UNIVERSAL DESIGN IN PUBLIC HOUSING: AN ETHNOGRAPHIC STUDY ON ENHANCING THE QUALITY OF LIFE OF OLDER PEOPLE WITH MILD COGNITIVE IMPAIRMENT LIVING ALONE

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Universal Design in Public Housing: An Ethnographic Study on Enhancing the Quality of Life of Older People with Mild Cognitive Impairment Living Alone

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CERTIFICATE OF ORIGINALITY

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Signature: ____________________

Name of Student: King Pui Yuk Alex

Dedication

For my dearest mother,
Anna Yuen
1945-2017

&

My father, the hero,
Woon-Man King
1938-2008

Abstract

The population of Hong Kong is ageing and is expected to gradually increase, and thus an increase in single older people with mild cognitive impairment is expected. This may progress to dementia overtime. By 2064, a third of Hong Kong's total population is expected to be aged 65 or above, which will put extreme pressure on long-term health services and increase social care costs. Studies of mild cognitive impairment (MCI) and dementia have mainly been conducted in the west, and evidence-based research addressing the genuine needs of patients with MCI in their daily activities is limited. The home is the central focus of many people's lives, and the elderly will spend most of time in it.

The specific objectives of the study are: (1) to briefly review and explore the common strengths and limitations of public housing in Hong Kong and selected cities; (2) to identify the deficiencies of current public housing in terms of universal design and broaden the scope of this approach; (3) to develop a model of the relationships among coping strategies for enhancing quality of life, unmet needs and the feeling and concerns of people with MCI living alone; and (4) to gain research experience by conducting user research with older people in Asian cities.

This ethnographic study is aimed at revealing some of the contemporary concerns about human culture and social interaction. A triangulation study approach is taken, beginning with participatory design workshop followed by participant observations with five residents living alone with MCI, and an in-depth interview with a centre manager who assisted in this study and is a carer for those with dementia.

This study suggests that universal design principles are not sufficiently applied in the development of public housing for single elderly people living with MCI. To address this deficit in interior, home furniture and product designs, the concept of a visible reminder has been suggested, which includes multisensory and psychological considerations. Design practitioners should fully utilise this conceptual model when developing universal design furniture for the general public, without stigmatising those with disabilities such as MCI. The coping strategies for improving the quality of life these older people are identified as continued home care and family support, an awareness of universal design principles, social networks and engagement and revisiting public health policies. Governments should take the lead in helping to improve the quality of life of people with MCI through healthcare, social engagement, caring and universal design.

Publications Arising from the Thesis

Peer-Reviewed Journal

King, A. P.(2019).‘Co-designing Mobile Collection Points with Older Persons to Promote Green Attitudes and Practices in Hong Kong’. *The Design Journal, An International Journal for All Aspects of Design*. DOI: 10.1080/14606925.2019.1595000

King, A. P. & Siu, K.W.M. (2018).‘Enhancing the Play and Leisure Experiences of Visually Impaired Young Adults in Hong Kong: A Qualitative Study’. *The International Journal of Design in Society* 12 (3): 29-39. doi:10.18848/2325-1328/CGP/v12i03/29-39.

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King, A.P.& Siu, K.W.M.(2017). ‘Universal Design Gameplay as a Rehabilitation Tool for Elderly Living Alone with Dementia: Participant Observation and Participatory Design Approach’. In the 11th International Conference on Design Principles & Practices at Institute without Boundaries at George Brown College, Toronto, Canada.

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Alex King
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1 Introduction

1.1 Introduction

An ageing population is inevitable as fertility declines while life expectancy continues to rise worldwide. In many countries, more than a quarter of the population will be aged 60 or over by 2050, and thus constitutes the fastest growing segment (United Nations, 2015). The proportion of the population aged 60 and over will rise gradually and comprise one-eighth of the total global population. In a recent United Nations report, the number of older adult globally was projected to be 1.4 billion by 2030, 2.1 billion by 2050 and 3.2 billion by 2100, thus putting pressure on health social care provision (United Nations, 2015).The population of Hong Kong is expected to continue to follow an ageing trend. In 2014,1,065,900 were registered as aged 65 and over, and by 2064 this is projected to rise markedly to 2,582,300, which constitutes a significant increase from 15% to 33% of the total population. This change in the age structure of the population will require both health care and housing policies to resolve expected problems and tackle potential issues.

The ageing rate of the Hong Kong population is faster than that of other major Asian cities. According to a government report, in 2024, Hong Kong was home to 397,000 people over the age of 80, which is 24.8% higher than the number in 2014 (Census and Statistics Department, 2016). Between 1961 and 2011, the average annual growth rate of older people increased by 4.8% from 87,918 to 941,312. As the number of older people increases, so will the level of assistance they will require to manage their daily activities. In Hong Kong, life expectancy at birth in 2012 was recorded as 80.7 (86.4) for males (females), which exceeds the 79.9 (86.4) for Japan and 78.6 (84.3) for Singapore (Department of Health, 2012). In 2011, 24.9% of the older population in Hong Kong were aged 65-69, 46.3% were aged 70-79 and 28.8% aged 80 and above.

According to a research report published by the World Health Organization (WHO, 2012), 35.6 million people in the world suffer from dementia, which is expected to increase two-fold by 2030 and three-fold by 2050, and is expected to increase faster in Asian cities due to the ageing population. Research has shown that people living with dementia are often socially isolated and feel lonely, as they are not able to communicate with others and may have lost their friends (Alzheimer's Society, 2012). Loneliness can be experienced in different ways, with some people feeling lonely even when they have regular contact with family. A lack of social networks, neighbours or friends can lead to people experiencing social loneliness, which can seriously affect their lives. Residence schemes are designed to enable single elderly people to live their lives independently, regardless of any disability. In 2011, 12.7% of older people aged 65 and above were identified as living alone, which is an increase by 9.5% compared to 2006. (Census and Statistics Department, 2011).

1.2 Problem Statement

People Living with Dementia in Hong Kong

Loneliness is more likely to affect people with dementia who live independently than those living with family members or in residential care homes. Hong Kong government reports have revealed that the proportion of older people living alone increased from 11.3% (2001) to 12.7% (2011) (Census and Statistics Department, 2011). The global impact of dementia is expected to increase with the growing ageing population trend. The increasing proportion of the population with dementia will consequently increase long-term health and social care expenditure significantly. Strategies for the development of cognitive-friendly elderly homes are therefore important. Social engagement tools such as ‘cognitive serious game sets’ can overcome social isolation, encourage human’s physical contact and enhance the quality of life of people with cognitive impairment. Meaningful activities including game playing can support them in achieving a sense of accomplishment, self-worth and self-expression, and more importantly reduce loneliness.

Design practitioners should explore and stimulate social interaction through participant observation, in which various stakeholders are observed in practical contexts (Rijn, 2010). Older people with mild cognitive impairment (MCI) have a higher risk of developing dementia compared to entire population (Petersen et al., 2014). Those with dementia may face problems in their day-to-day activities. Research into whether those with MCI suffer to a greater extent should be conducted, by adapting universal design principles and other related approaches.

1.3 Purpose Statement

Research in the field of dementia has mainly been conducted in developed western countries (Chan et al., 2010), although a few studies have revealed the prevalence of dementia in older Chinese people in Hong Kong. Thus, evidence-based research that can guide design practitioners is limited, in terms of applying universal design principles aimed at improving the wellness and health of those living alone with MCI or dementia. Qualitative assessments should therefore be combined with evidence-based research practice to address the broad range of issues in clinical-ethical decision making (Popay & Williams, 1998). Health practitioners should focus on the four main areas of feasibility, meaningfulness, appropriateness and effectiveness (Pearson et al., 2007). Universal design practices can be applied to support healthier behaviour and foster safe and liveable environments. Instances of cognitive disability such as dementia and MCI are obviously increasing in older adults worldwide, and the Aging, Demographics and Memory Study conducted in the US reflected that 13.9% of people aged 71 and above live with cognitive impairment (Plassman et al., 2007).

The key aim of this study is to investigate the needs of older people living alone in public housing with MCI. This can inform the future design of public housing for these Hong Kong residents. The research findings and conclusions can also serve as a reference for product and interior design regarding public housing in other major cities. To enhance the findings, the study also offers an empirical review of elderly living in Hong Kong does in addition to individual housing design for elderly people with cognitive impairment. Through the collected data we aim to identify any problems regarding these living environments and also carers' concerns. The specific objectives are:

1. to briefly review and explore the strengths and limitations of current public housing for elderly people in different densely populated cities;
2. to review and explore the strengths and limitations of such public housing in Hong Kong;
3. to identify any deficiencies in current public housing in terms of universal design;
4. to enhance the scope of universal product design research concerning older people living alone with cognitive impairment and to develop a model of the relationships among coping strategies for enhancing the quality of life and addressing the needs, feeling and concerns of people living alone with MCI;
5. to propose new directions and guidelines for universal designs concerning these elderly people, thus enriching the language of design;
6. to gain experience in conducting user research with older people in Asian cities.

To achieve these objectives, I address the following three research questions:

1. What is the level of quality of elderly public housing in Hong Kong?

2. How can universal design principles be applied more effectively in developing cognitive-friendly public housing for single elderly people in Hong Kong?'

3. How can we contribute to the design and development of cognitive-friendly products, home furniture and interiors and day-to-day activities through a participatory design approach, to improve people's quality of life?

1.4 Framework of the Study

Here, I firstly present an overview of the key stages in the research process and illustrate them in Figure 1.The five stages are as follows:

(1) Development of research questions

The research process for my study initially involved a review of literature in the following subject areas: (1) Types of dementia and MCI and its symptoms; (2) Elderly people living alone, isolation and measures for its mitigation; (3) Public housing in Hong Kong and other selected cities with ageing populations; (4) The application of universal design principles and related theories emphasising inclusivity and accessibility; and (5) Ergonomic considerations.

A participatory design workshop was conducted with local older people in a community centre in the New Territories. This enabled me to familiarise myself with the needs of people aged between 65 and 85 and to understand their living habits after retirement. The workshop served as a foundation for the behavioural study of older people who do not have cognitive impairment. Participant observation was also conducted in co-operation with the Mind Delight Memory and Cognitive Training Centre, where I served as ‘participant as observer’ and studied two people with early dementia during ‘serious game training’ sessions over three months. I had revisited the existing game set designs used for cognitive training purpose over the years where they were related to reminiscence and visual and spatial reasoning. Ten serious game sets were developed and produced under a new brand after detailed discussions with healthcare professionals. Pilot interviews were conducted with one female patient with early dementia, one social worker who offered care services and a physiotherapist working in the cognitive training centre. The purposes of the interviews were first to understand the behaviour changes common to people living with early dementia, second, to learn about the difficulties that the caregivers face and third, to discover whether serious games can affect the capabilities of each player. I based the development of the proposed research questions on insights gained from a review of literature and the pilot interviews.

I found that little research has been conducted into cognitive-friendly public housing for single elderly people in terms of universal design and ergonomic considerations. Studies of housing design, cognitive decline and the health status of single older adult are lacking, particularly in the Asian context, and more longitudinal studies in the community are required (Wahl et al., 2009). Relationship between housing design and personal characteristics, including cognitive function, is relatively difficult to observe as it occurs outside of hospitals or nursing homes. However, evidence-based research can reveal the genuine needs of people living with MCI, which may vary by city or cultural background. This lack of research can hinder any comprehensive investigations into housing and the characteristics and details of home environments (Harrison et al., 2010).

The Hong Kong population is ageing at a relatively fast pace and is projected to reach 26.8% by 2033, resulting in significant increases in health and social care expenses in a long run (Census and Statistics Department, 2016). Over 1,160,000 older people were living in Hong Kong in 2016, representing an increase of 36.4% over the last decade. Of this overall population, 150,000 were recorded as living alone, which constitutes 13.1% (11.6%) of the total, and 50.4% were living in public housing (Census and Statistics Department, 2016). The proportion of older people is expected to continue to raise significantly in the coming decades.

Thus, this study is aimed at understanding the daily activities and requirements of older adults living alone with MCI, so guiding principles for interior and product design practitioners can be developed and possible directions for enhancing the quality of life of each individual identified.

(2) Research Design

I apply a qualitative methodological approach to identify the needs of the end-users. These may vary between cities in mainland China due to the different cultural backgrounds of older people. In this study, I assess the user experiences of older people living with cognitive impairment through a participatory design workshop and participant observation. Dialogues among the centre manager, social workers, caregivers and physiotherapists that have experiences with such people can also offer research insights. The research questions also match the characteristics of a qualitative research approach, by identifying the main problems and offering opportunities for respondents to explain cultural and social change.

Four qualitative principles guide the research process in this study. First, purposive sampling was used to ensure all participants are selected according to predetermined criteria and are informative in terms of verbal and physical communication. Second, the qualitative research is flexible, ensuring openness throughout the research process and thus considering each participant’s perspective. Third, the data analysis is inductive, and patterns can be discerned and broad generalisations made from the qualitative research, thus enabling specific observations and conclusion to be drawn from the data.

The findings thus emerge from iterative examinations of the data collected. Fourth, the high standard of the researcher’s reflexivity is maintained through the process of self-awareness.

This reduces the risk of research and thus achieves a higher level of credibility. In this inquiry, both interviewer and respondents are involved in knowledge making.

(3) Data Collection

Data collection was conducted through three main sessions: a participatory design workshop; a participant observational study; and an in-depth interview study. I previously served as a volunteer helper in the Christian Family Service Centre, which had a subsidiary elderly day care centre, and over three months I worked to design and develop serious game sets for people living with early dementia. The research findings were applied to creating a collection of serious game sets that were commercialised in the following year. In addition, a participatory design workshop supported by FoodGrace under the governing organisation of Community Leap was conducted with 58 people aged 65 and over. FoodGrace is a non-profit making organization in Hong Kong that promotes food recycling service and collects edible surplus food from various sectors of food industry. After collecting the surplus food, they will redistribute to underprivileged families including older people. This consisted of both able-bodied and disabled people and offered several product design solutions based on the universal design principle in previous practice.

Participatory design research was conducted with the full support of the centre manager of Yan Oi Tong Wu Chung Community Centre, to explore the concerns of care givers, the caring experience of social workers and the daily problems faced by the people living with MCI. Interviewees were identified through the seminar ‘Changing Daily Habits to Prevent Early Dementia’, targeted at mildly cognitive impaired people and their care givers in Hong Kong. This provides opportunities for older adults to participate in local activities near their homes, so that they can meet experts on dementia care and find methods of slowing the rate of memory loss. In addition, it allows me to identify appropriate carer candidates to interview.

I chose to serve as a ‘complete participant’ in five public housing units with older adults living alone with MCI and became fully absorbed in those research communities (Balsiger & Lambelet 2014). Prior to the participant observation, I conducted an in-depth interview with each of 5 older people with MCI living alone so as to learn more about their backgrounds and concerns about daily living. I conducted regular observations for 2 hours a day and once a week over 24 weeks. Other activities in day care centre included the seminar I organised and also the participatory workshop. These helped me build a rapport with the targeted participants. The observational study typically took place on either Saturday or Sunday depending on the participants’ availability. A phone call to remind each participant was crucial, as they often forgot the day of the research practice, or may have arranged to attend family gatherings on weekends.

Qualitative field notes were recorded as evidence. Contextual information can give meaning and support and enriches our understanding, enabling qualitative modes of investigation and interpretation to be conducted. Although each individual research method has various weaknesses, together they can provide solid evidence and findings that can then be triangulated to produce a valid research outcome. The three techniques of data collection typically involved in participant observation are observation, discussion and interviews. A semi-structured interview was conducted with two local centre managers. One was experienced in day care services for MCI and dementia, and the other had been a caregiver for over eight years, looking after his mother who suffered from early dementia. He witnessed his mother's deterioration due to memory loss over a long period of time, and she became mildly cognitively impaired and was diagnosed with early dementia in 2015.

(4) Data Analysis

As my aim is to identify and analyse the particular social environments of elderly people living alone with dementia, voices, sounds, hand gestures and body language were considered during the participant observations. Questions were asked in situ to reveal the meaning behind specific behaviour in the four proposed communities to gain a collective understanding of these human experiences. Data analyses were conducted according to the frequency of the specific behaviour of interest or events using data collection instruments. The findings can then serve as a reference for developing in-depth interview questions in the later stage. Topic coding took place in the first cycle by reviewing the data in terms of single words or phrases.

In the second cycle, I revisit the identified passages and regroup them to identify any similarities and patterns, enabling me to create themes as research outcomes. The second session involves an in-depth interview study of care givers. Topic and analytical coding are the main analysis techniques used to examine the collected data. These enable themes to be created that refer to the needs of elderly people living alone with cognitive impairment in terms of daily living, such as dining, toileting, dressing, moving and personal hygiene. The relationship between loneliness and cognitive function is also be investigated and explored, to identify how universal principles can be applied effectively to designs for ageing in place. Insights for future interior and product design are recorded as memos.

(5) Research Outcomes

The outcomes of this research will have implications for future cognitive-friendly public housing in terms of product and interior design for the living environment. Housing can affect the quality of life of those people living with cognitive impairment. Physical spaces should be navigable and easily accessible by people with cognitive impairment, thus helping to facilitate a more meaningful and inclusive life. In addition to the care provided by family members, assistive technologies such as telecare can be integrated into interiors, and can be helpful in supporting the social interaction of elderly people living alone.

The implications of this research include its contribution to the conceptual understanding of universal design principles, product design and home furniture of public housing design for those with cognitive illness and early onset dementia. The new conceptual model clarifies the connection between these factors by illustrating the relationships among the coping strategies that enhance the quality of this type of public housing and quality of life, unmet needs and the feelings and concerns of people living alone with MCI. Design approaches that can minimise the burgeoning cost of healthcare and social protection are also proposed.

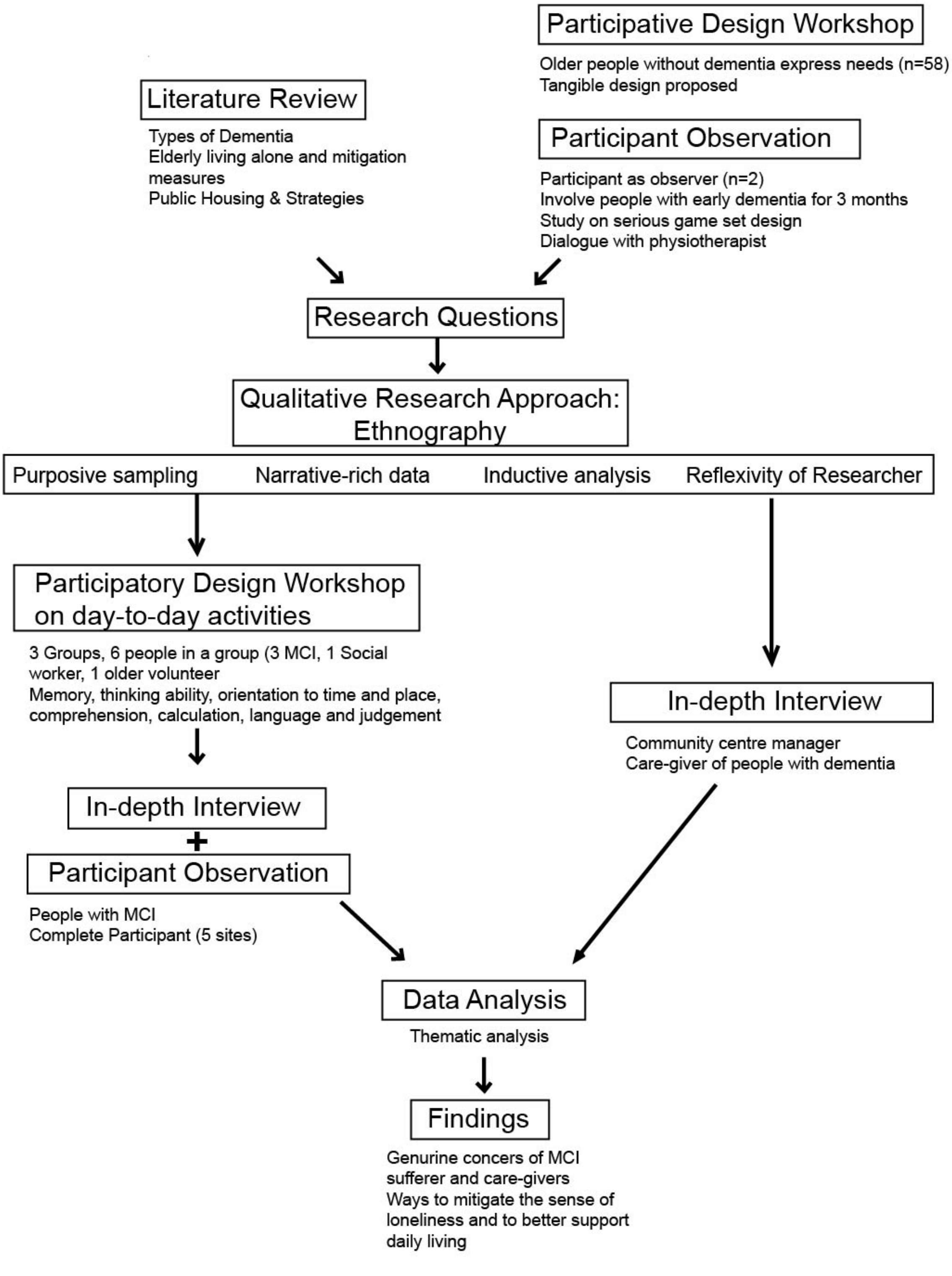


Figure 1: Research processes of this PhD research study

(6) Research Framework

The research framework of present study is guided by Rogers' Innovation-decision process model (Rogers, 2003) where there are five channels governing the innovation process, namely knowledge channel, persuasion channel, decision channel, implementation channel and confirmation channel. The complete model of Rogers' innovation-decision process theory is illustrated in Figure 2.

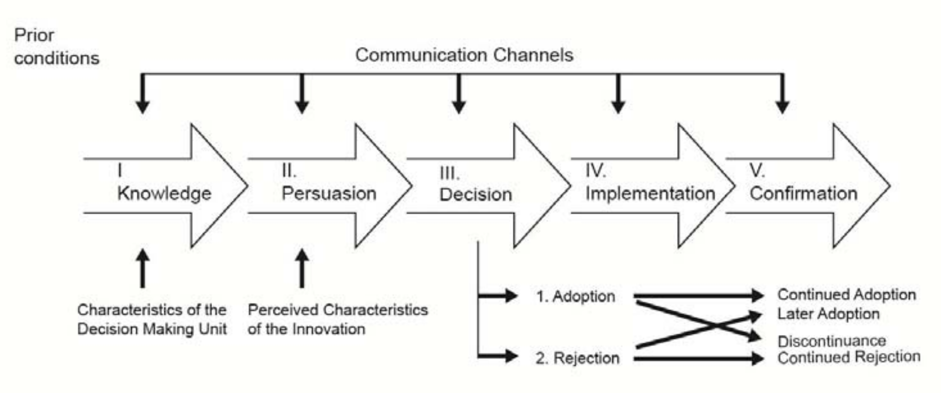


Figure 2. Innovation-decision process model (Rogers, 2003)

Suggested by the researcher, Rogers' model can be applied to the innovation-decision process of the concept of universal design for public housing involving people living alone with MCI. The researcher had developed a model where it was derived from innovation-decision process model (Rogers, 2003) and illustrated in Figure 3.

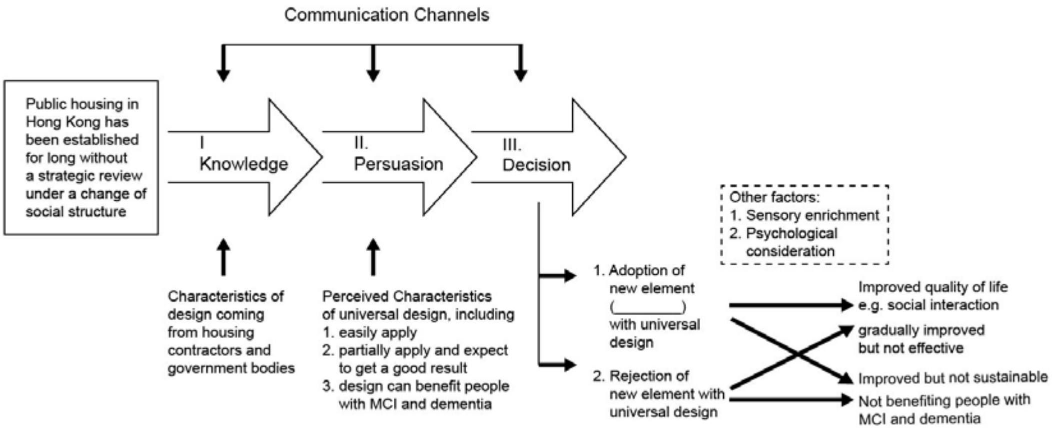


Figure 3. Innovation-Decision Process adopting Universal Design and a new element

This framework illustrated about the knowledge of universal design coming from prior conditions, for example, the previous practice of using universal design in public housing and the norms of social systems. It also includes the characteristics of design coming from the decision made by housing contractors and government bodies and appeared in the knowledge channel. The process then goes to persuasion channel that is affected by the characteristics of innovation related to universal design.

Public housing providers, including the builders, contractors, designers and officers from government bodies could make use of this model evolved from Rogers' innovation-decision process model to guide public housing design and remodelling activities. Meeting the needs of functionality, security and safety in housing for all people is the goal of universal design (Malizia, 1993).

1.5 Research Significance and Potential Benefits

The intention of this research is to address the design knowledge gaps related to public housing and the needs of the increasingly ageing population and those with cognitive impairment who live alone. The literature already indicates that benefits can be obtained by applying universal design when building public housing estates, as this can enable 'ageing in place' and integrates people with various disabilities in a barrier-free living environment (HKHA, 2007).

However, simply identifying the needs of tenants with mental illnesses such as MCI or dementia who live alone is not sufficient. In the 1980s, traditional housing design in Hong Kong mainly considered physically able families and individuals. As the issue of an ageing population emerged over the following decades, the government implemented its Ten-Year Housing Program and a new generation of public housing estates were developed, to satisfy the living requirements of local citizens.

This research can generate four types of outcomes:

- Identify the needs of elderly people with MCI living alone during their day-to-day activities in the ageing city of Hong Kong.
- Conceptually demonstrate the relationship between universal design and cognitive-friendly public housing design.
- Suggest design approaches for products and home furniture in the housing provided to single elderly people.
- Identify the challenges when raising public awareness through government bodies regarding the concerns of older people living with cognitive impairment and their care-givers.

1.6 Concluding Remarks

This chapter outlines the background and rationale of the study. As life expectancy continues to rise and the fertility rate remains low, the population of Hong Kong will continue to age. Older people in Hong Kong are likely to constitute up to 33% of total population, and will thus affect the current healthcare and social protection system. This will therefore become a major consideration for policy makers. Single elderly people should have the right to live independently, whether able-bodied or living with cognitive impairment.

The main objectives of this research study include identifying any deficiencies in the interior designs of public housing for single elderly people and proposing new directions and guidelines for universal designs aimed at older people with MCI. Thus, the research questions are related to assessing the appropriateness of universal design principles in this context and whether they can enhance the quality of life of older adults. We apply a qualitative research design, to ensure we identify the specific needs of older people living with cognitive impairment in Hong Kong, which may differ from those in other cities. The research framework consists of a participatory design workshop, participant observation and semi-structured interviews with stakeholders, and is aimed at providing insights based on the life experiences of older people living with MCI.

We obtain data on these experiences through the Yan On Tong Wu Chung Community Centre, Food Grace, under the parent organisation Community Leap, and the day care centre of the Christian Family Service Centre. Not surprisingly, the principles of universal design are new to the majority of the older participants. As a major factor affecting the quality of life of people living with MCI, the physical housing space should be well-defined to provide easy access and promote inclusivity. Good design execution can minimise the burgeoning cost of healthcare and social protection resulting from an ageing population.

The main topic of my investigation is how universal design principles can be more effectively applied to enhance the quality of life of older people with MCI living alone. Following a discussion of the research methods, the study presents an in-depth review of literature that concerns dementia and MCI, urban public housing and psychosocial interventions for those with cognitive impairment. This structural ethnographic study consists of a participatory design workshop and participant observation followed by a series of semi-structural interviews with the key stakeholders. Although the study is conducted in Hong Kong and limited in scope, as outlined in this chapter, the research outcomes can be of benefit in terms of future public housing development in other major cities.

2 Review of the Literature

2.1 Introduction

Designers are more concerned about people-friendly environmental qualities, human factors, emotion and spatial perception than scientific data such as heart rate, breathing rhythm and changes in body temperature. Most people with dementia are taken care of at home, and although dementia-friendly public housing has become more important the supply is currently inadequate (de Vugt et al., 2006). Those with dementia require a supportive physical environment, which is therefore an important factor in dementia care development (Day et al., 2000). The literature indicates that institutional dementia care emphasises the normalisation of daily life, through designing small-scale and relatively home-like environments. User-centred design can be applied to fit with the different needs of residents, who may be in various stages of dementia. However, older people with cognitive impairment should be enabled to remain living in one's own home (Moise et al., 2004).

2.2 People living with Dementia

2.2.1 History of Dementia

Dementia refers to the biomedical disease accompanying degeneration and a loss of abilities over time. The phrase was coined in the1900s by Dr Alois Alzheimer, a psychiatrist and neuropathologist. Alzheimer's disease is a degenerative brain syndrome characterised by a progressive decline in terms of memory, comprehension, thinking, calculation, learning capacity, language and judgement (World Health Organization, 2016). It involves a deterioration in cognitive function, which may not be expected in normal ageing.

2.2.2 Symptoms of Dementia

'Dementia' is a term that describes symptoms occurs when the brain is affected by specific disorders such strokes and Alzheimer's disease. It is progressive and can include losing memory, confusion, problems with speech and understanding (Alzheimer's Society, 2016). The gradual decline in ability can lead to the need for extra support in daily activities. Alzheimer's disease, vascular dementia, dementia with Lewy bodies and frontotemporal dementia are the most common types of dementia. In these progressive diseases, the brain's structure gradually deteriorates over time. Subtle problems in terms of reasoning and memory can be classified as mild cognitive impairment (MCI). The rate of cognitive decline varies, and those who suffer from strokes, diabetes and heart disease might expect to deteriorate faster. Every year, about 10-15% of the population will suffer from dementia.

2.2.3 Mild Cognitive Impairment (MCI)

The term MCI was firstly introduced to denote a clinical entity over thirty years ago. Those suffering with this diagnosis have been investigated from various clinical, genetic and pathological perspectives (Reisberg, 1988). Reisberg used the term to characterise patients in the intermediate stage before it developed into dementia. MCI can be traced back to the term 'benign senescent forgetfulness' (Kral, 1962). The term was first introduced into neurology and psychiatry in 1997 (Petersen et al., 1997). MCI is intended to denote this intermediate stage of cognitive loss, which is usually regarded as a transitional phase from the cognitive changes resulting from normal ageing to the early stage of dementia. In those living with MCI, general cognitive functioning is maintained, including the ability to independently conduct daily activities. A mild level of cognitive deficit in addition to memory loss generally occurs, but no isolated decline in the non-memory domain is present in MCI sufferers, as not all forms of MCI will evolve into dementia.

The number of observational studies of impairment leading to dementia steadily increased as researchers became aware of its importance as a public health issue. An early diagnosis can ensure that medical treatment is more likely to be effective, thus alleviating the pressure on health care services. A person demonstrating subtle problems with planning, reasoning and memory may be classified as suffering from MCI.

MCI has become a label that stigmatises sufferers when compared with able-bodied people. The personal wellbeing of those with Alzheimer's disease and MCI maybe threatened, along with their interpersonal relationships, thus leading them to be devalued as individuals (Beard &Fox, 2008). MCI can be divided into amnestic and non-amnestic MCI. Amnestic MCI affects the memory, and people may forget important information from recent conversations or appointments that they may have previously recalled easily. Non-amnestic MCI affects thinking skills beyond memory ability, such as visuospatial judgement, language and executive functions such as the sequence of steps required to complete a given task.

2.2.4 Types of Dementia

2.2.4.1 Alzheimer's disease

The progression of Alzheimer's disease can be summarised in three stages, and the symptoms may overlap.

Early Stage: Alzheimer's disease begins with minor changes in behaviour, and sufferers may not be able to recall recent events. Many elderly people sometimes forget events that happened recently, but they will recall them after a while, unlike Alzheimer's sufferers. They may find it difficult to learn new information and struggle to discern the meaning of a conversation. Their speaking ability may be reduced and their speech may become less fluent, and they may find it difficult to make decisions in their daily lives due to poor judgement. They may also show no interest in other people or activities and may find it difficult to perform sequential tasks such as cooking a meal. They may need some reassurance and emotional support, particularly if they become anxious, irritable or depressed.

Middle Stage: Observable changes become more explicit as Alzheimer’s disease progresses with time. Sufferers may need frequent reminders to wash, dress or eat. They may misinterpret what is happening in a situation or feel frustrated and lose their confidence to finish a task. They can easily get lost and may be confused about their current environment, consequently with drawing and focusing on activities and hobbies they are familiar with. The increasing memory loss interferes with their day-to-day living, and for example they may forget appointments or anniversaries. They may confuse daytime and night-time, wear improper clothes or exhibit socially inappropriate behaviour. They may experience difficulties with perception and in some cases delusions. Significant changes in behaviour are normal in the middle stage.

Later Stage: As Alzheimer’s disease continue to progress, those living with dementia can lose the ability to communicate. They may also have problems with reasoning and orientation. They may have difficulty eating and walking unaided. The situation becomes much worse in this stage, and thus that additional support is required and eventually sufferers will require full assistance in all their daily activities. Some will start to believe things that are not real and may experience hallucinations. Behaviour can become extremely unusual, including persistent calling out, disturbed sleep and over-reactions, and special treatment may be required.

2.2.4.2 Vascular Dementia

Vascular dementia occurs when the brain is damaged due to a limited supply of blood. It has become the second most common type of dementia in the UK, and affects over 10,000 people. Blood is delivered to the brain through the vascular system, and damage to blood vessels will block blood delivery to cells, which will eventually die. A stroke can occur when the blood supply is suddenly cut off, and the severity depends on how long the vessels are blocked by a clot. If the blood supply is stopped or interrupted for more than a few minutes, some tissue will die.

Not all those suffering from strokes will experience post-stroke dementia, but around 6% to 27% are likely to within six months, particularly if they have further strokes (Sun, Tan & Yu, 2014). Those with vascular dementia may have difficulties with their memory in terms of recalling recent events and may lose language fluency. Visuospatial skills are also affected, perceiving objects three-dimensionally can become an issue and sufferers' moods often change for no reason. This form is closely linked to high blood pressure and cholesterol in middle age.

2.2.4.3 Dementia with Lewy bodies (DLB)

Dementia with Lewy bodies (DLB) is another type of dementia in which the symptoms of Parkinson's and Alzheimer's diseases are combined. One tenth of people living with dementia suffer from DLB. DLB occurs due to a loss of connection between nerve cells, and the progressive damage of these cells can lead to a loss of brain tissue. Nearly one third of people suffering from Parkinson's disease will progress to suffer from dementia. DLB is common for those over the age of 65, and have similar symptoms to those of Alzheimer's and Parkinson's diseases. Symptoms include fluctuating attention and alertness, difficulty in organising and planning and problems judging distances and perceiving objects three dimensionally.

Visual hallucinations may be experienced by people living with DLB, which can be distressing for relatives and caregivers. They may also have problems with movement, including slowness and rigidity that can limit the range of facial expression, along with balance and trembling. They may suffer from unexplained episodes and become unconscious for short periods. Sleep disorders are also symptoms of DLB, and problems include confusion and violent movements, which may disturb partners. The symptoms become worse overtime, as BLD is a progressive disease. Problems with day-to-day memory begin to resemble those resulting from Alzheimer's disease in later stage, and thus extensive nursing care is required.

2.2.4.4 Frontotemporal dementia (Pick's disease)

Frontotemporal dementia is the least common type of dementia. It refers to damage affecting two lobes of the brain, which leads to dementia. The frontal lobes on the right side of the brain control behaviour and emotion, while the temporal lobes on the left side control the understanding of words.

Frontotemporal dementia is often diagnosed in people between the age of 45 and 65, and thus considerably younger age that those with Alzheimer's disease. Those living with frontotemporal dementia may have symptoms affecting fluency and behaviour. Progressive non-fluent aphasia, such as slow hesitant speech and errors in grammar, is typical. In some cases, speech may be fluent but the vocabulary used to describe may be limited along with the ability to understand what objects words refer to. Sufferers may find it difficult to recognise common objects and familiar people and may also lose their inhibitions.

2.2.5 Difficulties in daily living

Regular activities such as reading books, listening to radio, turning on the stove, switching on and turning off lights, watching television and using a remote control to select channels and volume, activating a digital door lock or using keys to manually lock a door are examples of day-to-day activities. Research into social support for people living with cognitive impairment is increasing, and indicates that older people maintaining social contact and participating in social activities can improve their cognitive abilities (James et al., 2011). Social isolation has been found to be a factor in cognitive decline (Zunzunegui, 2003). By re-assessing and improving product and interior design of public housing while considering the daily needs of people living with cognitive impairment, they can be helped to connect with other people and the outdoor environment, and participate in group activities.

2.3 Elderly Living Alone

2.3.1 Loneliness and Isolation

Social structures have changed substantially over the past 30 years as the number of older adults living alone has been increasing. Loneliness is an aversive individual experience and emotional state and involves unfulfilled personal and social needs (Peplau & Perlman, 1982). Social isolation refers to being cut off from normal social networks and involves an enforced lack of integration into society. This can have a harmful effect on cognitive functioning and thus increase the risk of developing cognitive impairment such as dementia (Fratiglioni et al., 2004). Reports from the HKSAR Government indicate that the proportion of older people living alone increased over a ten-year period from 11.6% (2006) to 13.1% (2016) (Census and Statistics Department, 2016).

