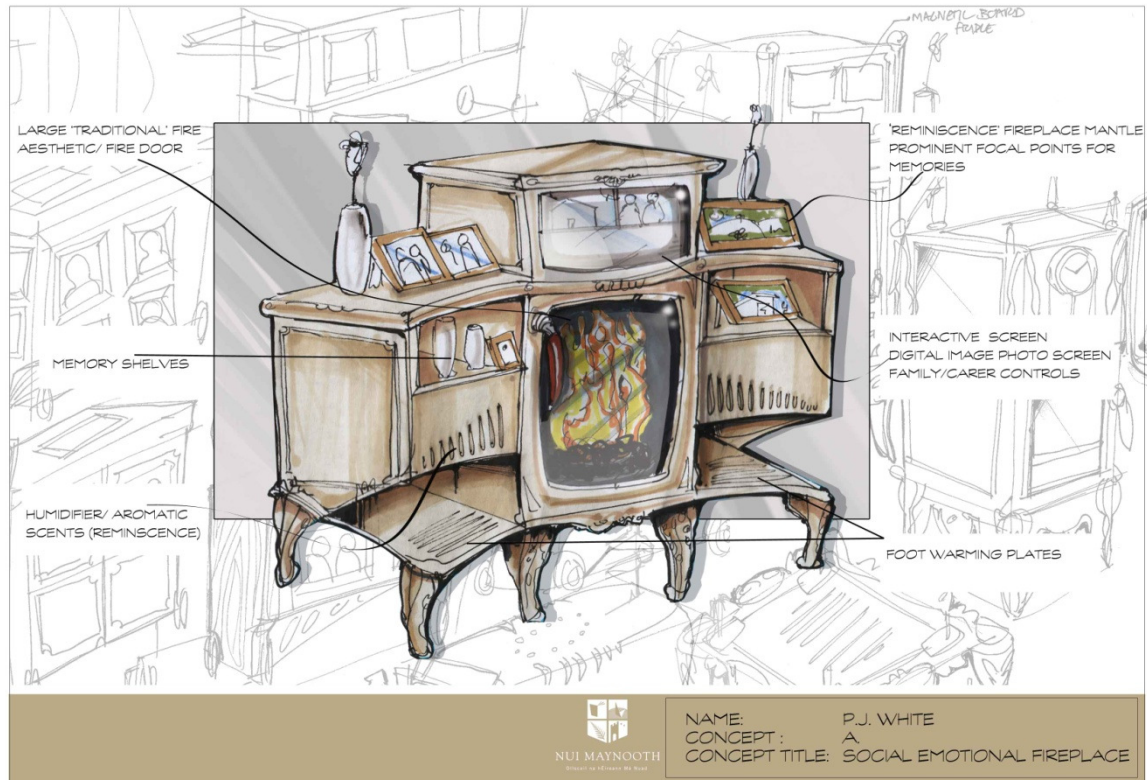
Figure 8.4: Display board for Concept A: Fixed heating product - "Social Emotional Fireplace"

Concept A. visualises the fixed heating category grouping of the sketchbook. Implicit within its design, its purpose was to focus on the social and emotional wellbeing needs of the user. Central to the concept was the suggestion that a fixed heating product could be a shared social and emotional gathering point in the home. The concept implies this by firstly promoting it as a reminiscent focal point. It achieves this by providing an abundance of nooks, shelves and gathering points for the display of personal and important material goods. To enhance this it also proposes the idea of having an interactive screen in which one could store and display digital images. This interactive screen could also provide a means of shared usability with user and family/carer controls.

Within its shared usability functioning the possibilities are many e.g. controlling levels of heat outputted by temperature or time, displaying energy costs etc. The purpose of introducing this shared usability would be to increase social contact and to provide peace of mind in the knowledge that the product is being utilised correctly at its optimum capability. Additionally, its physical form was created to induce social interaction in and around the product with the provision of 'foot warming

plates' to provide a more tactile and comfortable gathering point using heat. Its traditional visual aesthetic is designed to enhance comfort through familiarity, offsetting the aesthetic of the technological features. Complementing this visual aesthetic, it offers a large viewing window for optimal fire display for a 'warm aesthetic'.

8.6.2. Concept B. Description
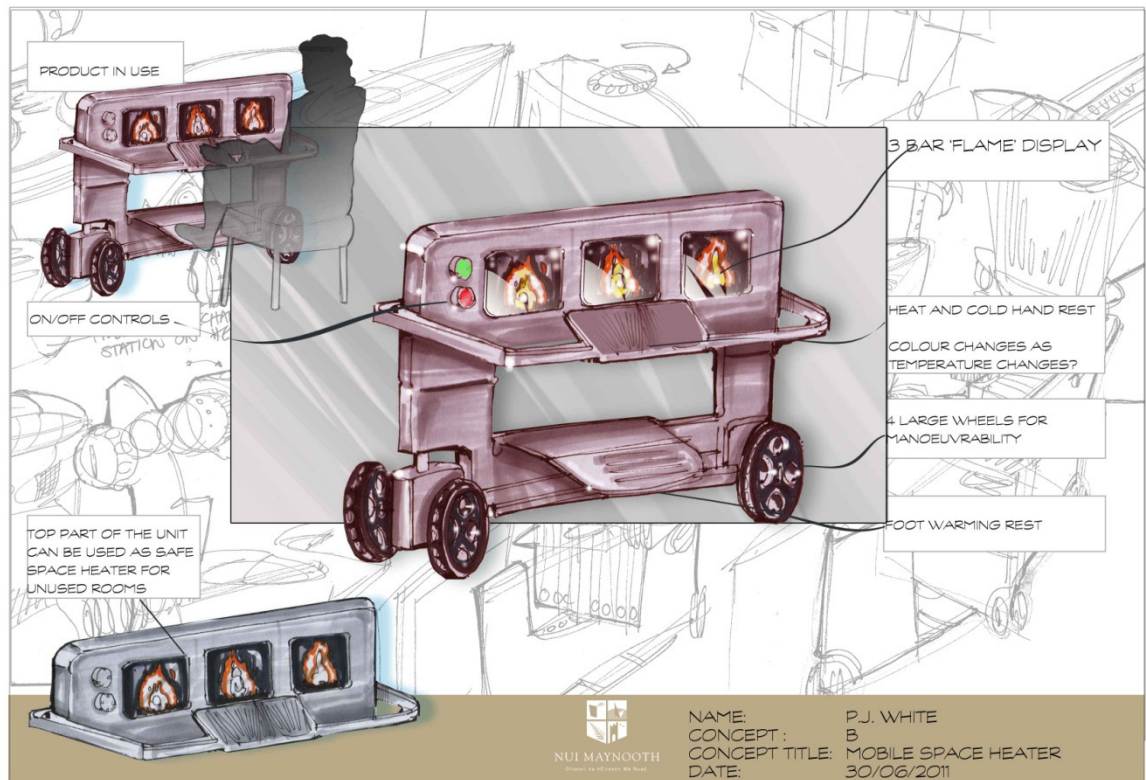
Figure 8.5: Display board for Concept B: "Mobile space heating product"

Concept B. visualises the mobile space heating category of the sketchbook. It aims to fulfil the demand for a suitable portable heating solution for older users. Central to this concept is its flexibility of use, portability, and lightweight structure. The upper part of unit is detachable for use in other rooms or environments if needed, for example carried upstairs for unused rooms in the home. For stability and added manoeuvrability in the domestic environment it has larger wheels in comparison to traditional mobile space heaters. For general comfort and for relief of arthritic pain it is provided with a 'heat and cold hand rest' and 'warming foot rest' to use when seated. For aesthetic and operational feedback and it has three small 'flame' displays, these simulate a 'three bar heater' functionality seen on conventional products.

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Additionally, the implication is put forward for this concept to having operational feedback through colour change, whereby, as the temperature changes, so too does the intensity and depth of the overall product colour e.g. from blue to red communicating cold to hot. The concept also has large on/off and operation controls for visibility and intuitive use.

8.6.3. Concept C. Description
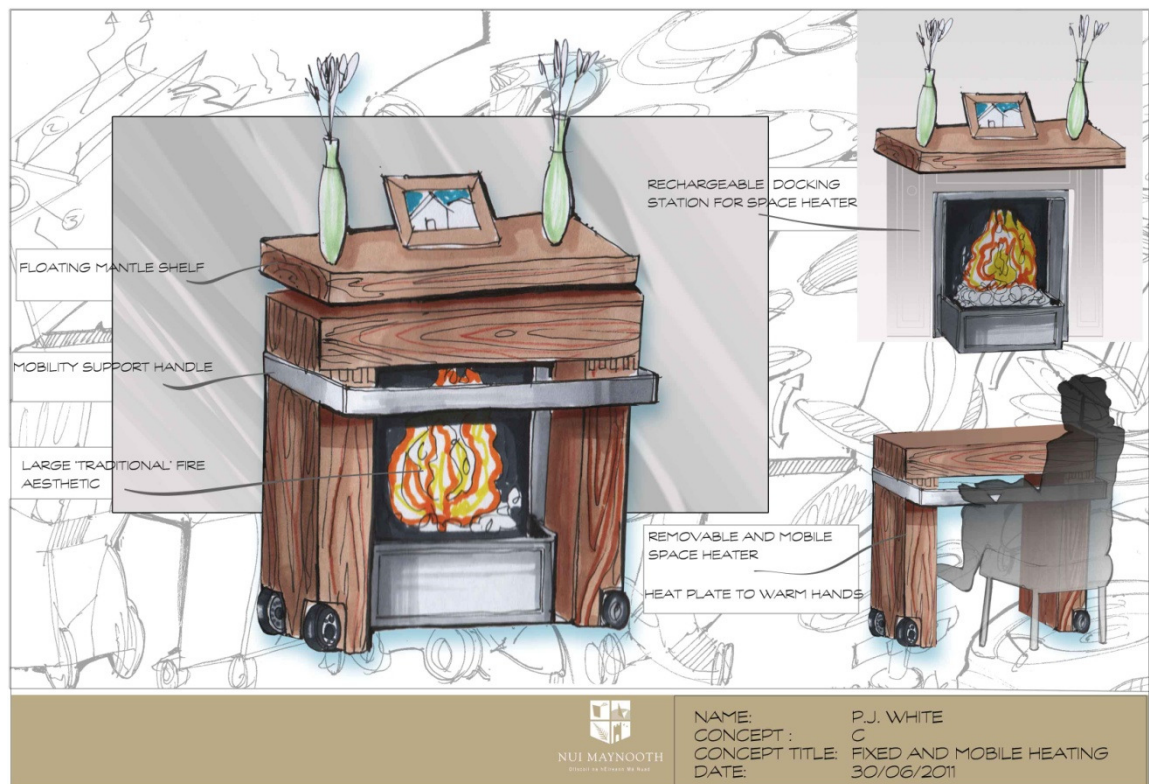
Figure 8.6: Display board for Concept C: "Product with both fixed and portable heating functionality"

Concept C. visualised a concept that provided both fixed and mobile heating functionality in one product solution. In its complete state the concept was visually comparable to a traditional fireplace with a large open fire flame, a (false) fire-grate, and a mantel piece. However, the fireplace surround is removable and possesses a separate functionality of a mobile space heater. The concept works off the premise that when this space heater is in the 'fireplace position' it is being recharged for use in a 'docking station'. The concept therefore does not possess electronic cables, which can be instrumental in causing trips and falls in the home. The mobile space heater element of the product has a long mobility support handle and therefore the

product could, at times, be used as a mobility walker. This support handle could also be heated to warm hands, similar to that of the 'heat plate' in concept B. This concept also has the potential to further fulfil a role for older people with limited mobility. Within the idea of "contained living spaces" discussed in Chapter 7, the mobile heater could act as a portable heat station allowing for storage and resting of personal items. The fixed fireplace element of the product includes a floating mantelpiece or shelf affixed to a wall to display material possessions and to add to the familiarity of a traditional fireplace.

8.6.4. Concept Screening Matrix

The next step in the process of convergence was to narrow the three concepts into two or preferably one concept to progress with. In the process of selecting concepts for design progression, Ulrich and Eppinger recommend using a concept screening matrix. Based on the "Pugh concept selection process" (2000, p144), a concept screening matrix allows the designer to rate and rank concepts for progression. The following steps were taken to create the concept screening matrix shown as Table 8.3 these steps were adapted from (Ulrich and Eppinger, 2000).

i. Identifying Reference Products

To rate concept A, B and C in a screening matrix, firstly a reference product was selected as a benchmark to be rated against. As there was no one potential product that had both fixed and mobile heating product functionality, two separate comparable products were chosen as benchmarks. In choosing the most appropriate reference products for this purpose it was decided to select products that were (a) seen continuously used in the field and (b) were currently on the market. The following were selected:

- The fixed heating product reference was the *Dimplex™ Cheriton Fireplace*[13]

- The mobile heating product reference was the *Dimplex™ Oil Filled Column mobile heater*[14]

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[13] http://www.dimplex.co.uk/products/fires_surrounds/freestanding_fires/cheriton/index.htm last accessed 12/10/2010
[14] http://www.dimplex.co.uk/products/domestic_heating/portable_heating/oil_filled_radiators/oil_filled_column/index.htm last accessed 12/10/2010

ii. Selection Criteria

In a concept screening matrix Ulrich and Eppinger state that a list of selection criteria must be present to rank each concept (2000). In this instance the list of screened requirements was used, at this point these requirements were assigned a code for future design reference.

iii. Rating and Ranking

Each concept was rated against the selection criteria[15]. A plus symbol (+) was used to rank criteria *better* than the reference, a zero (0) symbol was used to rank criteria *same as* the reference and a minus (-) symbol for criteria *worse* than the reference. Following this, each concept's "pluses" "sames" and "minuses" were tallied and ranked against each other.

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[15] If the concept display board did not explicitly illustrate the design requirement, it was ranked in the possibility of having the requirement. E.g. On the matrix below *C2 Seasonal Controls* was not explicitly illustrated on any of the concept display boards however it was ranked in having the possibility of being a function on all concepts.