Living alone is a major cause of loneliness among older people, as it reduces their accessibility to social connections and mutual support (Weiss, 1973). In addition, loneliness has been identified as a predictor of cognitive decline and is associated with a more rapid deterioration of visual memory and processing speed (O'luanaigh et al., 2012).

2.3.2 Mitigation through Design

The 'Guidelines for the Universal Design of Dementia Friendly Dwellings for People with Dementia, their Families and Carers' were produced by the Centre for Excellence in Universal Design - aimed at ensuring people with dementia have the ability to live in dementia-friendly environments, either alone or supported by family and carers. These guidelines outline the specific design considerations that are the foundation of universal design. Universally designed home environments and interiors enable the largest possible number of people including those with disabilities to live independently within society or at home, while maintaining main stream aesthetics considerations. Thus, those with special needs are not stigmatised (CEUD, 2015).

Adopting principles of universal design for built environment can avoid high costs typically involved in building for people with disabilities. Theses should be integrated into neighbourhoods, easily approachable and understandable, and be flexible over time while preserving considerations of cost effectiveness and adaptability (CEUD, 2015). When designing for people with dementia and cognitive impairment, family members and caregivers should also be considered by utilising the principles of universal design when developing living environment, home furniture and products. This can promote better living among vulnerable people and their carers (CEUD, 2015).

According to the CEUD (2015), dementia-friendly dwellings should (1) encourage a participatory design approach between people with cognitive impairment and care givers in the development process; (2) apply familiar design and visuals elements that fulfil user expectations; (3) support personalised living environment to improve individual home stability; (4) eliminate acoustic and visual disturbances to offer an environment that is easy to interpret; (5) offer effective visual aids across key areas of dwellings as reminders; (6) implement unobtrusive safety measures and assistive technology to provide a more safe and secure environment; (7) create spaces for various domestic activities of daily living that are understandable and memorable for those with cognitive impairment; and (8) provide accessible outdoor spaces that are perceptible from inside to facilitate better engagement. Below is an illustration of a two-bedroom apartment design in Ireland, which is applied to community housing for almost two-thirds of those with dementia (Connolly et al., 2014):

a. A high level of acoustic insulation to ensure sources of noise can be isolated and eliminated.
b. Using colour-coding to provide good visual access to major circulation areas including lifts and stairways.
c. Colours are also used in the entrances to the apartments and the brightly painted front doors are easily identifiable.
d. Curtains define the interior space to ensure those with dementia do not leave the house at unsuitable times.
e. Views of the outside should be maximised without being obscured by blinds or curtains and should be easily accessible to promote independence.
f. Floor finishes should be matte, plain coloured and continuous without any shiny

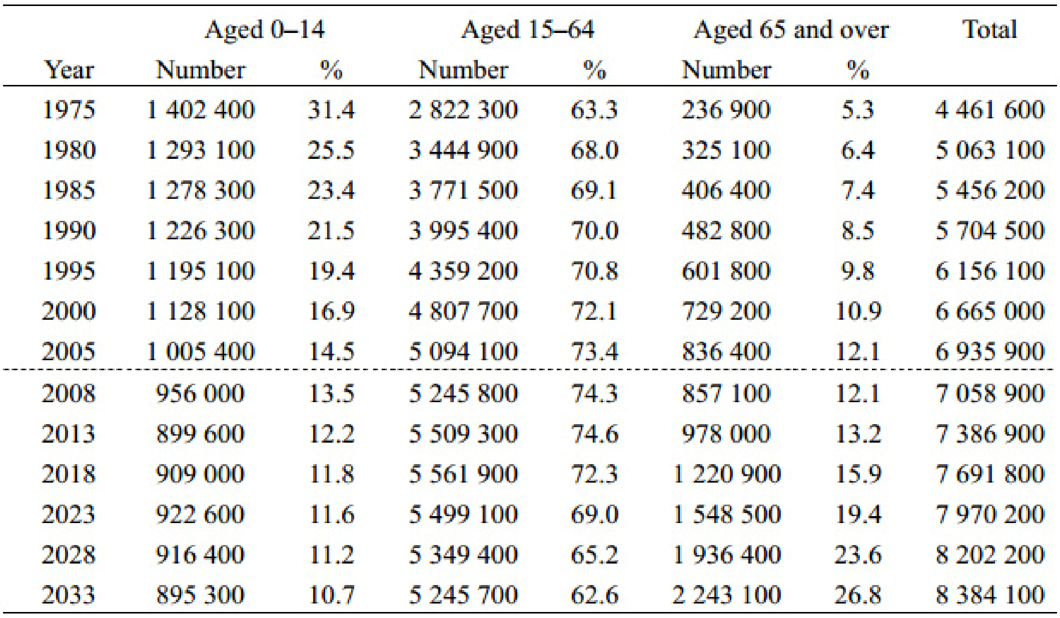
surfaces.

g. Skirting boards should provide a good visual separation between walls and floors.
h. Glazed kitchen cupboards and wardrobe can easily provide visual access to their contents.
i. Artificial lighting leading to toilets and bathrooms should be well designed.
j. A direct view to the toilet from the bed can provide a clear and direct visual cue to people with dementia (CEUD 2015).

2.4 Public Housing for the Elderly

2.4.1 Housing in Hong Kong

Universal design has become a significant global trend in recent years, along with the dramatic rise in the number of older adults, particularly in Japan, Northern Europe, China and other developing countries. People appear to be living longer and life expectancy is increasing. In many countries the over 65's outnumber the under-25's. For example, in a few years' time half of Norway's adult population is expected to be over 50 years old (Vavik, 2009). Based on the report of the Census and Statistics Department of the HKSAR, the proportion of the Hong Kong population aged 65 and above has increased from 9.8% (1995) to 12.1% (2005). The population of Hong Kong is ageing at a fast pace and this figure is projected to increase to 26.8% by 2033. Population sizes and age structures are shown in Table 1, which clearly indicates a rising trend in the ageing population over the coming decades.



	Aged 0–14		Aged 15–64		Aged 65 and over		Total
Year	Number	%	Number	%	Number	%	
1975	1 402 400	31.4	2 822 300	63.3	236 900	5.3	4 461 600
1980	1 293 100	25.5	3 444 900	68.0	325 100	6.4	5 063 100
1985	1 278 300	23.4	3 771 500	69.1	406 400	7.4	5 456 200
1990	1 226 300	21.5	3 995 400	70.0	482 800	8.5	5 704 500
1995	1 195 100	19.4	4 359 200	70.8	601 800	9.8	6 156 100
2000	1 128 100	16.9	4 807 700	72.1	729 200	10.9	6 665 000
2005	1 005 400	14.5	5 094 100	73.4	836 400	12.1	6 935 900
2008	956 000	13.5	5 245 800	74.3	857 100	12.1	7 058 900
2013	899 600	12.2	5 509 300	74.6	978 000	13.2	7 386 900
2018	909 000	11.8	5 561 900	72.3	1 220 900	15.9	7 691 800
2023	922 600	11.6	5 499 100	69.0	1 548 500	19.4	7 970 200
2028	916 400	11.2	5 349 400	65.2	1 936 400	23.6	8 202 200
2033	895 300	10.7	5 245 700	62.6	2 243 100	26.8	8 384 100

Table 1. Population size and age structure from the Census and Statistics Department, HKSAR

The Hong Kong Housing Authority (HKHA) also reported that over 520,000 people aged 60 and over live in public rental housing, indicating about 38% of older population in Hong Kong. Their survey represented a strong demand for purpose-built housing for older people in the middle-income group who have the means to live independently. The Senior Citizen Residences Scheme was thus introduced in the late 1990s and all of its units are let. Various residence scheme are provided by the HKHA, as follows:

- Single Elderly Persons Priority Scheme (public housing offered by HKHA)
- Elderly Persons Priority Scheme (public housing offered by HKHA)
- Harmonious Families Priority Scheme (public housing offered by HKHA)
- Senior Citizen Residences Scheme (apartment offered by Hong Kong Housing Society (HKHS))
- Joyous Living Scheme (apartment offered by HKHS)

The HKHA provides two major types of rental housing for older people in public estates: housing for senior citizens and self-contained small flats. Housing designed for senior citizens can be classified into three types:

- Type I (converted flats on the lower floors of domestic blocks, as shown in Photo 1)
- Type II (above a commercial podium or car park)
- Type III (located on the lower floors of small household developments)

Photo 1. Converted flats on the lower floors of domestic blocks

In 2003 and 2004, the first Senior Citizen Residences Scheme, supported by HKHS, was implemented under the Jolly Place and the Cheerful Court project. The design was specifically for older people, with integrated residential services targeted at the middle income group. The scheme was partly subsidised by the government. Located in Kwun Kong District, the Cheerful Court is operated by the Hong Kong Sheng Kung Hui Welfare Council. The residential units are composed of 254 one-bedroom flats and 79 studio flats of approximately 35 and 23 square metres, respectively. They are equipped with club house facilities, clinical and Chinese herbalist medical services, dentists and beauty salons. Fire safety facilities, smoke sensors and auto sprinklers, double swing doors and personal emergency links are installed in each flat. An example of the interior design in Cheerful Count is given in Photo 2.

The scheme is designed to be a long lease arrangement. This is a new concept, and after paying an entry fee older people can live in a unit free of any further rental payments. When a tenancy agreement is terminated, a proportion of the entry contribution, depending on each occupation period, is refunded to the tenant. The Joyous Living Scheme is a new market-driven project implemented by the HKHS that has provided purpose-built housing since 2015. This is not subsidised housing and thus applicants are not means-tested.

Photo 2. (Interior Design in The Cheerful Court, Hong Kong, 2004)

The Joyous Hub, designed under the Joyous Living Scheme, offers physical, social and psychological support, enabling older people to achieve an active and happy lifestyle. The studio flats are either 25 or 36 square metres. The interior design follows a universal design approach, and older people can access the wide entrances with U-shaped lever handles and use lever taps and emergency call buttons inside the bathroom to maintain a safe living environment. Handrails at a useful height are provided and anti-slip floors and large and clear signage are installed in the common area, including a life lobby. Surprisingly, no health centre specialising in cognitive impairment and cognitive training is provided in this living complex. There is a requirement when applying this service is that residents are over 60. An example of interior design in the Joyous Living accommodation is given in Photo 3 below.

Photo 3. (Joyous Living Interior Design Hong Kong, 2021)

As the ageing population continues to grow steadily in Hong Kong, the number of people living with dementia will increase. Providing opportunities for people living with dementia to practice their remaining skills by reinforcing their sense of well-being can help them to function at their highest potential (Marshall, 1998). People living with severe cognitive impairment can become disengaged, so initiatives that help them live with their family members or care givers in their own homes can help them re-integrate and re-socialise.

The Hong Kong Housing Society Elderly Resources Centre established its Mind-Friendly Home Exploration Centre in 2017, with the aim of promoting the concept of dementia-friendly homes as a new concept. The main objective is to demonstrate a friendly home design for people living with cognitive impairment, to alleviate pressure of carers and to promote ageing in place. The show-flat in the centre includes hi-tech product and interior design, which can help people in need by (1) reducing unobtrusive risks and unhelpful stimulation; (2) creating a familiar space that can support movement and engagement; (3) allowing people with dementia to see and to be seen; and (4) supporting movement and engagement (Elderly Resources Centre, 2018).

Gerontechnology, or technological innovations designed for elderly people, is not the focus of any dedicated strategy in terms of product solutions for elderly care, although it can be effective. The limited test scenarios and corresponding funding for design commercialisation means that the application of such systems in Hong Kong's smart elderly care services are still lagging behind those of other cities. In Norway, innovations such as tracking people with dementia and electronic drug dispensers were first tested in 2013 and implemented in the following years as smart home product designs, with the full support of the government.

2.4.2 Public Housing for the Elderly in Singapore

In Singapore, the Committee on Ageing Issues (CAI) indicated a transformative shift in demography, with the number of people 65 or older increasing by three times to 900,000 by 2030, constituting 19% of the total population. Singapore has one of the fastest growing ageing populations in Asia due to relatively longer life expectancy and a low fertility rate. Problems with public housing are likely to emerge, in which over 80% of the ageing population live, which has triggered the development of a future housing strategy that offers creative, affordable and integrative housing design. By 2030, 13% of those aged 65-74 will have completed tertiary education, and thus their expectations may differ from those of the past.

The Housing and Development Board (HDB) offers diverse apartment structures ranging from typical studio apartments to flexible apartments for individual families. The aim is to discourage social stigma and age discrimination, educate the general public about inclusive design, and to enable residents to remain independent by providing a living environment with stimulation through the application of universal design principles (Stamenovic, 2012). As Singapore is a densely populated city, it has no other option than to offer high-rise living to a growing number of older people. The size of each flat varies between 35 and 150 square metres, and they are governed by strict regulations. In 2015, 45,000 Singaporean were living with dementia, but this is expected to double by 2030 (Alzheimer's Disease Association, 2015).

Dementia-related costs in Singapore have reached US$2.4 billion, so planners, architects and designers should utilise universal design principles and take a user-centric approach when developing cognitive-friendly public housing. Solutions should have the flexibility to meet changing expectations overtime (Alzheimer's Disease Association, 2015). According to the Ministry of Health, assisted living should be considered, as many citizens own their own homes on public housing estates and these could be retrofitted (Straits Times, 2018). With the support of a cognitive-friendly community, this can de-stigmatise and improve the acceptance of people with dementia, thus avoiding institutionalisation and enabling each individual to continue to live in their own residences.

Yishun, formerly Nee Soon, is the first dementia-friendly estate in Singapore. It offers a good quality of life to elderly citizens and covers the areas of Chong Pang, Khatib and Lower Seletar. In Chong Pang, one in four residents are seniors. A dementia-friendly community can thus become the new normal. If others are not familiar with the symptoms and misunderstand those living with dementia, their shame may be exacerbated. An example of the exterior and indoor environment designs for the Yishun Estate is shown in Photo 4. A cognitive-friendly community is aimed at eliminating social isolation and promoting inclusion, thus offering a good environment for dementia sufferers to age in place and continue to be part of society. Staff in the community centre and hospital and security guards all receive ongoing training. Thus, Yishun is aimed at inspiring estate development in other districts in Singapore. The standard 2-Room unit of Yishun Estate Avenue 11 in Singapore is shown in Figure 4 (SRX, 2023).

Photo 4. Exterior design and indoor common areas of the Yishun Estate, former Nee Soon South Housing Blocks, Singapore, 2021

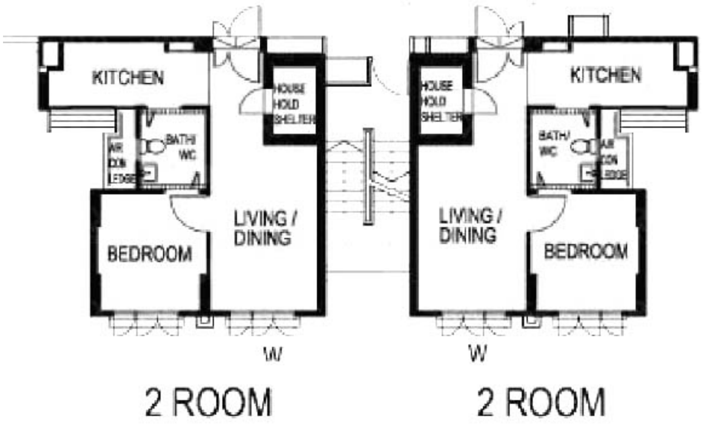


Figure 4. Floor plan of 2-Room unit of Yishun Estate Avenue 11 in Singapore. *(Retrieved from http://www.srx.com.sg, 2023)*

2.4.3 Public Housing for Elderly in Tokyo

In late 1980s, Japan introduced a new project named Silver Peer Housing Project aimed at providing older people with a communal-housing to promote independent living with physical environment in Tokyo. New features include recruiting a warden who lives as a neighbour to support the residents, establishing an emergency information system and barrier-free concepts, and also building up a good connection with service centres that support independent living

(The Silver Housing Project, 1992). People who are eligible to apply must be 65 or above, currently as a couple or living alone with the monthly income did not exceed 184,000 yen and 122,000 yen respectively. Research report indicated that there are a substantial number of older residents living in public housing have shown mental health problems and affecting the daily living of neighbours (Migita et al., 2002).

The area of each unit of Silver Peer Housing was 35 m^2 for one single and 40m^2 for one couple respectively developed to incorporate a lifestyle of Japanese where the living room will be changed to become a bedroom at night. This housing facility is deliberately located within 500M or less away from the train station or a bus stop nearby. Hospital, post office, supermarkets and banks have been well established. Research has shown that the residents living in Silver Peer Housing are not satisfied with the eating space, faced problems in going up and/ or down the stairs, preferred to have an emergency support and a full furniture sets in daily life (Migita, Yanagi, & Tomura, 2005).

The Japanese public housing is designed for older people who are able-bodied, however, for those who are suffered by mental illness and specific learning disabilities, they might find difficulty to lay out their bedding on a routine basis. Otherwise, they might require an extra support from carers. In addition, the physical capacity of aged people gradually declines, they might not be able to perform as good as normal adult. The residents are not satisfied with the Japanese styled interior setting and preferred to have a bed, table and chairs as fundamental furniture for daily use where could fit into existing living space. Through providing a more well-defined living space for older people with specific needs and day treatment in communal space, the change could facilitate social engagement where they can speak of a common topic without any burden. The standard unit of Silver Peer Housing in Tokyo is shown in Figure 5.

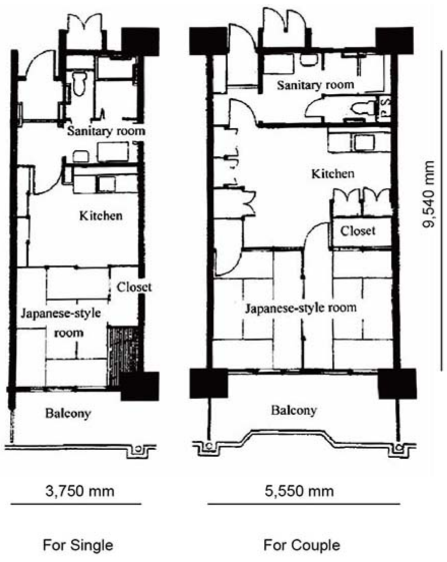


Figure 5. Standard units of Silver Peer Housing for single and couple. (*Migita et al., 2005*)

2.4.4 Public Housing for the Elderly in the US

By 2050, the older population of the US is expected to rise by nearly two times to 85 million (Ortman, Velkoff & Hogan, 2014). Such a rapidly ageing population requires the reallocation of resources, such as property to housing, and infrastructure development as more than a quarter of older people live alone (Bigonnesse, Beaulieu & Garon, 2014). Housing type is a major consideration when analysing ageing in place in the US. One study indicated that more than 80% of older people own their homes, rather than living in shared or multi-unit rental housing (West, Cole, Goodkind & He, 2014). Subsidised housing for older adults in the US has not been well promoted, and the numbers applying for such assistance or the time theystayin public housing are still relatively unknown(Stone, Harahan & Sanders, 2008). Further investigations into the nature of this type of subsidised rental housing are thus required.

The National Opinion Research Centre concluded that affordability, accessibility, supportive services and social participation are the main factors to be considered in housing programs when developing age-friendly housing. The unprecedented national growth of this segment of the population means that elderly public housing will become more important. The department of Housing and Urban Development (HUD) encouraged affordable housing for US citizens by funding assistive services programmes for seniors and disabled people, including home ownership and rental assistance, which benefited over 900,000 individuals. The three current types of affordable rent programmes in the US market are:

- Public Housing – run by local public housing agencies, and in which over one million families live. This includes single-family homes, duplexes and high-rise apartments.
- Multifamily Subsidised Housing – subsidised privately owned housing at an affordable price. This programme is designed specifically to enable older and disabled people to live independently with some assistance in their daily activities, and offers housekeeping and counselling services. Those 62 and older are eligible to apply for apartments, cooperative units or duplexes. An example of the exterior design of a multifamily subsidised housing unit in the US is given in Photo5.
- Senior Housing Vouchers – offer rental assistance to support low-income individuals and families for housing in the private market. This is tenant-based and non-transferable between projects, and is the largest assisted housing programme. The rental cost is typically calculated as within the range of 10% - 30% of monthly income.

Photo5. Exterior design of Multifamily Subsidised Housing, operated by the Department of Housing and Urban Development (HUD) US, 2021

2.4.5 Public Housing for the Elderly in Sweden

The total population of Sweden has been increasing since the 1970s and the elderly population made up over 20% in 2021. Those aged 80 years and over constitute2.4% (1970) to 5.4% (2021) of the total population, and in 2021 amounted to 10.4 million (Statista, 2022). However, the expenditure on elderly care has been decreasing in recent years.

Universal design is an instrument crucial to the national housing policy in Sweden. Public housing meets the needs of tenants through rental apartments (Bengtsson, 2001, 2004). Recent research indicates that the role of public housing is changing, to be more closely related to market forces while continuing to consider social responsibility. The Swedish government withdrew all subsidies for public housing to achieve an equal playing field (Salonen, 2015).

Sweden maintains this universal system, unlike the Dutch public housing system in which subsidies are offered, and thus eligible tenants must be self-funded. The legislation in some countries states that a varied supply of good quality public housing should be offered to attract various tenants, and universal design principles are becoming less important and only selectively applied. Some housing design practice may be exclusionary (Bengtsson, 2001) and ambiguity about the groups targeted can hinder the application of public housing.

A central feature of universal design is weakened through the Swedish approach, as many citizens will lose out due to the regulations. Thus, the principles are only partially fulfilled due to the lack of affordability and thus one aspect of the approach about inclusiveness is lost. The literature indicates that 50% of people with dementia live in their own homes and of these, 70% live alone, which constitutes 24,000 people who may receive informal help from their friends or neighbours. The increasing number of people with cognitive impairment and dementia exerts significant pressure on total costs-of-illness, and so developing a dementia-friendly public housing and living environment can reduce these and other informal and indirect costs, thus improving patients' quality of life and also their relatives. Research showed that older people had a fall associated with bedroom and kitchen, however, the consideration of universal design might not be applied effectively in these areas among senior public housing and expect to find ways to improve housing safety (Bamzar, 2017). The standard layout of a senior public housing in Sweden is shown in Figure 6.

Figure 6. Standard layout of a senior public housing in Sweden. (*Bamzar, 2017*)

2.5 Universal Design

2.5.1 Universal Design Definition

Over the past 50 years, effort had been devoted to making environment more accessible and liveable. Ron Mace, Ruth Hall Lusher and others realised that a different approach was required for the design and development of better built environments. They coined the term 'universal design', which followed the premise that the built environment should be accessible, and attention should be paid to its ability to improve the lives of a wider range of people. They expected this would become the norm.

Universal design in a global context where 'Universal' refers to design diversity, and that application should be based on a user-centred approach. The 'design' is the solution generated by a creative approach and supported by empirical investigation (Froyen, 2012). By utilising universal design principles, every environmental element can be made as accessible as possible as it addresses a full range of functionality, thus benefiting many people.

Universal design increases the potential for many people to develop a better quality of life (Russell, 1999). It involves the creation of product design, furniture and other spaces, and thus can reduce the need for any special accommodation. Universal design supports increased socially engagement and reduces the economic burden of specially designed services and products that fit individual needs. Mace (1985) first defined universal design as the design of products and environments that are as usable as possible by all kinds of people, without the need for adaptation or specialism.

> Universal design addresses the scope of accessibility and suggests making all elements and spaces accessible to and usable by all people to the greatest extent possible. This is accomplished through thoughtful planning and design at all stages of any design project. Universal design requires an understanding and consideration of the broad range of human abilities throughout the lifespan. (Mace, 1990, para. 13)

Story (1998) expanded on this definition as follows:

> Universal design reflects a belief that the range of human abilities is normal and results in inclusion of people with disabilities in everyday activities. The most significant benefits to the proliferation of universal design practice are that all consumers will have more products to choose from that are more usable, more readily available and more affordable (p.12).

Universal design is a concept emphasises the four main areas of accessibility, adaptability, aesthetics and affordability (Behar, 1991). McFadden (1993) claimed that universal design should be aimed at simplifying people's lives by making housing usable by more people at little or no extra cost.

Ronald L. Mace published seven Principles of Universal Design regarding the evaluation of designs, offering guidelines for design process so as to educate both designers and end-users about the characteristics of usable products and environments as follows:

1. Equitable Use: The design is useful and marketable to people with diverse abilities.
2. Flexibility: The design accommodates a wide range of individual preferences and abilities.
3. Simple and Intuitive to Use: The design is easy to use, regardless of the user's experience, knowledge, language skills or current concentration level.
4. Perceptible Information: The design communicates necessary information effectively to the user, regardless of the ambient conditions or the user's sensory abilities.
5. Tolerance for Error: The design minimises hazards and the adverse consequences

of accidental or unintended actions.

6. Low Physical Effort: The design can be used efficiently and comfortably and with a minimum of fatigue.
7. Size and Space for Approach and Use. Appropriate sizes and spaces for approach, reach, manipulation and use, regardless of user's body size, posture or mobility.

As universal design is not a design style in itself and does not follow a specific method, it can accommodate individual of all ages and mental and physical abilities (National Association of Home Builders, 1999). Story (1998) claimed that universal design features go unnoticed, as they are fully integrated into thoughtful designs that are widely adopted by a broad range of people. Universal design offers an accessible, adaptable, safe and supportive solution (Null, 1995). It exceeds housing requirements and provides accessible and barrier free designs for all (Mace, 1998). Some products purposely follow a universal design focus, such as lever type doorknobs, as does the higher positioning of electrical outlets at 18 inches from the floor.

Universal design is thus a fundamental condition for good design. Steinfeld and Maisel (2012) defined universal design as 'a process that enables and empowers a diverse population by improving human performance, health and wellness, and social participation' (p.29). Fully utilising the principles of universal design can provide better social support and thus people in need can be more self-reliant and socially engaged (King and Siu, 2017). Through the utilisation of universal design principles, product, home furniture and interior design can not only reduce social stigma, but also promote social engagement by ensuring equality between those with functional disabilities and the able-bodied (Danford & Maurer, 2005).

2.5.2 Universal Design for Housing

It is crucial to support UD application in public housing although people with different disabilities might have different needs in daily life. As the percentage of disabled people who lived at home increase, a study of housing design is worthwhile to encourage independent living among people with disabilities (Mansell & Brown, 2008). Housing has become one of the indispensable factors to public support system, in particular, affecting the people's quality of life with disability (Wong & Stanhope, 2009). The idea of UD magnifies the quantity of usable housing through the application of UD features immersed in development of housing (Connell et al., 1997). UD in housing becomes a concept that integrates product design, interior layout and features that usable by different types of people.

Most residents can benefit from universal design applied in housing regardless of one's ability and age (Deardorff & Birdsong, 2003). Modification in housing becomes crucial to provide an accessible home for people so as to promote to live independently. UD principles can be applied effectively, for example, at main entrance, bathroom and toilet, kitchen, control switches, and also the circulation to fulfil the needs of disabled people (Souza, 2004). People with disability should have the rights and needs as able-bodied. There are opportunities for design practitioners to develop suitable housing design for disability involving MCI through utilizing universal design concepts in housing development.

2.5.3 Universal Design and Social Interaction

Social sustainability is a term to describe how environment affects people's quality of life, therefore, an environment that being built socially sustainable should be maintained through better planning in architectural design practice. Universal design can serve as a major aspect in social development if design practitioners can fully utilize it and implement in various areas related to living. The ultimate goal is to foster social enhancement and mutual support that enhancing the quality of life of people, in particular, for those living with disabilities. There are a wide range of disabilities that are being measured including visual disabilities, hearing disability, self-care disabilities and cognitive disability (Hoffman & Livermore, 2012). The meaning of disability is defined as the society does not fully understand the capability of disabled person to socially participate, thus, there is less change to have social interaction compared with able-bodied (Coleridge, 2000). Without efficient accommodation and support from the social development in the community, people with MCI might have fewer tendencies to move from one living place to another that affecting social engagement and its development.

The application of UD in housing is a building concept integrating product designs, design layout and interiors and also specific features into housing, regardless of age, size and human abilities that can have benefits from it (Burgstahler, 2012). Developing living environment that works well for people recovering from illness, including changing in people's cognitive or physiological status is also the major focus of UD, as proponents suggests that understanding design for daily life involving all products and services should not be attentive to bodily complexity, physical and cognitive condition. Sanford suggests that UD has a large potential and opportunity to improve performance and social participation for people with disabilities and mitigate stigmatization (Sanford, 2012).

Universal design provides the means for ease of one's interaction with those well-defined environments where there is a range of sensitivity to adapt to variations of human needs (Imrie & Luck, 2014). For this reason, it is crucial to consider the inclusion and advancement of people who have been excluded from interacting in the society due to various improper design considerations. Research suggests most of the dissatisfaction of disabled people involving MCI and also their absence for social activities are related to the issues of social interaction (Kiewel, 2010). A comprehensive plan adopting universal design to connect various points and spaces so that people involving MCI patients can have active participation among a wide range of social activities, increase social interactions among others leading to social sustainability (Eslami & Mahmoudi, 2016). Social participation is an overall goal of universal design that can be identified as social integration, treating all people with respect and dignity without refusing to offer opportunities for choosing, and reinforcing cultural values with those environmental factors as a whole (Schuler & Namioka, 1993).

2.5.4 Inclusive Design

In an inclusive design approach, designers can address the genuine needs of a broad audience, regardless of their age or ability, when designing solutions in the form of products and services. This is central to the recent international trend towards integrating disabled and older people into the mainstream society. Design can play an enabling role, for example when inclusive design strategies are implemented to address the challenge of ensuring design works for the whole population. 'Inclusive design' is increasingly applied to ageing-related problems.

Ability level, population coverage and design approach are considered and presented graphically in the model. The aim is to develop designs that are widely accessible. The Inclusive Design Cube predominantly involves user-aware design. Through this approach, designers can develop custom products for specific end user groups. Between the two main levels are intermediary levels with flexible boundaries intended for customisable or modular designs that can be swapped for others, thus offering a simple and effective tool to communicate with people with varying needs. This approach is more flexible than designs tailored to a specific end-user group, which can exclude others and thus fail to be inclusive. This approach minimises exclusion through the careful consideration of usability and the impact of product and home furniture designs and can therefore satisfy the growing ageing population.

The Inclusive Design Cube is focused on the multi-faceted nature of levels of ability and how these levels interact. Sensory, cognitive and motion capabilities are involved, and thus the model offers a system for dividing a population in terms of the ability to perform such functions (Keates et al., 2001). The model can be regarded as a cube, by applying equal weight to each respective ability in a population. A specific design approach can then be developed according to the level of ability addressed. User-aware design dominates this cubic form, while the outer part of the cube represents severely impaired users who may require rehabilitation design approaches involving customised product designs. In the middle of these two boundaries are customisable modular and flexible boundaries. The Inclusive Design Cube is illustrated in Figure 7.

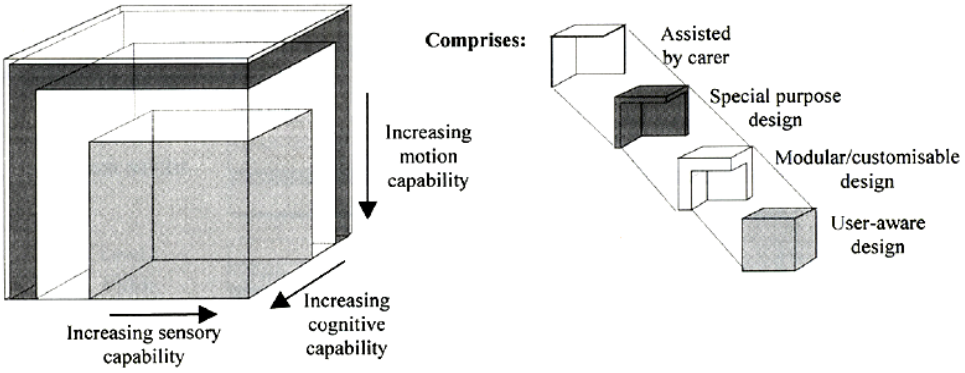


Figure 7. The formation of the Inclusive Design Cube, in which the four layers represent the degrees of motion, sensory and cognitive ability

2.6 Psychosocial Intervention

2.6.1 Psychological Treatments

Psychologists can assess dementia, offer counselling for family members and assist residential care home staff in managing the challenging behaviour of people with dementia. They must have extensive knowledge of the condition when providing services to dementia sufferers, due to the numerous possible contexts (Hinton et al., 2007). Older people with cognitive impairment living alone in their homes may encounter problems such as stress when cared for by professionals or family members, even when they are not living together as regular visits are involved.

Psychological treatment for depression can be beneficial for those with cognitive impairment, and various approaches regarding the managing of behavioural and psychological symptoms have been identified in the literature. Therapy related to cognitive behaviour has been increasingly applied as an effective treatment for older people living with dementia (Pinquart, Duberstein, & Lyness, 2006), to some extent, it could be an alternative to sedation and prevent further cognitive disability. The use of psychological therapy with older people is relatively limited compared to other age groups (Laidlaw, 2013). Cognitive-related content is increasingly applied by clinical practitioners to enable precise psychological interventions. Psychologists or mental health care professionals can support and motivate caregivers, and promote public awareness regarding mental healthcare issues within society (Powers, 2008).

Conducting regular cognitive behavioural therapy training sessions with caregivers and family members can enhance their awareness and motivation regarding such therapeutic intervention for people with MCI who live alone. Psychosocial professionals can empower collaborating participants during therapy to identify depression and recommend treatments to them. Their living environment, including its design and facilities, should consider both users and practitioners. Inappropriate behaviour can be a symptom of psychological distress.

Psychosocial support refers to various forms of either group or individual support and involves a wide range of therapeutic styles, services and training approaches. Post-diagnostic support from health organisations worldwide is limited and no international standard has been established. Therapeutic intervention combines practical information with opportunities to share experiences of dementia in an emotionally contained environment (Marshall et al., 2014). Psychological and counselling therapies such as cognitive behaviour therapy address the interactions between behaviour and thoughts (Spector et al., 2014). In practice, psychological treatment can involve the recounting of life stories and reminiscence.

2.6.2 Clinical settings involving psychosocial intervention

Treatment for older people with dementia is limited, although psychosocial interventions are potentially helpful (Chapman et al., 2006). Programmes such as Staff Training in Assisted-living Residences and Reducing Disability in Alzheimer's Disease offer training for family members or carers to improve their caring skills and reduce any depression or behavioural problems encountered by people living with cognitive impairment. Evidence-based psychosocial interventions include education, skill-set training and support provided either at home or through telephone calls. This can enhance the quality of life of family members and caregivers without resorting to nursing home placements, which is highly desirable (Stevens at al., 2012). Thus, ensuring interior and product designs are cognitive-friendly can improve the experiences of both those requiring care and their carers.

Various person-centred psychosocial treatments, training for caregivers and emotion-focused treatment have been identified as effective, although the approaches in such programmes can vary(Teri, McKenzie & Coulter, 2016). Psychosocial programmes may not only be considered less expensive than typical long-term care, but also less restrictive when compared to pharmacological management (Knapp, Lemmi, & Romeo, 2013). Without utilising psychosocial programmes, those living with dementia, their care givers and the entire health care system will eventually suffer from increased financial and emotional burdens.

2.6.3 Psychological Services in the Home Care Context

A satisfactory level of professional psychological services for the ageing population has still not been achieved, although clinical opportunities for professional psychologists to work with older people are increasing (Koder, Helmes, & Pachana, 2007). Psychology can contribute to combating mental health such as cognitive impairment, and is therefore important for the development of a good quality of life. The early recognition of and treatment for depression is critical for the prevention of suicide in the ageing population. Both family members and the health care system should provide psychosocial and emotional support (Osvath, Fekete, & Voros, 2002).

Antidepressants are found to be helpful in many situations, but the effectiveness of some medications has been questioned, particularly in the field of cognitive decline (Banerjee et al., 2011). Thus, alternative approaches are required to relieve depression. Research indicates that older people prefer psychological treatments over traditional medications (Gum et al., 2006). Cognitive training has proven to be successful in assisting those living with cognitive impairment, and their memories, recognition and day-to-day functioning can improve (Creighton, van der Ploeg & O'Connor, 2013). By applying specific psychological approaches to individuals, older adult with cognitive impairment have the opportunity to remain living at home.

Australian researchers used humour therapy to reduce the levels of agitation in residents of nursing homes. The Sydney Multisite Intervention of Laughter Bosses and Elder Clowns involved playing, laughing and being active as approaches for keeping the brain engaged (Low et al., 2013). Laughter has a range of health benefits, such as lowering stress hormones, easing anxiety and symptoms of depression, strengthening the immune system and improving social interaction to create a safe social environment.

There is a shortage of clinical professionals to implement such treatment, and the situation is expected to worsen as the population further ages overtime. Psychologists should therefore be trained to develop treatment plans for older adults with cognitive impairment. Psychological research aimed at improving the cognitive health and wellbeing of these older people should be a priority. Although the number of people receiving elderly care services in their own homes is increasing, research into appropriate treatments is lacking (Davison et al., 2017).

2.6.4 Multi-modal Intervention

Throughout a combination of cognitive behavioural therapy and physical exercise, multi-modal intervention can provide a positive effect on people living with dementia (Burgener et al., 2008). Small improvements were observed in a multi-modal group compared to the control group (delayed-treatment), and more substantial improvements were identified after physical exercise was included in the training. Tai Chi exercises can, for example, support the strengthening of memory about movement and a relaxation response to stress (Khalsa,1998). This form of exercise is effective in preventing falling among older people(American Geriatrics Society, 2001).

Interventions of cognitive training have been found to enhance a wide range of cognitive functions such as memory retrieval and storage (Verhaegen et al., 1992). The combined approach of exercise and cognitive training interventions has been examined with people suffering from dementia, and positive cognitive and affective outcomes have been identified, along with less of a decline in mental status (Olazaran et al., 2004). Tai Chi, as an alternative form of exercise, requires motor and sequence learning, which can potentially prevent accidental falls and benefit cognitive functioning (Ball & Birge, 2002). Multi-modal interventions can be effective when combined with pharmacotherapies for people with MCI.

2.6.5 Reminiscence and Psychology

Reminiscence involves memories of personal experience and past events. Reminiscing can contribute to the well-being associated with the ability of older people to adapt and to cope with the cognitive losses associated with ageing (Coleman, 1992). The idea of reminiscence involves remembering a time in which a unique experience occurred, thus giving the past value. This encourages self-definition and looking forward to the future that becoming an extension of the present and the past (Thorsheim & Roberts, 1995). Six types of reminiscence have been identified: (1) integrative; (2) instrumental; (3) transmissive; (4) narrative; (5) escapist; and (6) obsessive. Instrumental and integrative reminiscences are likely to be more beneficial than simply recalling memories about past life events as it can enhance older people’s sense of mastery (Wong & Watt, 1991). Integrative reminiscence helps preserve competence, which may be affected by old age (Wong 1995). Integrating life experiences can help older adults feel competent and that they have achieved a sense of accomplishment.

2.6.6 Psychologists’ contributions

The neuropsychological expertise of clinical psychologists enables them to diagnose MCI and dementia, such as by assessing emotional reactions. They have experiences and a particular interest in cognitive and behavioural aspects of the coping processes of people with dementia. Psychologists can thus provide ongoing psychosocial intervention training to professional and family caregivers and revisit the evidence-based results before any further developments. Appropriate psychological interventions can effectively alleviate stress, facilitate adaption and reduce the future need for long-term care for people living with cognitive impairment.

Shared understandings can be incorporated into one’s mental model to make personal sense of an experience. Research conducted by clinical psychologists also reveals that coping in a social sense should also be supported, to facilitate the sharing of experiences and mutual learning (Clare, 2002).

2.7 Concluding Remarks

Living well with cognitive impairment at home has inescapable challenges, particularly for those living alone due to the loss of a spouse or a lack of financial support in their later lives. Many people with cognitive impairment face rapid cognitive decline and consequently they may consistently suffer from short-term memory loss, poor judgement in daily activities and even self-harm.

Ensuring public housing is equipped for people living with dementia can enhance their family and community connections, by helping them feel psychologically safe within familiar surroundings in which they have built up their social networks (World Health Organization, 2007). Built environment can create a crucial challenge for those with cognitive impairment including dementia (Jackson & Kochtitzky, 2001). Institutional dementia care emphasises the normalisation of daily life through user-centred design and application and enabling older people with cognitive impairment to achieve ageing in place is of the utmost importance (Moise et al., 2004). In this literature review, public housing design in four cities selected from North America, Northern Europe and Asia is assessed, and by demonstrating the various recent strategic approaches in establishing public housing for older people forms the basis for this study. The future demand for public housing that incorporates cognitive-friendly housing and design elements is likely to increase.

MCI will not always evolve into dementia, but those with cognitive impairment have the right to understand the symptoms of dementia and ways of coping with it. The rate of cognitive deterioration can be reduced through various design interventions.

Accessibility is a major concern in universal design, as it is intended to provide accessible and usable design solutions by carefully considering all levels of ability (Mace, 1990). Design practitioners may have experience of applying universal design principles in housing, but the abilities of residents will vary, and thus deeper investigation and psychosocial interventions may be required for some groups. Evidence-based design and qualitative participatory research can therefore help people with cognitive impairment develop and adapt to their preferred home environments (van Hoof et al., 2010).

3 Theoretical Framework

3.1 Introduction

Universal design is widely applied in Western countries across different areas over the past few decades, including public facilities, architectural design and product design. One of the major objectives of UD is to provide accessible design solution to people regardless of age and possess different types of disabilities. There is a lack of research and exploration about universal design that covers the needs of people living with cognitive impairment and possibly, new element can be applied to compensate the areas where UD might not be easily carried out. Design practitioners should have opportunities to offer design execution and remodel public housing under a guiding principle, which is missing in the market. In search of daily needs of people with MCI as an innovation process to improve people's quality of life, a theoretical framework based on innovation-decision process model (Rogers, 2003) is adopted. This newly proposed theoretical framework in relation to universal design in public housing involving people living with MCI is presented through a process of different stages in knowledge, persuasion and decision.

3.2 Framework adopting Universal Design

Universal design aims at decreasing people's barriers when designing a product, furniture or environment is considered to begin with, rather than to wait for removing barriers occurred through individualized or customized accommodation (Seale, 2014). In search of the effectiveness and awareness of using of universal design applied for public housing involving people with MCI living alone, the innovation-decision process of Rogers' five stages model of adoption theory is applied to serve as a foundation of theoretical framework of the present study. Adoption of any new and possible ideas is the result of development and movement through a continuation of five different stages. These stages includes from knowledge to persuasion, from persuasion to decision, from decision to implementation and from decision to confirmation (Rogers, 2003). The complete model of Rogers' innovation-decision process theory is already illustrated in Figure 2 of Chapter 1.

In this present research, Rogers' model is applied to the innovation-decision process of the concept of universal design for public housing involving older people with MCI living alone. I had developed a framework where it was evolved from innovation-decision process model (Rogers, 2003) and explained in Figure 3 of Chapter 1.

The prior conditions mentioned in this framework, including the previous practice of applying UD in public housing and the norms of social systems. In the knowledge channel, it also includes the characteristics of design coming from the decision made by housing contractors and government bodies. Next, in the persuasion channel, it is affected by the characteristics of innovation related to universal design. The characteristics include UD itself, that is first, being adopted easily to housing design, second, partially applied to interiors and product design and expect to get a good result, and third, the benefit to people living with MCI and dementia through UD application. It is those perceived characteristics as a whole that can affect decision making, for the adoption and rejection of universal design and the new element (the innovation). The communication channels exist between each single step in the process of innovation-decision making, which becomes a feedback mechanism for information exchange within the process. Channel of implementation and confirmation of universal design with new element cannot be summarized as a conclusion due to the processing period takes years.

3.3 Creating an Inclusive Environment promote Social Participation

Housing affects the quality of life of people living with MCI. Meeting users' needs in housing design is crucial, no matter whether they are disabled or able-bodied. Many older people do not want to prolong their lives in an institutional setting as they aim to preserve their independence and are concerned about the high health care costs incurred over time. Design practitioners should carefully consider their motivations in the design process. Cultural concerns often substantially influence the development of living environments in terms of needs, values, images, norms and their consequent meanings (Rapoport, 2000).

Universal design in which people usually adopt to develop products, home furniture, interiors and living environment to be usable by all people without the need for specialized design or other adaptations is chosen for this study (NCSU, 1997). A universally designed environment and sustainable community can promote social participation and social integration through adaptable spaces provided that can be shared by a wide range of people to support local networks and also the community identity as a whole (Woodcraft at el., 2011). An inclusive environment aims at providing equal opportunities to people involving cognitive disabilities to foster interactive community and to enrich people's quality of life (Gossett et al., 2009). Considering the role of universal design in sustaining well-being, safety, accessibility of human space, encouraging participation and social interaction, universal design becomes a key factor to achieve social sustainability in a community.

3.3.1 Hierarchy of Human Needs

Maslow (1970) proposed that satisfying basic needs is critical for individuals to successfully develop and actualise their potential in a society. He identified various levels of needs and motivation, as shown in Figure 8. Self-esteem and self-actualisation can motivate people to establish a better living environment to meet people's expectations (Miller, 2007). Loneliness has been defined as the unmet basic need for social connection (Peplau et al., 1978), so developing a living environment that can provide the motivation to make connections can thus relieve loneliness. A high level of loneliness is more closely associated with a disconnection from close family members rather than from strangers, as a lack of support from them will be more directly perceived (Inagaki, 2015).

Although practical considerations regarding elderly people are to some extent factored into modern public housing, their forms and interiors can lack imagination and meaningful associations (Bachelord, 1994). Individual needs can concern physiology, safety, self-actualisation, belongingness and self-esteem, and will influence character formation. Life changes are accompanied by changes in cognitive capacity, including attention span, language ability, memory, thinking and judgement. The gratification of needs can help improve and strengthen individual personality development and motivate people to perform a simple daily task.

The process of designing a better living environment through various stages should be aimed at closely meet users' expectations according to their different needs. Residential buildings can be classified as 'shelters', 'houses' or 'homes' (Banham, 2007). A home is a broader concept than simply the physical structure of a house. Shelter suggests protecting inhabitants, whereas the creation of a home indicates a social structure. 'House' is itself a denotative concept as it describes the physical structure of a building, but 'home' becomes a symbol of living that reflects human relationships with domestic spaces (Oliver, 2006).Typical public housing only provides for the basic physiological needs of residents (MaCray & Day, 1977). Deficiencies in housing can have a negative effect on the satisfaction of high-level needs.

The enhanced provision of community services and optimal site selection can improve the social engagement opportunities of all residents. Architects, designers and policy makers should first address basic physiological and safety needs before social, esteem and self-actualisation needs, as such a strategy can support older populations along with the higher-level needs of middle-aged residents.

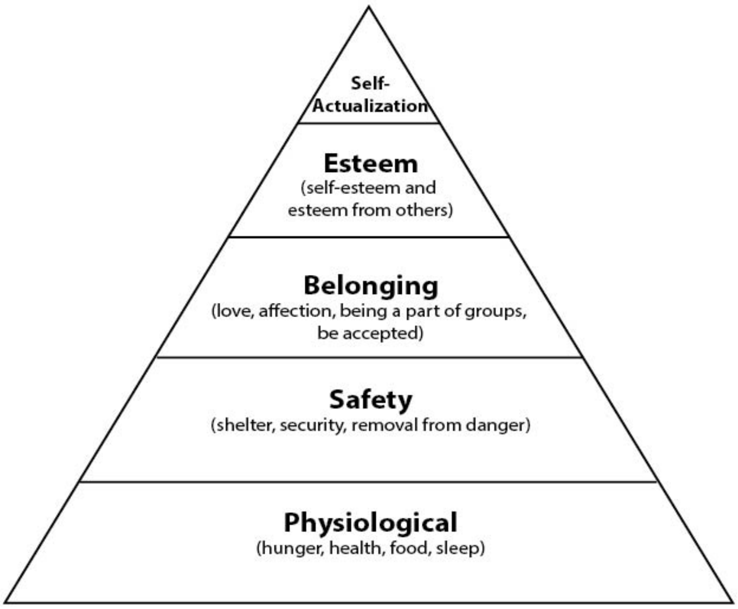


Figure 8. Hierarchy of human needs (Maslow, 1956)

3.3.2 Universal Design Pyramid

The universal design pyramid in Figure 3 illustrates the bottom-up route to universal design through eight levels of abilities (Goldsmith, 2000). The methodology is based on the notion that public housing should serve all kinds of people, including those with disabilities, by ensuring they are accessible. The lowest of the pyramid's eight levels describes those who are agile and energetic, and the second level those who are generally able-bodied and can walk freely without assistance. Those depicted in level 3 represent women who may face discrimination due to the limited provision of public toilets compared with those for men, thus often resulting in long queues. Level 4 represent solder people who walk with aids and those operating pushchairs waiting outside the toilets. Level 5 shows ambulant people who are disabled. The buildings in many major cities still do not fully accommodate those within levels 3 to 5. They therefore typically require further assistance when using the facilities. Those in level 6 are independent wheelchair users who do not necessarily need help. Wheelchair users who need someone to assist them when travelling around in public housing are classified as level 7. Those in level 8 need the help of more than one person or extra support when moving in and out of a toilet.

The WHO stated that 'Dementia is one of the major causes of disability and dependency among older people worldwide' (WHO, 2015). Disability does not simply refer to individuals' health conditions, as it involves issues of social inclusion and equal opportunities. Dementia is covered by disability discrimination legislation in the UK and is clearly stated in the Convention on the Rights of Persons with Disabilities. Interventions that enable living with cognitive impairment to have more rewarding interactions with carers are required, as the current medical model of caring is no longer desirable for people living with cognitive impairment and dementia.

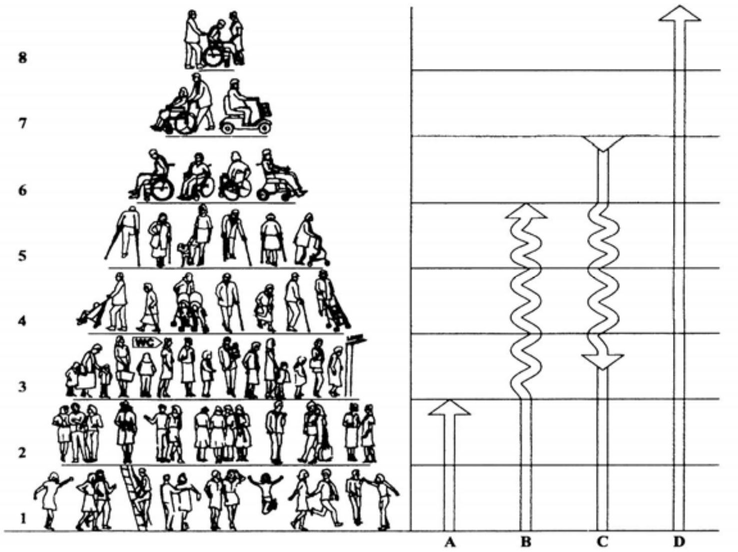


Figure 9. The Universal Design Pyramid (Goldsmith, 2000)

3.3.3 Enabler and Functional Limitation

‘The Enabler’ illustrated in Figure 4isan ideogram in an easily readable and simplified form that summarises the major difficulties and functional limitations when accessing a built environment. It can provide a model of occupational therapy to the relevant professionals such as architects, designers and health workers when addressing potential problems (Steinfeld et al., 1979). The Enabler illustrates the capabilities of those with disabilities when dealing with daily tasks. These can include difficulties in interpreting information and coordination, which are common in people with cognitive impairment. The ideogram therefore serves as a guideline defining the demands needed in physical environment and how disabled people can make use of assistive devices for better mobility.

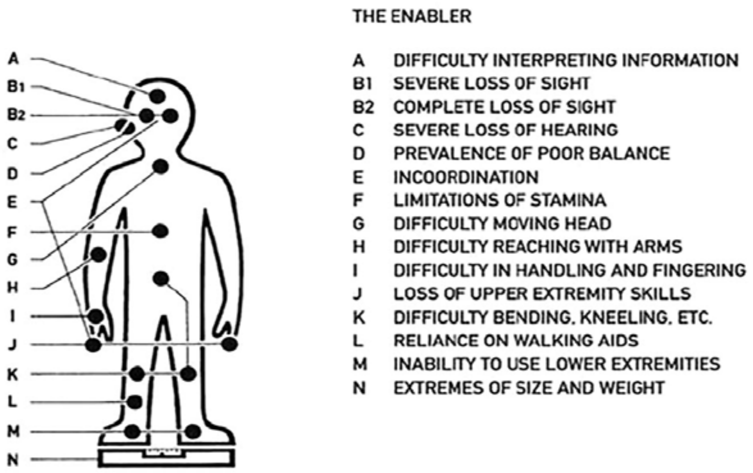


Figure 10. The Enabler (Steinfeld, 1979)

3.3.4 International Classification of Functioning, Disability and Health (ICF) Framework

Common health conditions can contribute to functional disability, such as cardiopulmonary diseases, cancer, visual impairment, auditory disorder and dementia. The International Classification of Functioning, Disability, and Health (ICF) (WHO, 2001) offers a unified language to address disability, in which the focus is on health rather than illness (WHO, 2001). Health can generally be described as the interactions between the main functions and structures of the body with activities, participation, environment factors and personal factors.

The ICF framework indicates that individuals have the potential to conduct and participate in various activities. External environmental factors are typically those within society. Personal factors are related to individual characteristics, including the acceptance of cognitive impairment and disabilities, which can affect quality of life outcomes. Sanchez (2016) adapted the ICF framework to explore mental functioning, activity limitations and the participation of adults with mental illness, as shown in Figure 11.

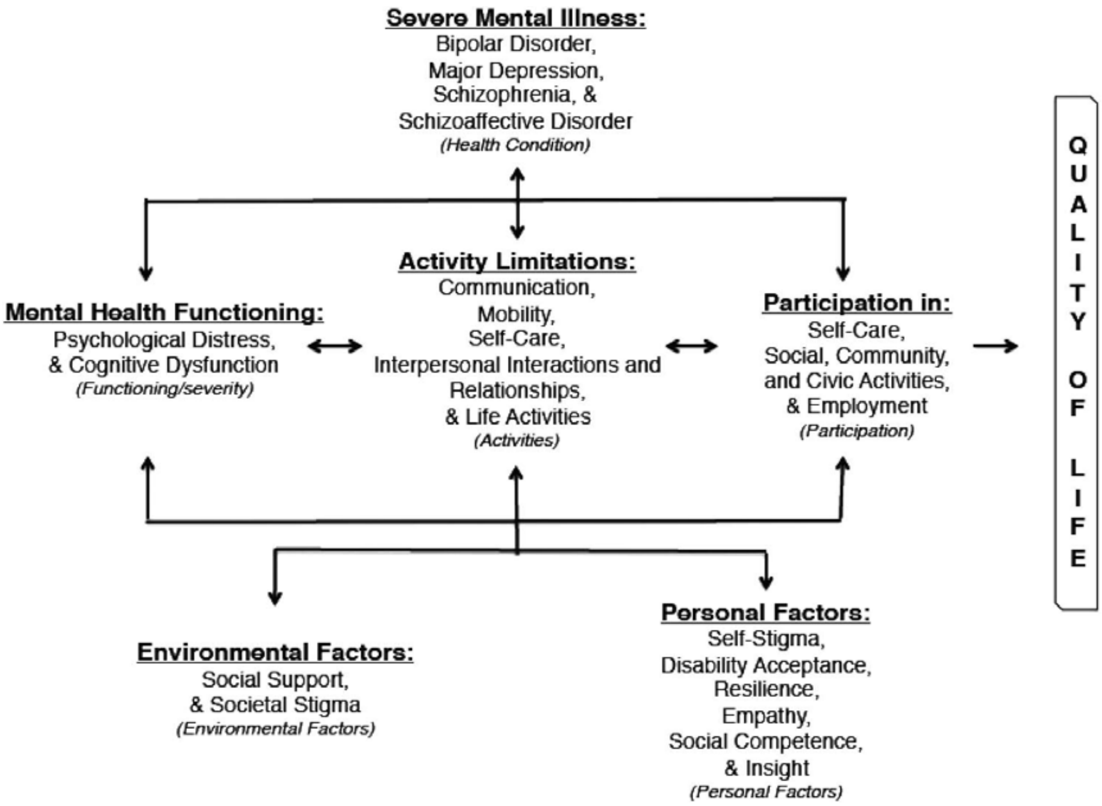


Figure 11. Severe mental illness affects quality of life, as indicated in the International Classification of Functioning, Disability and Health (Sanchez et al., 2016)

3.3.5 Sensory Enrichment in Cognitive Impairment Care

The application of multisensory experience design and its enrichment for people with cognitive impairment through meaningful activities can turn negative emotions into positive and promote the feelings of accomplishment and purpose (Zeisel and Raia, 2000). Older adults experience decreased in vision, hearing ability, smell, taste and haptic experience. Such sensory deprivation and a lack of suitable activity create a major challenge to health and wellbeing (Kovach, 2000). Hence, incorporating multisensory experience in design execution could promote feelings of accomplishment that enables one to remain active and has a greater tendency to maintain everyday skill set including self-caring ability. Sensory experience could trigger emotional memories and a pleasure feeling when one remembered positively experienced emotion happened in the past (Treadaway and Kenning, 2016).

The multisensory application aims at reaching people living with cognitive impairment through primary senses to meet daily care routine within residential environment (Marques et al., 2012). Multisensory experience could increase alertness and provide positive impact on mood (Strom, Ytrehus and Grov, 2016). In addition, it helps improve one's functional performance benefiting people living with cognitive impairment (Collier et al., 2010). Identifying design elements that could help improve the accessibility for people living with

MCI and dementia, will help government body and design practitioners to establish a better public housing for living benefiting local residents (Jakob and Collier, 2015).

Considering the research on the needs of people with MCI is limited and only limited home furniture and also products are appropriately and effectively designed to support care for each individual, a framework to support design practitioners to create meaningful experience for people involving older people with MCI is demanded.

3.3.6 Universal Design and Cognitive Impairment

Universal design requires an in-depth consideration and understanding of the full range of abilities an individual possesses throughout a lifespan (Mace, 1990). It promotes improvements in quality of life for a wide range of individuals (Russell, 1999) and influences products, furniture and places. It also supports self-reliance and social engagement, thus reducing the economic burden. Universal design is less about a consideration of style and more on diverse ages, individual characteristics and mental and physical abilities.

The design process considered in this study incorporates the following seven principles of universal design (Story et al., 1998, pp. 34-35): (1) equitable use; (2) flexibility in use; (3) simple and intuitive use; (4) perceptible information; (5) tolerance of error; (6) low physical effort; and (7) size and space for approach and use. This offers guidelines to design practitioners when developing improved living environments for older adult with cognitive impairment living alone.

The global prevalence of dementia will undoubtedly accelerate as the population ages further. Dementia is a biomedical disease related to degeneration and the loss of abilities over time, and is not considered to be part of the normal ageing process. This gradual cognitive decline means extra support will be required. Research suggests that MCI sufferers have a greater potential to go on to develop Alzheimer’s or other related diseases, and around 10-20% of those aged 65 who were MCI sufferers were found to develop dementia within a year (NIA, 2021).

Scholzel-Dorenbos (2010) suggested that the personal needs of people with dementia and their informal caregivers can be regarded as psychosocial, physical or practical. Unlike environmental and physical health needs, those related to mental health, society and disabilities are often unmet. In addition, the carers of those living with dementia may also need support with daily activities. Not surprisingly, care giving can result in psychological depression, stress and anxiety, which can lead to social isolation.

Caregivers may require support in terms of physiotherapy, house cleaning or regular respite care, in addition to financial support (Raivio et al., 2007).The application of universal design principles can facilitate social interactions and provide daily support to older people with MCI, as illustrated in Figure 6. By fully applying the seven principles of universal design when developing interiors, products and home furnishings in public housing, design practitioners can help end users to improve their social interactions and assist them in their daily lives. The further cognitive degeneration of those with MCI can be mitigated if public housing is well-developed and follows the seven principles, through a process of multi-modal intervention.

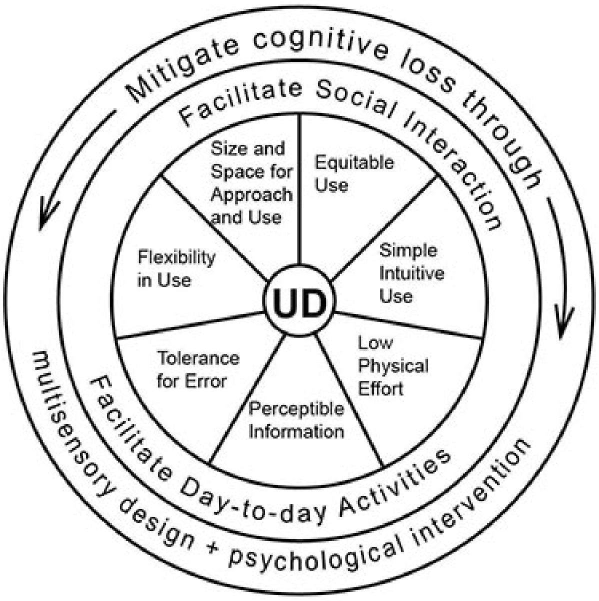


Figure 12. Framework of the relationship between the application of universal design principles facilitating social interaction and daily living with various kinds of intervention

3.3.7 The Relationship between Caregivers and Older People Living with Cognitive Impairment

Society is built on and relies on trust and communication. Any disease that affects one's normal cognition will also affect social interactions. The relationship between those with cognitive impairment and their caregivers will be influenced by the caregivers' attitudes and age, along with their past experience and knowledge about cognitive impairment and dementia. Factors including the previous occupations, religion and living family members of those with cognitive impairment will also affect this relationship. Although caregivers may have good general educations, many have limited knowledge or training regarding cognitive impairment. Caring for older adult with cognitive impairment is extremely challenging and demanding. Culture, belief and communication problems can present further hurdles, and interactions will then become even more complicated.

3.4 Concluding Remarks

In this chapter, a comprehensive description is provided for a theoretical framework of the relationship between universal design principles that can facilitate social interactions and daily living with various types of intervention. Through adopting Rogers' (2003) innovation-decision process as a foundation of theoretical framework, this study focuses on the use of universal design applied in public housing, benefiting and improving the quality of life of people with MCI living alone in Hong Kong. The benefits of using universal design in public housing and its inadequate to support people with cognitive impairment are identified, in particular, in an ageing city of Hong Kong.

Maslow's hierarchy of human needs can inform how individual potential is developed and actualised within society. Improving self-esteem and self-actualisation motivates people to create a better living environment (Miller, 2007). A living environment that connects people together can mitigate loneliness. The loneliness faced by many older people living alone is a sign that their basic needs are not being met (Peplau et al., 1978). Research suggests that severe loneliness can be associated with lacking connection with close friends and family rather than strangers (Inagaki, 2015). Therefore, ways of mitigating loneliness should be considered in the interior settings of public housing for single elderly people, and their lives can be made easier through the application of universal design.

In universal design pyramid illustration, the lowest of the eight levels refers to those who are agile, while people in other levels with varying degrees of disability face discrimination and difficulties. Dementia has been covered by disability discrimination legislation in the UK, and sufferers are entitled to equal rights. Interventions that enable people with cognitive impairment to have more rewarding interactions with others are required. The structure of the Enabler describes the capability of a disabled person dealing with daily tasks. Difficulties in interpreting information and coordination problems are common for people living with cognitive impairment. The framework of the International Classification of Functioning, Disability and Health offers a unified language for addressing disability, including mental health functioning, which can affect quality of life.

The prevalence of dementia will continue to accelerate as the population ages, and those living with dementia will need extra support. Some of those with MCI will eventually develop dementia, but the rate of cognitive decline varies. Interior, home furnishing and product design that can facilitate social interaction and improve day-to-day living should be explored.

These can include multi-modal interventions such as multisensory design and psychological considerations.

Many family carers only have a basic education and limited healthcare knowledge regarding those with cognitive impairment. Problems concerning communication, culture and beliefs will make the caring experience even more complicated, and thus conducting an ethnographic study, as detailed in the next chapter, to explore the coping strategies for those living alone with MCI will be beneficial.

4 Research Methodology

4.1 Introduction

This chapter provides an overview of ethnographic research and assesses how ethnography can be applied as an investigation method. The ethical considerations of involving vulnerable people such as those with cognitive impairment are also discussed. The chapter includes a description of the setting and sample size and details of all participants in this research study. The specific methods for analysing ethnographic data and information are then explored, including examples of ethnographic data, followed by an analysis.

An ethnographic study of older people living alone with MCI in Hong Kong is conducted. An interpretive research approach is taken, so the meanings attached to experiences can be established (Schutt, 2006). This research paradigm involves an empathetic approach of understanding of each participant's routine and any problematic events, within a natural setting. The research is timely, as the ageing population will continue to grow over the coming decade. Developing appropriate public housing for older people is therefore necessary, and particularly for vulnerable people with cognitive impairment and disabilities who are from low-income families. Participant observations are gathered from various sites, supported by project partners and non-profit organisations, and in-depth interviews are then conducted with people with MCI, assisted by their relatives or care-givers, care professionals and dementia centre managers who have previous experience of such interviews (Black and Rabins, 2007).

4.1.1 A Qualitative Approach to Research Design

4.1.1.1 Ethnographic Study

Qualitative research involves researchers fully immersing themselves so they can observe phenomena in a natural state (Hammersley & Atkinson, 1995). The aim is to understand how social experience can be created over time and its perceived meaning (Denzin & Lincoln, 2000). Process rather than causes are examined in a qualitative approach, and values, human thoughts and beliefs are explored, which quantitative research cannot detect through measuring tools (Denzin & Lincoln, 2000).

Qualitative researchers involves an understanding of phenomenon from the participants' perspectives and not simply the researcher's. Ethnography is often synonymous with cultural anthropology, suggesting a process through which cultural behaviour is described and interpreted (Schwandt, 2001). Ethnography refers to the written description of culture and originates from the Greek term *ethnos*, which means a group of people within a specific culture, and *graphic,* which refers to writing (Vidich & Lyman, 2000). 'Describing specific meaningful structures where local people produce, perceive and interpret their own and others' actions' is the fundamental purpose of ethnography (Emerson et al., 2001). An ethnographic approach allows researchers to investigate in detail interactions between product design and older adults living with dementia.

Ethnography can be a useful research tool. Ethnographers seek to reveal contemporary concerns within social sciences. It was originally the main research method in anthropology for exploring human culture and can represent and create new knowledge according to the personal experiences of the research participants (Pink, 2007). Ethnography focuses on a culture through an integration of observing, recording and writing (Inda, 2005) and thus focuses not only on individuals' interactions but also on the culture they are within. Systematic fieldwork enables researchers to observe culture and social interaction and to record what they observe and write up reports.

Ethnographers typically take a mixed method approach in social research, such as semi-structured interviews and participant observations. The main objective of this type of research methodology is to tell social stories by integrating data collection methods. Researchers should also immerse themselves in the context by spending long periods of time living alongside those studied, and recording the experience through field notes or diaries. They should explicitly focus on the language, cultural behaviour or artefacts of the group being studied. (Creswell, 1998). Ethnographic research thus explores phenomena within a cultural context from an emic perspective.

Geertz claimed that culture enables humans to associate with one another through systems of shared meaning-making. It is created by human being through daily interactions as a series of 'webs of significance' (Geertz, 1973, p.5). People working together or in the same profession or those engaged in similar leisure activities are members of a particular cultural group and thus share a common identity. However, culture may not be perceptible if one is immersed in one's own cultural practices. If a researcher shares the participants' culture, he or she will find it difficult to assess their beliefs, values and behaviour embedded in their day-to-day living. Creswell (2008) emphasised that ethnographic research should focus on the patterns of daily life.

The role of ethnographers is complex as they must observe and maintain a reflexive stance during their interpretation and representation of a culture. 'The ethnographer participates overtly or covertly in people's daily lives for extended periods of time watching what happens, listening to what is said, asking questions'. (Hammersley & Atkinson, 1983, p.2). This qualitative ethnographic approach is illustrated in Figure 13.

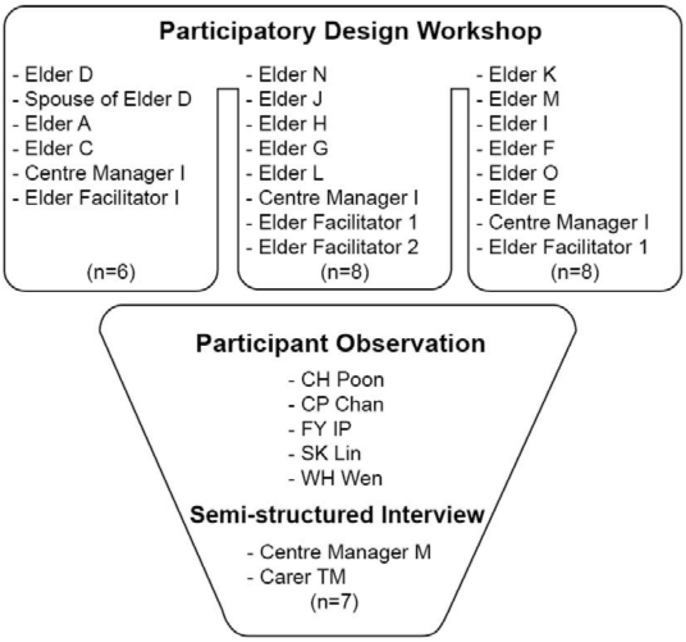


Figure 13. The qualitative approach of this ethnographic study

4.1.1.2 Appropriateness of Ethnographic Research into Public Housing for Vulnerable People

Ethnography has been successfully applied in gerontological research in many contexts (Kaufman, 2002). This method can effectively reveal processes and meaning, and is ideal for topic exploration when knowledge is limited or lacking (Rubinstein, 1994). A qualitative researcher focusing on gerontology will explore the knowledge and beliefs of older people, and it is appropriate to conduct research in their natural setting in which they live.

Vulnerable groups of people who are marginalised or powerless and therefore require protection are often the focus of ethnographic studies (Barlett & Martin, 2002). Ethnography is a viable approach for investigating the quality of life of those living with cognitive impairment, as a combination of participant observation and interviews has been found to effectively elicit rich content, which can ensure the analysis is robust (Hubbard et al., 2003). I have chosen an observational window in real-life to explore my conceptual framework and define the relationship between universal design and new element through a blending process of data received from observational study, semi-structured interviews, field notes and the literature about universal design and its application in housing.

4.2 Data Collection Methods

4.2.1 Participatory Design Workshop

Participatory design is an investigative approach aimed at collecting, organising and improving design through the accumulation and cross-fertilisation of knowledge. This approach is driven by social interaction as both the designers and end-users will co-create together (Simonsen &Robertson, 2013). Social interaction can be encouraged in a vulnerable population through participation in activities related to arts and cultural development, thus offering opportunities to pursue enjoyment and creativity (Flatt et al., 2015). This decision-making process when developing cognitive-friendly product designs allows for shared goals among the elderly living with cognitive impairment, their care-givers, social workers, physiotherapists, designers and manufacturers. Improvements can then be made through multisensory applications following the guiding principles.

Attitudes have changed from ‘designing for users’ to ‘designing with users’ in recent years. End-users may want to participate and prepare their own solutions rather than waiting to be offered them. It is a process of designing that allows for more meaningful outcomes and the development of tangible solutions for people with MCI. Artifacts including three-dimensional models can help to access feelings and identify latent needs in daily life. Social gatherings organised by community centres can be important sources of up-to-date medical information for many older people, thus giving them better control over their personal health. Participating in design workshops also empowers older people with limited cognitive abilities, in terms of being more skilled areas such as problem-solving.

The participatory design workshop in this study was conducted in the activity room of the fourth floor of Yan Oi Tong Woo Chung District Elderly Community Centre (YOT). Here, members of YOT come to participate in classes or social activities, such as board game playing, on a weekly basis. Yan Oi Tong, the parent organisation, was first registered as a charitable organisation in the1970s and has become one of the largest charity groups to provide full services in Hong Kong. Yan Oi Tong delivers comprehensive care services in various sectors including social, education and medical services, along with numerous social enterprises. The operating centres are mainly in remote areas including Yuen Long, Tin Shui Wai and Tuen Mun. The YOT is a four-storey complex situated in the heart of Tuen Mun. This district has a population of 481,200, or around 6.6% of the total population of Hong Kong (Census and Statistics Department, 2017, p.26).

Older people aged 65 or above made up 14.2% of Tuen Mun district’s total population in 2016. This is slightly lower than the average of Hong Kong of 15.2%, but the district had the third largest population of those aged 55-64, which contributes 16.1% of the total district population (Census and Statistics Department, 2017, p.26). The population in Tuen Mun aged 65 or above is expected to become the sixth highest out of 18 districts in 2023 (Planning Department, 2014, p.83). Thus, the number of older people living in Tuen Mun will progressively increase in the coming decade, due to the increase in those currently aged between 55 to 64, leading to a high demand for services, facilities and housing for older people, and particularly those with cognitive impairment living alone.

The research participants were not randomly selected by the YOT. The recruitment process was the responsibility of the YOT centre manager, who followed the stated requirements: older people who can understand and speak Cantonese, who are aged between 65 and 85 and who have MCI. I organised a one-hour guest talk that attracted 58 people, who were either living with MCI or were care-givers of those with early dementia. They were all official members of the YOT centre and those with MCI were diagnosed using the Montreal Cognitive Assessment (MoCA) at the centre by healthcare professionals. The MoCA test scores for the participants were between 22 and 24. MoCA has been widely used in screening for cognitive detection since 1996 in numerous clinics and cognitive training centres. The test contains 30 questions that help healthcare professionals detect cognitive impairment in its early stages. The diagnosis is rapid and can help improve a patient's quality of life. The test has been used to assess several cognitive domains including Alzheimer's disease, Parkinson's disease, Lewy Body and fronto-temporal dementia.

All participants were recruited through a seminar I organised: *Preventing mild cognitive impairment through changing habits in day-to-day activities.* A total of 15 older people with MCI volunteered to participate in the study, and were divided into 3 groups. Each group typically contained four or five older people living alone with MCI, one social worker and one older volunteer, who were involved in each session (see Table 2). I served as facilitator to motivate the participants, as such design workshops may have been new to them, particularly as they suffer from cognitive impairment. All of the participants consented to enrol in the study, with the guidance of the centre manager.

The participatory design workshop aimed to explore (1) memory ability, (2) thinking ability, (3) orientation to time and place, (4) comprehension, (5) calculation, (6) learning capacity, (7) language and (8) the judgement of older people suffering from MCI. My goal was to learn more about their daily needs and problems related to their kitchens, washrooms, living and dining rooms and bedrooms, and how they can cope with them. Each session consisted of two parts over two consecutive days (Thursday and Friday). All sessions were conducted in the afternoons and each lasted two hours. The participants' ages, not including the social worker and centre manager, ranged from 67 to 86.