CODE	SELECTION CRITERIA	A	B	C	REFS
	CONCEPT VARIANTS	**A**	**B**	**C**	**REFS**
	HEALTH				
H1	Features that prevent older persons living in one room of the home	**0**	+	+	**0**
H2	Features that provide heat for comfort	+	+	+	**0**
H3	Features that provide heat to relax	+	+	+	**0**
H4	Heat and cold treatments for arthritic pain	**0**	+	+	**0**
	SOCIAL				
So1	Products/features that enhance the ability of the user	+	+	+	**0**
So2	Family or carer shared heating controls	+	+	+	**0**
So3	Localised heat for warm gathering points in the home	+	+	+	**0**
	SAFETY				
Sa1	Product layout to prevent collisions/accidents	+	+	+	**0**
Sa2	Safety controls for dementia sufferers	+	+	+	**0**
Sa3	Features that aid hot item handling	**0**	**0**	**0**	**0**
Sa4	Rechargeable products (no leads to fall over)	**0**	**0**	+	**0**
	EMOTIVE				
Em1	Products/ features that provide comfort in familiarity	+	-	+	**0**
Em2	Display area to show personal or nostalgic items for reminiscence	+	**0**	+	**0**
Em3	Warm aesthetic (e.g. traditional open fire)	+	+	**0**	**0**
Em4	Traditional/Nostalgic aesthetic	+	-	**0**	**0**
	COST				
C1	Auto OFF switch to save energy	+	+	+	**0**
C2	Seasonal controls (Winter/Summer controls)	+	+	+	**0**
C3	Controls that show the cost of heat /energy	+	+	+	**0**
	USABILITY				
U1	Basic On/off heat controls	+	+	+	**0**
U2	Heat option to quickly warm areas	**0**	+	+	**0**
U3	Room heat control	**0**	**0**	+	**0**
U4	Clean fuel sources	**0**	**0**	**0**	**0**
U5	Localised control over heat	**0**	+	+	**0**
	ERGONOMICS				
Er1	Aiding limited hand dexterity (twisting and turning)	+	+	+	**0**
Er2	Features for visually impaired	+	+	+	**0**
Er3	Products that are adaptable to all abilities	+	+	+	**0**
Er4	Features for limited mobility	**0**	+	+	**0**
Er5	Products that prevent bending down	+	+	+	**0**
Er6	Products that prevent reaching up	+	+	+	**0**
Er7	Features for touch impaired (arthritis etc)	**0**	+	**0**	**0**
Er8	Ease of cleaning-bending down, reaching, in and up	+	**0**	+	**0**
	"PLUSES"	**21**	**23**	**26**	
	"SAMES"	**10**	**6**	**5**	
	"MINUSES"	**0**	**2**	**0**	
	NET	**21**	**21**	**26**	
	RANK	**2**	**2**	**1**	
	CONTINUE?	**N**	**N**	**Y**	

Table 8.3: The Concept Screening Matrix. The screening of concepts A, B and C in a matrix for progression

8.7. Concept Development

For further design convergence a process of concept development was conducted. From the results of the screening matrix concept C was ranked highest and therefore most appropriate for concept development, concepts A and B were ranked joint second. In traditional concept development, following the process of ranking concepts, Ulrich and Eppinger recommend reviewing all concepts fully to further consider if criteria can be combined and improved (2000). By doing this review, the stronger elements of the lower ranked concepts (A and B) could be considered for progression therefore strengthening the best ranked concept offering (concept C). The matrix and concepts were reviewed and the following requirements or 'selection criteria' were proposed to be included further for concept development.

- Controls that show the cost of energy with the possibility of 'seasonal controls'. Implicit in these controls is the possibility of family carer control functionality.
- A more pronounced area for 'reminiscence' - enhancing comfort in familiarity.

To include these, a further iteration of concept C was created in the form of a concept development display board (Figure 8.7). Additionally, in this display board, criteria or details not fully outlined on the previous concept board were illustrated, examples being:

- Basic on/off heat controls on the product.
- Magnified operational dial control for enhanced visibility
- A heated plate to specifically warm hands

The purpose of this concept development board was not to propose a final optimum concept, but rather to display embodied requirements in an appropriate manner for development purposes. This concept development board was designed to be used as a tool to present a proposed visualisation of important requirements for further development approval. It acted as a proposition to demonstrate how features may appear in a product rather than implying a final design solution. This served a role similar to that of the 3 concept display boards; suggesting rather than imposing

ideas. The purpose of the concept development display board was that of a tool to gain approval/disapproval, feedback, and suggestions for concept development.
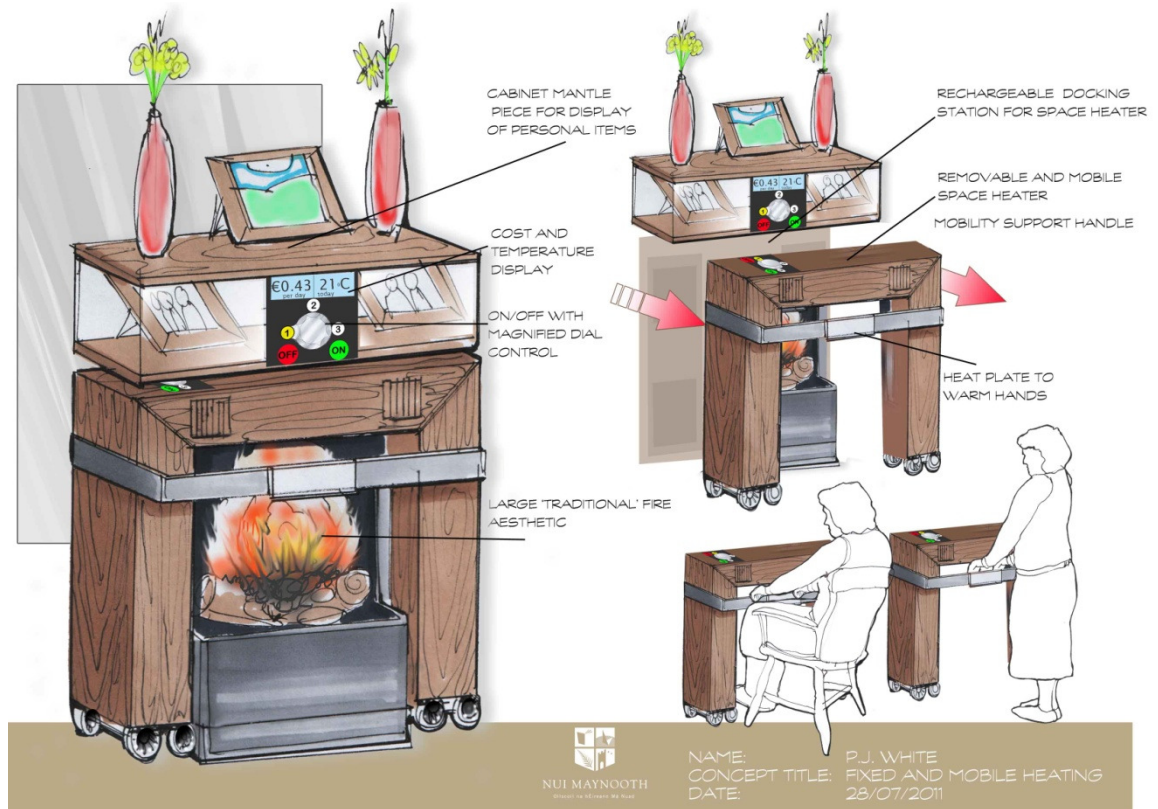
Figure 8.7: The concept development display board

8.8. Focus Group Session

To acquire feedback for progression, development, and further convergence, a stakeholder enquiry was conducted. This enquiry was designed to give direction and strengthen the concept development process by involving potential end users. A focus group was decided as being the most suitable means of conducting this enquiry for the following reasons:

- By using a group interviewing technique at this stage the researcher could elicit feedback from multiple perspectives in one sitting.

- These multiple perspectives could create rich and dynamic feedback by building off the ideas of others within the group.

- Focus groups can be both structured and unstructured in format, controlled and steered depending on flow of conversation by a moderator.

- Using focus groups at this stage would be used as a form of validation of the design concept before further development. Triangulating the design findings by way of respondent validation (Bryman, 2004) or "Member Checking" (Creswell, 2003 p.196)

However, issues in conducting focus groups with older people have been documented. Most notably, Lines and Hone mention difficulty in maintaining focus on the topic being discussed and in participant digression. To prevent this they suggest using smaller groups of older people, proposing five participants as working most effectively for productivity, group inclusion, and for allowing appropriate time for contribution (2004).

Four suitable participants were identified and recruited for a balanced and objective focus group session. Included, were one male and two female older adult participants, all three lived independently in a retirement village. To represent 'other stakeholders' a professional carer was present, this individual had over 25 years experience overseeing older people's needs. In the focus group session the researcher acted as moderator.

8.8.1. Preparation for the Session

In preparation for the focus group session the concept development display board (Figure 8.7) was printed in full colour on both A2 and A3 mounting boards to be viewed by participants. The display board was to be used as a central prop or feedback stimulus for the focus group. Using visual aids like these in older adult focus groups are seen as particularly effective in eliciting feedback. Goodman et al., state that visual items act as cognitive probes and can support participants in remembering situations and experiences related to the study (2004).

8.8.2. The Session

Firstly the participants were briefed on the background of the research and informed regarding the current stage of the research. The purpose of the session was outlined: to elicit feedback from stakeholders for purposes of development and progression. It was clearly explained that the idea presented was at a development stage and was conceptual in nature. Its purpose was then further explained; to provide dialogue as part of the iterative development process of design. Participants were encouraged to be open and constructive in their comments and feelings towards the concept.

To commence the session, the concept development display board was presented to participants for review. Firstly, and without explanation, the participants were asked to take time to interpret the products purpose and functionality. Following a short question and answers session, questions were put to the participants in regard to the appropriateness of the specific product features and overall functionality. Allowing the comments and suggestions to flow, the moderator used the selection criteria from the 'concept screening matrix' to steer and inform this questioning. The focus group session was 75 minutes in duration.

8.8.3. Focus Group Findings

The findings of the session were summarised in the form of a "top-line report" (Krueger, 1998, p.118). This outlined the most insightful findings of the focus group session through comments, points, and narrative. The findings include both positive

and negative feedback captured through the course of the session, these are divided into "Mobile heater" (Table 8.4) and "Fixed Fireplace" (Table 8.5). Included are the participant's most important comments and suggestions, followed by the moderator's interpretation and implications for future design development.

Product Feature	Participant Comments or Suggestions	Moderators Remarks/ Implications for development
Overall Scale/Size	• *"...It may be too cumbersome would need to be less bulky, seems to be large (in scale) for small rooms..."* • *"it might be more suited to a nursing home as they have more space"* • *"...it may be in the way all the time in the house...."*	The consensus was that the mobile heating product seemed to be too large in scale and somewhat awkward in appearance. Further development will consider reducing scale where appropriate. Further to this, aesthetic detailing should be considered to lessen the apparent "heaviness" in appearance.
Mobile heat	• The concept of both fixed and mobile heat was considered a good idea by older participants. The suggestion was put forward by the older participants of *"fixed heating touch points"* throughout the home rather than a fully mobile product. However the carer recalled many instances of going into older people's homes and observing individuals "hunched over open fireplaces (fixed fireplaces)" Thus preferring a mobile heat solution rather than fixed heating points in the home. • With this it was suggested that the handle of the mobile heating product could be made detachable and used in various points around the house. The carer dismissed the suggestion, believing that the solution requires it to be fully mobile. • The compromise of a *"moveable heated table"* was then suggested... *"...something that isn't moved very far...."*	In conclusion, the 'mobile heat' feature of the concept was welcomed by all parties and should be developed further. The "moveable heated table" suggestion is a very interesting concept to consider and should be iterated through sketches and prototyping. This idea would work well with the concept of "contained living spaces". Future sketch and prototype development should consider a mobile heating product with a flat surface similar to that of a table.
Use of heating product as a mobility aid	• *"We have mobility aids already... like walking frames"* • *"I'm not sure if I'd use it as a mobility aid I may do with time..."*	It was inconclusive whether this idea was considered fully useful. This feature however justifies further consideration through quick prototyping and user testing.
Material Selection	• *"If it was made of wood it may be scorched by the fire if it was left in front of it for too long..."*	Through development the product should be engineered to prevent possible scorching or burning. Presumably this could be achieved either by choice of appropriate material or considering product placement and layout in relation to the fire source.

Table 8.4: Focus Group Top-line Report: Mobile heater

Product Feature	Participant Comments or Suggestions	Moderators Remarks/ Implications for development
Operational Controls	• The height and positioning of operational controls were very much welcomed for posture. • The large magnified controls were received very well together with the large ON/OFF switch for visibility.	These responses confirm the fundamental need for older adult ergonomic requirements in products. To progress further detailed physical and cognitive ergonomic testing should be conducted. This should include detailed investigation into colour, size, torque etc of controls.
Mantle Piece	This feature had varying responses with two female participants stating they would like to have "the cabinet feature" in their homes. One participant mentioned that it should be black, plain, and non-descript so she could decorate/personalise it as she desired. The male participant stated that he would not necessarily use the cabinet for photographs etc but could see it as a useful area for a radio or speakers.	Concurrent sketch and prototyping sessions should be conducted to develop this feature. From the focus group comments, initial thoughts would be to simplify the mantelpiece back to its basic form and functionality. From this it could be iterated through designing and stakeholder feedback.
Ash-box/grate	• *"What does it gather"?* • Questioned if the ash-box/grate carried ash and if there was a function to it. • *"I wouldn't like to clean it out..."*	This is a false-ash-box/grate feature. This area was singled out to be an everyday cleaning concern. To progress, maintain this as an advantageous feature in the product.
Fireplace 'glow'	• The 'large glow' is considered an excellent addition however with direct concerns for cleaning	Again cleaning was seen as a major issue, it was explained that the product was likely to be electric or another clean source. Development should include ability to change the size and intensity of the visible glow.
Cost and temperature display	• It was reiterated the concerns older people had for the financial cost of energy. When the functionality was explained to the group it was very much welcomed. However it was questioned how complex the functionality was. Furthermore it was asked how an older person could control the frequently changing rates of their energy payments.	To answer the latter question, carer controls were suggested as a concept to be developed. Once explained the possibilities of this, it was welcomed by all parties. Again this feature warrants comprehensive development through prototyping leading to user trials. With shared stakeholder (family/carer) controls central to its development.