	Date	Participants	Age	Gender	Remarks
Session 1	18 -19 July 2019	Elder B	67	F	Living alone, retired at aged 60. She was a gardener before she took early retirement. She realised her memory was getting worse and was diagnosed as MCI.
		Elder Facilitator1	80	M	Volunteer, to motivate participation
		Spouse of Elder D	70	F	Lived together with Elderly D and oversaw his daily activities
		Elder D	78	M	A retired construction worker who suffered from early dementia. He did not respond frequently in the discussion and was supported by his wife.
		Centre Manager I	45	F	Five years of experience offering elderly care services
		Elder A	86	F	Living alone in public housing, and has two sons and two daughters
		Elder C (Withdraw)	77	F	Withdrew, as she forgot to attend the workshop even though she received a call as a reminder.
Session 2	1-2 Aug 2019	Elder Facilitator 2	78	M	Volunteer, to motivate participation
		Elder Facilitator 1	80	M	Volunteer, to motivate participation
		Elder N	77	F	Diagnosed with early dementia
		Elder J	75	F	Poor memory ability
		Elder H	69	F	Poor memory ability
		Elder G	79	F	Living with her disabled husband, supported by a domestic helper weekly
		Elder L	75	F	living alone and diagnosed as having MCI
		Centre Manager I	45	F	Five years of experience offering elderly care service
Session 3	8-9 Aug 2019	Elder K	75	F	Late comer with a poor memory ability

	Elder M	77	F	Well-educated, living alone and diagnosed with MCI
	Elder I	78	F	Living alone and speaking her indigenous language. The researcher needed to pay attention to hear her. She had a low education level.
	Elder F	78	F	Living alone, speaking indigenous language, experienced a fault in using household appliances
	Elder O	78	F	Her husband died 10 years ago. She is now supported by her male companion
	Elder Q	78	F	A janitor who realised her cognitive functions are declining
	Elder Facilitator 1	80	M	Volunteer, to motivate participation
	Elder E	72	F	Late comer, living alone
	Centre Manager I	45	F	With five years of experience offering elderly care services

Table 2. The list of those in the participatory design workshop

4.2.2 Participant Observation

Participant observation is a hallmark of ethnographic research. Although ethnographers participate in the culture being studied, they must ensure they keep a professional distance to observe participants objectively (Bernard, 2002). Participant observation has been applied as a data collection method for ethnographic studies conducted in elderly cares home in recent years. The process enables researchers to learn about behaviour in a natural setting through a process of observing and participating in activities (DeWalt & DeWalt, 2002).

Schensul, Schensul and LeCompte defined participant observation as ‘the process of learning through exposure to or involvement in the day-to-day or routine activities of participants in the research setting’. (Schensul et al., 1999). It is thus a hallmark of ethnographic research studies. Although they participate, ethnographers should be objective by maintaining a professional distance (Emerson et al., 2001). Participant observation involves a process of building a rapport and learning how to blend into a community. Every member should act naturally and become immersed in the situation. The researcher should also be able to record the observation in detail. Various methods including direct observation, natural conversations, interviews and other unobtrusive approaches can be used.

Researchers involved in participant observation should have a non-judgmental attitude, be interested in learning about other people, observe carefully and also be a good listener (DeWalt & DeWalt, 1998). ‘Peopled ethnography’ refers to the process of extensive observation in a specific field, which is a labour-intensive activity that can last for years in which very detailed observation is conducted (Fine, 2003). If the informants ask the observer questions about the research and how the observer is involved, this can be taken as a sign to leave the field, as the researcher should remain unobtrusive. Among the reasons Bernard (1994) lists for including participant observation in cultural and behavioural studies is that it can enhance the validity of the study by enabling different types of data to be collected.

By spending a long period of time on a site, a researcher will become familiar with the community, and may then become involved insensitive activities that would generally not be accessible to outsiders. In the context of the present study, I was able to develop questions that make sense and in a form of native language. However, truthful answers may not be given, particularly when the interviewer is identified as a stranger. The interviewees may provide answers that they consider the researcher wants to hear. Any data collected may then be unintentionally incorrect or misleading, and may lead to confusion.

Participant observation involves three stages when studying the progress of a culture (Keith, 1980). In the first stage, I familiarised myself with the culture through observing general activities, identifying key informants and asking a series of broad questions (Angrosino & Mays de Perez, 2000). Acquiring a general feel for the facility enabled more focused research to be conducted in the later stages (Fetterman, 1998). The staff may be intimidated by a qualified researcher due to their lack of health education (Lyman, 1994), and so this provides a basis for creating a rapport with them and thus gaining their acceptance and trust (Bernard, 2002).

In the second stage, I asked specific questions formulated through the initial observation (Keith, 1980). I took a systematic approach when collecting relevant data and reviewed the materials collected through focused observations (Keith, 1980). Five people living with MCI in the community were recruited, with the aim of understanding the difficulties they faced and the meanings behind their behaviour (see Table 3). This selected group had joined the participatory design workshop I organised in the YOT, through which I had established a rapport with the participants.

I initially contacted the centre manager by phone and arranged for an in-person meeting with the centre staff to further explain the nature of the research, and asked them for assistance in recruiting appropriate participants. The fact sheet described the study in detail, including the nature of participant observation and the timeframe. Five people expressed an interest by responding to the centre staff and confirmed their addresses before the study began. They were able to ask questions two weeks beforehand. Before participating in the observational research, those living with MCI provided informed consent, stating they were willing to participate in all forms of data collection that includes participant observation and interviews over 12 months.

Data were collected through participant observation for between two and two and a half hours in each session. The activities included jogging, watching TV, dining, cooking and house cleaning. Typically, I would discover the participant's skills and also their passion, let them show me their hobbies after retirement. Sometimes, I would also offer tidying, help them change fluorescent tube and check the electronic part of household appliances to see if they are still in good condition in the first half an hour of participant observation. Usually, I would observe their living environment and start to offer a helping hand for housekeeping – cleaning all kinds of wooden furniture, adjusting TV control setting where necessary, installing new apps for smart phone and playing Sudoku together. I would also spend time to jot down notes and sketch the scene if I could not find words to describe at that moment, and compare the similarities and differences about the finding collected each week before I could draw conclusion.

Informal interviews are commonly conducted in ethnographic studies, as they can effectively elicit information from the participants (Hammersley & Atkinson, 1995). A good qualitative research is usually designed to include both observational study and interview session in different combinations (Gerson & Horowitz, 2003). Researchers should conduct observation in cooperation with conversation among participants if they believe the research findings might be better off addressing the research questions (Riese, 2007).

These interviews enabled me to clarify what to observe (Bernard, 2002). The following questions were asked during participant observation. Appendix 9.1 provides the information sheet, Appendix 9.2 the consent form and Appendix 9.3 the interview scripts and questions.

- *Can you tell me about yourself and how long you have been living here?*
- *What was your occupation before your retirement?*
- *What was the happiest moment of your life?*
- *What are some of the things you are most grateful for?*
- *What accomplishments in your life are you most proud of?*

- *Will there be anyone to pay a visit to you regularly?*
- *Do you feel loneliness while you are living alone? How do you overcome it?*
- *What do you do in a typical day?*
- *How do you find the household electrical products, sanitary facilities and other interior product designs?*
- *Are those designs easy to understand and recognise?*
- *Can you describe your good and bad experiences when(1)controlling the TV/radio, (2) washing dishes, (3)setting the table and cleaning up, (4)closing the bathroom door, (5)turning off water, (6)putting shampoo in your hand, (7)getting clean clothes, and (8)putting on pyjamas?*

Name of Participant	Date	Age	Gender	Remarks
CH Poon	Nov 2019 – May 2020	78	F	Living alone, not married, retired janitor with cancer
CP Chan	Nov 2019 – June 2020	85	F	Living alone, younger son died, no longer has a good memory. The situation worsened, lived in public housing for over 35 years.
FY IP	Nov 2019 – June 2020	79	F	Her husband died six years ago, speaks an indigenous language and lives alone. Her younger son comes to visit her once a week.
SK Lin	Nov 2019 – April 2020	79	F	Has lived in public housing for over 30 years. She was a worker in the garment industry and now she needed to take care of her disabled husband and requires domestic helpers.
WH Wen	Nov 2019 – May 2020	80	F	Born in Singapore, well-educated and move to Hong Kong in the 1970s. She looked for an elderly community when she first moved to Tuen Mun.

Table 3: The list of participants involved in the observations

4.2.3 Field Notes

Note taking is essential, and should be carried out before the memories fade. The research required me to record detailed field notes and become aware of specific features and obscure but symbolic references. I noted the date and time of the record and the location of the observation to ensure my transcriptions were professional. I also recorded specific facts, figures and details of events at the site.

All of the sensory impressions of the older people with MCI were noted, including sights, sounds, textures and smells. Words and phrases specific to their age group were also recorded. Finally, questions about people or behaviour in their living environment were asked to enable future investigations. The ageing population faces diverse challenges, including issues around healthcare. If developments in elderly public housing in Hong Kong are informed by research, the risk of accidents among the elderly will be reduced, while providing user-friendly interiors and strategic designs will address their needs and improve their lives.

During the twelve-month participant observation period, I drew sketches and took field notes whenever possible. Descriptive notes can contain birth records or other information. For example, I summarised a visit to elderly people living alone in an old flat that lacked any decoration, features or settings, and without any neighbourhood spirit or community services, which I believe to be important. Notes can provide details on human behaviour within an environment and document what the research witnesses and understands. My descriptive notes provide detailed recollections of everything I had seen and heard and what people had done and said during the observational studies (Emerson et al., 2001). The goal of an ethnographer is to reveal the hidden meanings in each individual's actions through detailed descriptions (Geertz, 2001).

Analytic notes can add further insights to the factual descriptions in the field notes (Bernard, 2002).These are essential to qualitative studies as they create connections between field notes and themes derived in later stages. I took field notes during participant observations, which reminded me to pay attention to the physical context and the people involved. Verbal and non-verbal communication was crucial in the research process (DeWalt & DeWalt, 2002).

4.2.4 Semi-structured Interview

Ethnographers conduct various types of interviews according to the needs of field research. Semi-structured and informal interviews are the most common (Fetterman, 1998). Relevant information that cannot be obtained from observations or the review material is elicited from participants through interviews (Spradley, 1979).

Semi-structured interviews were conducted with caregivers in a private area of the district community centre. I first gave an introduction and then distributed the prepared information sheet and explained the overall study objectives to the interviewees. The participants were asked if they had any questions regarding the nature of the study and any future use of the data collected. I described the study and my expectation to interview the centre staff and care providers. Before the interviews began I sought permission to use a digital recorder and assured the participants of the confidentiality and anonymity of the project before reaching agreement (Bernard, 2002). A guiding interview information sheet is commonly used in semi-structured interviews in ethnographic research. As qualitative interviews change according to interviewees' narratives, the questions serve only as a loose guide and differ in each session (Rapley, 2004). Appendix 9.2 provides the consent forms and Appendix 9.3 the interview scripts and questions.

I conducted a one-hour interview with M, the centre manager of the Yan Oi Tong Elderly Community Centre. I asked her about the challenges and problems she faced with people with MCI when organising their regular activities and how we can communicate more effectively with people with cognitive impairment. She described the behaviour of people with MCI and how caregivers cope with stressful experiences. I asked her how the dignity and respect of those with MCI is maintained when delivering personal support to them.

TM (55), a male caregiver, was also recruited in the seminar I organised. He was a financial planner in an international investment firm and had lived with his mother over the past few years, who had early dementia. He had previously arranged for his mother to stay at a luxury elderly care home, but after being diagnosed as suffering from early dementia she was unable to stay due to complaints from the other residents, and had to return home. TM was asked to describe any stressful experiences he had. He explained his coping method and explained how caregivers rarely have professional training. He also expressed how he communicated with his mother and described how she had changed. TM also suggested that the interior setting and decoration should be improved in public housing design.

Audio recordings were made of the interviews with the permission of the participants. All transcripts were verified to ensure they were accurate. All participants were asked the same semi-structured interview questions supplemented with open-ended questions with respect to the development of theoretical framework.

The following questions were asked during the semi-structured interviews.

- *Tell me about yourself and how long have you been working with the elderly with mild cognitive impairment and early dementia?*
- *What do you think are the main responsibilities of caregiver?*
- *Can you describe care for the elderly with early dementia?*
- *What major challenges and problems do you face?*
- *In general, how should we communicate effectively with those with mild cognitive impairment?*
- *Can you describe how their behaviour differs from that of others?*
- *How should we communicate with people who have short term memory loss?*
- *How should we communicate with them if they have difficulty expressing thoughts of any length or remembering words?*
- *What should we do if they are slow to understand or speak, or seem anxious, upset or difficult for no obvious reason?*
- *Can you describe a stressful experience and explain how would you cope with*

it?

- *When delivering personal support to them, how can they maintain their dignity and respect?*

Individual interviews were recorded through audio and the field notes. All participants agreed the interpretations shared with them were accurate and truly reflected their genuine experiences in giving care to people with MCI.

4.2.5 Ethical Considerations

Many ethnographers study vulnerable groups who are marginalised and require protection (Barlett & Martin, 2002), including cultures in which some of the participants are disabled or live in poor conditions. They must therefore seriously consider the ethical implications of their work and ensure no participants are put at risk (Kayser-Jones & Koenig, 1994).

In this study, people living with MCI were interviewed and observed and thus their privacy could have been intruded. As this is an ethnographic research study, this risk is taken into account. I followed Stake (1994) in terms of ethical considerations, who suggested minimising the risks for participants by avoiding embarrassment or any loss of status or self-esteem, and that care should be taken to protect the research participants, particularly as I was involved in the study context.

Ethical approval was obtained before the study began and a consensus was reached with the informants, including those living with MCI, the carers, the centre manager and the facilitator during the training provided in the elderly centre. An information sheet and an informed consent form were prepared to effectively communicate with each of the participants. In addition, as the investigator, I initially provided a brief introduction about the study to all participants before the observations and interviews.

As the research is mainly qualitative, the informants were asked if they were comfortable with audio and video recordings being made of them and their agreement was required before the observation began. Due to the ethical considerations, the original names of the participants are not used in the study. This ensures anonymity throughout the data coding. All details such as voice recordings are stored on compact disks and transcripts and field notes will remain confidential. Only I and my supervisor can access to the data collected during the study period.

4.3 Data Analysis Methods

4.3.1 Data Analysis Method

Strategies of Analysis

An ethnographer should read and re-read field notes and transcripts and attempt to 'funnel' the data, select and reinterpret, search for comparisons and refine any interpretations. The segments of data may be considered as pieces of a puzzle that must be fitted together to give a rich description in terms of a cultural perspective of the research problem. Arnould suggested that 'ethnography attempts to explicate structured patterns of action that are cultural and/ or social rather than merely cognitive, behavioural or affective' (Arnould, 1998, p.86).

I first aimed to identify any patterns as reference, and to filter out 'atypical' daily events. I then attempted to categorise the participant observations recorded and the in-depth interviews. I finally analysed the findings, which included extended narrative descriptions with verbatim quotations from participants. Qualitative analysis involves assessing behaviour using certain words and emotional responses. Throughout this process, I can develop an evolving framework established from those observational stages and ongoing semi-structured interviews, it allows me to do clarification to continue my interviews. Hatch (2002) claimed that patterns are not just stable regularities but take various forms. A pattern can be characterised as similarity (i.e., people living alone with MCI do various things in the same way), difference (i.e., in predictably different ways), frequency (i.e., often or seldom), sequence (i.e., in a certain order) or correspondence (i.e., how some activities are related to others).

Coding for Patterns

Each unit of data was assigned a unique code. The goal is to identify patterns of actions that are repetitive and any behaviour consistencies in the data set. Codifying raw data involves arranging things in a systematic order and classification. Coding is a method of organising, compiling and grouping data that are similar into categories, which is the beginning of a pattern. Codes can thus give the meanings of specific words or phrases in the text collected through the interviews (Hammersley & Atkinson, 1995).

I used in-vivo coding to code the data from the participant observations and semi-structured interviews with the older participants, centre staff and caregivers, which is a form of qualitative data analysis that emphasises the words spoken by each participant (Bernard, 2002). I first examined the text using inductive coding and derived the data through reading the interview transcripts. I wrote down key words or phrases that captured the meaning of the text (Fetterman, 1998). Themes are more complex than codes and can be used to address ethnographical research questions about meanings in a culture (Emerson et al., 2001). Themes can be extracted from transcripts to reveal the meanings of social interactions in a culture (Spradley, 1979).

Several themes were identified during the investigation. Any recurring themes and phrases were identified and documented before assessing their meanings. Themes derived from participant observations were compared with those from the interviews to reveal any commonalities or differences, and finally the overall themes that described the participants' collective experiences were identified (van Manen, 1997).

By comparing themes identified in the participants' extensive quotes, I can cluster subthemes into a broader themes and eliminate those that comparatively are not central to the participants' life experiences. I met on some occasions to I discussed some of the emerging themes and their interrelations, and grouped them to elicit broader expression of experience (Parsons, 1997). A fellow ethnographer advised me in terms of research validation, which helped me gain new perspectives on the use of data when developing themes (Hammersley & Atkinson, 1995). Ethnographic research involves discipline, patience, an analytical mindset, reflection and time management. Working inductively can allow the data collected to provide themes relevant to the research questions (Bernard, 2002).

4.4 Concluding Remarks

This chapter provides a detailed description of how the present research was conducted as an ethnographic study. Ethnography can reveal contemporary concerns about social needs through observing, recording and writing (Inda, 2005). Ethnography is an applicable research methodology in gerontological research as it can reveal the processes and meanings behind various types of behaviour, and can provide insights into this little-known area (Rubinstein, 1994). An ethnographic approach was therefore taken when investigating the quality of life of people living with deficits in cognition.

The study consists of a participatory design workshop, participant observations and semi-structured interviews with older people living with MCI and caregivers, respectively. The shared decision-making in the participatory design workshop produced cognitive-friendly design insights that can enable researchers to make improvements to interiors, including home furniture and product design. The participatory workshop organised by the YOT also provides the opportunity for vulnerable people to have improved social interactions through creative participation. Making physical forms and quick models in the workshop offers a platform for the participants to share their points of view regarding the hurdles they face on a typical day.

As the researcher, I identified five people to participate in participant observation over a twelve-month period. I familiarised myself with the culture through workshops with the targeted older adults, to facilitate my general observations and to create a rapport to gain their initial trust and acceptance. The five have different backgrounds, levels of education, marital statuses and also different stories and concerns.

Ethical considerations are of the utmost importance when conducting qualitative research with people, and particularly with those who are vulnerable. Ethical approval was therefore obtained before the study began and all informants gave their consent. I provided a brief introduction to the study and made it clear that they could withdraw at any time without reason. The same approach is taken for the semi-structured interviews with caregivers, including the centre manager of the elderly community centre. Four themes were finally identified, based on the analysis of transcripts and field notes during the participatory design workshop, participant observations and semi-structured interviews. These identified core themes can contribute to the future development of public housing and other factors that will improve the quality of life of older people living alone with MCI.

5 Findings and Results

5.1 Introduction

This chapter presents the findings collected through a series of participatory design workshops and participant observations of five people with MCI. It also consists of in-depth interviews with a community centre manager and a male caregiver living with his mother with early dementia. The field research was undertaken between June 2019 and March 2020, and I conducted the data analysis under the guidance of my supervisor. I next provide a description of each participant, including their unique backgrounds and living situations. I then outline the themes and thematic categories derived from the research findings over the year. Extensive data including quotes and field notes further illustrate the themes and sub-categories. I begin with a description of the participants and their living situations, outline the themes and also the codes derived from the findings. The chapter concludes with a summary of the research findings, which provide the basis for the discussion in the next Chapter.

5.2 Participatory Design Workshop

The workshops consisted of three groups of participants, each of which contained three people who were over 65 living with MCI and a social worker and an older volunteer.

In this study, 15 older people with MCI, two older volunteers and one centre manager attended the participatory design workshops. Surprisingly, almost all of the older participants with cognitive impairment were female except for one man accompanied by his spouse. Six half-day participatory design workshops were conducted, with the full support of M, the centre manager of the YOT, and the makeup of the participant groups in each workshop was identical. Three sessions were conducted per day every Thursday and Friday, and each session was split into two parts to facilitate the development of dummy testing models. These were composed of four to six older people living with MCI, 1 supporting older volunteer who prepared the table setting and facilitated the discussions and 1 social worker who ensured the participants could attend each session. Thus, 15 people living with MCI were recorded on each afternoon.

The selection criteria were based on the conditions suggested by the centre manager. Each participant should be a member of Yan Oi Tong, diagnosed with MCI and living alone. They were between 65 and 85 years old and were able to speak and understand Chinese. The setting was simple and consisted of two long tables covered by a large beige-coloured sheet of paper, a set of coloured markers, felt papers, clay and modelling foam. These were used in the second workshop session to visualise initial ideas for improving the quality of life for those with MCI. A mini 3D printer was used to print out forms for verification in the second part of each session. Their concerns and difficulties are illustrated in Figure 8.

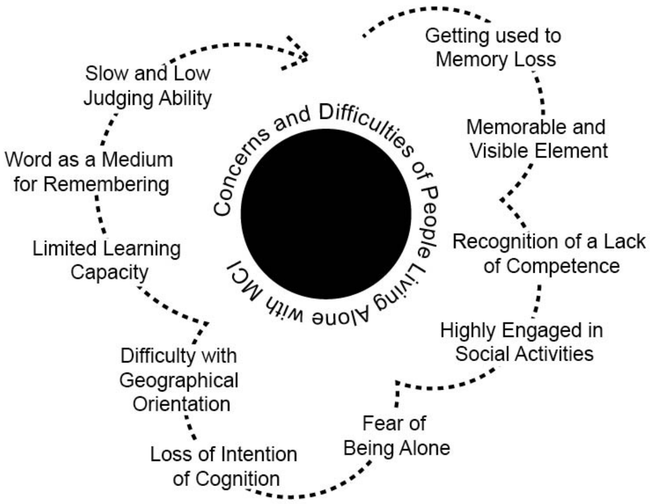


Figure 8. A diagram showing the concerns and difficulties of people living alone with MCI

5.2.1 Getting used to Memory Loss

Elder A (age 86) was living alone and had two daughters and two sons living in other districts. She was outspoken and was wanted to share some of her experiences with me if the research outcomes would be of benefit to others. She arrived late but was able to join the participatory design workshop. She said that quite often she forgot to turn off the tap after she used it (see Photo 6), and she was often not sure if she had turned it off properly. She indicated that the tap with a horizontal lever control was good enough, but she still forgot to turn it off after washing her hands. She also said that when she stood in front of the fridge and was about to open the door, she forgot what she was doing and had no idea about what she was going to cook for her dinner.

> *'When I finish washing my hands in the washroom, I don't remember that I need to close the tap and leave…quite often, I forget this act and believe there is no need to act at all'. Elder A*

Elder A (86) had suffered from MCI for a few years. She lived alone and her son visited her infrequently. She realised her cognitive level was declining but she did not know how to slow the rate of deterioration at the age of 86. Visual and audible cue can help remind people in such a situation when conducting daily tasks. For example, keywords such as 'Open' and 'Close' can be explicitly displayed on water taps and gas and electric appliances. Identifiable colours on visible parts of the tap, such as white when completely closed and red when open, can provide guidance. Such designs should be simple and intuitive to use for anyone, including those with MCI, and it should be easy to understand the meaning regardless of users' experience or education level.

Such a system can be applied consistently to various electric appliances to reduce confusion. As Elder A (86) found, visual and audio cues can be integrated into the development of universal electric appliances, to ensure against the potential risk of misusing white goods. If users' sensory abilities are poor, as in this case, a reasonable level of legibility is required .Different coloured LED lights can also be applied to remind people about simple operations they need to perform in a typical day. An LED light can be set up to turn on when someone opens a fridge door, and if he or she forgets to close the fridge, after a certain period of time the light can change to red and emit a reminding audio signal. Such designs therefore communicate with users through appropriately provided perceptible information. This can reduce the likelihood of accidents occurring, particularly for those living alone.

Photo 6. Elder A (86) explained her difficulties in day-to-day living due to MCI

Although Elder B (67) had white hair she was slightly younger than the other participants at 67, as most of others were over 75. She was a campus gardener and retired as the age of 60. Although her hearing was poor, she volunteered for the workshop as she realised her memory was getting worse and she was worried about it. She was diagnosed with MCI last year in the YOT. She suggested in the workshop that it would be helpful if she could control the speed of the water flowing out of the tap. She had experienced a flood after not closing the tap before going out (see Photo 7).

She also understood her memory was getting worse and said she had forgotten to shut off the gas supply after cooking her soup. A gas leakage could cause an accident. She also frequently forgot to bring her smart phone and even keys when she went to swimming class.

> *'I forgot the surname of the officer to remind me to attend this workshop, I forgot to switch off the gas stove, I forgot to bring my door key…and my phone…seems to me I forget at least one thing in a day…make me feel frustrated and that I am not concentrating at all'. Elder B*

Photo 7. Elder B (67) shared her experiences of suffering from MCI with other participants. She felt that she could not concentrate at all

Elder A (86) said she forgot to put the food she had bought in the fridge. She only realised when she noticed a nasty smell. She often ordered food deliveries at YOT as the meals were affordable and were good for a low-sodium diet. She also mentioned that she did not remember the route home after having a Chinese hot pot dinner, although the restaurant was next to her building. She tried to hide her memory loss from her daughter. She had also kept the metal door gate open for the whole night, which could have been a risk for someone living alone. She was reminded the next day by her neighbour to close the door gate. Her daughter did not believe that she suffered from MCI. Elder D (78), a male, wore a grey T-shirt and had tanned skin. He joined the workshop with his wife who was his family care-giver. He was a retired construction worker who suffered from early dementia.

He did not often respond to the questions I asked during the programme. When he did respond, his wife helped him when he could not find the correct word (see Photo 8). He responded to Elder A (86) and suggested that a clear glass cupboard could help her clearly locate the seasoning and eating utensils, and could also be useful in the living room. Elder A said that cleaning had become a hurdle to her, as she could not easily clean areas above shoulder height. However, she had become familiar with this issue and it no longer felt that unusual.

> *'It was difficult for me to clean the cupboard...if I didn't, I have to suffer with dirt and dust all over the cupboard. I had nothing else to do with it'. Elder A*

> *'To clean or not to clean up the living room…does not mean a lot to me…I enjoy the sense of physical and psychological ease in a typical day'. Elder D*

Photo 8. Elder D (78) (left) said that a sense of physical and psychological ease is important as it helps him overcome the difficulties of memory loss

The social worker also stated that different domestic helpers were sent each time by the Social Welfare Department to help elderly people living alone, and thus cleaning equipment was not always put back in the right place. Elder I (78) spoke an indigenous language. She had recently contracted the eye disease glaucoma. She had never attended school. I had to listen closely to what she was saying but I could still manage the workshop smoothly with the support of other participants.

Elder I said that she felt that her memory was getting worse. A dish had caught a fire when she was cooking as she had not taken care of it and left (see Photo 9). When she came back, some of her neighbours were waiting near her flat. Black smoke and choking smell came out when she opened the door. She realised she had forgotten to turn off the gas and the bowl was burnt and cracked. She said that this had happened four times in recent years and was therefore already a major problem for her.

> *'While I was washing my hair, I could smell the scent of gasoline,*
> *and then I heard the sound of an explosion. This is not the first time'.*
> *Elder I*

Photo 9. Elder I (78) (middle) talked of her experience and difficulty in cooking a meal for herself

She also mentioned that she could not easily see whether the fire was turned off completely or not as the cooking pot hindered her view and made her less cautious. She had to read notes and information written on her wall calendar each day before going out as she could not remember the daily schedule she had prepared for herself. She had missed a recent medical appointment and needed to call to reorganise it so she could collect her medicine. She said that she had forgotten to carry her watch and door key several times. To remind herself, she wrote the word ‘key’ in permanent marker on a piece of paper and pasted it to the back of door near the handle. She also mentioned that she had lost her personal identity card four times.

> *‘I lost my identity cards four times, and the corresponding government officer told me that is almost the last time she can issue a new one tome. (laughing).’ Elder I*

She wrote ‘Turn off the fan’ on the notice board to remind herself before leaving home, and she attached her keys to her shoulder bag using several rubber bands, as she did not think that she would forget to carry her bag when going out. She also wrote ‘Turn off the gas’ next to the gas stove as direct reminder, but she forgot to turn off the water tap after use and she flooded the kitchen was with water, although there was a hole in the floor for water to escape. She pressed the button to turn on the electric heater to take a shower, but she forgot to turn it off, which increased her electricity bill.

Elders A (86), B (67) and I (78) got used to their memory loss and initially tried their best to overcome the unusual experience. In the later period of cognitive impairment, however, this obviously became a part of their lives. Elder D (78) said that he went jogging in the park within his living community, thus achieving some psychological relief from repeated memory loss.

A good universal design application should be adaptable so that change over time can be met. Although many of the participants were getting used to memory loss, a cost-effective reminding design solution to assist their independent living would be beneficial. In addition, most older people suffer from various diseases in their later life, such as Elder I (78), who had been suffering from glaucoma for a couple of years. As she had never attended school, her limited and simple vocabulary was mainly learnt from newspapers. Products should be marketable and accessible to people with diverse abilities, to ensure their use is equitable.

5.2.2 Memorable and Visible Elements

Elder M (77) was a high school teacher in the 1950s in Tianjin City, China before she moved to Hong Kong with her husband. She participated actively and motivated others as she believed new solutions could emerge from participatory workshops, although the experience was totally new to her. She lived alone and said that she forgotten to carry her door key several times and asked her neighbour to look after her spare key some years ago in case of any emergency. She attempted to draw her ideas (see Photo 10).

Photo 10. Elder M (77) wrote her ideas on a piece of paper that enabled the researcher to record ideas

Elder N (77) wore glasses and had silver hair. She mentioned that she had left her polyester shoulder bag in the multi-purpose room after attending a training activity. She had to return to collect it from the centre manager who kept it safe. Her MCI was marginal but she believed it will evolve to become early dementia sooner or later. Elder Q (78) wore a white dress and had worked as a school janitor for the past 40 years. She mentioned that she had forgotten to carry a key when she went out to work, and she had to pay a locksmith almost two thousand dollars to open the main door, due to the overnight charge. Elder O (78) lived alone and had a similar life experience, and she connected the door key to her bag with rubber bands (see Photo 11).

She had to stay outside for the whole night if she could not get the door repair service. She had a male companion but he could only come to visit her irregularly. She explained the simple trick she had thought of to remind her to bring door key when going out. She usually remembered to carry her small black shoulder bag, so she hooked the keys to rubber bands so that she could see them, which served as a visual reminder.

'I put all my door keys on this shoulder bag. You can see these keys are attached to a rubber band. I will be in big trouble if I lost my bag!

> *To remember the entrance code of my building becomes an issue to me. I cannot memorise it, and even if I can, it is changed periodically'. Elder O (78)*

Photo 11. Elder O (78) shows her creative solution of connecting door keys with several rubber bands so that she could effectively remind herself to bring them when going out

Elder J (75) said that she had previously forgotten to take her medicine and was not sure if she had finished it or not. She brought an example of a pill case containing seven slots for seven days' dosage. She also said that she forgot what she had wanted to buy in the wet market, and had gone back home, thought about it and gone back to the market again. She had at times walked back and forth until she had remembered what she was meant to be doing. Elder O (78) would jot down items on a piece of paper and keep it with her.

> *'I walk to kitchen, but I cannot figure out what to do next. I stand still, in front of the door, like a statue and think again. Sometimes I remember the task to do, sometimes not. One day, I prepared some chopped ginger for my dinner and put it in the fridge. When I started cooking, I didn't know what to get when I opened the fridge'. Elder O (78)*

Photo 12. Elder O (78) shared her unique method of keeping personal documents and daily reminder notes

Elder J (75) also stated that she almost forgot to bring along her door key when attending the participatory design workshop. She said that she had experienced a deterioration in her memory since she was 67.Elder A (86) said that she had lost her memory in a short period of time. For example, when in the living room she decided to get some raw food from the fridge, but when she got there and opened the fridge door, she completely forgot what she meant to do. Over only a few seconds and a very short distance remembering had become difficult.

Elder L (75) was an insurance sales agent before she retired. She was now living alone, and preferred cooking for herself. She shared her story about her own cooking habits. Each day after cooking a meal, she had to see whether there was still a cooking pot on the gas stove, as this was the only way she could be sure the fire was out. She knew that the bottom of the pot turned black after heating for a long time.

> *'If I can see the stuff clearly at one time, that would be much better and I can easily recognise it. I put my snacks and personal belongings on my little white desk and make sure I can see it.' Elder A (86)*

> *'The most effective way for me to check again and again for the cooking pot is to see it clearly and make sure no pot is on the gas stove before I go out.' Elder L (75)*

I explained to the participants when simple calculations might be used in a typical day. Elder F(78) spoke an indigenous language and so I needed to pay extra attention to her explanations. Each time she shared her thoughts, the other participants would do their best to explain further, to ensure I could understand. If Elder F had gone to the local market nearby without other people to support her, communication could be a problem for her.

The situation would be made even worse due to her MCI. She explained that she forgot to bring along her purse to the wet market and only realised when she saw what she wanted to buy. She continued that she could not remember the multiplication table at all, and so without seeing it she could not do even simple calculations involving multiplication. Elder A (86) said that she relied on her caregiver to do her shopping in market and also used a mini calculator.

Several participants experienced losing or forgetting door keys when going out. Others addressed this by either connecting the keys to their bags or hanging them near the door handle on the inside, so that they could see the keys as a final reminder when turning the door handle and going out. They had their own methods of resolving these problems, which involved easily seeing, recognising and remembering the keys.

Maximising the legibility of essential information, such as on the kitchen cabinet or fridge, can provide a degree of transparency that allows users to see inside when they intend to find small pots of seasoning, plastic utensils or raw food. Universal design principles can offer guidelines for people with MCI through the design of products, home furniture and electric appliances by applying a simple and intuitive approach, regardless of users' experience or different language skill sets. All operation controls should be clear and intuitive if this principle is fully applied.

5.2.3 Recognition of a Lack of Competence

Elder A (86) said that home cleaning was a serious problem for people living alone like herself. She experienced memory loss and hooked her daily clothes outside of the cabinet. She could then easily choose her preferred wide cotton T-shirt and dark coloured pants without them being confused with other items with if she needed to go out.

> *'I prefer a simple wardrobe design so that I can clean it easily…as you know I am not good at memorising things. I prefer those that are easy to clean and use'. Elder A*

Elder L (75) indicated that she had various experiences of losing her memory over the past few years while she was preparing a Chinese soup as usual. When she came back to her building she noticed the corridor was full of smoke and people were talking about an accident. A few second later she realised that this was a sign of a fire coming from her flat and luckily, she managed to put it out. The cooking pot was broken and had turned completely black. Elder L was shocked when she first saw her kitchen and the walls, which were all black and with a bad smell. She had neglected to take good care while cooking with gas four times up until this point. She recognised her lack of competence in terms of cognition and her poor memory after these attempts (see Photo 13).

> *'Is there any good solution so that I can get out of this dilemma? I pick up the cooking pot so that I can easily recognise whether there is still fire heating up the soup…I just want to make sure that there is nothing on the gas stove when I finish cooking…why do I face such weird experiences all the time'? Elder L*

Photo 13. Elder L (75) explained that she needed to move the cooking pot from one place to another to make sure it was safe after cooking

Elder K (75) indicated that the best thing in her life was having the ability to do whatever she wanted, but sometimes that was not easy to achieve. Elder B (67) said that she had entered the wrong pass number several times in an automatic teller machine, and her account was then locked. She struggled to remember the number of digits when she entered the password. She tried to use the simple password of ‘1-2-3-4-5-6’ so that she could remember it more easily, but the bank suggested she changed it, although she could not memorise it.

She explained that she had tried to buy things in the wet market with a fifty-dollar note that she thought was only a ten. After several minutes, she realised she had paid more than she should. She accepted her mistake as she could not work out the difference when she recalled the situation, due to her wrong calculation and lack of recognition of different dollar notes even though they were printed in different colours. She said this situation had become worse and had quite often been a problem in recent months.

> *‘I do not know why I had lost of my memory about the password for my credit card two times. Up to now, I am still using the password provided by the bank printed on the envelope’. Elder B (67)*

Both Elder A (86) and Elder L (75) recognised their lack of competence due to MCI. Like L, A lived alone and tried her best to ease her situation through developing tactics when using the build-in gas hob, so that she could maintain her safety when experiencing memory loss. She understood that her sensory ability was reduced due to ageing and disease, and she no longer had good sensory capabilities when operating the gas hob compared to able-bodied people. New types of cooking utensils should also be considered to ensure safety when cooking. A minimum level of physical effort is essential when moving cooking pots from one side of a stove to the other, and efficient design can mean this is comfortable and can minimise fatigue.

The cooking hob control was found to be a key issue, as many of the older people could not be sure that the hob was completely turned off. This could increase the possibility of a fire or a burn injury when touching a cooking pot that has been heated for hours. The situation is even worse for those living alone with cognitive impairment. The participants including Elder B (67) recognised their lack of competence in terms of cognitive function. Elder K (75) realised her memory was getting worse and affecting her life. If assistive design can provide better support in her daily life, she would be more confident to travel on her own, thus achieving her post-retirement dream.

Many participants either intended to find an easier way of completing at ask or tried hard to remind themselves and ensure everything was safe in their day-to-day lives. Universal design is not about developing a ‘one-size-fits-all’ model, but one that works well for everyone and supports the delivery of care to a wider range of people in terms of aesthetics and accessibility, with no different approach for those with special needs.

5.2.4 Highly Engaged in Social Activities

The term social activity refers to social contact and participation in activities, such as attending family occasions, going to church, dining with family members in restaurants and participating in community centre workshops. Engaging in social activities benefits cognition through lowering stress levels. The negative effects of stress have been found to lead to a decline in cognition (Lupien et al., 2009). Social activities are also related to cognitive functioning. They can expand one’s social network and provide more opportunities for social support, engagement and social influence (Berkman et al., 2000).Elder Q (78) indicated that she seldom went out for activities other than those provided by the community as she did not want to disrupt her daily routine. She believed that exercising could make her feel better and lower the rate of cognitive decline, and she regularly stretched her hands and attended a workshop in which various board games were played.

> *‘I don’t want to go out too frequently, unless to the activities provided by community centre nearby here in YOT. I tried to avoid being disorientated like others’ Elder Q (78)*

Elder B (67) said that she knew Elder A (86) through the social activity of water aerobics for beginners organised by YOT. One day when Elder A was in the aerobics class, she appeared to be drowning. Elder B saved her by helping her move into the safer shallow area of the pool. When B realised that A was living alone and suffered from cognitive impairment, she decided to befriend her and visit her every week.

> *'I decided to travel with Elder A (86) and give her a better life'. Elder B (67)*

Elder B also said that she had participated for three years in activities initiated by the Christian Family Service Centre in addition to those provided by YOT. She tried to learn each step in the correct sequence when writing Chinese, so she could input Chinese characters into her phone. She could then improve her connections with others by using her smart phone (see Photo 14).

Photo14. Elder B (67) indicated the mobile phone apps she regularly used

The number of older people in the community with mild deficits in cognitive function is increasing. Each individual with MCI has a risk of progression to severe cognitive impairment (Mitchell & Shiri-Feshki, 2009). Those living with MCI also have a poorer quality of life in terms of their daily functioning (Muangpaisan et al., 2008). Elder B (67) said that she intended to connect with other people such as her neighbours, old friends from YOT and her grandson using her phone apps, which was why she felt it important to learn how to input Chinese characters.

I found that elderly people living alone who had lost cognitive function were still eager to maintain some of their social activities. This can benefit people such as Elder B (67), enabling them to connect with the outside world, rather than living in their own private reality. Social activities offered by local community centres play an important role for such people, particularly if they have no children or relatives who can visit them. These centres provide a stable environment in which all people can regularly participate together in training, volunteering services, meals, health checks and seminars, and offer each other support and care.

Research shows that older adults who are more socially engaged may have better cognitive health outcomes, and a lower risk of developing MCI (Verghese et al., 2006). No effective pharmaceutical products are available that slow cognitive decline from MCI. However, research into identifying non-pharmacological approaches is expanding. Cognition-related social activities may help slow down cognitive decline, and those living with MCI who engage in a range of social activities have been found to have a slower rate of subsequent decline, indicating that the risk of progression from mild to severe cognitive impairment is reduced (Hughes et at., 2013).

5.2.5 Fear of Being Alone

Elder A (86) mentioned that her eldest son worked for long hours and did not have time to frequently visit her. She believed that he and her daughter should be busy with their own families and do not have the time to take care of her. She also mentioned that she had lived alone in a flat for many years, eating and sleeping on her own. Her eldest son visited her several times a year, but not as regularly as she had originally expected. A simple telephone call each day from her children or grandchildren made her feel better. She felt insecure and worried about the health issues and difficulties that the elderly face every day. The main thing she missed was the regular care provided by her own family.

> *'When there is nothing to do, I feel so lonely. No one is able to talk with me …I feel dumb and I really feel bad. As such loneliness makes me feel sick, I would prefer to hang around at local shopping complex. Such activity would make me feel better'. Elder A (86)*

Elder A had feared being alone for many years. It made her feel sick and uncomfortable. Her friend Elder B did her best to take care of her when she realised her cognitive impairment was getting worse. Elder A lived in typical public housing in Tuen Mun in the New Territories, which was at least a thirty-minute walk from the YOT district community centre. She actively participated in a year-long training programme that included serious games training for cognitive impairment. She also spent time at YOT and waited for the early meal box, as this provided an opportunity to mingle with other senior members. She valued the times when she could meet old friends and social workers at YOT, although she forgot their names after each programme.

Care services such as housekeeping, renovation and personal care for elderly people living alone with cognitive decline are demanding, and particularly for those in districts such as Tuen Mun in Hong Kong, where the number of older people is growing. Helping them cope with loneliness through design interventions is essential, to provide them with a better quality of life.

5.2.6 Loss of Intention of Cognition

Elder A (86) indicated that occasionally, she had lost the intention to turn off the water tap after washing her hands in the washroom. The social worker said that she had come across a elderly person living alone who designed a way to make use of the rebounding effect of rubber bands, so that the tap would return to its original position after use. She suggested that for each operation the water usage could be limited to different amounts, such as 500ml or 1000ml, triggered by the press of a button. Alternatively, the water could be controlled by a time limit of a few seconds by pressing a series of physical keys.

Elder B (67) suggested that a sensor could be incorporated into the water tap for hand detection, as found in local shopping malls (see Photo 15).The social worker said that the areas of detection sometimes confused the users, particularly those with cognitive impairment. Instability and malfunction in the digital equipment could also create an issue for older people. They could trigger the sensor more than once and thus the electronic system could became less sensitive and respond slower.

> *'Very often, I open the tap and use water to clean, I forget to close it after use...I didn't have the intention to shut it down. I forget…forget this act at all. After a while, when I heard the sound of running water coming out, I realised I should shut down the tap immediately'. Elder A*

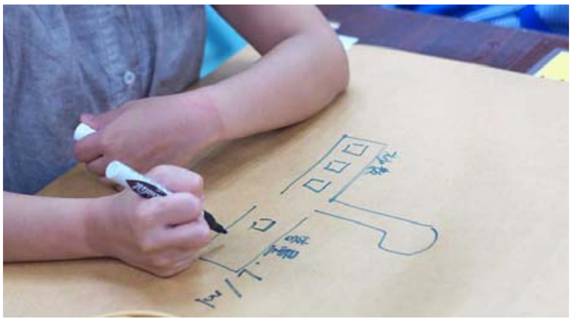


Photo 15. A social worker helping Elder B (67) visualise the ideal water tap and her initial water control concepts to facilitate further discussion

Elder F (78) had experienced a fault when using household appliances last year. She mentioned that she could feel her thinking ability getting worse. She required extra time to think about and comprehend a word or a sentence. Thus, she reminded herself not think too much in a typical day. She tried to achieve a state of emptiness and believed that her thinking ability would then deteriorate less quickly. She said that she sometimes took a nap on the bus for a short while. When she woke up and looked out of the window, she forgot why she was taking the bus and completely lost her intention (see Photo 16). She had no idea what her destination in this journey was.

> *'When I get off the bus, I cannot remember the direction to return home and blank out……I cannot figure out which building block I am supposed to go to after taking a rest'. Elder F*

Photo 16. Elder F (78) tells her story about losing her intention while taking a bus

Elder B (67) mentioned that she could not understand the term 'Fuji apple' at a cooking event when her group mate mentioned it. She should have recognised the phrase easily as she had regularly attended the event over the years (see Photo 17). Elder L (79) said that she experienced a loss of intention when she walked to the entrance of the kitchen. She picked up a chopstick and tapped it on the kitchen table for a while, and eventually she realised she intended to open the lid of the rice cooker and prepare a bowl of rice for dinner. In addition, she boiled water using an electric kettle without checking how much water was inside. This could cause a fire, as the kettle was an old model without an automatic turn-off, due to the low level of water.

> *'When I was invited to a cooking class and the chef told us that we could choose Fuji apple as the raw food…What is Fuji apple? What does it look like....I don't know what it is'! Elder B (67)*

Photo17. Elder B (67) shared her experience about forgetting the name of the fruits she used to buy in the supermarket

During the participatory design workshop, many participants shared their unique experiences of losing the intention of cognition before starting to discuss concepts to overcome memory loss, a decline in thinking ability and disorientation about time and place. Nearly all of the older people including Elder B (67), Elder L (79), Elder F (78) and Elder A (86) said that they did not know what MCI actually referred to, why they suffered from it and how this type of loss in cognition would evolve to become early dementia. They also said that they did not know about the tendency to develop early dementia from their current MCI stage. Education about public health thus becomes increasingly important, as the number of people diagnosed with early dementia will directly lead to increased public health costs.

Providing a better understanding to the public of the nature of dementia can potentially help reduce the risk factors of cognitive decline or the progression to other stages (Baumgart et al., 2015). Governments should ensure the quality of safety and care of people suffering from cognitive decline and dementia by providing sufficient health education to caregivers about the available services and support in the local community. Such education can reduce the risk of cognitive decline through promoting health of human brain and positive health behaviours, such as regularly engaging in physical activity, protecting one's head from injuries, eating a balanced diet and quitting smoking (Lee at al., 2010). Public health also increases early detection of dementia through ensuring we all understand the warning signs of cognitive decline and by providing up-to-date information in the prevention programme (Mukadam et al., 2019).

5.2.7 Difficulty with Geographical Orientation

Elder I (78) indicated that she was not good at orientation even in the areas near her building. She sometimes suddenly forgot the correct route to her destination and stopped for a while. She did not know what to do next and tried to remember what signage or landmark she used to follow. She tried to ask people on the street. Sometimes she needed to walk around the street to remember.

> *'I walked down the street and realised I had forgotten the correct path to the destination as planned. I searched for a while on the street…and then returned home and tried to think again'. Elder I (78)*

Elder F (78) indicated that when she tried to find a place, she had to think about the possible route before she started moving. Elder G (79) was a MCI patient living with her disabled husband who had suffered from a series of strokes and could not move by himself. They were supported by two domestic helpers on a weekly basis. She said that she could only follow familiar paths to restaurants, as she could lose her orientation if she tried to follow a new path even if a caregiver was next to her. Elder F also mentioned that she had experienced forgetting the way back to her own table after using a bathroom in a Chinese restaurant. Elder G (79) experienced a loss of orientation when she got off a bus one stop later than she usually did. She needed to ask for help as she completely blanked, although she had lived in the district for more than twenty years (see Photo 18).She then looked for a huge industrial building, which was the landmark of the district, and managed to follow the path and return home.

Photo 18. Elder G (79) explained that she had experienced difficulty with geographical orientation and even became unfamiliar with areas near the public housing she lived in

Elder J (75) had short grey hair and wore a pink vest. She indicated in the workshop that she did not have a problem with orientation as she seldom went to places other than the wet market and the nearby elderly centre (see Photo 19). She also mentioned that she put her identity card and travel documents in one place and her medical cards and various membership cards in another small bag. She had to organise them in this way to ensure she found what she was looking for in the shoulder bag, and otherwise they would get mixed up with other stuff. She had her own way of helping herself, so that she could organise and remember things better, according to her experience.

> *'I seldom go shopping. I only visit the community centre…when I finish the activity, I return home. This can reduce the problem of getting lost'! Elder J (77)*

Photo 19. Elder J (75) explained that she did not want to hang around the local shopping centre nearby and she wanted to find the correct way home

The social activities arranged by community centres such as YOT therefore provide an opportunity for older people who have reduced cognitive functioning, as many of them may not wish to go to places far away from their homes. They intended to spend more time with the people in the community centre rather than engaging in other outdoor activities that required lengthy travel, as they might get lost due to their limited ability in terms of geographical orientation. Making use of design to create an universally, naturally supportive environment by considering the diverse physical and sensory needs of both MCI patients and their companions can ensure that the composition of the living community is more easily accessed, usable and understood, and benefits all people to the greatest possible extent (Lindqvist et al., 2019).

5.2.8 Limited Learning Capacity

Elder A (86) mentioned that she needed to learn about how to operate mobile apps so she could connect with her son, which was totally new to her (see Photo 20). She indicated that the number of steps required to produce an action in apps sometimes made her frustrated. She could not remember the procedure and thus could not operate her smart phone. She usually needed to start over again. She remembered the user interface of the first landing page but could not navigate to the following pages. She could only use the navigation key to control the volume (left and right) and channel selection (up and down) in a self-learning app, and she did not understand the functions that the other buttons referred to.

Photo 20. Elder A (86) demonstrated her limited learning capacity when using mobile apps, which was one way she could connect with her sons and grandson

Elder B (67) indicated that her daughter simplified the key control panel of her washing machine by writing 1, 2, 3 and 4 next to the main control keys, as she could not figure out how to operate it. She said that she once caught the wrong train to a restaurant even though she had asked passengers if she was going in the correct direction. She got lost when returning home and spent an extra hour travelling.

> *'I realised my brain is getting some problems and cannot function well…I should catch a bus instead as it can bring me to my destination without changing routes a few times in through metro system'. Elder B (67)*

Elder O (78) said that it was not easy for her to operate the TV remote due to its complexity. She needed to call her son who lived in another district if she pressed the wrong button, as she could not return to the original position. In addition, the keypad was poorly designed as each key was too small, making the operation even harder (see Photo 22). She wanted to simply control the volume and select a channel. If she could not get through to her son, she would simply switch off the TV set. She also enjoyed reading the daily newspaper, but she did not know exactly what the reporters were writing about. She felt frustrated when doing basic calculations and wanted to give up.

> *'I use a square mini white label with a circle that signifies the operation of the TV and I put it on top of the corresponding key. I need to spend a long time to learn how to operate the TV. Eventually, I gave up and only use the 2-3 buttons marked with labels'. Elder O (78)*

Photo 21. Elder O (78) explained that she placed stickers on some of the function keys so she could understand and remember them

Elder A (86), Elder B (67) and Elder O (78) revealed that older adults with MCI lack support when learning in various situations, including travelling, leisure activities and meeting old friends. These are all related to social engagement, which is an important component when aiming to enhance the quality of life of older people with MCI. Designers, older people with MCI and healthcare providers should together explore the possible methods of empowering cognitively impaired people through simpler and better design and technology, to facilitate interaction and social engagement as support networks are crucial to maintain a cognitive health (Zanwar et al., 2018).

Due to their limited learning abilities, elderly people living with MCI can only deal with simple interfaces on mobile apps or the metro system map, which is easy to read and understand. Other information that is not related to the interface should be dimmed or hidden completely, to reduce the possibility of confusion. This can improve users' experience with digital controls and also suggests that haptic feedback is useful for users.

Although the metro system in Hong Kong is not as complicated as those of Tokyo or New York City, people with cognitive impairment require guidance. Those who are living alone may not have the opportunity to ask for help when tackling such problems. Interface designs of the control or navigation system should work well and not just cater for everyone including older people with MCI, and should support the delivery of care to a wide range of people. The main objectives are easy to understand: they should be safe to use and manage and also should be adaptable over time.

5.2.9 Word as a Medium for Remembering

Elder I (78) said that she could not remember the exact naming of destinations in either verbal or written format. She used a basic smart phone and hoped she could find some useful information to help her. Elder H (69) said that she sometimes repeated a phrase three times a day and she did not know why. Elder I mentioned that she had not been formally educated and could not write any words on the calendar. She thus had lost any effective method of reminding herself to do even a simple task. Elder B (67) indicated that she was asked to install a smart phone application to help her, which gave word associations in the form of Chinese characters while inputting a location. However, she could not learn the basic elements required to form a single word (see Photo 22). She also found it difficult to learn the sequence when writing a Chinese character.

> *'I don't know how to write…so I couldn't mark down what I have to buy each time'. Elder I (78)*

> *'I go to the community centre to learn about how to input Chinese characters in my smart phone, even though the teacher delivers the teaching content in a good manner, I could not learn from it. Another time, my grandson spent three hours teaching me about the philosophy of Chinese character input, still, I am not able to apply it in my day-to-day living'. Elder B (67)*

Photo 22. Elder B (67) explained that she was eager to learn the Chinese input method to support her communication with her grandson through digital tools

Digital technologies are becoming increasingly popular and can help and support those with MCI in many ways. Designers should note that access barriers can be encountered, as each person needs a different length of time to learn and access the system depending on their level of education. Community centres can offer regular training regarding the use of remote controls, for example. Universal remote-control designs can be developed that operate a TV set, an oven and a smart phone and its mobile apps. This could provide an environment in which those with MCI can learn from others.

Training can therefore offer an inclusive platform for those who are diagnosed with MCI and living alone and other older adults to learn together how to input simple Chinese character through writing and speech recognition. All of the participants in the design research were using smart phones with medium to large touch screens, but they lacked the experience to use the pre-defined functions, and only performed simple tasks. When they learn a basic rule for Chinese character input, they are very likely to use it and apply as a reminder. Chinese vocabulary concerning daily living should also be strengthened when learning how to input Chinese characters.

5.2.10 Slow and Low Judging Ability

Elder E (72) was had been diagnosed a couple of years ago with MCI and spoke with a quiet voice. She expressed that her induction cooker was not that sensitive, and she could not confirm whether she had pressed the switch or not. Elder B (67) said that she had an unusual experience when she paid a visit to Elder A (79) recently.

Photo 23. During the participatory design work, Elder B (67) said that she paid a visit to Elder A (79) and realised that she had two fridges, one in the kitchen and another in the corner of the living room next to the main door

Elder F (78) lived alone and said that the electric kettle was too heavy for her to use on a daily basis. She did not have an ability to clean the kitchen as this required her to expend a significant amount of energy. Elder I (78) said that a kettle that was simple, functional with a good beeping sound signalling the water boiling were the main criteria when she selected one, after having a horrible experience (see Photo 24).

> *'I don't want to boil water in a teapot! I bought an electric kettle instead…I am afraid that…I just can't hear the beep sound'. Elder I (78)*

Photo24. Elder I (78) indicated her preference when considering a new electric kettle after she experienced a fire

Elder H (69) had a poor memory and was diagnosed with MCI last year. She said that she knew she often threw away useful stuff in the trash and then had to go through the bin in the evening before she put it out. She also mentioned that when taking a trash bag from the kitchen, when she passed by the fridge located in the corner of the dining room she sometimes opened the fridge and intended to put the bag inside it (see Photo 25).

This happened a few times in her later life and she was curious about whether it signalled she was in the early stages of dementia. She mentioned that she was expecting the bag to be full of vegetables. Once she could not find her glasses for an entire day, although they were firmly on her head. She had to ensure she had turned off all electronic devices before leaving her flat. Elder F (78) also encountered a lack of judgement when disposing of trash bags even if they were placed on the dining table next to the front door. She fixed a mini hook for hanging the trash bags on behind the metal gate so she could easily remember.

> *'When I was disposing of the trash bag, I saw the fridge and opened it. My intention was to put the trash bag into the fridge before leaving home…and I can't explain…am I demented'? Elder H (69)*

Photo 25. Elder H (69) mentioned her experience regarding poor judgement on trash separation due to MCI and asked for the researcher's professional advice

Elder J (75) forgot to dispose of a trash bag when she went out to a social gathering (see Photo 26). To enable her to remember, she placed the trash bag next to the front door so that she could see it when she went out. However, this did not help her very much as she still forgot to dispose of it right away when leaving home. When she came back in the evening, she realised she had missed something.

> *'I try to place the trash bag next to my sneakers just behind the main door. At the very beginning, it served as a good reminder. In later days, it seems that my brain could not function well and I forgot to throw the trash bag into the collecting place'. Elder J (75)*

Photo 26. Elder J (75) explained that her judgment is getting worse over time, and she tried to work out some methods to remind herself

Elder I (78) could not judge whether she had turned off the gas supply or not and thus had to return home to check, even though it was time-consuming. This happened over a long period, and she had experienced fires three times in recent years. She expressed that she had lost confidence in doing anything, due to her poor judgement and memory. Elder F (78) always reminded herself to make sure the electric sockets were all turned off. She said that one day after cleaning vegetables for cooking she blanked out for a while and did not know what to do next.

She also put her shoes in the fridge rather than the vegetables after buying them at the wet market. When she needed to go out she realised her shoes were missing and found them in the fridge. She also said that a few times she had mistaken a stranger for her daughter, which illustrated her poor judgment (see Photo 27). She explained that she would imagine and see her daughter's face in other people and call them by her daughter's name.

> *'I don't want to talk about my other experience, as it was too shameful to tell everyone here…I lost my faith to live…I'm useless, useless to everyone'. Elder I (78)*

> *'I'm confused as I put my shoes to the fridge after shopping downstairs and place my food on the ground where the shoes usually go'. Elder F (78)*

Photo27. Elder F (78) said that she called a stranger her daughter as she believed it was her

Elder B (67) said that she placed her smart phone on top of her daughter's cabinet when she arrived at her house. When she was about to leave, she picked up her daughter's phone by mistake as she believed it washers.

> *'When I received a call after I left my daughter's home, I realised that I had picked up the smart phone that belongs to my daughter. I need to give it to her as soon as possible as it could have affected her work. I was afraid of losing my memory and made an error of judgement, but I need to pretend all was normal, calm down and think nothing had happened'. Elder B (67)*

5.2.11 Summary

The participatory design workshop offered 15 older people the opportunity to express their concerns about the effects of cognitive impairment in their daily lives. Like many other older adults, those living with MCI will experience poor judgement in various situations. However, unlike MCI sufferers, normal older adults will realise their mistakes and so further misjudgements will be less likely.

Those with MCI will continually face such problems, that affect their own lives and those of other people close to them. For example, Elder I (78) experienced a decline in cognitive function, which affected her daily cooking habits and led to dangerous situations. Her son now visits her more frequently and takes her to local restaurants for dinner instead of her cooking by herself. She had to wait for her son to call and remind her of events, as she did not know how to write on her A3-sized wall calendar. The designers of such wall calendars could help to minimise hazards and any adverse consequences of a mistake. Although Elder I had tried to use a little tab to remind herself, she could initially make a mistake. The design should provide guidance about whether the user has made an inappropriate selection or mistake in terms of content and date. In general, the design should be simple and intuitive to allow people with low levels of education to understand the meaning and application of a wall calendar with physical reminder.

At the end of the participatory design workshop, I asked all participants about the happiest moments of their lives. Elder K (75) was late to attend the workshop as she forgot she had enrolled in the event in the previous week. She mentioned that her daughter had been accepted by a leading high school in Hong Kong, which made her feel proud and satisfied. Elder J (75) said she had experienced various happy moments in her life. She was delighted each time she saw her grandson and felt joyful about her son's wedding dinner. Elder L (77) indicated that when she heard her grandchild say 'Grandma…grandma', she was extremely delighted. She felt proud of her younger son in his graduation ceremony and when he received a stable job in the Government. Elder O (78) said that she felt satisfied each time she visited Yan Oi Tong District Elderly Community Centre, as she could talk to neighbours and volunteers with similar backgrounds. She felt positive and happy when she served as a volunteer for various groups and events. She learnt how to deal with other people from different backgrounds even in the age of 78. Figure 14 provides a summary of the problems that people living alone with MCI face.

1. Getting Used to Memory Loss	Elder A	*When I finish washing my hands in washroom, I don't remember that I need to close the tap and leave…quite often, I forget this act and believe there is no need to act at all.*
		It is difficult for me to clean the cupboard...if I don't, I have to suffer with dirt and dust all over the cupboard. I have nothing else to do with it.
	Elder B	*I forgot the surname of the officer who reminded me to attend this workshop, I forgot to switch off the gas stove, I forgot to bring my door key…and my phone…seems to me I forget at least one thing a day…make me feel frustrated and that I cannot concentrate at all.*
	Elder D	*To clean or not to clean up the living room… does not mean a lot to me…I enjoy the sense of physical and psychological ease in a typical day.*
	Elder I	*While I was washing my hair, I could smell a scent of gasoline, and then I heard an explosion. This is not the first time.*
		I lost my identity cards four times, the corresponding government Officer told me that this was almost the last time she could issue a new one for me. (laughing)
2. Memorable and Visible Element	Elder O	*I walked to the kitchen, but I couldn't figure out what to do next. I stood still, in front of the door, like a statue and thought again. Sometimes, I remember the task to do, sometimes not.*
		One day, I prepared some chopped ginger for my dinner and put it in the fridge. When I started cooking, I didn't know what to get when I opened the fridge.

		I connect the door key to my bag with a chain of rubber bands.
	Elder A	*If I can see stuff clearly at one time, that is much better as I can easily recognise it. I put my snacks and personal belongings on my little white desk I make sure I can see it.*
	Elder L	*The most effective way for me is to check the cooking pot again and again and to see it clearly and make sure no pot is on the gas stove.*
	Elder L	*I need to make sure no fire remains on the gas stove.*
	Elder N	*I just left my bag in the multi-propose room!*
	Elder Q	*I forget to carry a key when going out for work……the door lock technician charged me a lot! Now I put my keys in my shoulder bag linked with a few rubber bands, just like others.*
	Elder J	*One day, I forgot to take my medicine and was just not sure if I had finished it or not…so I bought [a container]indicating the daily dose.*
	Elder M	*I put my door key in a good position so that I could see it and memorise it.*
	Elder F	*I could only remember it when I see the goods.*
3. Recognition of a Lack of competence	Elder A	*I prefer a simple wardrobe design so that I can clean it easily…as you know I am not good at memorising. I prefer one that is easy to clean and use.*
	Elder L	*I fully pick up the cooking pot so that I can easily recognise whether there is still fire heating up the soup…I just want to make sure that there is nothing on the gas stove when I finish cooking…why do I face such weird experiences all the time?*
	Elder K	*…I want to do whatever I want, but it seems this is not easy to achieve.*
	Elder B	*I do not know why I had forgotten the password for my credit card two times. I am still using the password that provided by the bank printed on the envelope.*
4. Highly Engaged in Social Activities	Elder Q	*I don't want to go out too frequently, except to the activities provided by the community centre nearby here in YOT. I tried to avoid being disorientated like others.*
	Elder B	*I decided to go travelling with Elder A and give her a better life.*
		I try to connect with neighbours and my grandson through mobile apps, but this is not easy for me.

5. Fear of Being Alone	Elder A	*When there is nothing to do, I feel so completely lonely. No one is able to talk with me…I feel dumb and I really feel bad. If such loneliness makes me feel sick, I prefer to hang around the local shopping complex. Such activity would make me feel better.*
6. Loss of Intention of Cognition	Elder A	*Very often when I open the tap and use water to clean, I forget to close it after use...I don't have the intention to shut it down. I forget…forget this act at all. After a while, when I hear the sound of running water coming out, I realise I should shut down the tap immediately.*
	Elder F	*When I get off the bus, I cannot remember the direction to return home and blank out…I cannot figure out which building block I am supposed to go in after taking a rest.*
	Elder B	*When I was invited to a cooking class the chef told us that we could choose Fuji apple as the raw food…What is Fuji apple? What does it look like?...I don't know what it is!*
	Elder L	*I picked up a chopstick and hit the kitchen table, after a while, I remembered I have to prepare a bowl of rice for dinner.*
7. Difficulty with Geographical Orientation	Elder I	*I walked down the street and realised I forgot the correct path to the destination as planned. I searched for a while on the street…and then returned home and tried to think again.*
	Elder F	*I need to find a place to settle down and think about the pathway for a while, before the next move.*
	Elder G	*I lost the correct path to the place when I got off a bus one stop earlier than I usually do.*
	Elder J	*I seldom go shopping. I only visit the community centre…when I finish an activity, I return home. This can reduce the problem of getting lost!*
8. Limited Learning Capacity	Elder A	*I want to learn more about using mobile apps so that I can get connected with my son…sometimes I am frustrated.*
	Elder B	*I realise my brain is getting some problems and cannot function well…I should catch a bus instead as it can bring me to a destination without changing routes a few times like the metro system.*
	Elder O	*I put a square mini white label with a circle that signifies the operation of the TV on top of the corresponding key. I needed to spend a long time to learn how to operate it. Eventually, I gave up and only use the 2-3 buttons marked with labels.*

9. Words as a Medium for Remembering	Elder I	*I don't know how to write…so I cannot mark down what I have to buy each time.*
	Elder H	*I repeated a phrase three times a day and I didn't know why.*
	Elder B	*I go to the community centre to learn about how to input Chinese characters in my smart phone, and even though the teacher delivered the teaching content in a good manner, I could not learn from it.*
10. Slow and Low Judging Ability	Elder E	*I found that my induction cooker is not that sensitive, and I didn't know whether I had pressed the switch or not.*
	Elder A	*I asked my older son to buy a new fridge as it was not working at all. When he came to visit me, he realised that the electric plug was just not put in the right position!*
	Elder I	*I don't want to boil water in a teapot! I bought an electric kettle instead…I am afraid that…I can't hear the beep sound.*
	Elder H	*When I was disposing of the trash bag, I saw the fridge and opened it. My intention was to put the trash bag into the fridge before leaving home…and I can't explain…am I demented?*
	Elder F	*I create a mini hook for hanging trash bags behind the iron gate for easy recognition.*
	Elder J	*I try to place the trash bag next to my sneakers just behind the main door. At the very beginning, it served as a good reminder. In later days, it seems that my brain could not function well and I forgot to throw the trash bag in the collecting place.*
	Elder I	*I don't want to talk about my other experience, as it was too shameful to tell everyone here…I lost my faith to live…I'm useless, useless to everyone.*
	Elder F	*I'm confused as I put my shoes in the fridge after shopping downstairs, and placed my food on the ground where the shoes should go.*
	Elder B	*When I received a call after I left my daughter's home, I realised that I had picked up the smart phone that belongs to my daughter…I was afraid of losing my memory and I made error of judgement, but I needed to pretend everything was as normal, calm down and think that nothing happened.*

Figure 14. Summary of the problems older people living with MCI can face in a typical day

5.3 Participant Observation

Participants were selected ethically and equally from the Yan Oi Tong District Elderly Community Centre. The centre manager was enlisted to help identify the most suitable participants. Purposive sampling was used as a selection tool to identify participants, using a wide range of characteristics based on levels of severity, age of onset and corresponding living conditions, which may affect participants' experiences (Patton, 1990).

An inductive reasoning approach was taken when observing the behaviour of older people living alone with MCI. The process was inductive, as I gathered data to build conceptual model rather than testing hypotheses through a deductive approach. The research timeframe is cross-sectional rather than longitudinal as this allows me to compare many different variables at the same point in time. For example, I can assess the ability of dementia patients with MCI living alone to wash dishes, set the table and clean up. I observed over twelve months how the participants conducted activities such as closing the bathroom door, turning off water, putting shampoo in their hands, getting clean clothes and putting on pyjamas. I visited them two times a week. Each visit lasted for one hour and was supported by the centre staff, who reminded the participants one day before a visit. The Montreal Cognitive Assessment (MoCA) score of each selected participant was between 18 and 23, while for those with normal cognitive function and severe cognitive impairment it is 24-30 and 0-10, respectively. No other specific criteria for selecting participants were imposed, except that they are able to hear and understand.

With the help of the centre managers from the organisations mentioned above, I recruited five elderly people living with early-stage dementia who are living alone and who are currently participating or participated in their respective training centre. Their ages ranged between 65 and 85 and the numbers of men and female are equal. I applied 'process consent' so that the participants are able to withdraw at any time if they feel uncomfortable (Dewing, 2007). Verbal consent was obtained in each research stage, and they were allowed to withdraw at any time.

5.3.1 Characteristics of Selected Participants and their Living Conditions

Five individuals were successfully interviewed, with the full support of YOT. One participant withdrew in the middle of the study as she felt sick and dizzy during the research. Although the intention was to recruit an equal number of male and female participants, all five were female. They had actively participated in the previous participatory workshop and agreed to let me visit them at home in Tuen Mun, New Territories before the participant observations began. The participants were CH Poon, CP Chan, FY Ip, SK Lin and WH Wen.

5.3.2 CH Poon (78)

CH wore a typical clean and white uniform of a local domestic maid. She is 78 years old, lives alone and is not married. She was diagnosed with MCI two years before she met me at the community function organised by YOT. I went to CH's 280 square foot public housing apartment, and she asked me to change the fluorescent tube in the living room that had been broken for a few weeks.

5.3.3 CP Chan (85)

I also introduced the research study aims and objectives, and the definition of mild cognitive dementia, to the second participant CP, who had been living in typical public housing in the rural area of Tung Mum 35 years (see Photo 28). When the estate was first established in the 1980s, there was only one bus stop to connect downtown with Tung Mum district.

CP described the housing estate she lived as designated for poor people, and one could find older people everywhere on a typical day. CP is an 85-year-old female who has been living alone for the past three decades. She did not have a comprehensive education and only attended school in mainland China for one year of general education when she was eight years old (see Photo 29). She indicated that she no longer had a good memory and the situation had recently worsened. Quite often she could not remember the dialogue we had conducted the day before. She experienced difficulty finding the keys to the front door even though they are located on top of the dining table, which is in front of her. She gave me a glass of water in the beginning of the study and reminded me to take some rest due to bad weather.

Photo 28. Interior of CP's living room, which is typical of public housing in Hong Kong

Photo 29. CP introduces herself on the first day

CP typically woke up at six in the morning and got to sleep at about ten. She washed before going for a walk in the nearest garden. When she came back home she watched TV and operated it without using the remote provided. She collected free daily newspapers although she could not read much of them. She said she could not remember the news and stories written in the newspapers and usually forgot them quickly. She participated in the afternoon activities organised by YOT and also the Lutheran Church Hong Kong Synod, which was located in the second street of the public housing area.

Her activities included health seminars related to daily living, basic skills in using a mobile phone and volunteering, such as being a helper at a small gathering. Her typical dinner included Chinese dishes with steamed rice, sliced bread and raw food, but not dairy products. She took a rest on her massage chair. Sometimes she watched TV and operated it directly through the control panel. I asked CP what she thought about her life.

> *I: Is the current living situation ideal for you?*
>
> *CP: It cannot be changed. Even if I want to change it, I cannot and I have to accept it. I do not experience much living pressure as I live alone. I can do what I want to some extent.*

CP told that she stayed at home all the time and felt bored. She noticed that her health was getting worse and her immune system was weakening over the past few years. Sometimes she felt sudden dizziness and it seemed like her legs could not support her body. She was worried and thought that the nearest community centre could offer her some advice to help her, as she had been a member of this organisation in the past. She bought a lunch box at YOT that cost 18dollars, comparing to the usual price of 50. Only YOT could provide lunch box at such a low cost, which benefitted the older people in her area. One day her social worker, Hung, offered her a free test for early dementia. She had scored 24 out of 30, which confirmed that she had MCI and that she was likely to deteriorate.

5.3.4 FY Ip (79)

FY was born in December 1939 in mainland China, and had lived in local public housing in the city of Tuen Mun for the past 25 years. She was a construction worker before she retired and raised four children. Her husband died six years ago, and she became one of those living alone in Hong Kong. She also worked as a street sweeper in the early 2000s when she could not get construction work. FY said that she was losing her memory and it was getting worse over time. She was not good at calculation and had no formal education. She only used a stamp for her employment contract instead of signing as she could not write. She could speak Cantonese, but she answered in her strong, indigenous accent most of the time. Her six daughters and sons would try to visit her once a week, and on Sundays they often chatted before going to a restaurant. Her youngest son visited irregularly, as he often had to work overtime.

I ensured the research study and the proposed time schedule did not clash with FY's weekly routine of visiting YOT and Tung Mum Park. I picked up a free newspaper and asked FY to read the headline. She tried her best to connect seven out of ten words, but she could not fully understand their meaning. FY expressed that she did not feel she had a happy life. Her first and second sons were born in China without receiving a good education, and thus could not easily apply for office work. Her husband had a long-term illness in the last few years of his life, which had made her feel even worse and exhausted. He could not care for himself and required a wheelchair in his later life. His activity became limited to the living room and the bedroom. Her poor eyesight and uneducated background made FY feel desperate and upset in recent years. She described herself as miserable but she was grateful as she still had a place to live.

FY stated that she could not find a job in mainland China in the 1970s. Although the construction work included handling waste material and was not easy, she was able to earn $38 per hour at the time when she moved to Hong Kong. An office worker earned $1800 on average, but FY was satisfied and pleased. She said the degeneration of her eyesight still caused her problems when dealing with day-to-day activities. Working on a construction site is tough, and rocks and large buckets of sand are extremely heavy. Even with a safety helmet a blow to the head could be extremely serious, and FY indicated that she was hit by a falling object that affected her memory. She visited YOT along with her younger daughter for the first time in early 2017, a few years after her husband passed away. FY participated in a few signature events about healthcare and dementia that included academics and healthcare professionals. She had participated in my seminars and workshops and was nominated by

YOT to participate in this research.

Although FY felt a certain level of loneliness as she was living alone, she was satisfied as she could still live independently and walk without a cane. She said that she had experienced depression after her husband passed away. She enjoyed participating in the activities organised by YOT, but she was unable to get in as the programmes were always full. The centre staff noticed that FY was ‘getting better’ and intended to take her out of the list of applicants for the activities related to cognitive training. Other activities were also filled using a lottery system.

5.3.5 SK Lin (79)

SK was 79 years old and lived her husband who had suffered from a serious stroke over 20 years ago. She sat on a wooden chair and next to her was a collection of photos pasted on the wall. She explained her stories to me and appeared to be worried about the participant observation. During our discussion, I noticed that her husband was lying on the single seat sofa. He had not acknowledged me. SK explained that he had to enter hospital from time to time and had recently been discharged. SK had two sons and three daughters. She had been living in public housing for 30 years. She was a worker in the garment industry before she retired at 60. She joined a one-year programme that provided a wide range of activities related to cognitive impairment and was funded by Hong Kong Jockey Club, one of the biggest non-profit organisations, and was co-organised by YOT.

SK was nominated to join this programme as she was diagnosed with MCI. She explained that she was ‘lucky’ to join this programme, which composed of four components each year, and reapplied so that she could participate in the following year. She said the activities involved Sudoku and Tangram and were aimed at training up the calculation and visual and spatial abilities of participants, respectively. After a few trials, she wanted to purchase one of the games from a department store, but she could not find it at all even though she believed it would be good for her thinking ability.

> *I: Can you name the one that you intended to buy in the shopping centre but did not succeed?*
>
> *SK: I am not sure…as I don’t know what it is and I don’t know how to describe it…*

5.3.6 WH Wen (80)

WH was born in Singapore and moved to mainland China when she was a child. She was five feet tall and spoke Cantonese with the accent of her hometown. She was raised by her mother after 1959. She had a relatively good education and had studied six years of radio-frequency engineering at Tianjin. She also said that she had attended one of the local universities, but she did not complete her study because of the political instability of China in the 1960s. It was not an easy time for her to raise her baby in Hong Kong. She used to prepare congee for the whole family with cheap fish that was usually fed to cats. She was a factory worker in the late 1970s and that was her family's main income. She could prepare reasonable food for her family. She was a qualified primary schoolteacher, but she did not have the opportunity to teach. WH started working for two companies at the same time to earn enough to pay her daughter's tuition fees. She was good at science, maths and engineering and she took up Sudoku to improve her calculation ability.

When she was playing Sudoku by herself, she felt calm and worry free. As she was Chinese and from overseas, her family was able to start a new life in Hong Kong, which was barely established at the time. After her husband passed away, she lived alone in Tuen Mun in a 300 square-feet public housing unit with a rental cost of 950 dollars per month. She had a daughter who had migrated to another country when she got married. WH also had a son, but he could not afford to visit her regularly, so she tried to meet him when she could, as she could still walk independently without using a cane or wheelchair.

5.3.7 Social Support for MCI

CH asked me to change the fluorescent tube before I had a chance to introduce myself, as she had bought a replacement at the local mini store. CH mentioned that it could not be returned as the packaging had been opened (see Photo 30). She asked if I could buy a replacement for her before the next visit.