Table 8.5: Focus Group Top-line Report: Fixed Fireplace

Figure 8.8: Image of the focus group in progress with participants

8.9.   Reflection on the Process and Methods in Design Ethnography

To reflect and describe the methods and process conducted in this research we can frame the research into two parts: "Insight/ Theory" within the context of ethnographic fieldwork, and "Practice" within the context of Design. These can be positioned along a practice/theory continuum. These parts of the process can be divided into acts of both divergence and convergence (Jones, 1992) within the "Double diamond model" (Design Council, 2007, p.10). Figure 8.9 offers a visualisation and overview of the process and the methods contained within. The following is a retrospective reflection of these methods within the process from the perspective of design ethnographer. It outlines the distinctive nature of design ethnography practiced by designers, and how methods and process can facilitate its application.
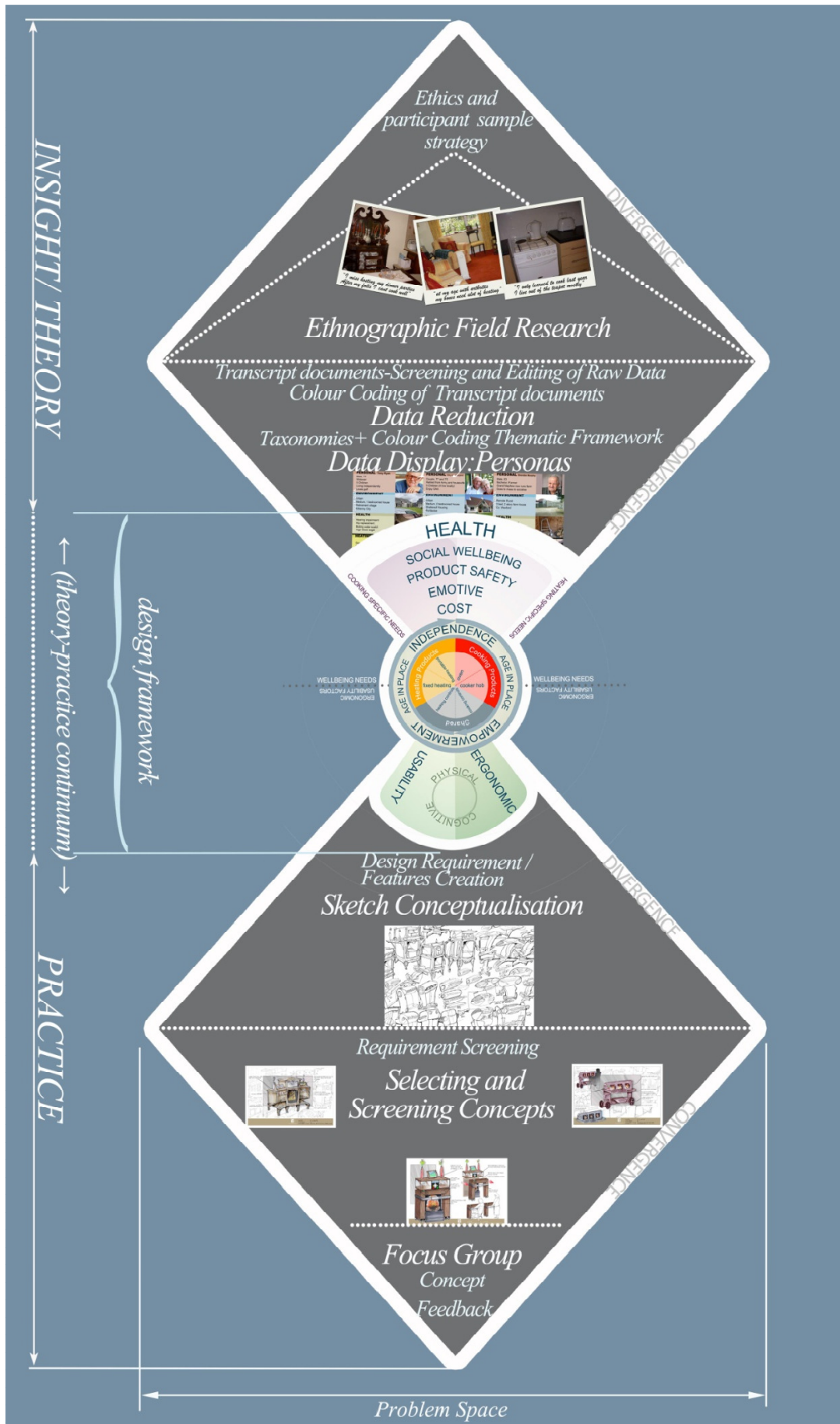
Figure 8.9: The process and methods framework

8.9.1. First Diamond Insight and Theory - Divergence

8.9.1.1. Ethics and Participant Sample Strategy

Prior to commencing design ethnography, approval by fully informed consent is essential in protecting the privacy and human rights of participants. It also can be the difference between quick, successful, and plentiful access to information rich participants, and delayed recruitment and withdrawn dialogue between researcher and participant. Ethical approval is a statement of trust, informing the participant fully and building a foundation of confidence prior to commencing a study, particularly with older and vulnerable participants. Open disclosure of intent places informants at ease allowing for a more fruitful and relaxed study. Equally important is informing other stakeholders (such as carers and family members) of the benefits and implications of the study.

Ethnography for the purposes of design requires attaining information in an open manner through holistic and naturalistic enquiry. Data collection methods used in design ethnography e.g. participatory techniques, interview, and observation, are intrusive in nature. When used in the domestic environment exposure to sensitive information is high. Therefore, design ethnographers are required to be acutely aware of ethical considerations in data collection and storage. Data collected by means of digital imagery and audio should be edited thoroughly both during and post fieldwork to protect anonymity and avoid exposing sensitive information. This should also be coupled with informing participants of data collection during research, for example, demonstrating data collection equipment or showing previews of collected data to the participant.

When constructing a sample of participants for a design ethnographic study, it is firstly important to consider broadly framing "units of analysis" (LeCompte and Schensul, 2010, p.169). Conducted at the beginning of a study, this allows the researcher to commit to certain constraints such as time and balance of gender etc. However, sufficient space must be provided within these constraints to allow theories evolve whilst in the field. As certain theories occur, the designer ethnographer requires sufficient movement between participants to explore these. The researcher must also consider participants that provide the most depth and

breadth for the study (Patton, 2002). To do this a sample strategy of both purposive and snowball sampling works effectively.

Purposive sampling used from the outset or prior to a study can frame the participant sample based on the units of analysis chosen. For this a broad use of various media to recruit participants should be used to provide wide spread recruitment, e.g. emails, letters, advertisement fliers, and cold calling. During a design ethnographic study snowball sampling works very effectively in exploring a culture, and allowing freedom for the researcher to adjust the sample as theories evolve. This can be achieved by word of mouth and referral. For both purposive and snowball sampling, informing and involving other stakeholders is paramount. Stakeholders can act as important gatekeepers to informants; building trust with gatekeepers (or as identified in this research "sub-gatekeepers") offers invaluable knowledge and rich access to informants. This allows the researcher to pick from a wider pool of participants if desired and provides much needed freedom in the field.

8.9.1.2. Conducting Design Ethnographic Field Research

Conducting design ethnographic fieldwork requires both sustained patience and empathy from the researcher for the duration of fieldwork. Once in the field this starts with setting the scene for the research and creating an informal environment. Trust should be built slowly and from the start by introducing informal conversation or "icebreakers" setting an informal tone for the study. This informal conversation should be continued and used as an actual data collection method. With informal conversation as a base for interview, semi-structured questioning can be introduced where and when appropriate.

Semi-structured questioning can be introduced effectively in a design ethnography when using Spradley's descriptive and structural questions (1979). Descriptive questions are very useful in allowing a participant to explain or describe interactions with products in a direct manner. If an even more direct means of questioning is required, structural questions should be used to probe further. Storytelling as a means of informal conversation offers rich illustrations of situations in the

participants own words, and can offer an excellent accompaniment to design ethnography.

Collecting visual data from the field is one of the most important tasks of the design ethnographer. Visual data offers a platform to instantly convey complex scenarios such as interactions between people, cultures, and the material world. Noted visual data collection techniques from this research included the construction of "cultural inventories" (Collier and Collier, 1986, p.45). When compiled and complemented with the narrative derived from interview, a rich diary of field events can emerge from cultural inventories; this is essential in gaining understanding through interpretation at later stages. Participant and artefact observations can be quickly and effectively collected by means of photography. Digital photography also offers the researcher a means of recording what cannot be observed by the naked eye during fieldwork. A collection of broad cultural snapshots of the domestic environment in the field can easily be analysed post fieldwork.

Introducing participatory techniques to design ethnographic fieldwork can work very effectively, but only if they do not disrupt the flow of the study. Participatory techniques can act as invaluable insights into participant/artefact interactions. Used both with interviewing and observations, participatory techniques can strengthen the research findings and complement in a structured or unstructured fashion. Techniques such as "Acting out" and "Researcher acting as apprentice" (Sperschneider and Bagger, 2003) assist the researcher in a structured approach to observation. Techniques such as "Shadowing" (Wasson, 2000) complimenting a more unstructured means of participation.

8.9.2. First Diamond Insight and Theory - Convergence

The second part of the first diamond deals with convergence. Convergence of fieldwork data from a design ethnographic study relates closely to Miles and Huberman's components of qualitative data analysis - data reduction and data display (1994). The following are the steps and reflection of the process of convergence in this research.

8.9.2.1.Transcript documents - Screening and Editing of Raw Data

The quantity of raw data collected from design ethnographic field studies can be (and should be) vast. Analysis of this data can seem like an overwhelming task for the design ethnographer. Hours of audio, and thousands of images are just some of the physical source data that may be required to be managed, together with the researchers developing thoughts and theories from the fieldwork. The transcription of audio and editing /screening of photographs is a slow, laborious process. An efficient and concise system of organisation is essential for this process. 'First pass' screening and editing is required to eliminate any superfluous data such as silent audio and poor quality images. The remaining data can then be managed by creating individual field documents in Word™ document format or similar. The key to organising field data is to create these documents as a concise logical description of occurrences, this will act as an early attempt to 'make sense' of the data. This can be achieved by placing text relevant to the direction of the interview and relevant visual data to illustrate and reinforce this. 'In process memos' of researcher narrative can be created by drafting rough 'descriptive codes' on the document margins and organising these formally later.

8.9.2.2.Colour Coding the Fieldwork Transcript Documents

Once field documents are fully transcribed, the design ethnographer now reads and re-reads the documents line by line to fully understand and to develop patterns, categories, and themes within. Open coding is an appropriate method for this on two levels, firstly to review and re-organise the documents into meaningful broad 'chunks'. Secondly, open coding can be used to highlight detailed patterns within these broad chunks. Using colour to open code data is particularly applicable for design ethnography. As distinct from other coding methods, colour instantly provides clear visualisation and illustration to help develop meaning and coherency as coding progresses.

Coding transcripts in colour is an iterative process. The design ethnographer is continually developing new themes and categories as coding progresses. This is achieved by reading, re-reading, highlighting, assigning, and reassigning appropriate colours to patterns and themes in the data. Concurrent to coding, a system of

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tabulating or recording emerging patterns and themes is required. This should be created as coding progresses, as large quantities of codes can be quickly accumulated. As identified in this research, a basic recording system such as the "Colour coded thematic framework" assists the researcher in simplifying complex patterns until the data is theoretically saturated.

8.9.2.3.Data Reduction - Taxonomies and Colour Coding Thematic Framework

Reducing data is an essential phase for actionable design ethnography. However, after completing intensive ethnographic fieldwork activity, researchers can feel that data reduction is a complicated task, firstly because of the vast quantity of data it creates. Secondly, ethnographic fieldwork allows a designer to feel deeply embedded within a culture. It creates an emotional bond between the researcher and the individual participants involved. This emotional attachment together with the vast amounts of personal insights collected can make the process of data reduction seem impossible and at times makes it difficult to let go of the smallest of participant idiosyncrasies.

Screening and editing of raw data only acts to reduce data minutely; if anything it acts as more of a cleaning and organising process. Similarly, colour open coding achieves very little in reducing data, allowing the researcher to organise data further and provide understanding by creating explicit themes and categories. However, a system such as the 'Colour Coding Thematic Framework' provides a base and an important component in which data reduction can be commenced. In addition to this framework it was identified that by creating a separate coding structure of 'taxonomies', an effective means of data reduction can be achieved. The advantage of coding data into taxonomies is that data reduction can be achieved in a person centric manner, reducing data and maintaining key human insights.

8.9.2.4.Data Display through Personas

Displaying data visually is a shared means of analysis by both qualitative researchers and designers; it is also an essential means of drawing results and conclusions from

data. Identified in this research was a means of creating both data reduction and data display by coding the data into two separate formats: The Colour Coded Thematic Framework and the taxonomies. A visual data display template can be created by means of 'Personas'. Besides being an effective way to reduce data, personas are advantageous to the design ethnography process on several levels:

- Personas are a means of maintaining human centricity and can help reduce complexity by humanising the data collected.

- Personas act as an important transition step into the design process and further, personas can be reused throughout the design process.

- Personas illustrate true insights from the field whilst protecting the privacy and confidentiality of individual participants.

8.9.3. Transition from Theory to Practice - Design Framework

We can now conclude that personas are not just an appropriate means of visualising collected design ethnographic data, but are also a means of categorising and reducing data. However, analysis in design ethnography does not end here; conclusions in qualitative and ethnographic research are drawn from theories built and derived from data collected. Personas as a standalone entity can be used as a theoretical reference for design practice. However, there is an underlining issue in doing this - the matter of the subjective interpretation of the data. The requirement for emotional, subjective detachment and in avoiding bias during the creation of theory is essential for the designer ethnographer.

Creating synthesis and objectivity is essential at this stage. Introducing viewers unfamiliar to the personas through interpretation sessions can create objective theory. Additional viewers to the data can assist the researcher in understanding the complexity of a culture as a whole, and to synthesise this further into an actionable design practice. Sessions such as peer debriefing sessions achieves this. Using forms of 'affinity diagramming' and 'memoing' allows ideas to flow quickly, and for a quantity of interpreted data to be produced. Once data from the session is categorised and patterns of theory identified, the designer should simplify complexity and

visualise findings. Frameworks should be designed to visualise and map the theory in context of the design process. In this research, data was visualised in a framework that divides theory and practice. Converging from the first diamond were the "soft" or intangible wellbeing needs. Diverging into the second diamond was the 'hard' or more tangible design theory of Usability and Ergonomics.

8.9.4. Second Diamond Practice - Divergence

8.9.4.1. Design Requirement and Feature Creation

For design ethnographers, creating a framework as a visual metaphor assists greatly in describing design intent and in lessening the perception of complexity. Designing frameworks in this manner can be very useful in building design requirement and features creation. In this research, the visual metaphor of a 'machine' and 'silos' were used to place product design requirements into product categories. Design requirements and features are the foundation of any product design project. Requirements created from design ethnography can remain implicit or ambiguous in meaning. This can be advantageous in portraying the language of the end user or customer;   however interpretation from the designer is required.

8.9.4.2. Sketch Conceptualisation

Sketch conceptualisation allows designers to draw multiple interpretations of possible solutions from requirements in a divergent manner. At this stage requirements and features should be quickly and iteratively explored until exhausted. Sketch conceptualisation relies on a quantity of quality ideas to iterate and explore; investigating both practical and unconventional ideas. Essential to sketch conceptualisation from design ethnographic output is that the designer is suitably inspired by person centric insight. A list of requirements and features alone may not offer the designer the desired inspiration to fully explore or to divergence ideas.

Introducing visual cues or prompts into this process can help this exploratory process. These visual cues or prompts should be concise and relate closely to the end user, to humanise requirements. Here, the personas can be reintroduced. These

should however be shortened and summarised to their most basic and informative format. Other visual and emotive stimulus for sketch conceptualisation e.g. a lifestyle or style boards are also helpful at this juncture to assist the designer in embodying physical features from requirements.

8.9.5. Second Diamond Practice - Convergence

8.9.5.1. Requirement Screening

Conceptualisation should be a highly divergent, open, and creative process. As a process it should offer a vast quantity of ideas and concepts to choose from, and should widely explore a given problem. This, paradoxically, can cause difficultly in achieving actionable design solutions, as the designer is again left with a vast amount of data to synthesize.

Returning to participants or stakeholders can greatly assist in reducing data. Moreover, the more participants and stakeholders that are utilised in the process of design, the more effective the results. Continually involving stakeholders in the design process saves time and effort across the term of a project. Screening requirements quantitatively through participants and stakeholders can quickly create a 'rapid rough cut' of requirements for progression.

8.9.5.2. Selecting and Screening Concepts

Once requirement screening and conceptualisation is complete, the designer should be left with the 'most desirable' ideas for progression. These should be converged further by synthesising them into a small number of visual concepts for approval and progression. Output from conceptualisation should be physically categorised into overarching concept groups with the aid of an external viewer or auditor. It is also important to describe the form of conceptual output that design ethnography creates. As noted previously there was a vast quantity of implicit meaning derived from design ethnography; and this follows through to conceptualisation. Therefore, many abstract ideas are created by this implicit meaning, as a result concepts are and abstract in nature. This can be advantageous if the researcher wants to create further

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dialogue with participants and probe further into meaning before progressing, however, not advantageous if one requires explicit concepts within a time constraint. Concepts created should be appropriately visualised and displayed. These displays must be concise and suitably implicit for interpretation purposes. Sketched and rendered concepts are effective, remaining critical and conceptual in nature, implying the conceptual standard to where they are situated in development.

Concept screening is a form of further convergence of concept ideas. Design ethnographers can use traditional techniques to screen concepts. Pugh's concept screening matrix is one such method to rate and rank against appropriate benchmark products. Involving stakeholders to help rate and rank at this stage can strengthen reliability in the outcome.

8.9.5.3. Focus Groups

A focus group was used in this research to evaluate a concept derived from design ethnography, and in part to validate concept findings. By eliciting feedback from multiple perspectives in one sitting, this session illustrated the importance of involving stakeholders in the process of physically designing in design ethnography. The session produced many stakeholders' viewpoints, with a concept display board acting as a catalyst for these viewpoints. The selection criteria from the concept screening matrix, together with the display board reinforced the participants understanding and stimulated the group to interact and verbalise viewpoints. As the session progressed it evolved into a form of 'Co Design' session with participants manipulating the concept features into formats to suit their own living environments and utility. Participants recommended redesign options and visualised these accordingly. The critical nature of concepts derived from design ethnography harmonise perfectly with co-design sessions allowing for interpretation and input from stakeholders. From this research it is noted that co designing would be at its most optimum at earlier stages such as conceptualisation or concept selection.

Chapter Summary

Ethnographic research by its nature produces theoretical data. Design ethnography requires a means to make this theory actionable. In the transition from theory to practice within design ethnography, essential methods lie with both synthesis (data reduction) and visualisation (data display). Visualisation perceptively makes complex data appear more actionable and maintains the humanistic characteristics of the data. Designing succinct frameworks from ethnographic data is a means of greatly reducing complexity, including depth and breadth of information within a given study. Creating visual metaphors within frameworks greatly assists visualisation; this visualisation plays the fundamental role of a bridge into design practice. Design and design ethnography are thoroughly iterative processes and particularly so in cases where empathy and sensitivity are required. Gradual divergence and convergence utilising the major stakeholders is required. Design output from ethnography is 'critical' in nature with concepts implicit and abstract in meaning. This can greatly complement a gradual, iterative, user centric process.

Chapter 9.
Conclusions and Future Research

9.0. Conclusions and Future Research

Chapter Overview

In conclusion, this thesis contributes to two domains. Firstly, it develops a methodology and an understanding of design ethnography as a process for design practice. With artefact design as a primary overall objective, design ethnography adapts and adopts traditional ethnographic methods to realise a profoundly insightful research methodology for early stage design. This research provides a framework for development of theory and conversion to practical design output. Secondly, this thesis provides an example of a designer ethnographic approach to product design for older people, producing insights and product design requirements for cooking and heating products. Outlined in this chapter are implications for future research from this thesis within the fields of design, ethnography, and the wider context of qualitative research methods in design.

9.1. Design Requirements for Irish Older people - Cooking and Heating Products

The literature reviewed from the outset of this study showcased design ethnography as a method in which designers could gain empathy for and sensitivity to people, users, and cultures. This literature specifically encouraged ethnographic methods when enquiring into the domestic product design requirements of older people and highlighted the fundamental role of nutrition and heat in the lives of Irish older adults. Following this literature review a 12 month design ethnographic field study was undertaken. This field study revealed the complexity of older people's lives, personalities, and attitudes, together with the diverse dimensions of their requirements.

This research demonstrated that for older people, cooking and heating products encompass a complex and diverse mix of wellbeing needs and usability/ergonomic factors. The research categorised wellbeing needs into health, social wellbeing,

product safety, emotive, and cost requirements. Additionally, this research exposed 'tangible' human factor requirements within ergonomics and usability. These needs and factors were discussed through theory constructed from the field and offered views into causality and possible solutions for redesign. A framework was constructed to diagrammatise design requirements; 'health' transcended all needs and factors. This framework simplified and visualised the complexity of findings documented within the field for design practice.

Aggregating all needs and factors into one overarching theme of research conclusions, the need for 'independence' predominates. Sustaining a state of independence and age-in-place within the domestic environment is a priority requirement for older Irish people and new product designs must reflect this. Designers must create future products that do not encroach on, and will encourage a positive daily routine to strengthen independence and thereby provide a means of ageing in place for longer. To strengthen independence there is a great need for domestic products to provide for a range of user capabilities, including many extremes. Offering a solution to this, the concept of "Shared Usability" is proposed. Giving effect to this concept in domestic products will certainly provide for further independence, dignity, social inclusion, safety, and ultimately ageing in place at home for longer.

9.1.1. Design Ethnography and Building Product Requirement: Future Research

This research revealed that the domestic products older people use in their daily lives directly and indirectly influence their health and wellbeing. This presents designers with many opportunities to improve future product offerings. The research revealed that cooking and heating products transcend the physical functionality and output of cooking food and heating environments. These products, fundamental in their nature and conventional in their domestic presence, assume holistic healthcare roles that can enhance emotive experiences, strengthen social bonds, and sustain independence and age in place. This should be fully considered and strengthened in new product development and for future design research.

New knowledge and insights from this study can lead to many new innovation streams in the design of domestic products for older adults. The human centric, ethnographic approach of this research has uncovered many unforeseen possibilities to improve usability, independence, and domesticity. Product requirements from the study are represented in three product areas. (i) 'Cooking Products - ovens and hobs' (ii) 'Heating Products - Space heating and household stationary heating', (iii) Shared Usability.

This research concluded with design practice and the creation of concepts. These concepts were used to acquire feedback directly from a stakeholder focus group. Results from this offer conceptual insight and opportunities to develop future products. From this point, the process is now in more classical product design territory. Bringing design to a conclusion while maintaining a dominantly human-centric approach requires appropriate methodologies. Co-design sessions can creatively embody the suggestions of the focus group into a chosen concept. From Co-designing, three dimensional prototypes can be quickly generated and feedback created through user testing. Exploratory testing and assessment testing (Rubin, 1994) can disclose this feedback. In using Rubin's definition, exploratory testing is suitable to be used at early development by using early physical prototypes to explore and test appropriateness (1994). These exploratory tests can be achieved by using basic paper and card scale models with realism introduced through scenarios or storyboards. Assessment testing can be achieved by refining three dimensional prototypes and conducting quantitative task or performance analysis with older people. This testing can be accomplished with full scale models, creating specific test scales and conducting user trials within the domestic environment.

9.2. Conclusions of Design Ethnography: Methods and Process

This research has also contributed to understanding the distinctive nature of design ethnography practised by designers. It has aggregated and developed methods and a process that facilitates its application. This research has particular value in that it has been undertaken by a designer, and consciously reported from a designer's perspective. It has applied designers' insights and ways of working into the

frameworks developed. This is intended to inform future design ethnographies and further amalgamate the disciplines of design and anthropology.

This area of the research was prompted from the literature reviewed, firstly calling for designers to move outside of their discipline to further acquire person centred methods. Secondly, to contribute to the future research of person centric methodologies, specifically in conducting field studies and gaining empathy into people and cultures. Anthropology and design were highlighted as disciplines with related and emerging methodologies; sharing the common interest of people, cultures, and artefacts. Ethnographic methods and the emergence of design ethnography were highlighted for their potential in approaching real world issues and for their benefits for the future of design related disciplines. For the future of design ethnography, the literature reviewed strongly suggested that designers should adapt ethnographic methods to suit design disciplines rather than anthropologists and ethnographers alone using design ethnography.

From this research a methods and process framework was formulated for conducting future design ethnography. This framework plots methods in the process of design ethnography, from fieldwork and data analysis to design practice. The conclusions from this framework are follows:

- Design ethnography should be broken into acts of divergence and convergence. The research demonstrated that acts of exploration and synthesis are essential in this process, exploration through deep enquiry, creativity, and synthesis through reflection, data reduction, visualisation and interpretation.

- For acts of 'divergence' appropriate ethical approval is a priority requirement, both in constructing participant samples and informing gatekeepers of the research intentions. This research also identified the importance of "sub-gatekeepers" in this process.

- Achieving depth and breadth in fieldwork enquiry is essential for rigorous exploration. Participant sampling was shown to be crucial for enquiry and divergence. For design ethnographers, allowing for appropriate 'creative' movement according to developing theories was shown to be critical. A mix of purposive, snowball, and theoretical sampling was demonstrated to achieve this.

- For a holistic and open enquiry, ethnographers adopt a research approach of Naturalism, Discovery, and Understanding. Methods to achieve this for design purposes include using semi structured interviews, storytelling, participant and artefact observation, and participatory techniques.

- In design ethnography, convergence occurs with data analysis. This commences with managing and organising data. Using traditional qualitative methods such as Grounded Theory and coding techniques assists the design ethnographer to methodically 'make sense' of the vast amount of data that can be accumulated from the field. For the design ethnographer, visual organisation of data was shown to be central to overcoming the sheer amount of insight derived from fieldwork and on into forming patterns, categories and conclusions from the research. This research proposes that design ethnographers utilise *'Colour Coding'* and a *'Colour Coding Thematic Framework'* to categorise and visualise reoccurring themes and patterns.

- Concluded from this research was that analysis in a design ethnography consists of both Data reduction and Data display (borrowing terminology from Miles and Huberman) (1994). Data display and reduction can be achieved in a visual and person centric means by using personas. Personas can then be used to attain objectivity and validity by triangulating findings and building theory prior to practice.

- Displaying data extends to visualising theoretic findings and design requirements. Creating frameworks were shown to be advantageous in simplifying complex theory for use in design practice and to visualise the complex transition between theory and practice. Created to diagrammatise this transition was a framework in the form of visual metaphors (a 'machine' and 'silos'). This framework format can be utilised in future design

ethnographic research. Its format is particularly useful in understanding the 'tangible' e.g. ergonomic requirements and 'intangible' e.g. social, emotional product requirements produced from design ethnography, and its application in design practice.

- It was established that in design ethnography, once the threshold of theory to practice is crossed, traditional systemised design methods can be used to converge ideas into categories of concepts e.g. screening and scoring matrixes.

- Early stage design practices such as conceptualisation are truly divergent in nature and require a means of creative inspiration. This research revealed that persona displays can be reused at various stages of the design process, particularly at conceptualisation, as a means of humanising design requirements.

- Shown in this research was that a particular form of conceptual output is produced from design ethnography. Mainly due to the holistic nature of the enquiry, output can be critical or abstract in nature. This holds distinct advantages for person centred design. Output of a critical nature can imply meaning rather than imposing solutions. This can be favourable when sharing with stakeholders and acting as probes or prompts in the design process.

9.3. Design Ethnography Methods and Process: Further Research

Comparable to other research fields, many design disciplines are 'young' and are constantly developing methods and processes. In this development, some methods and processes can be transient. What will remain constant for the future of design is a requirement to deeply understand people and cultures. As a result, design ethnography has lasting power as a standalone subject matter. Its deep and holistic enquiry offers the ability for researchers to approach and answer complex human centred questions. This research thesis is the early stage of an exploration; much can be achieved by designers delving into anthropological (and indeed other disciplinary) methods for the future of design. This can be attained by designers conducting field studies, practicing design, and reflecting on methods and processes.

This research has broader context in considering the relationship between design and qualitative research. It became very clear throughout the progress of the research that design shares many approaches and values with the broader qualitative research methods of the social sciences. Much can be explored, learnt, and developed from their shared similarities and their combined future potential, offering exciting possibilities. This thesis identified many complementary qualitative techniques for design such as grounded theory methods, coding, memoing, (Glaser, 1998) and building taxonomies (Spradley and McCurdy, 1972).

To conclude future opportunities to strengthen design ethnography were identified. The following are some of these opportunities -

- **Methods in engaging with gatekeepers and stakeholders.** These should be explored and expanded further in greater detail. Advantages of doing this are twofold, firstly for building participant samples and confidence in research studies. Secondly, engaging more with other stakeholders in the design process is critical for strong theory and practice. A noted area for future research with gatekeepers and stakeholders lies with developing methods of co-designing.

- **Field methods.** Expanding on and experimenting with new design ethnographic field methods should be a priority for future research. This exploration should not just be limited to interview, observation, and participatory techniques. Novel ways of blending both design and ethnographic methods such as ethnography with co-design or design and storytelling with ethnography should be explored.

- **Post field work processes of analysis.** Post fieldwork analysis can be arduous and time-consuming processes. Many applications can be designed in the future to aid the design ethnographer in the transcription and editing/ screening of raw data collected.

- **Colour Coding and a Colour Coding Thematic Framework.** A software system of coding could be developed specifically for design ethnographers to both categorise and visualise reoccurring themes and patterns.

- **Data reduction and display, Personas and Frameworks.** A computerised means of data reduction and display for the creation of personas and frameworks would be highly beneficial for the designer ethnographer. This would be a computerised means of systemising the process of reduction and display in a human centred manner.

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Appendices

Appendix A: Participant Information and Consent Form

Title of the Study: The design and development of cooking and heating appliances for the elderly.

I am a student of the National University of Ireland Maynooth and I am currently undertaking a PhD in Product Design. In part fulfilment of my PhD I am required to complete an ethnographic research study. The purpose of this is to gain a true insight into the requirements and needs of various age groups in cooking and heating products.

I am asking you to take part in this study. If you agree to participate, I will ask you to sign this informed consent form. This document will tell you about the purpose, benefits and risks of this study. Please read carefully before you sign it, if you have any questions I would be happy to explain it to you. You should only sign the consent form when you feel that you understand what is being asked of you and you have sufficient time to think about your decision.

The Study

The design and development of cooking and heating appliances for the elderly.

You have been asked to participate in this study as it is felt that can contribute valuable research information to this. The research participants will range in age group from 60 years upwards.
The research requires informal interview, observation and possible participation of everyday tasks in the domestic environment. If you agree to participate in this study I will carry out the research from your home, this will take approximately 1-3 hours to complete. Items from interview may be recorded however only when consent is given.

Confidentiality

Your name and any personal information revealed during the research study will be coded so that you cannot be identified in any way. Your name will not be included in research results and will be stored in the National University of Ireland Maynooth. Research may be viewed by specialised focus groups and used as material for brainstorming sessions for product design and development studies only; any of these studies will not identify you in any way.
Confidentiality is Subject to the requirements of legislation, including Data Protection Act and Freedom of Information Act; information obtained about a participant is confidential unless otherwise agreed in advance.

Benefits of this study

It is hoped that the information obtained from this study will help educators and designers to provide high quality research and product development to cater for elderly persons.