> *'Welcome! Did you have lunch yet today? And do you mind helping me fix the fluorescent tube? I bought a new one already…can you help please'? CH*

Photo 30. CH said that she urgently needed help fixing the fluorescent tube that affected her daily life

I first looked for a ladder or sturdy chair that I could stand on support. I found a classic square wooden stool and stood on it with the replacement. Unfortunately, the new tube was larger than the old one, so it needed to be changed. CH felt frustrated and explained that she had no idea that fluorescent tubes came in various sizes, and assumed that they were all the same length. She told me that as the packaging was opened, she would have to buy a new one without a refund or exchange. CH was diagnosed as MCI in one of the community activities organised by the YOT.

I was told that the living room lights had been broken for the past three weeks, and so CH had to sit in the darkness if she wanted to stay in the living room in the evening. Social support is an important function of social relationships that affects the quality of life of each individual, and particularly those living alone with MCI. Supportive behaviours can include emotional, instrumental, informational and appraisal-based support. CH needed to have her old friends support, provide help and listen to her needs, which represents an expression of trust and caring.

In addition, social workers from the welfare department or district community centres such as YOT should organise regular home visits to those living alone, with dementia or with MCI. They would then realise the difficulties faced by elderly people such as CH, who could only go to the nearby mini store and get a tube she believed to be the correct size and dimensions, but that was, however, no use at all. Offering tangible aid and volunteer services is demanding, and particularly for those who are vulnerable and need special care and protection. She had regular gatherings with her old friend FY who was also diagnosed with MCI. CH cancelled the lunch gathering so she could participate in the first day of the observational research with me.

> *‘Today is Saturday…I usually have dim sum and Chinese tea with FY. Because you came to visit me, I called FY this morning and postponed the lunch gathering’. CH*

FY and CH are the same age, live alone and were diagnosed with MCI. CH was also found to need emotional social support. She attended seminars and group activities in the community centre with FY and they are now close friends. She can provide her with hope and a listening ear.

CH served as school janitor in a local primary school situated near the Western District Hospital for 38 years. She felt blessed as although she was uneducated she had a full-time job. She was passionate about her job and used to call students’ parents if she did not see them in the assembly. She generally knew the meanings of Chinese writing, but she could not write even very common words. She tried hard to remember the meanings of words and phrases but recently she could feel her memory getting worse. I asked CH to write the heading of a paragraph from a free newspaper on a piece of paper, which consisted of one simple phrase (see Photo 31). Her handwriting was 75% correct, which was unexpected, but the sequence of the strokes was entirely incorrect.

Photo 31. CH wrote a few words assigned by the researcher and she generally learnt complicated words and phrases by copying them from newspapers

CH was eager to get advice and suggestions about the problems she encountered in her daily life. Her shaking hands also hindered her writing ability and thus she had to go slowly to copy the unique shape of each word. In the past, she had sometimes learnt new words through the different names of new students, which constituted a type of social network.

At the age of 62 she began a new job with a local teacher, Mr Chan. CH had never married, and had moved to Hong Kong from mainland China in1968. Finding a job in the 1960s was difficult, particularly without a good education. She has two younger brothers, but they argued about property rights ownership in her hometown in China. Remembering this situation brought tears to CH's eyes. She mentioned that her memory loss was accelerated by these negotiations with her youngest brother, who treated her badly. She could not sleep well and did not seem to understand at all.

CH was involved in an incident involving a fire with her neighbour six months before my first visit. She seldom met her neighbours as she believed they were engaged in illegal business. A two-year-old boy had been left alone and lit some candles as the central electricity supply had been cut off in that the evening. His elder sister ran out and pushed on CH's door gate to ask for help.

No other adult was in the flat and CH said that she could not escape from the living room as smoke was coming through the open main door. She closed the door when she noticed both the smoke and the sound coming from the cracked tiles, as they could not withstand the extremely high temperature. The fire spread out from neighbouring residence in a few seconds. According to CH, the doorbell and the door plate melted before falling off. She immediately switched off any electricity or gas appliance to minimise the risk of an accident.

> *I: I was told that you have been identified as having mild cognitive impairment. How is the current situation?*
>
> *CH: I feel that I am not able think too much and my memory is getting worse. My memory was good when I was still working in school, however, my ability declined after retirement and I cannot remember too much about recent activities. That I still can remember some of the events is startling.*

Social support involves care and assistance from a supportive social network. One could imagine that the fire incident could be fatal for CH as it was just next to the door. Support such as public training on the prevention of a wide range of incidents, including gas leakage, flooding, accidents occurring during cooking, careless handling of materials (matches and candles) and malfunctioning lifts should be enhanced and considered. Intangible personal care and health advice should be available from sources including family, friends, neighbours, co-workers and governmental organisations, but CH was missing this. Although she understood her cognitive ability was declining, she did not find a way to help herself through advice from her personal network. Obviously, Social support for CH, as for many others with MCI, is clearly not sufficient and not all service providers provide enough and professional training to the staff (Kwok et al., 2011).

FY said that she did not want to think too much as this made her feel better and happier. Her children needed to regularly work long hours and seemingly had no time to take care of her. She understands that they have their own families, and she does not want to bother them for assistance even though she knows she needs some help in her daily life, such as seeing a doctor at a nearby clinic and making a reservation. Although different kinds of elderly services are available, resources are still lacking for a large group of MCI sufferers in the New Territories (Chau et al., 2012). Government officers should review their strategies, current data and practices about caring in terms of MCI and carers in Hong Kong. Reviewing international good practices and interventions, and proposing specific target groups, can benefit older people in Hong Kong by planning priorities and monitoring progress (Chan et al., 2021)

5.3.8 Acceptance and Being Optimistic

CH had worked in Hong Kong for over 40 years as a janitor and then as a domestic helper. She experienced a fire next to her flat that affected her life. According to a report from the Fire Services Department, fires claimed 24 human lives and over 300 people were injured in 2020 (Fire Services Department, 2020).

> *I: Have you thought about whether another fire accident may affect you?*
>
> *CH: I have applied to a subvented elderly care home with the help of the centre staff at Yan Oi Tong. Yet, it requires me to wait for at least three years, maybe up to five years as there is a long queue…If there is further decline in my cognitive function, I believe I will be given priority treatment for my application at the elderly nursing home, which is not a bad thing.*

One way to deal with a prolonged period of memory loss is to accept it. CH was optimistic, and when she faced daily problems she would try to handle them herself. If she could not manage this or she did not know what was going on, she would seek assistance from her relatives, centre staff and old friends who were more or less the same age as her. She said that if her cognitive function continued to deteriorate and further affect her day-to-day living, the only way was to apply to a public elderly nursing home. In her case, she would be given priority. I did not observe any feeling of upset or frustration when she mentioned such a situation. Positive acceptance can occur when people view help and support as a good thing. Those who show positive acceptance are likely to have better contact with the community, family and friends.

I visited CH once a week over six months. The centre staff typically called CH one day before I visited. On the second visit, I was allowed to take some photos as records and investigate the interior of her home, including the bedrooms, washroom and kitchen. My observation of behavioural interactions demonstrated the necessity of a skilled approach by an experienced researcher, to foster communication with each participant with MCI.

> *I: It seems to me there are a few bags in your bedroom. Do you need to move out your belongings before sleeping?*
>
> *CH: The bed is a bit high and I sleep on top of the wooden cabinet that constitutes a single bed. You can see there is not enough space for sleeping as I have different small things to organise. My old friends come to visit me, but not often, and if so they may stay overnight and sleep in my beds while I turn my massage chair into a bed for myself instead.*

Photo 32. The researcher observed two bedrooms for CH, which were full of various belongings

> *I: Is there anything you want to improve in the current situation?*
>
> *CH: No need to change at all. I am expecting to be moved to the elderly care home in a short timeline. No need to spend extra money to renovate this house. I have many clothes, nearly a few dozen everyday clothes. When I move into the care home in the future, I understand I have to throw away most of the clothing I have. Like me, people should understand happiness comes from contentment and no amount of money can change that.*

After consulting medical professionals in her hometown, the doctor in the public clinic could not offer medical advice as the medical records could not be easily retrieved. She was recently diagnosed with benign tumour and a few tiny red spots appeared on her abdomen. Her family doctor suggested that she should start medical treatment as soon as possible otherwise the disease might spread to other major organs close to her stomach.

CH said that since last year she could not at times use her towel properly due to shaky hands. She was worried about the large quantity of medicine she had to take, but she followed the suggested dosage. She had a white A5-sized pouch where she put two small notebooks: one was for the YOT and the other for medical appointments. She made use of the notebooks to record to-do lists as personal reminders for different occasions. These were roughly in A6 format and consisted of 20-25 pages, and were white in colour (see Photo 33).

Photo33. CH sitting on a high stool in the middle of living room, intending to show the small notebooks, which became personal reminders, to the researcher

On the other side was a mini monthly calendar for her easy reference. She said that she could write a simple similar word on a large-format memo pad to remind herself when she did not know how to express the word itself or its meaning. When she finished using the page, she could simply remove it and have a clean sheet. This was one method she used to keep things in mind. She was eligible for the benefits offered by the Hong Kong government and she could receive a HK$3,000 subsidy each month due to her being over 65, which was enough for her to travel locally on a regular basis.

CH illustrated how to tackle life with MCI by maintaining a positive attitude towards the future. Her optimistic thinking and behaviour became a way of resisting negative feelings, which in our society we would normally assume older people living alone with MCI would experience. Maintaining an optimistic mindset about life is vital, and can be a way to balance the hurdles faced in day-to-day living with hope. CH did her best to focus on the many positive aspects of her life with her remaining abilities. She did not compare herself to other able-bodied people, or those in the latter stages of dementia. She always hoped for the best and planned for the worst. As long as CH was alive, she positively accepted her living situation.

SK is optimistic as she continued to learn after she retired and valued the programme she joined. She does not want to waste any opportunity to acquire new knowledge at the age of 79. She was diagnosed with MCI during a cognitive training programme, but this does not affect her motivation to participate in new programmes offered by the community centre. She still finds some happy moments in new things, although she must look after her husband after he was discharged from hospital.

5.3.9 Feeling Hopeless

However, CP was not optimistic, and she did not have happy memories of her life after her husband left her in the 1980s. She had to raise her children on her own as a single mother. She worked in the garment industry before she retired, which was a popular occupation for women. CP insisted that her whole life was a tragedy. A few weeks before my first visit, the government officer paid a visit to her to see if any repairs were required in her home or for the basic facilities. CP mentioned that she could not move the loose furniture by herself if the walls needed repair. If she saw a crack in the wall, she had to accept it. She understood that the flat would be returned to the Housing Authority when she died. She did not expect to have another decade of life as she was already 86. When I asked CP to share her happiest moment in her life, her immediate response was unexpected.

> *I: Can you share your happiest moment or event in your life with me?*
>
> *CP: The happiest moment? You ask me to share my happiest moment, but I cannot think of any one at all. The time in a typical day is long for me, and when it is over, another brand-new day comes again and nothing special…My younger son died a few years ago, which made me feel very upset as he was the one who treated me the best in my life.*

CP said that her sons and daughters did not pay her regular visits. However, they would invite her to Chinese-style gathering lunches of dim sum every four to six weeks as family reunions. She believed they were busy with their own family matters and had to work long hours, so they could not afford to visit on a regular basis. The gatherings were simple and not sophisticated at all. She did not have a religious background and therefore no routine gatherings took place. No social workers came to visit her unless she asked for assistance through the local elderly community centre of YOT, and it appeared that these visits occurred less often than before.

She rarely had other visitors from other non-government organisations on a typical day. She again said that the YOT had not paid a visit to her this year, and the last visit was over ten months ago. She noticed that the visits became less regular than before, due to the increase in older people in Hong Kong. However, she preferred to be alone if the staff treated these visits simply as part of their job, without giving love and care to older people. She understood each visit might be conducted by a new member of staff, and thus she was unlikely to build a good relationship with them. The centre staff would bring her a gift set consisting of a mini pack of noodles, crackers and cooking oil, but she did not need these extras at all.

Extra support such as a regular clean service from a domestic helper was in fact required. When she saw the dust and dirt on the floor and walls, she felt unhappy and wished to clean it immediately, but she could not do it solely by herself. According to CP, the government offered cleaning services in 45-minute sessions to older people living alone. She questioned the duration as she believed that this was not enough time to clean a flat, and the service was not regular. The cleaning visits may often clash with her social gatherings at the YOT. Different cleaners visited each time, so she could not feel comfortable and relax as she did not recognise them. She cancelled the service as it did not fit her purpose and schedule, even though she required help living alone. She said that she had applied to a subsidised elderly care home and expected to wait for four to five years. Another funding source in Hong Kong unfortunately refused her application for a living subsidy due to this doubling up of benefits.

> *I: Do you have one moment or achievement that you are really proud of?*
>
> *CP: Even worse! As I told you my life is a tragedy, I know nothing at all and am like a stupid pig! Some of the basic skillsets I have learnt in the past I could not make use of now, as I have totally forgotten…I have become useless.*

FY also said that she could not think of any happy moments in her life. Family issues such as her husband’s long-term illness and her son losing his job made her feel exhausted, hopeless and depressed. During the participant observations, I noted that both CP and FY do not feel any hope or happiness in their later lives. When they looked back on their lives, they described them like tragedies, and they felt they had become useless to society.

5.3.10 Confounding Forgetfulness

CP mentioned that she had a few good friends who had known each other for many years, but she did not remember their names or nick names or even take a guess at what they were called, although she did remember their faces. CP experienced memory loss as she talked with the centre staff, and she did not remember who had spoken with her after the call. When she met her retired friends who usually participated in the activities, she could not name them. Instead, she would nod her head or move her hands to show respect to them.

> *I: When did you realise you are getting worse in terms of cognitive function?*
>
> *CP: When I forgot to bring along my door key to go for raw food in the local wet market, I had to find my close neighbour who kept another key on behalf of myself in case of emergency…the next day, when I start cooking, I found my key inside the fridge without any reason. But this happened only once. I have a few times placed the key on the mattress…I am not good at calculation anymore, basic calculation such as addition and subtraction are not easy for me. When I go to market to get some raw food and am about to pay, I realise I have forgotten to bring along my wallet and give up buying the goods in the end.*

CP mentioned that she seldom engaged in the activities provided in the nearby centre as the number of people enrolling is far higher than expected. She was often put on a waiting list due to the overwhelming volume of applications. When she was not selected, she was upset and refused to apply for future activities. CP suggested that she like many older people would join activities that were free of charge. If there was even a small fee, she would not go for it. She said that she was not good at using the mobile phone app and intended to join one of the short courses, although the cost would still be a burden. When she learnt how to operate her phone, she could only remember for a while and then forgot, due to its complexity and flexibility. She forgot the name of the person she was just talking to over the phone and she could not remember the name of the staff member at the elderly centre who regularly offered caring service to her.

> *'I think I could handle the payment of a regular fee for the phone operator, however, I paid two hundred for the staff while actually I only had to pay two dollars according to the statement.' CP*

CP said that a few times she had forgotten to add soya sauce and white pepper powder to her homemade congee after she cooked it. She forgot that she was supposed to open the mini cap of the pepper bottle to sprinkle it on, and she unscrewed the whole cap and threw half of the bottle of pepper into her bowl of congee (see Photo 34).

Photo34. CP shows her white pepper powder, which helped her recall a memory when she was asked about her cooking experience

The design of such pepper containers fails to fulfil the needs of older adults who do not have a good education background and may make mistakes. Product design should be intuitive and inclusive and satisfy the needs of everyone. While CP realised that she had to go back to kitchen again or do without the taste of pepper that she liked, she did not remember the seasoning sauce that she had placed outside the kitchen. She stood still for a few seconds and thought about what was happening and what she needed to do next. I noticed that the fridge was located far from the kitchen in the corner of the living room. CP had to walk through the living room to get the seasoning bottle.

> *'While I was preparing dinner, I had intended to get some raw food for cooking. When I went out of the kitchen, I lost my memory and could not remember the stuff I was just dealing with.'* CP

She believed that even if the fridge was relocated in a better position, it would not help much as she could not remember the preparation procedure. CP tried not to cook using gasoline as she believed that one day she will forget to turn off the cooker after use. Instead, she preferred to use an induction cooker, as she understood that if a pan boils dry the heat will immediately turn off. She then said that she wanted to heat up the soup again using the gas stove.

While she was heating up the soup, she disposed of the waste outside the door. All of a sudden, the door closed automatically but CP had not remembered to bring the key with her, although she knew the door’s mechanism closed it immediately. The waste collecting point was just next to her flat, but itself-locked in two seconds (see Photo 35). Although she was eventually able to get in, her stainless-steel pot was badly burnt, and all of the liquid had evaporated. She mentioned that she had since given a spare key to a neighbour she trusted just in case it happened again.

Photo35. CP said that the self-locking system on her door was not user-friendly at all and created many problems

CP used to put her dollar notes anywhere in her apartment or inside something. For example, she put forty hundred-dollar notes inside a mini diary, which she did not frequently use. When she was about to throw it away she realised there were some folded dollar notes in it. I clearly noticed the large amounts stuff scattered on the tables, as it covered almost half of the table-tops (see Photo 36).

Photo 36. CP believed that if she could see all of her stuff, she would be reminded about what she was looking for

She had a large round table and a mini squared table. Snacks like biscuits, dried food and candies were packed in transparent bags so that she could see them clearly and easily identify them. She mentioned that the doors of the cupboard were made of plastic instead of glass as the original had been broken (see Photo 37). She could find what she was looking for as she deliberately ensured she could see it clearly. CP was satisfied with her taps and appreciated the design, as the taps were operated by pulling up and down.

I noticed that the walls of the corridor were tiled, which she held on to when walking to the toilet so she did not have a fall (see Photo 38). The space did not allow her to install a grab bar as it was blocked by a washing machine. The door lock of the washroom was not user-friendly, as it required two steps to lock it firmly. CP had to pull up the white metal handle and turn it to the left to unlock the door (see Photo 38). It took CP much effort to complete such a simple task, and over time the paint had been scratched off the wall. She needed to perform the entire task again to lock the door before she used the toilet (see Photo 39).

Photo 37. CP helped herself by replacing the original brown tinted glass with clear doors after they were broken

Photo 38. CP said that the tiles were the only things she could grasp when she could not balance well when moving around

Photo 39. The door locking method of the bathroom, which was not user-friendly and did not follow universal design principles

When WH tried to cook for herself and walked towards the kitchen, she experienced a sudden loss of memory. She had to go back to the dinner table and repeat the action again, hoping something would jog her memory. Both WH and CP experienced a confounding forgetfulness that deeply affected their daily lives.

5.3.11 Scared and Worried about Others

FY could recognise the streets and shops nearby in the daytime, but she could not identify after eight o'clock in the evening. It was not easy for her even if there was signage, such as the McDonald's fast-food store at the corner of the street, which was only 100 metres away from her building. She went in the wrong direction as she did not recognise the path to her building, even after a few attempts. She said that when she went to the nearby wet market, she sometimes could not find her way home. Her neighbour finally brought her home safely. She believed she could manage her day-to-day activities in spite of her poor visual ability, but actually she could not.

> *I: Can you give me one example of difficulties you currently face?*
>
> *FY: I cannot go sightseeing alone and I am afraid to do so. I have to travel with other people in order to have their support……I do not know how to read and pronounce words, which creates many hurdles when I place an order for food…People seem to not understand what I say although I can understand what they are talking about.*
>
> *I do not want to think too much and thus make me feel happier about life. I want to speak to people. I try not think about the past…talk to others and it will soon be better. Older people who are not able to*

> *walk, to see or to hear are full of pity. My son spent over three thousand Hong Kong dollars to buy a pair of spectacles for my eyesight correction, but I understand it is all about the degeneration of the visual ability. I have to manage the day-to-day difficulties by myself as my children need to work and have no time to take care of me. I don't want to bother my elder son as he has his own family and is occupied most of the time. Sometimes, I want to ask him for assistance, but I still don't want to get him into trouble.*

CP preferred to prepare daily meals through inductive cooking, as she believed this is safer than the traditional cooking method. She also believed that inductive cooking could reduce the likelihood of an accidental fire. She was scared, not only of unexpected accidents, but also of the consequences, as they could be life-threatening to her neighbours and concern her children.

FY, CP and WH all said that they did not want to bother their children as they had their own families and problems might occur. They did not want to get them into trouble and intended to fix any problems using their own abilities.

5.3.12 Relying on Family Support

FY mentioned that when she came home, she would place the front door key on top of the mattress, on the mini cupboard in her bedroom, in the kitchen, or anywhere in the living room, including on the two-seater couch where it was not supposed to be. Her younger son, PC, visited her at 11 o'clock and shared his experience of taking care of his mother. He said that he had taught his mother to place the key in a location that was obvious. This was a 4" x 8" rectangular area on top of the shoe cupboard, which was in fact suggested by FY (see Photo 40).

It was situated on the left-hand side of the front door, where other objects such as a drinking bottle, medicine and coins were scattered. PC suggested that having a designated area for key storage was essential for his mother in the long term. He said she always kept the key in her pocket in the past and lost it a few times. By making a habit of keeping the door key in the same place after use, people such as FY can cope with such simple tasks. FY also reported that she had a few times opened the gate and left the key in the keyhole when she went inside. PC also suggested that his mother might have problems cooking alone and using utensils such as a pot to boil water in.

> *I: You have mentioned that memory loss has been a problem over the past decade. Can you share with us a typical example in your life?*

> *FY: When I come home and open the front door, I put the keys in some place without any reason– on top surface of the shoe cabinet, on the Corian table-top in the kitchen, and sometimes it appears on the corner area of the mattress.*

Photo 40. The optimum location for FY to place the door key each day

The shoe cabinet was 850mm high, of a basic design, light in colour, and made of plastic. Neither graphical patterns nor decorative cut-outs appeared on the surface. FY again said that she needed to take medicine on a daily basis. She places a teacup next to the pill box to remind her to take the dose twice a day. When she removed the teacup, it signified that the task was finished, and she would not do it again. She had to make it clear so she would not take more pills than required. She said that she had a regular check-up with the family doctor every three months, and so she will finish her medicine before she goes to see the doctor again. There were a few times that she realised half the medicine was left in the bag after two months. The pills were packed individually, with ten pills in a set and five in a column. To be safe she will not take any pills if she is uncertain, to ensure she does not double the dosage.

FY typically wakes up at six o’clock and then does some exercise. She goes jogging and exercising with neighbours after washing. She prefers to go for a walk near Tuen Mum City Hall in the afternoon, which is30 minutes away from home and take a nap before preparing dinner for herself. Even though she remembered my face, she had forgotten my name.

FY said that she had a problem identifying directions. For example, she was unable to catch a bus in the right direction although the surroundings should have been familiar to her. This caused problems when she participated in a tour as the sightseeing destinations were new to her. FY’s orientation ability was low, and she had been diagnosed with MCI. She said she found it difficult to express her feelings to other people, although this would relieve the. She had to rely on family support when travelling outside of Hong Kong.

> *I: How will you use your calendar? It looks so new. How do you remind yourself to see a doctor on a regular basis?*
>
> *FY: No…my son will give me a call to remind me. My children usually do. The centre staff will also remind me to attend gathering activities a day before (see Photo 41). My lack of any education background affects my ability to read and write about the reminder…although other older people participating in YOT local community centre are barely educated, they are still better than me…I will use the apps but I cannot remove them after using. Usually, I press icons for phone calls, photo talking and instant messaging. Recently, it didn't function properly, and so my son asked for technical support, but all applications were removed when the cell phone was returned.*

Photo 41. FY said that the calendar did not mean a lot to her, as she could not write and relied on other people to remind her

FY's cooking stove in her 40 square-foot kitchen was fuelled by gasoline. She explained that she had a few cooking accidents when cooking soup in a stainless-steel pot. A Chinese chicken soup requires two hours' cooking time, so FY often took a nap on the couch and then forgot to switch off the gas when the soup was boiling. This situation also happened to her neighbour and the wall near the cooker turned black, due to the fire and steam. I accompanied FY to review the panel control design of the cooker.

Although the panel display included a digital timer, FY said that she could not operate it. The panel was 5cm x 1.5cm without any description next to it. There was a rotary knob that appeared to control the time with + and - icons. A large black rotary knob on the right-hand side was the gas supply control, surrounded by tiny, printed graphics that FY could not see. She only used the turning button to ignite the fire.

In addition, the sugar and salt containers were similar and placed next to each other, while FY used another container for storing cooking powder to keep them separate. The powder could be distinguished as it was solid white in colour, while sugar and salt are slightly opaque. She also made use of chilli sauce and a bottle of oil to help her strengthen her orientation. A rice cooker was placed on top of the dining table filled with old newspapers. The power cable was stretched across the table and chair from the nearest socket. She explained that she had frequently forgotten to press the cooking button. When she thought the dishes should have been ready, she realised that the cooker was still cold. This had happened almost 10 times over the past year, and she used this cooker nearly five times a week. She could accept this as she believed that it would not cause a fatal accident.

FY also showed me her bathroom setup. A stainless-steel handle was installed on the side wall to assist her when taking a shower. A grey square four-legged plastic stool was near the wall. Water leakage was still a problem, although she had done some maintenance in the past few years doing. She could still identify the difference in colour on the wall due to the water leakage. Around a fifth of the wall had become off-white, which was annoying. FY expressed that unlike other older people, she cleaned her flat by herself without hiring an hourly maid cleaning service.

Typical activities included cleaning the floor, windows and tables and curtains three times a week. Previously, FY received several A4 sheets printed by her son – a modified Sudoku that required players to fill out the remaining figures in the blank areas with 1, 2, 3 and 4 so as to provide her some brain exercise. The basic rule is to put numbers in the rows and columns without duplication. I realised that some columns were not correct and needed to revisit for correct calculation. Medicine and keys are the most important items in FY's typical day.

Older people living alone often rely on family support in their daily lives. CH could not fix the fluorescent tube for two weeks. She had a younger brother in Hong Kong, but their relationship was not built on trust or care. CH felt upset about her lack of family support even though close family members were nearby.

5.3.13 Treasured Social Participation in Later Life

SK said that she was eager to attend social activities and re-joined some a few years ago. She paid the membership fee for three years as she thought she would not be able to remember the date of renewal each year. The learning activities included learning origami step-by-step, to make a flower out of folded paper (see Photo 42). They also took part in a scenario of shopping in a wet market where participants were allowed to choose various foods to buy and practise transactions with sellers. It also included a range of outdoor exercises such as lawn bowling with other older members of YOT. After each session, the participants were required to do conduct a health check to see if their cognitive levels had changed. SK also mentioned that she had taken a group photo at the cognitive camp, on the last day of the programme concerning precautions against dementia.

> *I: What were the requirements concerning the learning activities? Is there anything you need to fulfil in the programme?*
>
> *SK: If you have been selected to join the programme, you need to attend all sessions. If you can't show up, you need to report an absence. I don't want to waste any opportunity in this class! If I have to leave for any personal matters, I will find another class to attend…I can't believe I still have chance to participate in such kinds of outdoor activities!*

Photo 42. SK shows the origami flower to the researcher that she had made in the recent group training

CH and FY were old friends and had known each other for decades when they moved to Tuen Mun. They have regular lunches together every Saturday as they both live alone. Social participation has become important in their later lives as they could exchange life experiences about their grandchildren and remind each other about the activities they had booked at the YOT.

As mentioned, FY could understand local people as she had been living in Hong Kong for many years, but she still could not speak Cantonese well, which obviously affected her participation in training activities and her communication with others who did not understand her indigenous language. WH worked as an event support volunteer as she could meet and learn from other people of different backgrounds.

Social participation was essential in the daily lives of CH, FY and WH. Although some studies suggest there is no association between MCI and social participation, this study demonstrates that social activities can potentially be a resource that affects the progression of MCI to dementia, as they can provide a platform to connect with people living with MCI and other unaffected adults (Hughes et al.,2013).

5.3.14 Hidden Family Burdens

I asked SK what the happiest moment in her life was. After thinking about this for a while, she said that she enjoyed the beginning of her retirement at the age of 55. When she retired she spent a few years looking after her daughter's new-born baby, which was not easy for her. Her daughter still needed to work long hours and so she helped her take care of the baby.

> *I: Do you have any happy moment in your life you want to share with me? What is it?*
>
> *SK: I am glad that all of my daughters and sons are in good health, as poliomyelitis was a major risk at the time. Although they are not well-educated, my elder daughter had the opportunity to become a personal secretary at Time Magazine!...My two sons were not good at academic study, but they still got entry jobs and work hard…They are all grown up…but you know, everyone is not the same. I told them seriously, it is not the end of their lives when they face difficulties in their own lives.*

SK also shared her experience of living with her husband. She moved to the Tung Mum district, which was a rural area in the 1990s, because she intended to avoid the street gang that could have had a negative influence on her husband.

Her husband suffered from a series of strokes when SK was 60. He did not listen to the doctor recommendation and as he had been addicted to alcohol and smoking in 'the good old days', his situation was even more serious. SK realised that she could not take care of him anymore. She discussed it with her daughter and decided to hire a domestic helper who charged by the hour. She then recently hired another to assist her as she was no longer able to take her husband to the washroom as it required a lot of strength. After the third stroke, her husband could not move unaided. This prevented SK from participating in the group stretching exercise for elderly people provided by the YOT that she used to attend regularly. Her husband was also seeing a psychiatrist regularly.

> *I: What is your happiest moment in your life?*
>
> *SK: It was the period after my retirement, and I wanted to learn something new and to see something I had ever seen before…I want this but my husband does not.*

Not surprisingly, SK stopped participating in the observational research due to her husband's health condition after one and a half months. When I visited SK, I realised she did not feel comfortable at all. She needed to look after her husband as the domestic helper had not yet arrived.

I did not hear a word from him, as he was taking a nap in the living room on a long couch. It seemed to me that he had a serious illness. When I visited SK for the second time, she said that she had got a headache and that she could not concentrate on the research project. On my last visit, she said that she needed to take her husband to hospital to have a mental health check, to see whether his hypomania had developed into mania. Thus, she would be alone for a while. I had to reschedule my third visit as no one responded when I rang the bell. I assumed SK was out for lunch.

Many people living with MCI have similar hidden family burdens. Some like SK occasionally live alone, in fact, and must face the pressure of taking care of a companion who suffers from other diseases. Thus, living independently becomes even more difficult and they need to ask for assistance. Opportunities for social participation will be greatly decreased due to this hidden family burden.

CH said that she was upset about her younger brother, who was born in China and had moved to Hong Kong. He knew CH had cancer and did not care about her. He first persuaded her to share her property in China with him and then forced her to hand over100% of the property rights if he promised to take care of her at the end of her life. This made her felt depressed and she felt she could not trust him anymore. CH's brother was her only close family member, and this loss of family support became, as for many people living with MCI, a hidden family burden as they needed extra on a daily basis.

5.3.15 Community Spirit

In late 1990s, WH had a car accident, which resulted in her not being able to work for the rest of life. She looked for any opportunities to serve as a volunteer to contribute to society. In addition to YOT, she helped at the Hong Kong Federation of Trade Unions, making calls to remind members to actively participate and assisting the events manager. She enjoyed serving as a volunteer to support her neighbours, and was introduced to the centre manager of YOT who helped her apply for public housing (see Photo 43).

> *I: Can you tell me why you live here and how long you have been living here in Tung Mum?*
>
> *WH: Before I lived in Sha Tin (New Territories)…one day the respective district councillor told me that I could apply for single living public housing while I was working as a volunteer for event*

> *support…After I settled down, the first thing I did was to find out the elderly centre close to me. I firstly registered at YOT and then become a volunteer so I could get in touch of other people… Through interactions with different people, I can learn how to do things right and to communicate with people with different backgrounds.*

Photo 43. Unlike other older people with MCI, WH had written down the volunteering duties she had over the next few weeks on a standard calendar

WH felt blessed as the Housing Department offered her a subsidy to rent a flat over a long period, and her living allowance from the Social Welfare Department increased as she had not had any income for years (see Photo 44).She said that she was satisfied with her current living standard and told her children that she could manage her day-to-day activities by herself. She was pleased to participate in the community centre, as the staff and other older participants knew her well. Each year, she contributed over 300 volunteering hours to society, through roles such as project helper and activity facilitator.

> *I: Do you feel lonely when you are living alone for long?*
>
> *WH: I don't think so, since I'm now experiencing a long period of prosperity. I don't spend much in a typical day. The social service voucher offers me low-cost medical support…I have many people to take care of me and understand that my children are busy at work most of the time, and accept they are unable to visit on a regular basis…*

WH said that unsurprisingly, she and her children have different living habits. She was happy, optimistic and as she was still able to walk, she tried her best to live independently. If she deteriorated, she could still apply for the subsidised elderly care home in Hong Kong, and she felt she would still get support from her neighbours.

Photo 44. WH lived in a subsidised flat provided by the government, which was a 10-minute walk from the local community centre

> *I: Do you feel any pressure in your life? How do you deal with it?*
>
> *WH: Unlike other older people in Hong Kong, I seldom go to restaurants to order dim sum in the morning. I believe the food is unhealthy, particularly for an older person. YOT offers health talks to members so they can learn more about healthy eating habits, and I will follow their suggested recipes…I usually wake up at 6:30am and the visit community centre in the morning after exercising. I have learnt how to use a used plastic bottle filled with red beans as a dumbbell. Let me show you the stretcher for stretching exercises…*

WH said that she had devised a way of keeping healthy by making a dumbbell through an activity at YOT. She regularly did stretching exercises with a stretcher, as she believed this could be beneficial to her memory.

> *I: Do you have any moments you can remember that made you feel happy? Can you share one with me?*
>
> *WH: When I was in the community centre, many people in the centre already know me well…When my leg was broken, I couldn't go out and prepare food for myself, but the centre staff and those senior volunteers in YOT wholeheartedly take care of me. When they said how are you today WH? I felt warmth and happiness around me.*

WH left her door key at home a few times when she went out shopping. She then got a spare key cut and gave it to a neighbour who lived next door. This potentially saved WH money, as she may have needed to call out a locksmith.

YOT had become a second home for WH, as she could feel the love and care of the staff and also those who served as volunteer assistants, like herself. They would give her a call to see if she had recovered from the fall, although WH often did not remember the name of the staff members. Community spirit can be found everywhere, which makes her optimistic when she faces challenges.

CH and FY illustrate this community spirit as they regularly met to share happy memories and support each other. Very often, they applied for the same activity. They lived in different buildings but in the same public housing estate in Tuen Mun. Although CH may not fully understand what FY says, as her pronunciation of Cantonese might not be correct, she is supportive and they visit YOT together and thus participate in society. CH believed that community spirit can promote a better community, which is why she participated in this research with FY.

5.3.16 Lack of Universal Design Elements

WH mentioned that her memory had been declining since 2015. She said that she once had a strange experience, as she intended to prepare dinner and walked to the kitchen, but stood in front of the kitchen door (see Photo 45) and her mind went blank for a few seconds. She then walked into kitchen again and saw the cooking utensils.

> *I: Can you describe an event in your daily life that was an uncommon experience?*
>
> *WH: When I intended to cook a meal and walked towards the kitchen, I didn’t know what things I should get to prepare for cooking. I don’t know why…I went back to the dinner table and repeated this again to see if I could remember.*

Photo 45. WH cooked for herself everyday but realised she could not remember day-to-day activities as well as before

As WH did not want this situation to recur, she thought of putting a S-shaped hook next to the door lock so that she could easily hang the door key immediately after closing the door (see Photo 46). A designated place for putting door keys helps her remember. WH also said that she had placed her keys in the wrong place when she arrived home. She then had to spend extra time finding the key before going out. She therefore designed a hook to attach onto the back of the front door so that she could always put the key in the same position.

Thus, she could locate the key in the visual area of the front door before she opened it and left the room. She sometimes found the key in her bed or bathroom, which made her very frustrated. An automatic door locking system can thus be a significant problem for older people living alone, and should be addressed.

> *I: What will you do as I can see you are not good at memorising day-to-day activities?*
>
> *WH: You know, older people are not good at memorising things, thus, they find a way to help them build up their memories…like when clearing out the trash bags, I need to see my door key clearly as a quick reminder to collect it so that I can return back to my flat after clearing.*

Photo 46. The S-shaped hook was placed in a good position so that WH could put her keys on it as a reminder before going out

Older people often throw bin bags into the nearest rubbish collection point, which can be at either side of the corridor. Thus, they will need to take their key as they will walk there and return home. The front door closed automatically with a strong force, so if WH forgot her key and went alone to the collecting point, she would be locked out. She did not want to bother her son to help her as he lived far away.

I saw WH preparing her breakfast of instant oats and boiled eggs. Occasionally, she would steam chopped chicken and boil fresh vegetables without adding any cooking oil. She believed that such a cooking style was healthy. Thus, she spent a good deal of time in the kitchen, as she prepared three meals a day. She needed to have a well-equipped kitchen cabinet to make preparing food easier.

She used a pocket-sized notebook to record the daily scheduled tasks and activities. She was given this at an event initiated by the government. She also had a personal pocket-sized diary for recording upcoming events other than centre activities. This became a reminder when she faced memory deterioration. WH had previously been an active traveller and had visited most of the major cities in China.

WH enjoyed travelling, but her current cognitive state meant that she found it hard to find a companion to go with. She had put aside her dream in the early 2000s, and now simply watched TV programmes about tourist attractions she had never visited. When she was not serving as a volunteer, she stayed at home and watched TV. When I asked WH to pass me the remote control to have a look, she said that she seldom used it and simply pressed the button on the TV instead (see Photo 47). WH preferred this simple and direct operation.

Photo 47. The TV set is close to the convertible sofa bed so it can be easily managed

CP said that her white pepper pot was difficult to use, as the holes for the pepper powder were too small. She had to shake it quickly to force the powder out. Once the plastic cap suddenly came off and nearly half the bottle of pepper went into her congee. Dispensing pepper as required is not usually difficult, but those living with cognitive impairment often have limited perception and ability. CP did not realise the cap and the bottle were two separate parts and paid no attention to how she shook it. A broadly applied design for all condiment containers could address this issue and benefit all users.