Risk of this Study

There will be no risk attached in participating in this study.

Permission

I have I have obtained permission from the head of Department of Electronic Engineering and the Product Design Program Co-ordinator in the National University of Ireland Maynooth. I have also received ethical approval from the University ethics committee.

Consent to participate in study

Your participation is entirely voluntary. If you consent to take part in the study, please sign the declaration below. Of course you may decide at any stage to change and withdraw from the study. Should this occur you will not be penalised in any way. If you have any further please do not hesitate to contact me at Mobile: 087 6637940

Declaration

I have read this information document and I have all my questions answered to my satisfaction. I understand what is expected of me if I agree to take part in this study.
I understand that I may withdraw from the study at any time without prejudice.

I consent to participate in this study

Participants Name

Participant signature

Contact Details

Researchers Signature

Date

Appendix B: Ethical Approval of a Research Project from Research Supervisors to Ethical Committee

16th February 2009

To whom it concerns

Ref:

Application for Ethical Approval of a Research Project
The design and development of cooking and heating appliances for the elderly

Mr. PJ White has been a PhD student with NUIM since September 2008, under the joint supervision of Dr. Frank Devitt and Ms. Damini Kumar in the Department of Electronic Engineering. His PhD research is in the area of product design for elderly people, and it is proposed that ethnographic research by observation within the homes of participant elderly people will be undertaken by PJ.

PJ has been a professional product designer working in industry for 5 years before commencing his PhD at NUIM. In preparation for this research work, we (as supervisors) have undertaken multiple discussions with PJ in regard to objectives, methodology and protocol. We have also, jointly, met with two anthropologists to gain understanding of best approaches to undertaking the research. These are Dr. Adam Drazin from Trinity College, Dublin and Dr. Pauline Garvey from Dept of Anthropology, NUIM. PJ has had further meetings with Dr. Drazin.

We are satisfied that PJ will conduct the research with appropriate sensitivity and ethical propriety.

_____   _____
Dr. Frank Devitt   Ms. Damini Kumar

Appendix C: Letter from University Ethics Committee formally awarding approval

NATIONAL UNIVERSITY OF IRELAND, MAYNOOTH
MAYNOOTH, CO. KILDARE, IRELAND

NUI MAYNOOTH
Ollscoil na hÉireann Má Nuad

Dr Carol Barrett
Secretary to NUI Maynooth Ethics Committee

Dr PJ White,
Department of Biology,
NUI Maynooth

23 February 2009

RE: Application for Ethical Approval for a project entitled:
The design and development of a cooking and heating appliance for the elderly.

Dear PJ,

The Ethics Committee evaluated the above project for ethical approval and we would like to inform you that ethical approval has been granted.

Kind Regards,

Dr Carol Barrett
Secretary to NUI Maynooth Ethics Committee

Appendix D: Formal Letter of Consent to 'Gatekeepers'

Dear Sir or Madame

My name is PJ White and I am a PhD researcher in Product Design with the National University of Ireland Maynooth. I am doing research in the area of product design for the elderly and I am currently involved in primary research in the design of a cooking and heating appliance for older adult users.

I require a number of interviews with persons over the age of 70 years of age, in their own living environment to gain a firsthand insight into user's requirements of appliances and I am writing to you to ask if you knew any participants that would like to be involved
I propose to do this research through talking informally in regard to personal views on the following:
· Everyday domestic tasks.
· Functionality of household appliances.
· Nutrition and food.
· Heating the home.
These will not be structured interviews and everyday lifestyle storytelling will be encouraged in a friendly and relaxed manner.
I have gained Ethical Approval from the University for such research and an official letter can be viewed if required by you.
If you wish to contact me further you can do this by email pj.white@nuim.ie or mobile phone 087 6637940
I would be glad to answer any questions you might have.
Many thanks in advance; your help is much appreciated.

Regards
PJ White
PhD Researcher
National University of Ireland, Maynooth
Email: pj.white@nuim.ie

Hello My name is PJ White, I am a PhD student
in the National University in Maynooth.
I am doing research on the design of a cooking
and heating appliance for people aged 70 and
over.....can you help me please??

All I ask is to have a chat with you in
your own living area about personal views
on the following:
-Everyday domestic tasks
-Functionality of household appliance's
-Cooking, nutrition and food
-Heating your home

Appendix F 1-3: Evolution of the coding thematic framework, four revisions

Appendix F 1: Revision 1 of the coding thematic framework

Highlighted Colour Legend	Theme
Light Magenta	Personal
Light Cyan	Environment
Blue	Ergonomics
Yellow	Heating
Light Red	Cooking
Grey 30%	Other Appliances
Green	Health

Appendix F 2: Revision 2 of the coding thematic framework

Highlighted Colour Legend	Theme
	Persona
Light Magenta	Personal
Orange2	Religion
Orange 3	Pass-times
Orange1	Loneliness/Isolation
Salmon	Independence
Brown	Pets
	Environment
Light Cyan	Environment-Home
Turquoise 5	Weather/ seasons
Violet	Safety in Environment
Turquoise	Possessions
Magenta 7	Lighting
Magenta 4	Household chores
	Heating
Yellow	Heating Products
Yellow 6	Water/ Shower/Bath
Yellow 4	Clothes Drying
Yellow 2	Fuel Heating Cost
	Cooking
Light Red	Cooking Products
Red 1	Food/ Drink/Meals
Red2	Cooking/Baking/ Grilling/ Frying
Red 3	Eating out
Red4	Shopping/ Cooking/ Food Cost
Red 5	Meals on Wheels, food centres
	Appliances
Grey 30%	Television/Radio
Grey 10%	P.C. Internet
Grey 20%	Phone
Grey 40%	Refrigerator/ freezer
Grey 60	Other Appliances/Products/gadgets
	Health
Green	Injury
Light green	Good health/ Illness/medical conditions
Green 6	Cognitive functioning/Memory
Green 3	Orthopaedic issues
Green 2	Sleeping Habits
	Mobility
Brown 2	Mobility issues
Blue	Ergonomics
Chart 10	Socialising
Orange 2	Money
Orange 4	Pension

Appendix F 3: Revision 3 of the coding thematic framework

Highlighted Colour Legend	Theme	Description
	Persona	
Light Magenta	Personal	Age,/General demographic family,friends,stakeholders/Work/Profession
Orange2	Religion	Opinions, thoughts, death, religious possessions,relics
Orange 3	Pass-times	Hobbies, daily recreation etc.
Orange1	Loneliness/Isolation	Loneliness/Isolation
Salmon	Independence	Statements of independence status/importance,
Chart 10	Socialising	Socialising, Getting out and about.
Orange 2	Money	Wealth, Financial status
Orange 4	Pension	Pension Money
Brown	Pets	Domestic pets, animals, stories
Chart2	Cigarettes/Alcohol	When Where why
	Environment	
Light Cyan	Environment-Home	House/home/ extended living environment
Turquoise 5	Weather/ seasons	Weather
Violet	Safety in Environment	Safety
Turquoise	Possessions	Material possessions, ornaments, meanings
Magenta 7	Lighting	Lighting in context, locations, usage
Magenta 4	Household chores	Domestic jobs, washing up, cleaning.
Blue	Ergonomics	Posture, Reach etc issues/ designing the environment
	Heating	
Yellow	Heating Products	Stoves, radiators, blow heaters, timers, open fires,
Yellow 6	Water/ Shower/Bath	Showers, baths, means of heating water, hygiene.
Yellow 4	Clothes Drying	Dryers, Clothes lines (internal/external),Means of drying
Yellow 2	Fuel Heating Cost	Types of fuels, uses and opinions. Bills and payments
	Cooking	
Light Red	Cooking Products	Cookers, Microwaves, Stoves, pots, pans, utensils
Red 1	Food/ Drink/Meals	Breakfast, dinner, lunch, tea supper, eating habits
Red2	Cooking/Baking/ Grilling/ Frying	Any means of cooking, why when and how
Red 3	Eating out	Dining outside of the home, why what how and with whom
Red4	Shopping/ Cooking/ Food Cost	Shopping habits-where how why , costs
Red 5	Meals on Wheels, food centres	Meals on Wheels, opinions etc
	Appliances	
Grey 30%	Television/Radio	Television/radio usage- what is watched when, where how often
Grey 10%	P.C. Internet	Internet usage- when, where how often, opinions
Grey 20%	Phone	Phone usage- when, where how often, house/mobile
Grey 40%	Refrigerator/ freezer	Fridge usage- when, where how often, what is stored
Grey 60	Other Appliances/Products/gadgets	Other Appliances/Products/gadgets
	Health	
Green	Injury	When where the injury happened, Falls, operations, hospitals
Light green	Good health/ Illness/medical conditions	Type of illness, medication usage
Green 6	Cognitive functioning/Memory	Any mention of memory/loss dementia
Green 3	Orthopaedic issues	Hips, knees, breaks surgery, operations.
Green 2	Sleeping Habits	Sleeping Habits
	Mobility	
Brown 2	Mobility issues	Getting around on foot/ Mobility aids
Brown 4	Public Transport	Why where when how
Brown 3	Private Transport	Why where when how
Brown 1	Travel	Why where when how

Please see folder "Appendix G" on CD for this Appendix (affixed to back cover of thesis)

Appendix H: Creating Memos of the Coded Source Data-Example

Sheet (Names edited for confidentiality purposes)

I.   Core personal Insights of Participant

- Couple, ▉▉▉▉, Sheltered Housing Urban both originally from ▉▉▉▉▉▉▉. 2 girls and 3 boys, 15 grandchildren (proud)
- Medium sized one bed roomed house, 2 years, lived with Son before moving in, Quiet and peaceful
- Likes to be able to walk to amenities
- ▉▉▉▉ likes to go for walks a lot on his own to get messages and for walks along the canal.
- Finds the gas pretty good and reasonable
- Needs a lot more heat than when younger
- Would use a lot of heat in the winter
- Uses Gas thinks its handier for Older people
- Had oil fired heating which was fine but quite expensive
- 5 ago ▉▉▉▉ had a triple bypass and nearly died he has a pacemaker
- Both have arthritis
- Turns on that electric fire it gives the place a boost to help when the heating is coming in
- Likes to turn the lights on the fire dark nights so it gives a nice glow
- Use microwave quite a lot for defrosting or heating not cooking
- Freezer shelves slide out to prevent bending down
- Has mobility and adaptors around the house to help them in everyday tasks
- Eats in a lot. Lunch: light Dinner: salads and cooked chickens some of the time
- Breakfast: cereal and fruit and tea, never have fries because of heart conditions
- Social life is curtailed these days they are very much together now
- Feel the benefits when they can rest and relax even if its just with the newspaper

II.   Core issues a participant has in daily life.

- Didn't like being far away from everything had to get taxis everywhere
- Worries about ▉▉▉▉ memory and wandering off
- ▉▉▉ suffers with dementia was getting forgetful and repetitive
- ▉▉▉ gets really bad circulation so even in the hottest night she would be freezing
- Both have heart complains problems with cardio vascular so more heat-cardio vascular in legs go gets cold if sitting
- Would be cheaper if they had electricity
- Just turns on and off the timer as they need it-son sets the time-gets nervous with touching it
- Heat is nearly on the whole time
- Forgets to put on his watch for pacemaker
- One of the grandkids pressed the panic button the other day
- She has Rheumatoid arthritis in hands , finds it very painful
- Wants a oven that opens out rather than opens down-like old gas cooker because they have to bend down to get into it with arthritis –cant bend knees to clean it
- Son is getting something that would higher the fridge up
- Has to have to have a chair beside her when bending down to clean to help get back up again sometimes the two of them end up stuck on the floor after him trying to help her up
- Doesn't like the mobile but family insists her son put her numbers on a piece of paper on the back of the phone on speed dial after 12 missed calls "Wanted press one button phone"
- Gets annoyed when they can't do things because they were quite active and try to be still. Still thinks they are 25
- Walker- never used it, I would only use it if I absolutely had too afraid I won't be able to bring it into the doors of the shops

Profile

- Male, 77, Widower Living Independently, wife died 17 years ago heart attack and has five children, three boys and two girls. Misses wife terribly
- Works as a volunteer going around to elderly persons homes each day for a chat
- Was a carpenter
- Cahir Tipperary-2 brothers, living in Kildare since 1954
- Gets lonely gets monotonous at times on his own but has friends-
- Resourceful person

Getting out and about

- Gets out of the house nearly every day for a walk around the shops and shopping centres
- Gets out and about so he wont sit down and mope

Pets

- Has a canary for years, puts him out in the hallway during the day loves his singing, thinks they are good company for old people

Pastimes

- Likes going down to the local bar for a pint and a game of cards with the lads and to place the odd bet on the horses
- Loves golf has been caddying and playing since he was 7 was offered the job as a professional
- Keeps golf mementos on mantle piece Given up golf because he cant afford the green fees and the cost of playing.
- Active social life-very positive outlook on life
- Was a treasurer of his local golf club
- Meets a lot of friends through golf
- Plays Santa Claus for Christmas in the Shopping Centre works for local charities
- He enjoys going down the town for a few pints.
- Owns a clock collection
- Owns a video collection doesnt watch much TV watches videos / DVDs most of the time
- Loves steam trains- owns a train set but has to get it fixed

Possessions

- Has a lot of old photographs on his mantle piece and old possesions handed down from his parents

Environment

- Environment hand made by himself in the conservatory desk, tables, stands etc
- Made his apartment to suit himself
- Built a dummy fireplace in sitting room but took it out for his new bigger telly and Sky
- Medium 2 bed roomed apartment, Urban social housing development living there 5 years
- Loves living on his own
- Kitchen spills out into the hallway with his fridge beside the bathroom
- Likes the amenities and how it was handy to get in and out of town.
- House in regimental and meticulous order.
- Keeps his awards and mementos on his mantle piece
- Puts the bins out every week for infirm people in the village
- Has the village recycling
- Happy and secure in environment- tidy and compact easy to manage-but is. Frightened of break ins
- Can't stand washing up and thinks the dishwasher wastes too much energy
- He has a helper that comes into him for an hour every Friday morning to help him with changing his

bed covers and the ironing

Transport

- Car he uses now and again
- He moved to his current house because it was better for transport-driving car less

Health

- Burnt his hand after boiling the kettle for washing up when the phone rang
- Hearing impairment-hearing aids are a nuisance in his ears when he goes out for a drink
- Had a hip operation 2 years ago is so much better now and is waiting to get his other done
- Loves his orthopaedic chair because he can easily get in and out of it
- He can only stay on his other furniture for an hour and he gets sore