Universal design principles should be widely applied in public housing, to ensure access for the greatest possible number of people, so they can operate products and systems independently. Product and home furniture designs should work well for not just the able-bodied but also for disabled people and should support the delivery of care for a wide range of needs. The ultimate aim was to achieve affordable, accessible and aesthetically pleasing design involving people living with mind cognitive impairment.

The current standard of public housing does not fulfil the needs of WH, as she had to devise a method of solving various problems in her daily life that others might take it for granted. The auto-locking system failed to satisfy any ‘tolerance for error’ criteria, as the system could not determine whether the user was going out very briefly or for a long period, such as going to work or to a social gathering that did require the door to shut automatically for safety. As WH was living alone, no other family member could immediately come to her aid and calm her down. Therefore, the auto-locking system was potentially a problem. This was the standard design implemented by the Hong Kong Housing Authority, but was not suitable for people living with MCI, and particularly those living alone. Universal design can extend people’s quality of life, however, for those who are diagnosed late-stage dementia, a well-defined household product design underpinned by Universal Design Principles is still remain strange to the patient (Harrison & Dalton, 2013).

5.3.17 Loss of Verbal Memory

WH also said that at times she could not find appropriate or even a simple words in a verbal dialogue context as she used to. She explained that if she remembered something that was funny or she saw a photo that was extraordinary and wanted to share this with centre volunteers, she could not find the correct word or a phrase to represent the experience.

> *I: Do you remember a situation in which you were not capable of finding a word to represent your intended context? During social gatherings? Having a meal? Or shopping at the wet market?*
>
> *WH:I saw something interesting, and I wanted to share it with someone…I couldn't figure out how to express it or how to describe it with a simple word…Hmmm…I can't remember it…you know, I'm not good at it…Hard to remember!*

In the MoCA cognitive assessment, WH obtained 21 marks and was therefore classified as with MCI. She said that she could not think of the exact wording when she wanted to indicate what she had in her mind. When she came across some interesting dialogue, a funny image or video clips, she did not know how to express it naturally as she used to. WH was thus less inclined to speak in a group of people and would smile at people to distract them.

She mentioned that she would only use ten dollar notes to purchase food at the supermarket, which was near to that the total sale price so that she could calculate the change easily without further calculation. She had a bad experience paying for vegetables with a hundred dollar note when the seller complained. For WH, the impairment of losing her verbal memory harmed her ability to communicate with others using the correct words. This type of problem can deeply affect those with MCI, as it can prevent them from having regular social participation and building up social support within their community.

SK could not name the things she intended to buy in the nearby shopping centre, and thus she was unsuccessful as she did not how to describe them correctly. She could not recall at the critical moment the main words or even the everyday items she usually bought. Thus, MCI affected her quality of life.

5.4 Interview

In-depth Interview with the Manager of the Elderly Centre

5.4.1 Interview with the Site Manager Providing Caring Services

The interviewer knows the areas to be covered while allowing the interviewee to take different pathways and explore different thought, thus they are equal partners. Sinding and Aronson (2003) reflected on what successful researchers can bring to an interview, how it can affect those taking and thus jointly create ‘liveable stories’. Interview data as a resource represents conventional social science perspectives, in which the interviewee must obtain pre-existing knowledge, i.e., attitudes and experience, to ensure the data are genuine (Baker, 2004). These data are eventually analysed by the interviewer who can then discern a ‘theme’ in the content of what the interviewee expressed.

The centre manager (M) had worked at the non-profit-making organisation of YOT for a decade. She was a 45-year-old social worker who had been dedicated to providing elderly care services over the past 15years for people in need. She mainly provided training services and monthly activities for older people living with MCI and early dementia. She explained that on the fifth floor of the building there was a day centre focusing mainly on those with dementia. Her office was on the fourth floor, and the interview session took place in one of the activity rooms on the same floor.

Those with dementia were all over 60 and had been transferred from local hospitals to YOT through a matching rehabilitation programme. New members were also recruited regularly through community services for older people. M said that the centre staff dealt with people living with MCI who did not understand their situation, and thus they often forgot to attend events they had registered for. The centre staff would then recommend that they attended a cognitive assessment. Several cognitive assessment tools including MoCA were used to verify whether an individual was a confirmed case or at a different level of cognitive impairment.

‘Serious games’ are used to identify those who may have mild cognitive impairment. These offer opportunities for players to think and make judgements while playing. Viewing TV programmes typically requires the viewer to watch passively without a process of deep thinking. In these games, however, as M insisted, play is interactive and allows players to use their brain to make judgements on their own, while supported by the facilitator. Over 200 members were classified as having MCI, and were all aged 60 or above.

M’s main responsibility was to oversee the administration of the centre and to provide cognitive training to the older people in need. She had also taken part in several participatory research programmes regarding the daily problems faced by such people. She designed new programmes for new members of this elderly community, and provided care and support to them, and particularly to those with dementia.

She mentioned that the district the older people lived to some extent determined their needs. For example, those with mild cognitive impairment living in Tuen Mun (New Territories) had different needs from those living in Causeway Bay (Central Business District). The discrepancy was due to the widely different financial and education backgrounds, the people they met each day, their past experiences of working in Hong Kong in addition to their living culture. Tuen Mun also has a sub-culture of new immigrants from mainland China. Many of the classic public housing designs in Tuen Mun district were developed in the 1990s to address Hong Kong's expanding population.

5.4.1.1 Insufficient Supporting Services

I noted previously that some older people involved in this research study wanted their cleaning services to be provided by the same person. They mentioned this when they requested the volunteer service from the non-profit making organisation. Due to limited resources, however, house cleaning services can only be provided according to the availability of volunteers. The waiting time was unexpectedly long.

> *I: What challenges do people with mild cognitive impairment face?*
>
> *M: A few members in my centre who have mild cognitive impairment are offered volunteer support in weekend activities. However, the biggest challenge is that one might not easily understand and recognise oneself as having cognitive impairment. Whether there is a helping hand to give support at the right time is also crucial to them.'*

M indicated that the biggest challenge was to educate the general public about the meaning of MCI. Older people may believe it was just a sign of ageing. If they did not have a medical background they would find it difficult to determine whether they had MCI or early dementia unless they were examined by professional healthcare practitioners using indicative tests, such as MoCA, for early and accurate detection.

Experiencing memory loss or other forms of cognitive decline can lead to uncertainty and stress for everyone involved. In addition to healthcare professionals, others involved such as family members and caregivers needed professional advice when taking care of people with cognitive impairment. Identifying how each individual's cognitive function is affected is essential, to ensure any treatment is unique and appropriate. A cognitive screening tool should be applied by healthcare professionals, and public seminars and talks can be provided for potential sufferers.

The older people with cognitive decline involved in this ethnographic study were mainly living alone. It is not easy for them to overcome difficulties, or when they need help in their daily lives, for example with finding a smart phone to communicate with others, looking for seasoning when preparing meals or forgetting the correct way home.

5.4.1.2 Universal Furniture and Accessory Design

M said that the majority of very old people did not have a good level of education, so information given to them should be easy to understand, simple and intuitive. It should not require advanced language skills. For example, when explaining the rules of the serious games aimed at lowering the rate of cognitive deterioration, the facilitator should speak clearly, particularly if their facial expressions were not visible.

> *I: Is there any difficulty communicating with people with cognitive impairment?*
>
> *M: There should not be a problem if the caregiver is trained in elderly care focus. Caregivers should explain things more than one time to those people living with mild cognitive impairment. One of our roles is to identify the ability of the patient and give support to them, that's why the training of our staff is important. And, they need to speak and explain clearly…normally they do not have good education backgrounds, as you can imagine. However, due to the pandemic, the centre staff are now required to wear a mask, so the older people are not be able to see their faces and emotions while talking. We need to take care of them with our hearts.*

M also explained the possible ways of coping with memory loss, which is common for people living with MCI. One effective way is to develop assistive home designs that consider the user experiences of those with MCI without sacrificing aesthetically pleasing qualities, by integrating user needs with design elements to develop accessible, affordable and attractive products.

> *I: Can you describe any difference between a normal older adult and one with mild cognitive impairment, and how do you manage those suffering from short-term memory loss?*
>
> *M: The latter lacks confidence to talk with people, in our case, they may not be sure whether they have registered for a local tour or an*

> *exercise class. We must find some measures to help each patient as their unmet needs are not identical, for example, making use of stickers and post-its on locations to remind them about the task they should do in a typical day…I think a good measure does not simply serve as a tool to help them live easier: instead it should be immersed into their daily life in terms of furniture and accessories seamlessly. Commercial design should be developed in this way, and not just focus on aesthetically pleasing qualities without paying attention to the genuine needs of users.*

M revealed the problems found in local public housing that have developed over 40 years. She said that some older people tried to help themselves remember their daily schedules and tasks through memos and post-it notes on top of cabinets or on the backs of their main doors. They often hung up wall calendars that had each month on different sheets of papers. However, even if the calendar was large enough and had enough white space for writing, it often did not help those living with mild cognitive impairment, as many of them could not read or write well.

Thus, writing was a barrier for this group of people. Even though they could remember the shapes of words, they could not write them on the calendar properly as they did not know the correct sequence. Good calendar design can assist older people and help to remind them more effectively about events, and the design should be easy to use and let users understand the meaning of each reminder, by using colours and icons. Thus, all family members could use the same calendar without stigmatising those with cognitive impairment.

Researchers have recently examined smart home designs for older adults using databases of user behaviours collected from a smart community. Although such contributions may help increase the acceptance of technology and individual user experiences, they may not be easy to apply directly to those living with cognitive impairment. In a few research cases, home modification and decoration could worsen the situation and affect older adults' quality of life (Trecartin & Cummings, 2018).

Home decoration and modifications using smart technologies can theoretically enhance the level of independence, but their effects in the specific home environments of older adults of various cognitive levels are still being explored. M suggested that food and drink should be kept in separate transparent containers that can be easily recognised and identified, and the product design should be governed by universal design principles, so that the design itself provides adequate information and any essential information should be fully legible.

5.4.1.3 Enhanced Interaction and Bonding

M had been a social worker for around 20 years. She was experienced in communicating with older adults living with dementia and MCI. I asked her about how in general we can communicate effectively with older people with MCI, particularly those who could no longer express their intended meaning with the right words after suffering from cognitive decline.

> *M: Accept and support them. Even as a normal adult, sometimes we might forget the words we want to use to express some specific meaning. Ask a few more times to see if the patient can provide you with more information and adjectives to construct the meaning. We may need to reconfirm the answer again with them if we have doubts about it. We should try our best to facilitate their expression.*

As I talked with M and shared my research experience with her, I realised that sometimes people with MCI appeared to not understand what we were saying and what we really wanted them to respond to. For example, older adults were not familiar with the term *day-to-day activity*. When I explained the meaning to them, they nodded. When I mentioned the term again the next day, they had forgotten it and I needed to introduce it once again. I asked M if there was a specific method of helping people with MCI express themselves more effectively.

> *M: There are a number of ways to help them better comprehend a meaning, such as through supporting images. For example, after finished an activity organised by the centre, participants were asked to give feedback by filling out an evaluation form. The Likert scale might be too abstract for older people, however, if we apply visual images – a happy face or a neutral and sad face to represent the satisfaction level of each participant, that will be helpful to them.*

Taking good care of people with MCI requires a professional skill set and proper training as some may be less responsive and their expressions may not be obvious to care givers and family members during group activities. I asked M if she could share her valuable experience and observations of such situations and what can be done to improve them.

> *M: While they are not good at expressing words and thoughts, they may feel discouraged and speak less, which further hinders their expression. In fact, they will repeat actions such as swinging their legs for self-stimulation when they are not good at communicating with people…We observe and discuss with their family members when possible, and try to learn more about their backgrounds before they began suffering from mild cognitive impairment.*

M said that a man recently visited YOT and became a new member. He generally sat alone, aside from other members without talking. They realised that he used to be a salesperson in property sector and spent most of his life in the industry. M then initiated the bringing in of newspapers with property and investment sections, and started to discuss them with him as it was his personal interest. A dialogue then began and they formed a bond due to the mutual trust and support.

I then expressed my concern when I saw older people that appeared to be anxious and upset. It happened several times when I conducted a participatory design workshop in the community centre. I asked M if there were any constructive measures we could apply when people living with MCI showed irritation and impatience.

> *M: For those in a weak medical and health condition, we will first record their body temperature and also blood oxygen level to make sure they do not have a fever or other related disease. They should be able to give feedback to us. We should understand that older people may become anxious and feel sad due to physical weakness. We will engage in chit-chat according to their interests, take care of them and see if they need help in their daily activities. They might share their stories with us, no matter whether they are happy or miserable stories.*

As M had been working in YOT for years and had organised various training to help YOT members to mitigate cognitive decline, I asked her to share her view in terms of the development of MCI to progressive dementia, the time frame of development she witnessed in her older members and the percentage of members with MCI among those at YOT.

> *M: I let them participate in the activities and the training provided by the centre so that they can actively apply their cognitive function during participation…it depends, if the patient has a long-term illness such as high blood pressure or diabetes, this may accelerate the process of deterioration. They may have a fall due to their low level of muscle power. Such kinds of injuries will induce further deterioration. You can imagine when someone cannot go outside and do exercise as usual, their personal health will possibly be weakened. They may just stay at home for a long time without interaction with others. If they cannot manage their health condition, they will incur cognitive decline.*

5.4.1.4 Respect and Mutual Trust

Before taking her managerial role in elderly services, M developed a series of game sets and training programmes for members with MCI. She worked closely with 1,000 members who faced different levels of cognitive deterioration. I asked M if she could share a stressful experience in her working environment when taking care of cognitively impaired patients.

> *M: I had an experience of handling a complaint concerning a male member of YOT with dementia. He was 75-year-old and has a bad habit of swinging his hands in an impolite way that made other people feel uncomfortable and embarrassed, as most of the centre staff are female. We did not confirm whether he had the deliberate intention to harass his caregiver in the day-care centre or if his unconscious movement is just an expression induced by early dementia…Because of this, we put more effort and time into relieving the stress of my staff and meeting the family of this member to verify his unusual activity. We tried to learn more about his situation.*

M said she gave telephone calls to remind older people to attend activities they had enrolled in a few weeks ago. They were pleased to have these gentle reminders as this was a kind of personal care, particularly as they were living alone. She indicated that she could still manage this and did not feel stressful at all when she had built up a relationship with trust. They would not perceive the reminders as annoying, and were happy to receive them before a new activity began.

A caregiver charged with preserving the dignity of a family member, centre members or residents, who was familiar with care-giving, will become less sensitive to little things that could make a difference for those receiving care. I wondered if M could share her thoughts on how to maintain dignity and respect to anyone with MCI while delivering services and support to them.

> *M: We try not to call a person by their nickname as this may appear too naïve and childish, and instead, we will use their full name to show respect in this regard. The nature of the dialogue between us should be adult-to-adult, but not adult-to-child or parent-to-child…Some old people need us to give support in terms of food intake and assistance when going to the restroom. We will not use the specific terms we use to talk to babies and use it for elderly people with cognitive impairment. Privacy is also important. People with mild cognitive impairment required extra time to change clothes when participating in a centre event and we should not urge them to finish a task without considering their cognitive function. We aim to protect them with highest degree of dignity and privacy.*

Over the past few months, M mentioned many activities that were provided for elderly members. Older people may feel they are cut off from the world and isolated if they have no social life. This can damage their sense of identity and dignity. Having a social life can effectively instil a sense of purpose that certainly improves their quality of life. It provides an opportunity to show mutual respect and build trust.

5.4.1.5 Everyone is Unique

I asked M to share an experience that could help newcomers and serve as a reminder when offering care.

> *M: People with mild cognitive impairment do not lose any human abilities except cognition. They are suffering from a damage to the memory, but they are good in some areas –for example, cooking a tasty dish. I met a few members who are good at painting and art creation. They are different from the stereotype we usually see in our centre. You should also understand that everyone is unique, they have different preference and wants. We spent time exploring other domains outside of memory training, such as art making…*

M said that YOT offers classes by local art therapists, and participants can learn to draw using water colours, oil paints and paste-ups. The results were amazing, colourful and created based on the topic of love and care. Everyone is unique and not just defined by their cognitive function, but also by their ability to express through art. She intended to organise an exhibition outside of YOT to provide more exposure to the general public and to share the caring knowledge and the characteristics of MCI. The quality of the artworks was very high, and they were unexpectedly beautiful and meaningful.

Due to the pandemic, many large-scale events were suspended. M could only collect the portraits and handmade artworks and be ready for future opportunities. She explained that she intended to create an exhibition if there was funding support from a prestige foundation.

5.4.2 Interview with TM, a Local Caregiver

TM was a committee member in the Hong Kong Carer Alliance for Dementia. The main office is situated in Prince Edward District, a shared space offered by St James Settlement Continuing Care. He was 55 years old and living with his mother who was diagnosed with MCI in 2012 and developed dementia within five years. He was currently a senior staff member in an investment company. On the first day I met TM in his modern living room at 5pm, after office hours, he was tired but eager to share his life experience with me. He had been invited by other universities in Hong Kong to participate in many in-depth interviews over the years. He agreed that our entire dialogue could be recorded for education and research purposes.

5.4.2.1 Being a Family Caregiver

TM had been a typical family caregiver for years. He had observed his mother's MCI develop into dementia over the past few years. I asked TM to give a brief introduction of himself and share his long-term care-giving story with me.

> *TM: Good evening sir … my mother had a fall in 2012 when she was about 79 years old. I remember that at the age of 75, she experienced memory loss and she could not find a route to return home after a family gathering. After the fall, she required a surgical operation on her worn-out joint, which was the only way to save her leg so she could walk again. Obviously, her cognitive thinking ability unexpectedly declined and developed gradually into dementia after the surgery. She took rest for a long time most days after she was discharged…My mother realised she has a memory problem for long, therefore, I brought her to a nearby community centre to do the cognitive test a few times to see if there was any discrepancy about the results. The report of the first examination is classified as mild cognitive impairment (second tier), whereas the second and the third time were both recorded as dementia (third tier).*

TM explained that a normal adult taking this cognitive test would be expected to be in the first tier, i.e., without cognitive illness. Hong Kong has a world-leading public medical system. He said that the cost of a cognitive test was around 200 dollars, which with acceptable. I wondered if the test was the MoCA, as this was a straightforward method of diagnosing patients, so they could be provided with an appropriate treatment plan. It is regarded as more precise than other cognitive tests on the market.

> *TM: The MoCA test is composed of a set of questions to test an individual's memory ability, judgement-making, identifying shapes and images and calculation.*

As a family caregiver, TM had shown genuine respect towards his mother. He was a member of Hong Kong Alzheimer's Disease Association, which is dedicated to providing support to caregivers and the development of academic research into dementia care. I asked TM to share with me his thoughts about the responsibility of a typical caregiver.

> *TM:…it is very difficult for someone to take care of those with*

> *dementia as each of them has different needs and requires specific help. I will share my experience of taking care of my mother - she is well-educated and obtained a Master's degree, which is quite uncommon in her time. Since the year before last, she can hardly remember who I am…To me, she still has a certain 'level' of cognitive function, as she will try to avoid directly answering your question.*

TM believed that people living with dementia who have a higher level of education will be more likely to cover up their cognitive impairment. I asked TM if his mother's cognitive level became worse after her fall.

> *TM: You're correct…her self-caring ability dropped significantly after the accident happened to her.*

TM would be 60 in five years. He was now living with his mother as she could no longer care for herself. He said that each sufferer was so different that we need to address cognitive decline on a case-by-case basis. He appeared exhausted when he talked about taking care of his mother over the years.

5.4.2.2 Feeling Depressed and in Low Spirits

> *TM: 'Do you still remember me?'*
> *TM's mother replied: 'I remembered.'*
> *TM: 'Do you remember my name?'*
> *TM's mother replied: 'How come I don't know?'*
> *TM: 'Then what's my name?'*
> *TM's mother replied: 'I don't want to talk about this'*

TM said that his mother never remembered his name anymore. He was extremely upset about this and spoke slowly when explaining this miserable situation. He still believed her cognitive ability was 'high' as she seldom went off on her own and usually recognised other people. Once in 2019, she did not know how to get back home. I asked TM about how he communicated with his mother and what he would do to help her express herself better.

> *TM: If the patient has a relatively good educational background and she understands that she has got a cognitive illness, I believe this is still a good sign for her and her family, otherwise, she may have different types of weird behaviour…She may believe someone stole her stuff and quite often she will get lost and cannot find her way*

> *back home. I feel exhausted…and it is so difficult to communicate with my mother in such a situation…I need to take good care of her emotionally. When she remembers the good old days, she will be stimulated and cannot fall asleep. She will keep asking questions…as she lives together with me most of the time.*
>
> *I: Have you found that people with cognitive impairment cannot express their thoughts with the correct wording?*
>
> *TM: I believe those people with mild cognitive impairment are less likely to have mental illness than people living with dementia, however, they are quite stubborn about things they believe are correct. Even if we have proved it is not the truth, they will still believe we are bad guys and not trustworthy…My mother used to be a teacher, could you believe that she will speak foul language to me?*

TM said that some types of stimulation led to negative emotions in his mother, which he could not understand. It would be good for her if he could do something to calm her down. TM understood that his mother would forget the things she had just said and the way she had said them.TM felt sad and despondent when his mother used foul language, which he could not imagine her ever doing and never thought was possible. In the latter period of dementia, she could not make judgements about what was correct. It was ironic that TM's mother was a teacher for decades, and this fact put TM into further low spirits when he was taking care of her.

5.4.2.3 Financial Difficulty

TM made a major contribution to his mother's health over the years. Unlike other families who put elderly relatives in dementia-focused nursing homes, TM did his best to take care of his mother. Taking up this role was not easy, as many unexpected and unpredictable situations were likely to occur. TM worked in the financial sector as a consultant in global investment. He worked until 7 o'clock and then drove home to take care of his mother. While he was out at work, his wife and a domestic helper looked after her before sending her to a day care centre. Two Filipino domestic helpers were employed but both quit due to unpleasant experiences while caring. They were also not sufficiently trained to provide care to people with MCI or dementia. I asked TM to share his experience of dealing with nursing homes or hiring professional help before taking care of his mother and them living together again.

> *TM: There was a short period of time that she stayed at a sanatorium after the surgery, as the death rate is generally quite high. A fracture of the femur head is a serious injury and requires the broken bone to be cut out and filled with a replacement to support movement…My mother had mild cognitive impairment before the critical fall, but got worse after the days in hospital. She stayed at an elderly nursing home and lay in bed for three months.*

> *She was tied up by the working staff as she was over-stimulated with the new environment. This is due to unexpected pain…In addition, the manpower of the nursing home is limited, and therefore they may prefer to use their own methods to look after each older person. Staying at a sanatorium requires more staff to take care of patients, however, the resources in public healthcare are still limited, and the social workers suggested she moved out since many new patients are waiting for a long time.*

TM indicated that he applied to the Wan Wah Care & Attention Home for the Elderly, which was one of the best in the district, as he wanted to do the best he could for his mother. He was a typical middle-class individual in the social hierarchy. He understood that many people were construction, factory and office workers who could only afford basics and essentials. He said that he was lucky as he could afford the high service charges of the nursing home.

> *TM: Since my mother is living alone, I could apply for a government subsidy, which will enable her to stay at the nursing home more easily, however, the subsidy only covers a three-month period. Thanks to the Community Care Fund, it subsidised the monthly service fee for a year before she returned to live with me again. A domestic helper has also been recruited to assist her while I am out working. She will look after my mother and bring her to the elderly centre four times a week.*
>
> *TM: Even for the minor renovation to add assistive tools in the washroom, it still costs a lot….life is hard! It is quite sad to be poor in such a world, not just in Hong Kong! My colleague sent her mother to one of the prestigious elderly care home at a high cost, but the service in return is not as good as expected…you may have a waiting room to use before taking a shower and that is it and nothing more!*

TM said that his first priority when selecting an elderly care home was that it is clean, liveable and well-decorated. He also was interested in an electric cooking stove with an alarm to warn if pans burnt, which can reduce the risk of a fire. However, purchasing and installing such a device was expensive and not many families could afford it.

5.4.2.4 The Challenge of Day-to-Day Activities

TM spent most of his time as a caregiver for a family member. I asked TM to share with me one of his most unforgettable experiences when taking care of a person with dementia.

> *TM: One day, my mother suddenly went out when the carer had fallen asleep. As a person living with dementia, she was wandering*

> *in the aisle outside and could not find her way home again. One of her neighbour called the police, who arrived at 5am to see if they could find us out of the eight families who are living on the same floor…My mother was given a chair and sat for a while and waited until the police found us. She was unexpectedly calm and didn't get hurt. She went to sleep as after the wandering.*

TM explained that people with dementia can be affected by emotional triggers, and do not easily fall asleep. This can be a burden for care givers. I wondered what the biggest challenge he faced was and how he could communicate with his mother more effectively.

> *TM: Ummm…taking care of my mother, taking her for toileting. Her personal cleaning is done by the domestic helper we appointed since she moved to the nursing home. It is difficult to communicate, since my mother had lost most of her memories, she is like a shell without content inside. She is past the middle stage and migrating to the later period of dementia. She can still eat with the support of the domestic helper and thus I believe she cannot be classified as in the later stage.*

TM witnessed his mother go through a transition from a normal older adult to one with MCI and had then gone on to develop early dementia. I asked him about the differences in terms of day-to-day abilities between a normal adult and a person with dementia.

> *TM: Losing memory so that one cannot take care of oneself. Losing memory, you cannot manage yourself at your own pace. You forget the correct pathway to return home and you cannot handle your financial account and require someone to assist. It is a living body with no memory…In my case, my mother will hardly speak at all, but each patient is different, they are not identical. In the early stage, she was hyperactive and did not easily fall asleep at night. But now, she has no energy, she is tired and distressed.*

I noted that in a training activity a few people with dementia were unhappy even when they finished the games. I asked TM what he would do if he found his mother upset or having an anxious moment.

> *TM: Open a dialogue with her! Distract her attention from the things she seems to be too focused on. Talk to her about a topic she is interested in it. The centre officer reminded me to find some dated*

> *memory as a topic to discuss together with the caretaker. My experience told me that the memory should be about the good old days. If most of the patient's memories are not positive and happy, that can induce a worse condition. In my case, I would try to find out the places she prefers to go to, the stuff she wants to do and the food she prefers to have, so as to make her feel better. When she feels better, the tendency to unconsciously wander in the living room will be lessened.*

TM explained that as a caregiver, it was better if his mother fell asleep quickly. He observed that his mother had become uninterested in eating, which could be a symptom of dementia. His mother was sometimes spoon-fed by the domestic helper, who forced her to swallow soft food so that helper could take a rest earlier.TM said that he had told the helper a few times that she shouldn't force-feed his mother. She should instead take a break and watch a video or play a game on her phone so his mother could have enough rest time after having meals, as otherwise she became hyperactive.

5.4.2.5 Need of Day Care Services for those with Dementia

Day care centres should provide multi-faceted cognitive training services and rehabilitation activities to slow cognitive degeneration and to enable people with dementia to continue to live within a community. This approach can alleviate the pressure on family caregivers by providing care in the daytime. Many of the day care centres in Hong Kong are run by large non-governmental organisations. The residents obtain medical services from cross-disciplinary professionals, live in a dementia-friendly environment, are offered multi-dimensional cognitive training, rehabilitation plans and social activities to encourage them to interact. I asked TM how he coped with hard times and stress when taking care of a family member with dementia.

> *TM: My personality is a bit laid-back…my mother has an elder sister, and she had gone through most of the application procedure with the nursing home and lived with a domestic helper before she suffered from dementia. The day-care centre is important to me as a caregiver, since the operating staff serve my mother a meal and look after her while I am working, on a regular basis. If she is going to stay home for the entire afternoon with my Filipino domestic helper, you can image that the situation will become difficult and induce pressure on the helper.*

TM indicated that the most difficult task was to manage his mother's monthly administration, including getting medical appointments and the bi-weekly activities in the local elderly centre. After her surgery, she had to have regular medical checks by a geriatric specialist, at the bone and joint health centre, and eye and otorhinolaryngology check-ups. She also had to undergo a comprehensive x-ray scan to make sure her blood vessels were in a healthy condition.TM needed to spend time on her daily necessities such as purchasing adult diapers, paying the domestic workers and renewing their contracts. These routine tasks had induced a level of stress in TM when he was taking care of his mother.

> *TM: The government support, to some extent, is good for us as we can still go to the day care centre to relieve our stress. Our domestic helper helps me look after my mother in the daytime while I am at work. However, not many families can support people with dementia living in their homes, instead, they may be transferred to dementia-friendly elderly homes if family members cannot manage and offer support in daily living.*

5.4.2.6 Inhumane Treatment in Nursing Homes

> *I: How can we retain the dignity and respect of people with dementia?*
>
> *TM: That is so difficult! As I said before, not many families can offer a one-to-one caring service to people with dementia, and to allow them to live together with normal adults. When they stay in a nursing home that is completely new to them, their state of mind is not good. Even if they are given a living place that is operated privately and charges a high price, they may not feel good and have the intention to move out after a few months My mother's elder sister lived in my mother's flat in the early 2010s. Her sister mentioned that she hated the stereotype of older people in elderly care homes, and it seemed that she had been excluded by her family who exerted social pressure on her. To relieve the pressure on my mother who was 80, her sister was finally transferred to an elderly care home where she slept and was picked up in the morning by my mother to go jogging.*

TM said that in many reasonably priced small- to medium-sized care homes, the caregivers required the residents to queue naked for the showers.

> *TM: I was shocked when I realised such a situation occurred in Hong Kong. The most difficult thing is not being nude facing each other, but seeing excretia in front of you when taking a shower. In winter, you can imagine the situation becomes even worse due to the cold weather.*

5.4.2.7 Reduced Physical Effort with High Flexibility

As TM had been serving as family care giver for years, I asked TM if, in his experience, there was anything that family members could do to improve the quality of life of those with dementia.

> *TM: Washroom! The standard washroom in public housing is rectangular in shape. I suggest installing a safety grip bar in a good position for people living with dementia when they sit on plastic bath stool. The current washroom design is not functional. When we hang a clean and dry towel on the plastic hook for further use and start taking shower, half of the towel will get wet, as you can imagine …In addition, I expect a caregiver will assist people with dementia to take showers, and they will sit on a bath stool, with a shower curtain installed. I have chosen one with back support. My mother faces the wall with two hands holding onto the grip bar.*

TM said that the bathroom could do with some modification as an open bathroom would offer more space. The issues are complex, and not many families can afford to hire a professional caring service for people with dementia.

5.5 Themes and Codes

5.5.1 Insufficient Regular Home Visits Provided by Community Health Care Services

The participants with MCI in this study encounter many difficulties that affect various facets of their lives. Regular community health care visits represent the support provided within a set timeframe, and those receiving the services are prioritised based on their needs and their gradual loss of cognitive function. These home visits provide community health care, and so if they are insufficient they may have a negative effect. Elderly people with MCI may experience *hopelessness, a loss of verbal memory, fear of being alone, getting used to memory loss, recognition of a lack of competence, loss of intention of cognition, a hidden family burden, difficulty with geographical orientation, reliance on family support, word as a medium for remembering, acceptance and being optimistic and challenges in their daily activities*.

Challenges in Daily Activities

Problems with the services provided may result from communication issues between those with MCI and the centre staff who schedule the regular volunteer visits. These visits serve different purposes, such as providing house cleaning, which those requiring the services may not be able to easily arrange. CP told me: ‘I need to wait for at least 3 months in order to receive the house cleaning service provided by the local community centre'…'I expected the same volunteer to offer support to me, however, each time I open the door, I see a different person'. CP explained that she preferred and expected the same person to come and clean regularly so she did not have to explain what she needed doing each time. A designated volunteer can understand the older person's genuine needs and concerns, such as how they prefer their electric appliances and cooking utensils to be arranged after cleaning and where glasses and crockery are put away.

Individual preferences should be considered by cleaning volunteers, but if the community centre cannot send the same people each time, those receiving help such as CP must explain their routines each time. A decline in cognitive function will affect housekeeping abilities and make daily activities more challenging.

Insufficient Support

M, the centre manager of YOT, said that the centre offered several weekend activities, including home visit to members living with MCI, but the waiting list is still longer than expected as the service team is not stable and has a limited number of volunteers. The service could not adequately support its 1,000 members. M felt that offering stable and regular home visits to members was essential, and symptoms of MCI or other diseases may be identified, which require ongoing medical attention. Such long-term illnesses can be preliminarily diagnosed by volunteers who had professional nursing backgrounds. M said 'A helping hand…at the right time is crucial to people with MCI'. Arranging scheduled cognitive health checks and care is vital and provides an opportunity to talk with older people with MCI who live alone.

CP said that her 'daughters and sons are busy at work, they cannot afford to have lunch gatherings with me…I am alone'. She told me that she did not see her son for a few months and although she had children, she felt lonely. A regular scheduled health care visit could provide CP with a good opportunity to talk with people she can trust. She mentioned that 'When there is nothing to do, I feel so completely lonely. No one is able to talk with me…loneliness makes me feel sick, I would prefer to hang around…would make me feel better'. She needed sincere care and relied on her own family. However, many older people miss this and feel hopeless.

I asked CP to share the happiest moment in her life with me, but she felt frustrated and told me: 'The time of a day is long for me…and nothing special…My younger son died a few years ago, which made me upset for a long time…He treated me the best.' Home visits can reduce feelings of loneliness or depression. As elderly people living alone are typically separated from their previous social networks, including family and friends, they can feel isolated as they have lost their social role. A regular community care service visit can then prevent further social isolation, enable regular visitors to become companions and improve the self-esteem of the elderly.

Hidden Family Burdens

The present study also reveals that some families have hidden burdens, which is unexpected. Expectations in terms of quality of life vary, and can be culturally dependent or influenced by life experiences, gender or age. SK told me about her happiest moment: 'After my retirement, I preferred to learn something new…although my husband did not'. She explained that he had suffered from a serious disease and seldom talked to her in recent years. He could not manage daily activities on his own, and had been hospital frequently. SK therefore had to take leave from her regular cognitive training at YOT. At the age of 79, she needed to ensure she remained capable, not just for herself but also for her husband. This was her family burden. Living in such a situation will affect her cognitive functioning, and may lead to further cognitive decline.

Acceptance and Being Optimistic

However, some participants demonstrated that they had accepted their impaired cognitive function and were optimistic. CH told me: 'If my cognitive function continues to decline further, I think I will be given first priority regarding my application to the subsidised elderly nursing home, which is not bad'! CH explained that she had to wait for at least five years before moving to the home. She obviously applied because she felt she could not take care of herself, and required the day care the home provided.

Financial Difficulty

CH could afford a subsidised nursing home but not a private one. She had no income after the age of 60, so she had to spend money wisely to avoid financial difficulty.

Getting used to Memory Loss

Participants such as Elders A, B, D and I said that they had been getting used to cognitive impairment. Elder A told me: ‘I don’t remember I need to close the tap…I forget this act and believe there is no need to do at all’. Elder B said: ‘I forgot to bring my door key…and my phone…I forget at least one thing a day…makes me feel frustrated’. Elder D told me: ‘To clean or not to clean up…does not mean a lot to me…I enjoy a sense of physical and psychological ease’. Elder I said: ‘I lost my ID card for four times…the officer told me that it is almost the last time she can issue a new one tome’. All of these participants had been diagnosed with MCI. Although some of them may not understand how MCI develops into progressive dementia and the difference between the stages of dementia, they had accepted they were suffering from memory loss.

Recognition of a Lack of Competence

Elders A, B and L had recognised that they were not fully competent. Elder A told me about her preferred wardrobe design: ‘I prefer a simple wardrobe…I can clean it easily…as I am not good at remembering’. Elder B told me: ‘I do not know why I had forgotten the password two times…and now, I am still using the password provided by the bank’. Elder L said: ‘I pick up the cooking pot completely so that I can be sure that there is no fire…why do I face such weird experiences all the time’? The participants recognised their own lack of competence in daily activities, and they lacked any useful design elements that could alleviate their problems.

They instead tried to make their own lives easier. As they live alone, they cannot easily discuss things with others. Regular home visits can help to connect people with MCI, social workers, physiotherapists and other healthcare professionals. The visits can include activities in addition to a health check, and can provide an opportunity for physiotherapy volunteers to introduce serious game sets to people with MCI. These people in need should be made aware that cognitive impairment may continue to develop further, and provided with information about how to lower the rate of cognitive decline. Regular home visits through community health care services can help enhance the quality of life of those with MCI who are living alone.

Loss of Verbal Memory

If older people cannot speak accurately due to a loss of verbal memory, they will lose confidence in communicating with others. WH told me: ‘I want to share with someone…but I couldn’t express even a simple word…I’m not good at it’. She said that her verbal memory has deteriorated in recent years, due to the further development of MCI. Persistent social engagement can help to slow the rate of cognitive decline, and thus regular home visits tailored to individuals is important.

Loss of Intention of Cognition

Many of the participants said that they had lost their intention of cognition. Elder B said: ‘What is Fuji apple? What does it look like’? She had experience of buying Fuji apples at the supermarket and had tasted them with her sons. Elder F told me: ‘I cannot remember the direction when returning home and blank out…I cannot figure out which building block I am supposed to go to’. Elder A indicated: ‘I forget to close (the tap) after use, I didn’t have the intention to shut it down…after a while, when I heard the sound of running water coming out, I knew I should shut the tap’. A sudden loss of cognition at home or in a market could lead to a fire, water leakage, a fall or other problems.

Difficulty with Geographical Orientation

Similar experiences emerged in terms of difficulty with geographical orientation. Elder I told me: ‘I forgot the correct path to the destination as planned…then I returned home and tried to think again about it’. Elder J tried to avoid such situations by doing less. She told me: ‘I seldom go shopping. I only visit the community centre…when I finish an activity, I return home. This can reduce the problem of getting lost’!

Each case of MCI is different, and one sufferer may experience difficulty with geographical orientation, while another may lose their intention of cognition. The cognitive functions of those with MCI may decrease overtime if they do not receive medical advice or treatment. Regular home visits can create bonds between people, and social workers canobserve those they visit to monitor any decline in their cognitive functions. Training programmes and activities focused on individual needs can also be of benefit.