Heating

- Uses the timer only in winter when he wants hot water and heating-spent time and studied timer to learn how it works from October onwards
- Timings are from 7 to 9 in the morning, evenings from 5 to nine then drop an hour and have it on for an hour before going to bed
- Doesn't use central heating much only in the mornings because of being in middle apartment
- His bills don't cost too much as account of the pension
- The electricity would be 120 euro 350 for rest of bills-reduction on heating with pension
- Loves his versatile old oil heater and is the main source of heating for his home
- Likes the fact that it has a thermostat, is mobile and can move with him dries his shirts and socks on it, and has heat at the same time
- Never uses his heater in his bedroom- an electric blanket and two duvets
- Never liked gas, doesn't like spending to long in his sisters and sons home, feels the air is not right with gas
- Washing in the hallway: puts it out in the sun later on in the day-Uses rads as a dryer
- Never uses his fireplace is too much hassle with all the ash
- Claims that the old women around the village love the open fires Ash makes the bins very heavy
- Puts his 2 bar fire on if he gets too cold (in front of the fire place)
- Uses his electric blow heater if it was very cold and wanted to heat the place in a hurry
- The gas heating is enough for him dislikes the electric fire because of the air it produces but uses the glow on the fire- makes it comfortable and warm
- Always in credit with the electric bill only use the electric for the cooker and the glow on the fire
- Thinks a open fire is hard labour
- Puts a tenner a week on a gas card to keep in credit with his bills
- Dislikes the dry air from his electric fire
- Doesn't like dead heat likes a breeze
- Puts electric fire on when it gets chilly
- Shirt draped across the floor in front of the heat source to dry it out
- Uses the electric heater when he has been out and wants to warm the room up quick
- The jet on the gas heater kept on getting stuck and blocked so had to get an electric one

Cooking

- Cooking for 17 years since wife died
- Cooks a lot, doesn't eat out except it was an occasion
- Wants a simple cooker, method of cooking is very simple learned to cook when working
- Breakfast-3 mornings a week-porridge, I make the porridge and a poached egg, yoghurt and dried nuts or boiled egg the other mornings with 2 slices of brown bread
- Lunch -sandwich/pasta with some cottage cheese
- Grows sprouts in kitchen for sandwiches and salads
- Steams almost everything-cook a decent meal on it like fish, can watch it cooking
- Made a wooden stand for his steamer places it on hob so he can see it
- Very seldom uses the microwave- not very happy with the methods of cooking that way many no's, the dishes and utensils you use and the way you use it puts him off- difficult controls to understand
- They dont allow gas cookers in his block
- Design of an oven -foolproof and economic, the biggest fear is the cost of electricity Cost is one Safety is the other...old people like myself can didder and be careless
- Cooks for two days- roast beef hot on a Sunday, cold on a Monday. Corned beef Saturday night sandwiches the next day
- Breakfast: Porridge every second morning or two cuts of toast and marmalade blood sugar ran a bit

- high last year
- Has two good meals a day
- Shops in local butcher –roast lamb beef
- Lunch: Spuds and fish on pan
- Just has a snack during the day- something for breakfast then he would be ok til dinner in the evening Justa cup of tea in the morning none for rest of day
- Evening meal: very simple-bit of toast with cheese or patewith tea and boiled egg
- Whiting and a dozen eggs on a Friday as a standing order
- Eats out for lunch once during the week goes down to the pub for the bacon and cabbage
- Doesnt like going over to the dining hall for dinner because of all the women
- Cooking appliances all electric- no trouble with it
- Very particular about food- likes to know what hes eating and drinking
- Doesnt trust the tap water makes a cup of tea from bottled water
- drinks goats milk thinks it's safer than cow's milk-cut out all dairy from diet was getting chest pains
- His small worktop oven was the greatest thing he ever bought- uses the hob on the built in cooker
- Small worktop oven-easy to use conducive to the food he eats- correct eye level can see his food cooking can understand the dials
- Has inspired other men in the estate to buy one
- His hob holds his empty pots-probably use three of the hobs at one time
- Looking to get other worktop mounted products-freezer to stop him bending down-easy to handle
- Sandwich Maker- not used very much
- Cooks his own food about four days a week- not an expert but gets by
- Big cooker-thinks it's more difficult to manage-too complex
- Weakness for cakes and the biscuits gets very hungry at night
- Finds cooking no problem before he got his hip done he cooked everyday now he gets meals on wheels and cooks at the weekend-steak corned beef lamb in the oven the hobs after that
- His Joe foreman - the greatest thing of all time has it six years so its beginning to stick, T-towel on the grill to reduce grease.
- Does his shopping weekly
- Doesnt use timer on cooker knows how long it takes in his head
- Son joins him sometimes for dinner on a Monday

Fridge

- Fridge too low built a stand up higher for comfort (bending down) and to see all food Placed pots big stuff not used daily) in bottom.
- Fridge is always full and in order

Telly/radio

- Watches telly only in winter getting a bigger one for winter
- Likes to watch the football on the telly mostly in the evenings, doesn't waste to much time in front of it, likes the news

Computer/Internet

- Has gained a new lease of life from learning about computers and the internet but he needed patience
- Uses the internet and computer just for a hobby has no real projects for at the moment, If he was younger he might be a writer on the net
- Set the computer up himself
- Sometimes thinks the computer thinks he's an ol eejit when not knowing what to do
- Owns a laptop is learning Skype

Gadgets

- Loves his grabber- simple and great for heavy weight elderly people that find it difficult to bend
- Loves his grabber and shoe horn bought a stronger one for himself after I had the hip operation-Slip on shoes Had lace up shoes but couldn't cope with sore hip so has to wear slip on shoes

Leftover Insights:

- Army-jacket which he proudly displays his army medals and wears every day polishes medals

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everyday after breakfast-has no one to hand them down too
- Possessions from a different life
- Reformed alcoholic-14 years misses the social side of it father was alcoholic
- Heavy smoker - about 25 fags a day his wife was too
- Broke his hip 17 months ago was told he wouldnt walk again, but walks regular now
- Night store heater, comes on during the night and stores heat
- Doesn't bother with setting the timer for the heat used to use it but found it a waste of gas-was putting on the timer for two hours and he wouldn't be in
- Has a fire guard on his electric fire in the summer time to take the look off it"
- Would like an open fire but wouldn't be able to handle it-safer without it
- Microwave -fantastic, great for heating up stuff and very clean
- Never uses his oven only his microwave-just the hob for frying
- Cooks for himself sometimes but mostly gets something down in the shopping centre

Please see folder "Appendix J" on CD for this Appendix (affixed to back cover of thesis)

Appendix K: Peer Debrief Session: Recorded and Classified Memo Notes

Cooking Specific Needs	Heating Specific Needs
Cooking	**Heat**
Limited cooker use	Easy heat controls
Primary user (on own)	Cost of heating high (spatial shrink)
Poor perception of microwave	Economy- cost of heat (spatial shrink)
Safety on hob(fire)	Energy efficient=cost efficient
Teach themselves -to use cooker	Using localized heat to cut cost
Designed for new cooks with limited ability	Open fire winter and summer for comfort
Easy healthy cooking	Open fire= comfort
Indoors a lot (heavy user of cooker?)	ON off heat controls (easy)
Traditional methods of cooking	Local heat to ease arthritic pain
Mainly hob usage	Heavy user of heating
Easy means of cooking (tasty)	Heat and medication=drowsy needs settings for timer
Limited cooking knowledge	House bound more
Avoiding malnutrition (east cooking)	Getting older depends on heat more and more
Malnutrition fear	Pet heat usage
Pride with cooking (male)	Environment getting smaller (heat)
Nostalgia cooking and baking food	Precious about heat
Heating and eating	Close proximity to heat
Independence with cooking	Fear of being cold
Weekend use cooker	Heat-open fire important
Food for socializing (going out)	Clothes drying local for independence
Blood sugar (healthy eating)	Solid Fuel hard labour
Make microwaves more approachable	Open fires-Old women association!
Understanding and control of cooking	Willing to learn heating controls (convenience)
Cooking you can see in Action (eye level)	Comfort from fire appearance
Dietary Info	Non dry air
Nutritional Easy Meals	Active social life out of the house (flexible heating)
Cooking for social company	Heat to relax
Cooking as a means of family meeting	Localised control over heating i.e. drying clothes and in bedroom
Carer dependant cooking	Seasonal controls
Carer dependant non user of cooker	Boost facility
Carer is user	Ease of heat controls
Cooker has little usage	Constant heat important
Cooking facility personalized	Limited ability for heating usability
Light weighing foods OK!	Easy thermostat control
Heating leftovers	Heat boost facility
Comfortable with microwave	Heat as company
Comfortable with electric cooker (very safe)	Dry heat is a problem
Cooker minimum use (small meals)	Constant heat required
Social gathering with food- eating out	Lives around the radiator (environment)

Familiarity in eating out	Concerned with cost of heating bills
Small cooker (minimum use)	Solid fuel perceived as dangerous
Eating in weather permitting	Daily routine, independence (heating)
Tea making personal experience	Comfort and heat in sitting room
Wide variety of meals (hob and oven)	Modular space heating (occasional)
Cook and eat at home (high use)	Heat for arthritis
Traditional meals	Energy loss in unused rooms
Design for healthy eating	Heat for showering (water)
Cooking for one	Non dry air
Small scale cooking	Layers clothes for warmth
Poor association with microwave (rays)	Insulation helps keep house warm
Perception of healthy cooking	Mobile heat for arthritis
Al Fresco dining (health)	Unused room's cold
Fear of technology with excuses (cooking)	Active Social life (flexible)
Mini grill (George Foreman)	Comfort
	Heat boost ability
	Arthritic relief (access to heat)
	Access to heat (more in winter)
	Localize heat modularity
	Heat as comfort
	Heat as comfort health (heat for legs-heart condition)
	Active flexibility
	Energy efficiency
	Boost directional heat
	Boost space heating
	Heating flexibility
	Heating comfort for hobbies
	Conscience of cost of heat (saves)
	Heating control for user important

Usability and Ergonomics

Usability

Adaptability for loss of ability

Mobility one floor housing

No bending down

Ease of use products

Inviting and easy to use

Sight: problems with visibility

Low motivation

Easy to use

Easy interface required

Low motivation for products

Sight problem

Transition period products

Mobility issues with legs

Emotional Wellbeing

Emotive-Nostalgia

Emotive display of possessions

Personalization of living space

Emotional attachment possessions

Fire place focal point for possessions

Seasonal Usage Sept-May

Personalisation –Focal Point

Nostalgia/Emotive (Cooker)

Nostalgia/Emotive (Personalization)

Emotive Possessions

Nostalgic possessions collection

Large cooking area (nostalgia)

Nostalgia warm aesthetic

Nostalgia through stories

Carer and family usage	Nostalgic values
Carer and family usage	Personalization (pride of place)
Limited use by house occupier	**Product embodiment**
Desire to use (usage)	Durability of products
Limited hand ability (stroke)	Transition to new products
Less effort to do things	Products supports lifestyle
Control of Products (seeing is believing)	Product is routine supported
Adapted products to height (ergonomics)	Products that empower
Ergonomics to suit posture	Clothes drying facility
Adapted products for comfort	Standard space available (confined)
Some chores-limited ability	Local storage for utensils
Easy clean	Cleanliness of aesthetic- soft and natural
Easy Clean	TV is the entertainment and comfort zone
Easy controls (cooking)	Willing to embrace computers but with difficulty
Easy to use	**Emotional wellbeing**
Willing to learn technology (patience)	Emotional dependence of other people
Hard of hearing-(sounds)	Comfort with familiarity
Visible controls (sight)	Comfort with familiar objects
Irish weather controls (heat)	Piece of mind (everyday needs)
Irish weather controls (environment)	Sense of purpose (personally)
Easy heating controls	Reminiscent- fire (past association)

Independence/Social Wellbeing

Easy to use fire	**Independence**
Seasonal controls (weather)	Routine important
Family and intuitive heat controls	Time for routine important
Visible controls for heat (intuitive)	Wanting to self support
Clean fire important	Embarrassed by limited ability (pride)
Out and about socially regularly- active	Routine important
Independent living adapted	Proud Irish man
Usable timer (cooker)	Drip fed independence (pride)
Cleanliness ease of maintenance	Fear of losing independence (male)
Easy to clean and light	Manageable independence
No hassle fuel source	Male independence (embarrassment)
Convenience	Maintain independence (cooking and heating)
Efficient usage (order)	Moving-mobility issue with hips
Easy to use	**Social Wellbeing**
Timer- ease of use to dispel fear	Social interaction-meals
Average older adult usage	Social interaction
Ease of use with physical challenges (hands)	Fostering more interaction socially
Easily transported product	Social networking
Mobility	
Limited hand ability (twisting)	
Environment getting smaller and smaller (special shrink)	Conflict!! More intuitive functionally less social interaction
Ease of use (avoid bending)	Social Cooking
Embarrassment- bed down stairs	Piece of mind

Open to gadgets and aids

Social events stunned with immobility

Ergonomics

Mobility adaptors

Bending down problematic

Work top height desirable

Avoidance of bending down

Avoidance of reaching up

Side hinge opening preferred

Easy to clean oven ergonomics

Family Usage

Carer and good family support

Family usage cooker

Family usage

Family member usage

Used by other family members

Transitional period (moving)

Personalization of environment and appliance

Personalization (showing)

Personalization- fire as focal point

Transition period

Transitional flexibility

Intuitive functioning in new environment (ease of transition)

Family interested in Quality of life (health)

Embarrassment

Embarrassment and fear of technology usage

Youthful aesthetic (embarrassment)

Safety

Safety

Security (safety)

Safety (Piece of Mind)

Needs security

Safety

Mobility (safety)

Family control safety

Fear for safety

Safety- falling over heater

SafetyX2

Safety-Distance between rings and front of cooker

Alzheimer's safety

Awareness of fire safety (cooker hob)

Cost

Cost

Organized payment of bills

Cost Important

Cost an issue cooking and heating

Minimal/less electrical usage

Paranoid of cost

Cost of cooking (roasting economical)

Low running cost

Appendix L: Categorisation of features (memos) to establish broad product categories
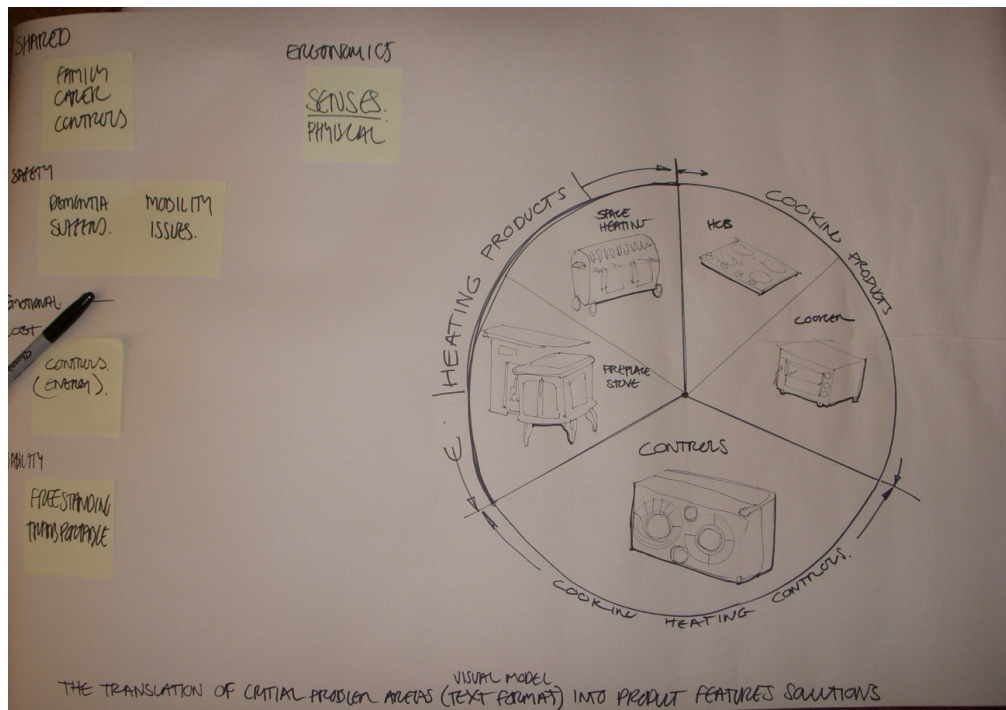
Shared

Family/Carer controls: Safety For dementia sufferers, mobility issues

Cost: Control of energy

Usability: Transport for transition periods

Ergonomics:

Extreme users! Senses/Physical
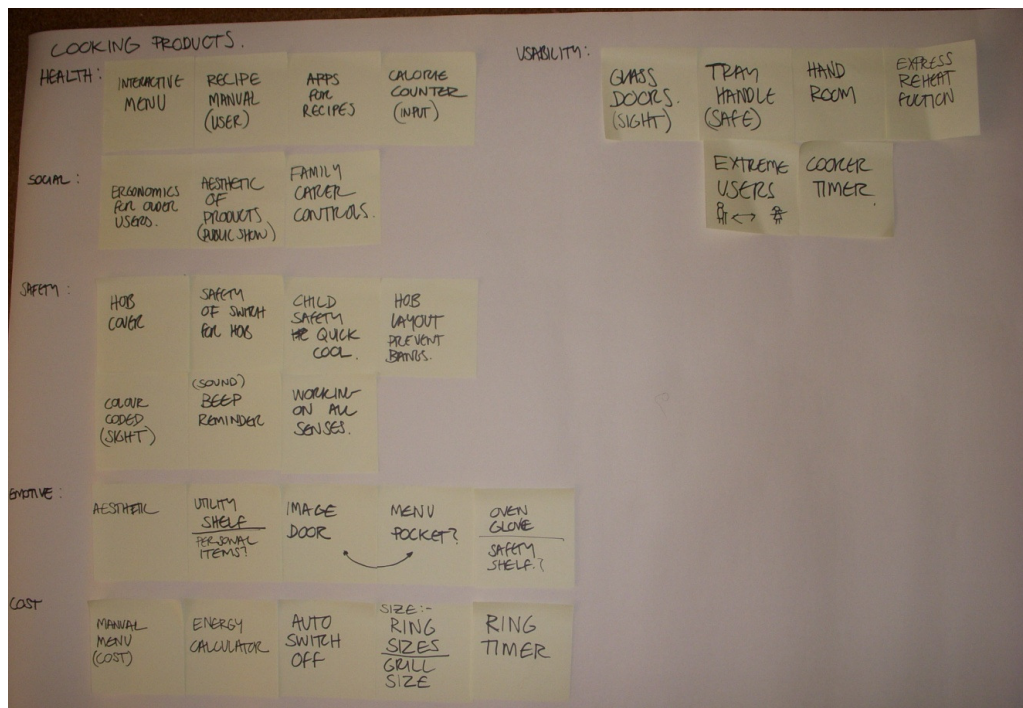
Cooking Products

Health: Interactive menu, Recipe manual, App for recipes, calorie counter (input)

Social: Ergonomics for older users, Aesthetics (public show) Family or carer controls)

Safety: Hob cover, safety off switch for hob, child safety (quick cool) hob layout to prevent bangs, Colour coded for sight, Beep reminder for sound, working on all senses.

Emotive: Aesthetic, Utility shelf for personal items, Image door-Menu pocket? Oven glove safety shelf.

Cost: Manual menu (cost) Energy calculator, auto switch OFF, Ring sizes, grill sizes, ring timer

Usability: Glass door, safe tray handle, hand room, express reheat fuction, Cooker timer

Heating Products

Health: Spatial Shrink: Control, gently heating rooms, Safe space heater, Mobile heat for rooms. Heat for pain: Heat pack (oven) space heater adaptor, heat blanket cushion Comfort: Simulated open fire, heat adaptors

Social: Heating controls

Safety: Reminder beeps, safety controls, rechargeable (no leads)

Emotive: Warm aesthetic, Memory mantle piece

Cost: Energy efficiency controls, heat controls, cost indicator

Usability: On/off heat controls, boost heat option, boost space heating, room control, mobile space heater, intuitive heat (senses) Small clothes rack, easy clean smooth surfaces, non dry air, pet friendly, family controls.

Appendix M 1-2: Revisions of Design Requirements and Features List

Appendix M 1: Revision 1 of the Design Requirements and Features List

		Space Heating	Fireplace/stove
Factor			
Health	Mobile heat product for all rooms in the house	•	
	Heat and cold for arthritic pain	•	•
	Heat blanket or cushion	•	•
	Products that provide heat for pastimes	•	•
	Heat for comfort	•	•
	Heat to relax	•	•
	Products that provide localised heat	•	•
Social	Products that enhance ability of the user	•	•
	Family or Carer Shared heating controls	•	•
	Localised heat for warm gathering points in the home	•	•
Safety	Product layout to prevent collisions/accidents	•	•
	Heating products that use all senses (sight, smell, taste, touch hearing)	•	•
	A safety shelf- for first aid items	•	•
	Products that aid hot Item handling		•
	Reminder beeps on heating products	•	•
	Carer or family safety controls	•	•
	Rechargeable products (no leads to fall over)	•	
	Safety controls for dementia sufferers	•	•
	Products that consider child safety	•	•
Emotive	Display area to show personal or nostalgic items		•
	Personalization of heating products	•	•
	Youthful aesthetic	•	•
	Traditional/Nostalgic aesthetic	•	•
	Warm aesthetic (e.g. traditional open fire)	•	•
	Products that give comfort in familiarity	•	•
Cost	Controls that show the cost of heat /energy	•	•
	Controls that show energy efficiency	•	•
	Auto OFF switch to save energy	•	•
	Small scale products to economise heat/energy	•	•

Continued...	Seasonal controls (Winter/Summer controls)	•	•
Usability	Clean fuel sources	•	•
	Local storage for utensils	•	•
	Basic On/off heat controls	•	•
	Heat option to quickly warm areas	•	•
	Room heat control	•	•
	Small clothes rack for drying	•	•
	Easy clean products	•	•
	Non dry air from heating products	•	•
	Pet friendly- heat area for pets	•	•
	Transportable heating products for transition periods	•	•
	Localised control over heat	•	•
	Styled mobility aids for non stigma	•	•
	Products that are adaptable to all abilities	•	•
	Aiding limited hand dexterity (twisting and turning)	•	•
	Control of heating all rooms, including rooms not used	•	•
Ergonomics	Aiding limited hand dexterity (twisting and turning)	•	•
	Preventing bending down	•	•
	Preventing reaching up	•	•
	Products for visually impaired	•	•
	Products for hearing impaired	•	•
	Products for impaired touch (arthritis etc)	•	•
	Products with side hinge opening (e.g. doors)	•	•
	Products at hand height	•	•
	Products at human sightline	•	•
	Products for limited mobility	•	•
	Ease of cleaning-bending down, reaching, in and up	•	•
	Products that you can see in operation	•	•

	In terms of Cooking Product Features how important is/are	Cooker Oven	Cooker Hob
Factor			
Health	Provision of dietary information in a cooking product	•	•
	Provision of a calorie counter device	•	•
	Products that provide healthy cooking for one	•	•
	Provision for a simple healthy cook book or recipes	•	•
	Features that help people with limited cooking knowledge	•	•
Social	Promotion of meals for Social Interaction/family gathering	•	•
	Products that enhance the ability of user	•	•
	Family/Carer cooking controls	•	•
Safety	Cooker Hob safety devices		•
	Safety off switch for hob		•
	Cooking products that consider child safety	•	•
	Layout of cooking products to prevent collision/accidents	•	•
	Products that use all senses (sight, smell, taste, touch hearing)	•	•
	A safety shelf- for first aid items	•	•
	Products that aid hot Item handling	•	•
	Reminder beeps on heating Products	•	•
	Carer or family safety controls on cooking products	•	•
	Safety controls for dementia sufferers	•	•
	Improving Safety perception of microwaves (safe reheating)	•	•
Emotive	A display area for important personal items	•	
	Areas of cooking products that one could personalize	•	•
	Youthful aesthetic	•	•
	Nostalgic aesthetic	•	•
	Nostalgia in cooking and baking	•	•
Cost	Food cost menu, device or display	•	•
	Energy efficiency controls for cooker	•	•
	Energy calculator to show cost of energy usage on cooker	•	•
	Auto OFF switch to save energy	•	•
	Small scale cooking products for economise energy	•	•

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Continued...

Usability			
	Devices that aid hot item handling	•	•
	A cooking product for one (small scale product)	•	•
	Express/quick reheat function	•	•

	Shared cooking product-Carer /family member cooking	•	•
	Clean fuel source	•	•
	Cooker timer	•	•
	Local storage for utensils	•	•
	Easy clean cooking products	•	•
	Transportable cooking product for transition periods	•	•
	Products that give comfort in familiarity	•	•
	Styled mobility aids for non stigma	•	•
	Traditional methods of cooking	•	•
Ergonomics	Aiding limited hand dexterity (twisting and turning)	•	•
	Preventing bending down-Posture	•	•
	Preventing reaching up-Reach	•	•
	Products for visually impaired	•	•
	Products for hearing impaired	•	•
	Products for impaired touch (arthritis etc)	•	•
	Products with side hinge opening (e.g. doors)	•	•
	Products at hand height	•	•
	Products for limited mobility	•	•
	Ease of cleaning-bending down, reaching in and up	•	•
	Products that you can see in operation	•	•

Appendix M 2: Revision 2 of the Design Requirements and Features List

		Space Heating	Fireplace/Stove	Cooker Oven	Cooker Hob	Shared Usability
Health	**Requirement/ Feature**					
	Heating products that prevent older people living in one room of the home	•	•			•
	Mobile heat product for all rooms of the house	•				•
	Heat and cold feature for arthritic pain	•	•			
	Provision of "heat" blanket or cushion	•	•			
	Products that provide heat for pastimes	•	•			•
	Features that provide heat for comfort	•	•			•
	Features that provide heat to relax	•	•			•
	Products that provide localised heat	•	•			•
	Provision of dietary information in a cooking product			•	•	•
	Provision of a calorie counter device			•	•	•
	Products that provide healthy cooking for one			•	•	•
	Provision for a simple healthy cook book or recipes			•	•	•
	Features that aid people with limited cooking knowledge			•	•	•
Social	**Requirement/ Feature**					
	Localised heat for warm gathering points in the home	•	•			•
	Promotion of meals for social interaction/family gathering			•	•	•
	Products/features that enhance the ability of user	•	•	•	•	•
	Family/Carer shared controls	•	•	•	•	•
Safety	**Requirement/ Feature**					
	Product layout to prevent collisions/accidents	•	•	•	•	•
	Products that utilise all senses (sight, smell, taste, touch hearing)	•	•	•	•	•
	A safety shelf- for first aid items			•	•	•
	Products that aid hot item handling		•	•	•	
	Reminder beeps	•	•	•	•	•
	Carer or family safety controls	•	•	•	•	•
	Rechargeable products (no leads to fall over)	•				•
	Safety controls for dementia sufferers	•	•	•	•	•
	Products that consider child safety	•	•	•	•	•
	Cooker hob safety devices			•	•	•
	Safety off switch for hob			•	•	•
	Improving Safety perception of microwaves (safe reheating)			•	•	
Emotive	**Requirement/ Feature**					
	Display area to show personal or nostalgic items (reminiscence)		•		•	
	Personalisation of heating products	•	•			
	Warm aesthetic (e.g. traditional open fire)	•	•			
	Products/features that provide comfort in familiarity	•	•	•	•	
	Areas of cooking products that one could personalise				•	
	Youthful aesthetic	•	•	•	•	•
	Traditional Nostalgic aesthetic	•	•	•	•	•
	Nostalgia in cooking and baking			•	•	•
Cost	**Requirement/ Feature**					
	Controls that show the cost of energy	•	•	•	•	•
	Controls that show energy efficiency	•	•	•	•	•
	Auto OFF switch to save energy	•	•	•	•	•
	Small scale products to economise energy	•	•	•	•	•
	Seasonal controls (Winter/Summer controls)	•	•			•
	Food cost menu, device or display			•	•	•

Usability	Requirement/ Feature	Space Heating	Fireplace/Stove	Cooker Oven	Cooker Hob	Shared Usability
	Clean fuel sources	•	•	•	•	
	Local storage for utensils	•	•	•	•	
	Basic on/off heat controls	•	•			•
	Heat option to quickly warm areas	•	•			•
	Room heat control	•	•			•
	Small clothes rack for drying	•	•			
	Easy clean products	•	•	•	•	•
	Non dry air from heating products	•	•			•
	Pet friendly- heat area for pets	•	•			
	Transportable heating products for transition periods	•	•			•
	Localised control over heat	•	•			•
	Styled mobility aids for non stigma	•	•			
	Control of heating all rooms, including rooms not used	•	•			•
	A cooking product for one (small scale product)			•	•	•
	Express/quick reheat function for food			•	•	•
	Shared cooking product-Carer /family member cooking			•	•	•
	Cooker timer			•	•	•
	Traditional methods of cooking			•	•	•
Ergonomics	Requirement/ Feature					
	Aiding limited hand dexterity (twisting and turning)	•	•	•	•	•
	Products that prevent bending down	•	•	•	•	•
	Products that prevent reaching up	•	•	•	•	•
	Products for visually impaired	•	•	•	•	•
	Products for hearing impaired	•	•	•	•	•
	Products that are adaptable to all abilities	•	•	•	•	•
	Features for impaired touch (arthritis etc)	•	•	•	•	•
	Products with side hinge opening (e.g. doors)	•	•	•	•	•
	Products at hand height	•	•	•	•	•
	Products at human sightline	•	•	•	•	•
	Features for limited mobility	•	•	•	•	•
	Ease of cleaning-bending down, reaching, in and up	•	•	•	•	•
	Products that you can see in operation	•	•	•	•	•

Appendix N: 7 Summary Persona Profile Cards

PERSONAL Billy and Margaret

Couple, 77 and 75
Retired from Army and housewife
5 Children (4 live locally)
Enjoy GAA

ENVIRONMENT

Urban
Medium, 2 bedroomed house
Sheltered Housing
Portlaoise

HEALTH

Billy has Alzheimer's (family worry)
Both are arthritis sufferers
Billy suffered stroke last year

HEATING

Gas fired central heating
Electric Stove (for "glow")
Margaret is main controller of heat

COOKING

Electric Cooker and Hob
Microwave-defrosting and heating
Cook and eat at home mostly
Dinner in Daughters on Monday

OTHER PRODUCTS

Refrigerator (chair beside as aid)
Don't like the mobile phone(family insist)
Television-Sport and Current Affairs

PERSONAL Brendan Murphy

Male, 83
Bachelor, Farmer
Grand Nephew now runs farm
Goes to mass to socialise

ENVIRONMENT

Remote Rural
3 bed, 2 story farm house
Co. Wexford

HEALTH

Both hips replaced
Hearing impairment
Problems with mobility

HEATING

Loves his solid fuel range
Ignites his open fire with oil
Is sometimes frightened of his
oil central heating

COOKING

Gas Cooker-Own cooking
Home help uses microwave
Dinner in Day care centre
on Wednesdays

OTHER PRODUCTS

Likes listening to radio

Landline Phone with
emergency numbers

PERSONAL Joanne Bishop

Female, 72
Living Independently
Regularly gets sad and lonely
Religious

ENVIRONMENT

3 bed end 2 story terrace house
Confined to ground floor
Stays indoors beside radiator

HEALTH

Arthritis
Osteoporosis
Depression
Recent falls

HEATING

Cant use timer
Doesn't like dry air from electric fire
Gas bills very high

COOKING

Carer makes most meals
Meals and wheels delivered
Everything cooked in microwave

OTHER PRODUCTS

Loves television especially soaps
Loves her grabber and jar opener

PERSONAL Mary Brown

Female, 72
Widow of 12 years
Living Independently
3 Children
Would love a pet

ENVIRONMENT

Rural Tipperary
1 bed apartment
Social Housing development

HEALTH

Recently undergone a heart op
Poor mobility after falls

HEATING

Misses her open fire
Great heat from her gas fire
Cannot use her timer

COOKING

Long association with cooking
Dislikes microwave rays
Only uses 2 rings

OTHER PRODUCTS

Loves television especialy soaps
Did a basic computer training course

PERSONAL Tony Ryan

Male, 77
Widower
5 Children
Living Independently
Loves golf

ENVIRONMENT

Urban
Medium, 1 bedroomed house
Retirement village
Kilkenny City

HEALTH

Hearing impairment
Hip replacement
Boiling water scald
High blood sugar

HEATING

Gas fired central heating
Electric fire (replaced open fire)
Dislikes open fires (cleaning)
Loves his oil heater (drying clothes)

COOKING

Electric Cooker (not in use)
Electric worktop cooker (manageable)
Cooks for son on Mondays
Loves his George Foreman grill

OTHER PRODUCTS

Adjusted refrigerator height
Television only in winter mostly
Learning-Computer/Internet
Dishwasher- too much energy
Loves his grabber and shoe horn

PERSONAL Declan Allen

Male, 81
Living Independently (3 months)
Worked in UK for 30 years
Married twice
1 Daughter

ENVIRONMENT

Suburbs
Small 2 bed house
Social Housing

HEALTH

Hip replacement
Malnutrition
Alcoholism/depression
Vision impairment

HEATING

Prefers a open fire
Dislikes storage heating
Uses a gas heater to save money

COOKING

Only learnt to cook last year
Fries most foods or ready meals
Microwave scares him

OTHER PRODUCTS

More difficult to watch TV with sight
Cant use washing machine
Listens to radio in morning

PERSONAL Fiona Rodgers

Female, 81
Widow husband died 9 years ago
Orginally from UK
2 Sons

ENVIRONMENT

Rural Village
Large 5 bed house
Kildare

HEALTH

Arthritis
Poor mobility (swimming helps)
Recently fell in hallway

HEATING

Cant use her timer
Thinks open fires are unclean
Blocks draughts from chimney
with best rug

COOKING

Never really cooks
Goes out to eat and socialise
Uses microwave now and again

OTHER PRODUCTS

Likes her new reading lamp

Appendix O: Lifestyle Display Board (Originally in A2 Format)

Please see folder "Appendix P" on CD for this Appendix (affixed to back cover of thesis)

Appendix Q: Requirement Screening Survey

Green denotes requirements for progression

Red denotes requirements not for progression

How important are the following features in a HEATING PRODUCT for older people's HEALTH						
Answer Options	**Not Important**	**Somewhat Important**	**Important**	**Very Important**	**Rating Average**	**Response Count**
Mobile heat for all rooms in the house	1	6	9	4	2.80	20
Heating products that prevent older person just living in one room of the home	0	4	3	13	3.45	20
Heat and cold treatments for arthritic pain	0	7	9	4	2.85	20
A heatable blanket or cushion	1	8	9	2	2.60	20
Products that provide heat for pastimes	2	7	8	3	2.60	20
Products that provide heat for comfort	1	1	12	6	3.15	20
Products that provide heat to relax	2	3	10	5	2.90	20
					answered question	**20**
					skipped question	**0**

How important are the following features in a HEATING PRODUCT for older peoples SOCIAL INCLUSION						
Answer Options	**Not Important**	**Somewhat Important**	**Important**	**Very Important**	**Rating Average**	**Response Count**
Products that enhance the ability of the user	1	1	5	13	3.50	20
Family or Carer Shared heating controls	1	4	9	6	3.00	20
Localised heat for warm gathering points in the home	1	5	7	7	3.00	20
					answered question	**20**
					skipped question	**0**

How important are the following features in a HEATING PRODUCT for older peoples SAFETY?						
Answer Options	**Not Important**	**Somewhat Important**	**Important**	**Very Important**	**Rating Average**	**Response Count**
Product layout to prevent collisions/accidents	0	0	2	18	3.90	20
Heating products that use all senses (sight, smell, taste, touch hearing)	0	6	6	8	3.10	20
A safety shelf- for first aid items	1	9	5	5	2.70	20
Products that aid hot Item handling	0	4	6	10	3.30	20
Reminder beeps on heating products	1	3	9	6	3.05	19
Carer or family safety controls	0	5	10	5	3.00	20

	Not Important	Somewhat Important	Important	Very Important	Rating Average	Response Count
Rechargeable products (no leads to fall over)	2	2	6	10	3.20	20
Safety controls for dementia sufferers	0	0	6	14	3.70	20
Products that consider child safety	1	3	10	6	3.05	20
				answered question		**20**
				skipped question		**0**

How important are the following features in a HEATING PRODUCT for older peoples EMOTIONAL WELLBEING?

Answer Options	Not Important	Somewhat Important	Important	Very Important	Rating Average	Response Count
Display area to show personal or nostalgic items for reminiscence	2	8	5	5	2.65	20
Personalization of heating products	7	9	3	1	1.90	20
Youthful aesthetic	6	11	2	0	1.79	19
Traditional/Nostalgic aesthetic	7	5	7	1	2.10	20
Warm aesthetic (e.g. traditional open fire)	2	10	7	1	2.35	20
Products that give comfort in familiarity	0	3	12	5	3.10	20
				answered question		**20**
				skipped question		**0**

How important are the following features in a HEATING PRODUCT for older people to reduce COST?

Answer Options	Not Important	Somewhat Important	Important	Very Important	Rating Average	Response Count
Controls that show the cost of heat /energy	1	6	13	0	2.60	20
Auto OFF switch to save energy	1	2	11	6	3.10	20
Small scale products to economise heat/energy	3	6	9	2	2.50	20
Seasonal controls (Winter/Summer controls)	2	5	9	4	2.75	20
				answered question		**20**
				skipped question		**0**

How important are the following features in a HEATING PRODUCT for older people in terms of USABILITY?

Answer Options	Not Important	Somewhat Important	Important	Very Important	Rating Average	Response Count
Clean fuel sources	0	7	4	9	3.10	20
Local storage for utensils	2	7	6	5	2.70	20
Basic On/off heat controls	1	1	3	15	3.60	20
Heat option to quickly warm areas	0	1	10	9	3.40	20
Room heat control	0	1	10	9	3.40	20
Small clothes rack for drying	1	12	7	0	2.30	20
Easy clean products	1	8	7	4	2.70	20
Non dry air from heating products	2	8	9	1	2.45	20
Pet friendly- heat area for pets	2	12	4	2	2.30	20
Transportable heating products for	2	10	8	0	2.30	20

transition periods						
Localised control over heat	1	5	8	4	2.83	18
Styled mobility aids for non stigma	3	10	4	1	2.17	18
Control of heating all rooms, including rooms not used	3	8	5	3	2.42	19
					answered question	**20**
					skipped question	**0**

How important are the following features in a HEATING PRODUCT for older people in terms of PHYSICAL DESIGN OR ERGONOMICS?

Answer Options	Not Important	Somewhat Important	Important	Very Important	Rating Average	Response Count
Aiding limited hand dexterity (twisting and turning)	1	0	2	17	3.75	20
Products that are adaptable to all abilities	0	0	7	13	3.65	20
Preventing bending down	1	0	6	13	3.55	20
Preventing reaching up	0	1	7	12	3.55	20
Products for visually impaired	0	0	6	14	3.70	20
Products for hearing impaired	0	2	7	11	3.45	20
Products for touch impaired (arthritis etc)	1	1	4	14	3.55	20
Products with side hinge opening (eg doors)	1	4	9	6	3.00	20
Products at hand height	1	2	6	11	3.35	20
Products at human sight line	2	2	6	10	3.20	20
Products for limited mobility	0	2	4	14	3.60	20
Ease of cleaning-bending down, reaching, in and up	0	3	3	14	3.55	20
Products that you can see in operation	0	3	8	8	3.26	19
					answered question	**20**
					skipped question	**0**

The design of heating products for older people (+65 years)

WOULD THE DESIGN OF A SHARED (FAMILY/OLDER PERSON)HEATING CONTROL BE BENEFICIAL TO THE OLDER PERSON IN TERMS OF INDEPENDENCE?

Answer Options	Response Percent	Response Count
YES	100.0%	19
NO	0.0%	1
If answered "NO" please state why		0
answered question		**20**
skipped question		**1**

How important are the following features in a COOKING PRODUCT for older people's HEALTH

Answer Options	Not Important	Somewhat Important	Important	Very Important	Rating Average	Response Count
Features that help people with limited cooking knowledge	0	8	8	4	2.80	20
Provision of dietary information in a cooking product	2	6	8	4	2.70	20
Provision of a calorie counter device	5	12	3	0	1.90	20
Features that improve healthy cooking for one	1	4	11	4	2.90	20
Provision of a simple healthy cook book or recipes	3	5	9	3	2.60	20
				answered question		**20**
				skipped question		**0**

How important are the following features in a COOKING PRODUCT for older peoples SOCIAL INCLUSION

Answer Options	Not Important	Somewhat Important	Important	Very Important	Rating Average	Response Count
Promotion of meals for social interaction/family gathering	1	5	8	6	2.95	20
Features that enhance the cooking ability of user	1	4	10	5	2.95	20
Family/Carer cooking controls	1	7	9	3	2.70	20
				answered question		**20**
				skipped question		**0**

How important are the following features in a COOKING PRODUCT for older peoples SAFETY?

Answer Options	Not Important	Somewhat Important	Important	Very Important	Rating Average	Response Count
Cooker hob safety devices	0	3	7	10	3.35	20
A safety off switch for hob	0	0	8	12	3.60	20
Features that consider child safety	2	4	10	4	2.80	20
Layout of cooking products to prevent collision/accidents	0	3	10	7	3.20	20
Products that utilise all senses (sight, smell, taste, touch hearing)	0	7	5	8	3.05	20
A safety shelf- for first aid items	2	5	9	4	2.75	20
Products that aid hot item handling	0	2	11	7	3.25	20
Reminder beeps on cooking products	2	2	6	10	3.20	20
Carer or family safety controls on cooking products	0	6	10	3	2.84	19
Safety controls for dementia	0	0	6	14	3.70	20

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	Not Important	Somewhat Important	Important	Very Important	Rating Average	Response Count
sufferers						
Improving safety perception of microwaves (safe reheating)	0	5	8	7	3.10	20
				answered question		20
				skipped question		0

How important are the following features in a COOKING PRODUCT for older peoples EMOTIONAL WELLBEING?

Answer Options	Not Important	Somewhat Important	Important	Very Important	Rating Average	Response Count
A display area for important personal items	6	7	4	3	2.20	20
Areas of cooking products that one could personalise	7	8	5	0	1.90	20
Youthful aesthetic	10	6	2	1	1.68	19
Nostalgic aesthetic	5	8	5	1	2.11	19
Nostalgia in cooking and baking	3	7	8	2	2.45	20
				answered question		20
				skipped question		0

How important are the following features in a COOKING PRODUCT for older peoples to reduce COST

Answer Options	Not Important	Somewhat Important	Important	Very Important	Rating Average	Response Count
Food cost menu, device or display	2	11	3	3	2.37	19
Energy efficiency	1	7	6	6	2.85	20
Energy calculator to show cost of energy usage on cooker	4	8	7	1	2.25	20
Auto OFF switch to save energy	1	4	7	7	3.05	19
Small scale cooking products for economise energy	3	3	10	3	2.68	19
				answered question		20
				skipped question		0

How important are the following features in a COOKING PRODUCT for older people in terms of USABILITY

Answer Options	Not Important	Somewhat Important	Important	Very Important	Rating Average	Response Count
Devices that aid hot item handling	1	1	11	7	3.20	20
A cooking product for one (small scale product)	1	5	9	5	2.90	20
Express/quick reheat function	1	5	11	3	2.80	20
Shared cooking product-Carer for family member cooking	4	4	9	2	2.47	19
Clean fuel source	2	6	8	4	2.70	20
Cooker timer	1	2	12	5	3.05	20
Local storage for utensils	2	6	8	4	2.70	20
Easy clean cooking products	1	3	10	6	3.05	20
Transportable cooking product	3	10	5	0	2.11	18

for transition periods					
Styled mobility aids for non stigma	2	10	5	2	2.37	19
				answered question	**20**
				skipped question	**0**

How important are the following features in a COOKING PRODUCT for older people in terms of PHYSICAL DESIGN OR ERGONOMICS

Answer Options	Not Important	Somewhat Important	Important	Very Important	Rating Average	Response Count
Aiding limited hand dexterity (twisting and turning)	0	1	4	15	3.70	20
Products that are adaptable to all abilities	0	0	4	16	3.80	20
Preventing bending down	1	1	6	12	3.45	20
Preventing reaching up	0	2	5	13	3.55	20
Products for visually impaired	0	1	6	13	3.60	20
Products for hearing impaired	0	2	6	12	3.50	20
Products for impaired touch (arthritis etc)	0	3	7	10	3.35	20
Products with side hinge opening (e.g. doors)	3	4	8	5	2.75	20
Products at hand height	1	2	8	9	3.25	20
Products for limited mobility	1	0	5	14	3.60	20
Ease of cleaning-bending down, (reaching in, down and up)	1	1	6	12	3.45	20
Products that you can see in operation	3	2	9	6	2.90	20
				answered question	**20**
				skipped question	**0**

	skipped question	**0**

The design of cooking products for older people (+65 years)

WOULD THE DESIGN OF A SHARED (FAMILY/OLDER PERSON) COOKING CONTROL BE BENEFICIAL TO AN OLDER PERSON IN TERMS OF INDEPENDENCE?

Answer Options	Response Percent	Response Count
YES	89.5%	17
NO	10.5%	2
If answered "NO" please state why		1
answered question		19
skipped question		1

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