Words as a Medium for Remembering

Writing things down can be an effective way of reminding someone to do things. Elder I told me: ‘I don’t know how to write…so I couldn’t mark down what I have to buy each time’. Elder B told me: ‘Even though the teacher delivers teaching content in good manner, I could not learn from it…I am not capable of applying it in my day-to-day living’. Both participants understood the importance of using words as a medium for communication, either by writing them on a calendar or in a mobile app. YOT aims to support older people to achieve independent living, promote social inclusion and ensure each individual has a good quality of life. Regular visits can enable them to gather information to assess the needs of older people, and elementary user training in information technology or other areas can also be beneficial.

5.5.2 Lacking an Empathic Approach to Universal Design for People with MCI

Universal design application is the design and composition of a living environment that can be easily accessed and understood. It should be aesthetically pleasing and widely accepted by all people, regardless of their abilities. While the environment becomes more accessible, convenient and pleasurable to use, it will benefit all people. The strategy for implementing universal design principles for people with MCI should be based on the following considerations: *everyone is unique; the inclusion of memorable and visible elements; universal product and furniture designs; a current lack of universal design elements; reduced physical effort with a high level of flexibility; limited learning capacities; a lack of judgment in daily life; forgetfulness; a loss of intention of cognition; a loss of verbal memory; words as a medium for remembering; the challenges in day-to-day activities; financial difficulty; and enhanced interaction and bonding.*

Everyone is Unique

M told me: 'You should also understand that everyone is unique, they have different preference and wants'. Thus, product and furniture design should consider a wide range of people with various needs, such as those with long-term illnesses, stroke patients, those living with MCI or dementia and the visually impaired. Although many design practitioners and engineers are aware of universal design, only a few implemented it into older public housing. Most developers prefer to apply easier approaches to building and design, as universal design principles can be complex and challenging to implement.

Universally designed products are sometimes viewed as fundamentally unattractive and expensive. However, more recently the designs, colour variants, product ranges and availability have improved. Local availability may still be limited, and currently obtaining universally designed household products and furniture requires extra time, effort and cost. People living with MCI should be provided with more information about universally designed products and their unique advantages, and by raising public awareness well-defined products are more likely to become available to all, without stigmatising those with cognitive impairment.

Universal Furniture and Accessory Design

M told me: 'Normally they (older people with MCI) do not have a good education background…their unmet needs are not identical…it (design) should be seamlessly immersed into their daily life in terms of furniture and accessories'. Participatory design requires the close collaboration of designers and participants, in which the main objectives are to explore the needs of and culture of those with MCI, consider their affective and emotional experiences and co-design tangible solutions that empower them in the design process. The implementation of universal design principles is still limited in Hong Kong public housing, and even basic items such as the main doors and metal gates provided by the Hong Kong Housing Authority, and furniture and accessories such as electrical goods, fail to support older people. Design practitioners should therefore pay more attention to the behaviour of those with MCI, as everyone is unique.

Memorable and Visual Elements

Limited visual access will result in difficulties recognising and locating objects, and thus will make it difficult for those living with MCI. Elder O told me: 'I put all my door keys on this shoulder bag, you can see these keys are attached to a rubber band' and 'I prepared some chopped ginger for my dinner and put it in the fridge…I didn't know what to get when I opened the fridge'. Elder A said: 'If I could see the stuff clearly at once, that would be much better…I put…personal belongings on my little desk and make sure I can see them'. Elder L told me that 'the most effective way…is to let me see it clearly'.

Lack of Universal Design Elements

WH told me: 'I walk towards the kitchen, I don't know what …I want to get to prepare…I go back to the dinner table and repeat this again to see if I can remember'. She continued '…not good at memorising things…find a way to…build up memories…' WH said that she had faced problems remembering the simplest of tasks. She applied her own method to remind herself to take the key when going out with the trash bag, to avoid being locked out by the automatic door mechanism.

The management of the Hong Kong Housing Authority should assess whether this type of hydraulic door locking system is applicable to older people who are living alone, and particularly those with cognitive impairment. If safety is the main priority, the design details of the main door and the metal gate could be redeveloped. Universal design should be effectively applied to day-to-day objects for their ease of use and tolerance for error.

Any unconscious action required during use should be discouraged. When the front door is closing, an added force is derived from the hydraulic door closer, which was originally designed to be helpful by closing the door automatically and locking it, to ensure security and safety. However, older people living alone with MCI have weak cognitive abilities, so their judgement about whether they want to close the door after going out or taking the trash to the collection point is relatively poor.

The risk is that the door will close and automatically lock unexpectedly. The system was designed to help people but it also creates many hurdles. When older people notice the door is closing, they may not have the strength to hold it open. Designers and engineers should together develop door locking system functionality, focusing on the mechanical movement along with the decoration and colour scheme of the door so it fits into the environment. However, another consideration should be whether the design can be used comfortably and efficiently with minimum effort by older people. The operation process should only require reasonable force, and sustained physical effort should be minimised as many tenants who lived alone are very old, and have very limited physical abilities.

Reduced Physical Effort with High Flexibility

Highly flexible products offer a wider operation choice, such as opening a water tap through moving a single lever instead of turning. People suffering from strokes have reduced sensitivity in terms of the sense of touch. TM said: ‘I suggest installing a safety grip bar in a good position…the existing washroom design is not functional…as you can imagine…I have chosen the one with back support…[this allows] my mother to hold onto the grip bar’. Again, minimum effort should be considered in the design, no matter who a product is aimed at. A product designed for all should maintain a high level of flexibility so that the design can accommodate a wide range of individual abilities and preferences. Product design should also aid accuracy as older people typically have limited sensory abilities. It should allow a certain degree of adaptability to every user’s pace, as everyone is different.

Enhanced Interaction and Bonding

Interaction and bonding can be enhanced by thoroughly considering universal design. M said she would ‘…Ask a few more times to see if the patient could provide…more information and adjectives to construct the meaning…and then reconfirm the answer with them…and facilitate their expression’. Interior settings should be accessible and understandable. The context of future new-build public housing should recognise the cognitive, behavioural, physical, psychological and sensory difficulties that old people with MCI can face in a typical day.

The combination of product design, furniture and accessories should reduce the environmental stress that can affect how people feel and act, and thus what they think. Stress can result if the demands of the physical environment exceed one’s ability to address them. This negative subjective response to an environmental stimulus becomes an interaction between the individual and the external world. M said that it was ‘easier to comprehend the meaning when supported by images…we can apply a happy, neutral or sad face to represent the level of satisfaction’. She continued: ‘They are not good at expressing words and thoughts…they feel discouraged…hinders their expression…learn more about their background before they had mild cognitive impairment’.

Bonding is a key factor developed among groups of people. It refers to the process of developing an interpersonal relationship between two or more people and mainly takes place between friends and families. Bonding is an interactive process of mutually nurturing social connection and also involves emotions. In this study, some furniture and accessory designs, including a wooden cabinet and the front door auto-locking system, were found to not meet the requirements of universal design and thus did not help establish a bond between elderly people living alone and the outside world.

A poor design approach, as found in the doors and the gate previously mentioned, may discourage older people from going out to meet others. They may prefer to stay at home instead of meeting friends and family. Those with MCI typically have poor memories. CP, for example, preferred to place her snacks, tissues and glassware on a small table so that she could see them clearly. However, she did not want her home to appear untidy, and so she was less likely to invite people round. Her social life was thus affected, due to unsuitable furniture and accessory designs. M also said she would chat with older people ‘according to their interests…they might share their stories with us…let them participate in the activities and the training…so that they can actively apply their cognition during participation. They might have a fall…injury will induce further deterioration…they may stay at home for long periods without any interaction with others…cannot manage their health condition…incur cognitive decline’.

A loss of interaction and bonding is likely to lead to further cognitive decline. Design practitioners should consider user feedback and the concerns of other stakeholders through participatory design workshop. They can then effectively apply universal design principles and seriously consider how to enhance interactions between people.

Confounding Forgetfulness

CP said that one day ‘when I started cooking, I found my key inside the fridge without any reason…a few times I placed the key on the mattress…basic calculation…are not easy for me…I realised I had forgotten to bring along my wallet…and gave up buying goods [at the market]’.She continued ‘I paid two hundred…while actually I had to only pay two dollars according to the statement’. CP also told me: ‘…I had the intention to get some raw food for cooking. When I went out of the kitchen, I lost my memory and could not remember the stuff I was just dealing with’. As CP said that she had placed her door key in various areas, although she had no intention to do, a visible and a designated storage area could help her remember the action and get used to it.

A designated area for key storage could be integrated into furniture design, such as the surface of an AV/TV cabinet or a shoe cabinet, which is often found near the entrance of a living room. The participants CP, FY, CH and WH had no regular area to leave their door keys. CP and CH had experienced the auto-locking of the door when they took out the rubbish and forgot their keys. CP and CH developed a rubber band chain connected to their shoulder bags, but they do not take their bags when putting out the trash. Perhaps a spare key should be hung on the back of the front door if no other place is available.

Slow and Low Judgement Ability

Many older people’s ability to judge is poor and the responses are slower than usual. Elder I told me: ‘…I bought an electric kettle instead…I am afraid of that…I can’t hear the beep sound…I lost my faith to live…[and I am] useless to everyone’. She was afraid of boiling water in a teapot as she had witnessed accidents a few times. The classic teapot was burnt and went completely black. Elder I is living alone, and to keep herself safe when boiling water she used an electric kettle. Although her hearing ability is not as good as that of a normal adult, she could still manage herself and did not need to pay attention and wait for the beeping sound. The judgement ability of Elder I is low and she had a slow response to changes.

Elder H, Elder J and Elder B had poor judgement and slow responses to situations. Elder H told me: ‘When I was disposing of the trash bag, I saw the fridge and opened it…put the trash bag into the fridge before leaving’. Elder J said: ‘I try to place the trash bag…behind the main door…as a good reminder…my brain does not function well…I forget to throw [it] into the collecting place’. Elder F told me: ‘…I put my shoes in the fridge…and place my food on the ground where the shoes go’. Elder B said: ‘…I realised that I had picked up the smart phone that belongs to my daughter [and left]…I was afraid of losing my memory…pretend as normal…seems nothing happened before’.

Universal design principles should be implemented, such as in domestic electric appliances that fail to fulfil individual needs. A design should be simple and intuitive by providing prompting feedback effectively to users during and after the completion of the action. Elder B picked up the wrong smart phone only because the two phones similar were when in idle mode. The ability to judge and also the sense of colours, sounds and textures are not as good as they used to be for such people. Designers should understand the perceptible information received by each individual regardless of their sensory abilities. Using pictorial information or simple words instead of the redundant presentation of essential information can be an effective method of reminding users with MCI. Even simple functions in the home should be considered, such as a designated area for storing shoes, which can serve as a reminder when housekeeping.

Limited Learning Capacity

Elder B told me: ‘…My brain…does not function well…I should catch a bus instead [of the Metro] as it can bring me to my destination without changing routes’. Elder O said: ‘I use a square mini white label with a circle that signifies the operation of the TV and I put it on a key. I spent a long time learning…[and] gave up, I only use the 2-3 buttons marked with the labels’. Elder B preferred to take a bus and took more time travelling as she did not want to change trains. She understood she could not find the correct path due to her limited learning capacity. Elder O tried to help herself by adding supporting information to the remote buttons. She realised her learning capacity was limited and tried to simplify the daily tasks she needed to do.

Universal design principles are not applied to electronic devices, which are not intuitive. Design practitioners should attempt to eliminate any unnecessary complexity, for example by hiding unnecessary function keys that are not related to common control sin the control hierarchy. A number and a single word displayed next to a key does not cater for older people living alone. Those who are cognitively impaired must take measures to learn and to remember the function of each key. In many cases, these are modified to fit personal requirements if the design does not meet their expectations.

Universal design can be simply defined as good design, but a universal approach should consider a design that is intended for all and is long-lasting. An environment or product that is usable by people of all ages, including children, young adults and older people without stigmatising specific groups should be developed. Traditionally, design has met the needs of those with a wide range of abilities by creating specialised approaches to make up for a lack of ability.

Those who must use specialised items must typically pay more for often unattractive products. Universal design should be supportive, adaptable, accessible and safety oriented. It should provide an aid while not hindering the function. Without the consideration of these supportive features, any design will lead to stress. If display text size is fixed and cannot be changed to fit users of different ages, accidents due to visual limitations may occur. Accessible design implies removing both attitudinal and physical barriers. Universal design empowers each individual and promotes accessibility as barriers in terms of mobility and well-being inhibit many individuals. Strong contrasting colours or patterns and texture scan alleviate possible dangers due to visual limitations. Safety-oriented design is a cornerstone of universal design, as it promotes well-being and good health. Visual and audible signals can be used together and are safer than either one or the other, as for example they can remind users that water is boiling on a gas stove.

Safety entails a sense of psychological well-being and self-esteem and safe design should recognise physical and psychological challenges. Product designs and living environments should enable residents to gain a higher level of competence and protect them from losing independence when ageing. The environment should be flexible to accommodate changing needs and abilities.

Promoting a participatory design approach is also essential when developing universal product design and environments. Key stakeholders should contribute to the design process to ensure the target users' preferences and genuine needs are fully incorporated into a design. This is important for those living with cognitive impairment who are often not consulted directly.

5.5.3 Inadequate Social Networks and Engagement

Beingactive and socially engaged aremajor components of well-being in later life. Older people who are more socially engaged, could have better cognitive health, ranging from a slower rate of cognitive deterioration to a lower risk of dementia. The inadequacies of social networks and the engagement of older people canbe explored through thefollowing themes:*valuing social participation in later life; neighourhood spirit;engagement in social activities; respect and mutual trust; being a family caregiver; feeling depressed and in low spirits; scared of orworried about others; social support for elderly people living alone with MCI;the need forday care services for those withdementia;*and *inhumane treatment in nursing* *homes.*

Social Participation in Later Life

SK told me: 'Even if you can't show up [for a centre activity], you need to report an absence. I don't want to waste any opportunity…I can't believe I still have the chance to participate…outdoor activities'! SK said she wished to participate in activities offered by YOT, no matter whether the programmes are small or are subsidised and co-organised by other community centres. She was eager to learn as she had spent most of her time taking care of her husband after she retired at 60. Due to her husband's health condition, he required frequent medical checks at the hospital and so SK was often alone and lived independently.

The year-long cognitive programme gave SK an overview of MCI and advice on how to be aware of further developments towards early-stage dementia. SK wanted knowledge and professional advice from healthcare professionals, so she could join the elderly group as a normal adult. She was at times selected to participate in the local cognitive training programme.

Neighbourhood Spirit

WH told me: '…the district councillor told me that I could apply for public housing for single living while I was working as a volunteer at the event …I firstly registered at YOT…as I could get in touch with other people…learn how to do things right'. She continued: '…I understand my children are busy at work most of the time…I have learnt how to use a used plastic bottle…as a dumbbell…Many people in the centre already know me well…when my leg was broken, [they] took care of me'. WH valued the neighbourhood spirit as she could receive more information about age-friendly living environments and also how she could contribute to the voluntary activities. However, most activities provided by the YOT are oversubscribed, so she had to apply a few times before she was successfully enrolled. This exposed the inadequacies of the social networks provided by the community centre.

Engagement in Social Activities

Elder Q said: 'I don't want to go out too frequently, unless…provided by the community centre'. An ageing population leads to many health and social concerns, as the psychological well-being of older people who are living alone is of the utmost importance. Previous studies have reported that older people who live alone are more likely to have poorer mental health and a lower quality of life than those who do not. Loneliness can lead to depressive symptoms and thus affect the quality of life.

Living alone can have a strong negative effect on Asian elderly people, in terms of being healthy and happy. Those who are living alone and feel lonely require good and cohesive social support. Elder Q did not want to go out except to attend activities provided by YOT, as she trusted the relationships built with people she had met at the centre over the years. The more quality activities local community centres provide, the more likely it is that older people will attend them. Specific programmes related to cognitive training typically fail to meet the market demand and thus older people who wish to participate in social activities are affected. Elder B said: ‘I decided to go travelling with Elder A and give her a better life’.

Elder B obviously noticed that Elder A did not want to attend activities related to cognitive change and how to prevent the development of dementia, due to the cost of each activity. Although senior members are entitled to a discount, Elder A still preferred to join free programmes. Elder B was younger than A and intended to support to her by bringing her to places in China she had never visited before.

Respect and Mutual Trust

M told me she had the experience of handling a complaint case about a male dementia sufferer who had the bad habit of swinging his hands. This was viewed by some as sexual harassment. As a care giver, M had to learn more about the unique backgrounds and situations of those at the centre. She said that she should respect each member and that the relationships between members and staff are built on mutual trust and life experience. M told me: ‘Try not to call a person by a nick-name …give support in terms of food intake and assistance when they go to the restroom’. Inadequate social networks and engagement will prevent people from connecting with each other. They can, however, provide a platform for sharing life experiences and obtaining help when facing a problem. Many members of YOT live alone and may need help from the centre staff and volunteers with problems, such as changing light bulbs.

Being a Family Caregiver

TM told me: ‘It is very difficult…to take care of people with dementia as each of them has different needs...Since the year before last, she can hardly remember who I am’. TM said that his mother returned home after being discharged from a nursing home. He noticed that he service provided by private nursing homes may be below an acceptable standard, which can have a negative effect on those living with cognitive impairment. He said that social engagement could enhance the cognition of those living with MCI.

Research suggests that social engagement and lifestyle factors can predict how cognitive abilities change. Social engagement was found to improve cognitive ability over a five-year period after an MCI diagnosis. Socialising can be cognitively stimulating as it entails active social interaction, which can be a health-promoting strategy, through improved physical and emotional health. Active social interaction, which involves remembering activities and the names of those one interacts with, can exercise the brain. However, when people with dementia are looked after by a family caregiver instead of living in a nursing home, they well have fewer opportunities to be connected with others. Social engagement can prevent the further development from mild cognitive decline to progressive dementia. Family caregivers should ensure adequate social participation and networks are available to those with cognitive impairment, so they can retain their cognitive health.

Feeling Depressed and in Low Spirits

TM told me: ‘She (his mother) might have different types of weird behaviour…believe someone stole her stuff…cannot get back home. I feel exhausted…and it is so difficult to communicate with my mother in such situation…(and) take good care of her emotionally’. TM revealed the psychological stress affecting a typical caregiver. Not only those with cognitive impairment but also their carers should be provided with adequate social support, as this can alleviate depression and anxiety in caregivers. A network of social interactions can be developed between caregivers and those with MCI. TM continued: ‘My mother used to be a teacher, how could you believe that she would speak foul language to me’? TM could not accept the fact that his mother treated him in such an offensive and rude manner. Through regular contact and participation in dementia care management programme, caregivers and those with dementia can learn effective methods of dispelling feelings of being in low spirits and depression (Chien & Lee, 2008).

Scared of and Worried about Others

FY told me: ‘I cannot go sightseeing alone and I am afraid to do so…People seem to not understand what I say although I can understand what they are talking about’. She continued: ‘I do not want to think too much…makes me feel happier…I have to manage…difficulties by myself as my children…no time for taking care of myself…(and) don’t want to bother my elder son…don’t want to get him into trouble.’ Those living alone with cognitive impairment need more support from others including neighbours, old friends and those in nearby community centres, such as the volunteers and members FY met in YOT. She is scared of going out alone as she could not remember the layout of the district very well. She could not even remember the fast food chain store at the corner of the street, which has an eye-catching logo on the roof as a landmark. Her diminishing eyesight also affected her ability to see clearly.

In addition, many participants including FY speak indigenous minority languages, which others may not easily understand. Those living with MCI who cannot communicate effectively with others will feel scared and may try and hide if they have no support. FY also worried about her family as she did not want to bother her children. She believed that they were busy every day and had their own families to take care of. She tried to manage when she faced problems such as dealing with banking services, seeing a doctor or using newly bought electrical appliances. Social networks and social engagement are crucial elements for people living with MCI, by providing a wider networking circle through which they can socially connect. This can help them build up their connections and achieve mutual support with other elderly people, such as through the opportunities provided by community centres. A lack of social networks and engagement can affect the quality of life of people with MCI, and over the long term this can put pressure on the public health system.

Social Support to Elderly People with MCI Living Alone

CH told me: ‘Do you mind helping me fix the fluorescent tube?...because you come to visit me…(I) postponed the lunch gathering’. She continued: ‘…Not able to think too much and my memory is getting worse…cannot remember too much about recent activities’. The case study of CH revealed that some elderly people living alone failed to manage the difficulties they faced in a typical day. The ranged from fixing a fluorescent tube to operating a newly bought gas stove. CH could not judge whether the tube was of the same size as the one she was replacing, as she could not give the salesperson the exact size and dimensions. When she realised she could not get a replacement as the packaging was opened and thus she would have to pay again, she was disappointed. FY said: ‘I do not know most of the functions of each single key as I do not remember and understand what they stand for’. FY received a new gas stove from her son, which was aimed at making her life easier, but she could only remember its basic operation.

The social support for elderly people with MCI living alone is inadequate. Non-profit-making organisations that provide social support to older people should work closely with government bodies to implement regular visits or free training programmes on how to manage living alone with cognitive impairment. After each training programme, centre staff can conduct cognitive tests and record the scores of each participant, to assess whether they find dealing with typical daily activities difficult, such as controlling the TV set, operating electrical appliances, cleaning up dishes after a meal, locking doors and using smart phones. Such one-stop service with unique contact point of caring centre is high in demand (Chan et al., 2010).

Without substantial social networks and engagement, the rate of cognitive decline can increase and can evolve into dementia.

5.5.4 The Slow-moving Development of Public Health Policies

The latest government population projection for Hong Kong suggests that more than one-third of the population will be aged 65 or over by 2064, and the number of people aged 65 or above is expected to rise from 1.1 million in 2016 to 2.5 million in 2064. The government has repeatedly emphasised the importance of elderly care, and this is a key approach of ageing in place rather than institutionalisation. Under the funding mode of ‘money-following-the-user’ and the ‘affordable users pay’ principle, older people can be subsidised through the community care vouchers for the elderly pilot scheme.

Eligible older people are given the right to make their own choices. During the second phase of the scheme, the recognised providers offer unique services that fit individual needs, such as those of older people. It also aims to relieve the pressure on caregivers and to facilitate older people living with MCI to age in place. However, these subsidies and arrangements are still not sufficient. The development of public health policies can be slow-moving, as illustrated by the instances of *inhumane treatment in nursing homes,* and the *need for day care services for those with dementia.*

Inhuman Treatment in Nursing Home

TM told me: ‘When they [those with dementia] are staying in nursing homes that are completely new to them, their state of mind is not good…Her [mother’s] sister mentioned that…seems she was excluded by her family…and finally transferred to an elderly care home’. TM also said that people living with cognitive impairment who move to new surroundings require a substantial period of time to become familiar with the environment. They may meet many different people at one time, including others with dementia and carers, which can put pressure on them to remember all the names and the rules and regulations of the home. If their communication abilities are relatively low due to cognitive impairment, they will be more likely to feel negative and may believe they are excluded by their families.

Recent research conducted by the Hong Kong Christian Service indicates that in numerous nursing homes in Hong Kong, many of which have been established for years, half of the respondents aged 60 and above reported that they were not satisfied with the quality of the nursing care. Almost 50% of respondents worried that they may not have enough funds reserved for their retirement. Thus, many could only afford basic nursing homes, which are reported to have low levels of service quality and poor environments. TM continued: ‘I was shocked…not just about [people] being nude facing each other but seeing excretia in front of you…In winter, you can imagine the situation will become even worse due to the cold weather’. The quality of elderly nursing home varies by organisation. Because of existing low-quality care homes for elderly that failed to meet requirement over the years, the welfare minister in Hong Kong has warned the service providers that the operation could be replaced if the situation continued (SCMP, 2022). Elderly people living alone with MCI are likely to consider applying to such residential care homes if they cannot manage on their own.

CH is a typical case. She is 78 and suffers from cancer in addition to declining cognitive function. If her ability to care for herself continues to decline, she will need to apply to a residential nursing home, as she does not have family members that can take care of her. The government officers responsible for health policies should actively regulate the operators of local residential nursing homes, so that people with MCI can maintain their dignity in their later lives.

The Need of Day Care Services for those with Dementia

TM told me: ‘The day care centre is important to me as a caregiver…look after her [TM’s mother] while I am working…if she…stays at home for the entire afternoon with my Filipino domestic helper…it puts pressure on the helper’. He continued: ‘Our domestic helper helps me look after my mother in the daytime…not many families can support…to live in the same place….instead, they may be transferred to dementia-friendly elderly homes’. Few families can afford the cost of prestigious day care centres or residential nursing homes that have good reputations.

In addition, the day care centres with good reputations rarely have any vacancies, and so people must wait for a long time or choose another, possibly far from where they live. Day care services can also relieve the pressure of taking care of those with dementia all day (Yiu et al., 2020). A domestic helper offers a way to balance the provision of good care with the preservation of a high standard of housekeeping, as expected by the house owner. Various community care and support services are provided by independent non-governmental organisations, including day care centres, home-based rehabilitation, home care and care-giver support. However, services are often not only below the market standard, but also fail to maintain the dignity of those in their care, which is inhumane. Public health policies therefore urgently require revision.

5.6 Concluding Remarks

This yearlong study consisted of a participatory design workshop, participant observation and in-depth interviews, and four themes and 33 codes were identified. The research revealed that the regular home visits provided through the community health care service of local community centres are insufficient. The investigator found that older people living alone with MCI generally get used to memory loss and recognise their lack of competence, and they rely on family support. They experience a loss of intention of cognition and verbal memory and face challenges in their daily activities.

An empathic approach is required along with the adoption of universal design principles for people with MCI. The number of older people with cognitive impairment is expected to rise, due to a gradual increase in the ageing population, so re-assessing the home furniture and product design in the interiors of public housing is timely. Basic features such as the door locks, gates and kitchens and bathrooms are found to lack universal design elements. Older people living alone with MCI have a limited learning capacity and have a reduced ability to judge situations, particularly in a timely manner. This can be improved through embracing universal design principles using additional elements to produce intuitive, safe and flexible furniture that is easy to use.

The inadequacy of social networks and lack of engagement of people with MCI affects their quality of life. They value social participation, respect and mutual trust in later life and worry about other people. Older people who are more socially engaged can have better cognitive health and thus a lower risk of developing dementia.

Public health policies develop slowly, and the unavoidable increase in the number of people living with MCI will put more pressure on the health care system, in which the management of cognitive decline is already a major challenge. There was “Dementia Action Strategy” published by Dementia Working Group to educate caregivers regarding enhanced understanding on dementia and its impact, and stress reduction technique, however, a formal policy has yet to be mapped out (Cheung at el., 2015). Those with MCI require support from day care services to help them live independently or with family members, rather than going to residential care homes, where they may suffer from inhumane treatment due to a lack of proper supervision.

Figure 15 presents the main findings of the study.

Theme	Code		Theme	Shared Code	Insight
Theme One: Insufficient Regular Home Visits and Provision of Community Care Services	Feeling Hopeless	Difficulty with Geographical Orientation	Theme One	Shared Code with Theme Two Loss of Intention of Cognition	Continued home visits can provide regular cognitive health care to single elderly people with MCI.
	Fear of Being Alone	Reliance on Family Support	+	Loss of Verbal Memory	
	Getting Used to Memory Loss	Insufficient Support Services	Theme Two	Word as a Medium for Remembering	
	Recognition of Lack of competence	Acceptance of being Optimistic		Challenge of Day-to-day Activities	
	Hidden Family Burden			Financial Difficulties	
Theme Two: Lacking Empathic Approach to adopt Universal Design for People with MCI	Everyone is Unique	Limited Learning Capacity	--------- Theme Two	Shared Code with Theme Three Enhanced Interaction and Bonding	Universal design should be effectively promoted to the general public. More flexible, safer and easy-to- use product design items and home furniture should be developed. Design practitioners should utilise participatory design research to obtain more first-hand data from stakeholders and co-design with them.
	Memorable and Visual Element	Slow and Low Judging Ability			
	Universal Furniture and Accessory Design	Confounding Forgetfulness	+		
	Lack of Universal Design Element	Reduced Physical Effort with High Flexibility	Theme Three		
Theme Three: Inadequate Social Networks and Engagement	Value Social Participation in Later Life	Being a Family Caregiver	--------		Expand the social network and social engagement of people with MCI to reduce the likelihood of their cognitive decline becoming more severe.
	Community Spirit	Feeling Depressed and in Low Spirits			
	Highly Engaged in Social Activities	Scared and Worried About Others	Theme Three		
	Respect and	Social Support			

	Mutual Trust	for Elderly People with MCI Living Alone	+ Theme Four		
Theme Four: Slow-moving Development of Public Health Policies				Shared Code with Theme Three	Revise current public health policies in terms of the implementation plan and health strategy across the main elderly care service providers. Examine how to collaborate with other support domains including industry leaders, academia and design practitioners.
				Inhumane Treatment in Nursing Homes	
				Need for Day Care Service for those with Dementia	

Figure 15. The themes and codes influencing the quality of life of older people living alone with MCI in terms of caring services, universal design, social engagement and government policy

6 Discussion

6.1 Discussion of Findings

In this chapter the findings from Chapter Five are discussed in relation to the research and literature reviewed in Chapter Two. As indicated in the previous chapter, four themes were identified using thematic analysis, which strongly converge in terms of subthemes. They capture a common and recurring pattern across the extensive qualitative data, enabling patterns of meaning to be identified and thus analysed and interpreted. The coping strategies for improving the quality of life of older people with MCI who live are identified as *Continuing Home Visits and Family Support, Awareness of Universal Design Principles, Expanding Social Networks and Engagement,* and *Revising Public Health Policies.* The relationships between these strategies, which involve improving public housing and thus the quality of life of elderly people, the unmet needs and the feelings and concerns of those with MCI are illustrated in Figure 16.

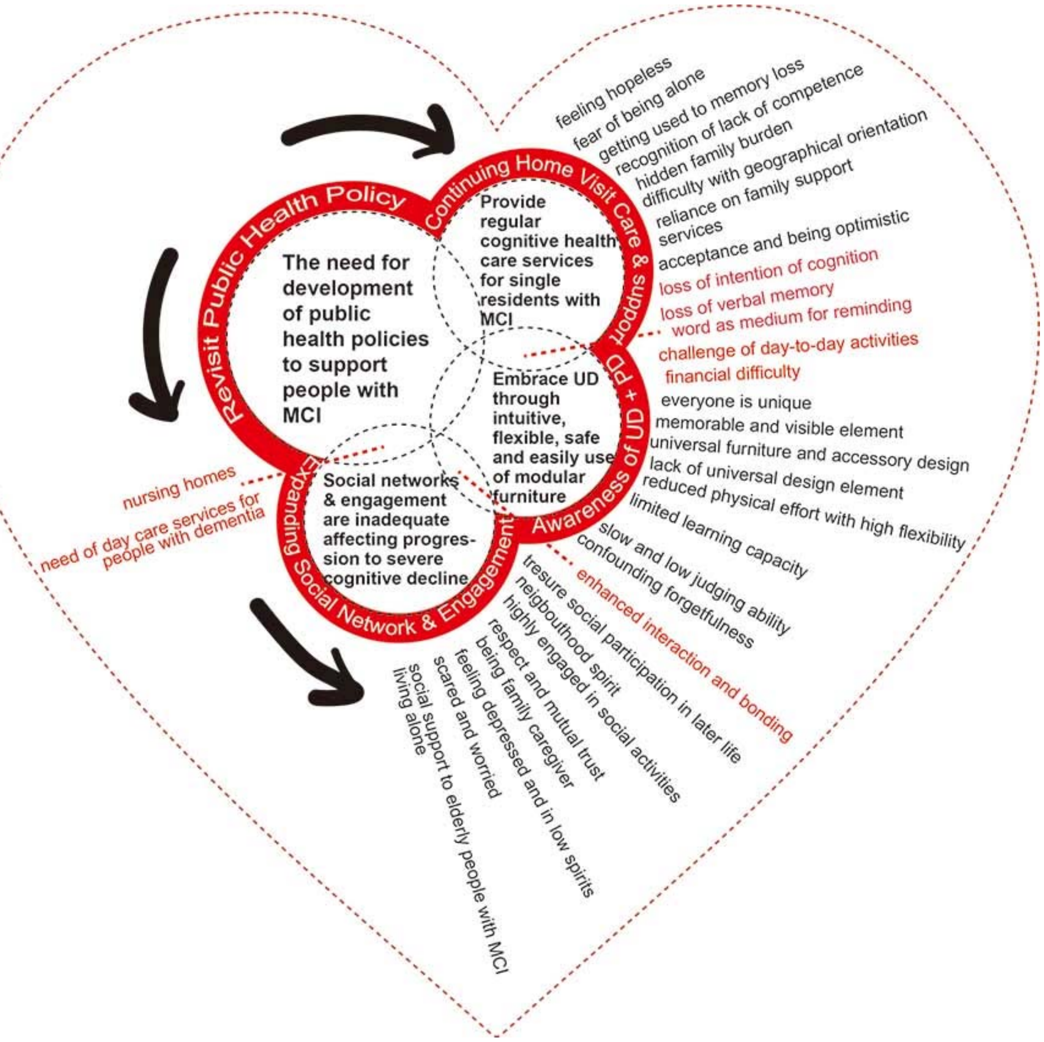


Figure 16. Conceptual model of the relationships among the coping strategies for enhancing the quality of public housing and the quality of life, unmet needs, feelings and concerns of those living alone with MCI

6.1.1 Continuing Home Visit Care and Family Support

Older adults living alone are more vulnerable to socioeconomic, physical and mental problems than those who live with family members and domestic helpers (Sok, 2008). An individual living alone has a larger risk of isolation and suffering from loneliness, and this can exacerbate poor cognitive functioning, which cannot be recovered (Evans et al., 2009).

Those living alone have also been found to suffer more from depression and loneliness than those living with their families (Finlay & Kobayashi, 2018). A study in the Asian context found that a third of older adults living alone reported loneliness, which was associated with cognitive loss (Lee et al., 2008). Older people living alone with cognitive impairment require a wide range of social activities and cognitive training to prevent dementia or lower the rate of further cognitive decline. Non-pharmacological treatments for early dementia or those with a high risk of dementia have become more popular in recent years. Cognitive intervention and exercising are recommended as effective ways to prevent MCI becoming dementia (Karssemeijer et al., 2017). The cognitive function and quality of life of older people in the community was found to improve after they participated in a cognitive intervention programme (Park et al., 2013).

The Japan Post offers a fee-based home visiting service, through which postal workers visit older people living alone once a month, so as to check their health and also living conditions. A report indicated that 524 people began using the service, and their mean age was 79.5.A significant interaction between the factors of time, family (whether living alone or not) and social isolation was identified. The home visit service was also found to be beneficial in terms of social isolation and cognitive health (Inagaki& Awata, 2020).

Needs of Older People with MCI Living Alone

Continuing home visits, care and family support can be viewed as the latent needs of older people with MCI living alone. They must learn how to take care of themselves as most of the time they do not see, talk or interact with others. CP, for example, expected to have regular gatherings with her older sons and daughters. However, they had their own family issues and due to the work environment of Hong Kong, they often felt stressful and did not have the time to visit CP on a weekly basis. This made CP even more pessimistic when her younger son died, as it was a critical moment in which CP needed extra family support and home care. Home visits can therefore make a difference to older people living alone, and particularly for those diagnosed as MCI..

When older people find it difficult to cope with daily chores such as washing, preparing meals, taking medicines and going out, moving into a residential care home can be a better option than care at home, as middle-aged adults in Hong Kong typically work long hours. CP required help with basic soft skills such as operating instant messaging apps. She mentioned that she 'could not make use of it …totally forgot…I know nothing at all like a stupid pig'. Care visits offer older people living with MCI the support they require, and the visiting carer can thus make a difference.

As CP experienced, she could not move the furniture by herself when the walls were in need of repair, and had to wait for the volunteer from the YOT or the Social Welfare Department. However, she could not build a relationship with them as a different person visited each time. She then had to explain again her requirements. Daily activities were challenging for CP. When she has nothing to do, she 'completely feels so lonely…loneliness makes me feel sick'. Visits by family members and friends can help to alleviate loneliness by maintaining an individual's social role. Regular home visits by family members can prevent further social isolation and improve self-esteem.

6.1.1.1 Ageing in Place Involving MCI

Ageing in place refers to the ability of an individual to live independently in their home, comfortably and safely regardless of age or ability (Center for Disease Control and Prevention, 2014). Policy makers, healthcare providers, older people and their family members have found ageing in place to be beneficial, as it avoids the cost of institutional care and can provide a sense of security which contributes to active living (Sixsmith & Sixsmith, 2008).

Ageing at home enables people to maintain autonomy while retaining their connections with family members and friends, to form a wider community (Wiles et al., 2012). Good social relationships are essential for successful ageing (Rowe & Kahn, 1997), and poor social relationships have been associated with various negative health outcomes (Tomaszewski, 2013). When older people face changes in their social environment, they may be at a greater risk of loneliness and social isolation (Finlay & Kobayashi, 2018). Social networks shrink as close social contacts die and children grow up and become independent (Bordone & Weber, 2012). New opportunities for social contact thus become limited and thus social isolation becomes more of a risk (Kobayashi et al., 2009).

Living alone may increase the risk of poor cognitive functioning in later life (Gow et al., 2013). Home visits can be effective in reducing social isolation and loneliness. Some people living with MCI barely have any social support, and a timely home visit can help ensure they are safe (Foster, 2019). Community centres like YOT should take the first step and develop free-of-charge caring plans or programmes and establish a caring team, so that the potential crisis facing those with cognition impairment living alone can be avoided. During home visits, the care team canal so assess the cognitive decline that contributes to MCI and the development of progressive dementia.

Although technological developments in healthcare can make remote monitoring possible, clinicians or community centre staff will still depend on carers to provide the first-hand information required for diagnoses, planning, caring and monitoring. MCI is undoubtedly recognised as a major public health problem. Neurologists have a crucial role in recognising and treating people with MCI, while care and support can help them to live independently even though they have cognitive impairment.

Research has found a clear association between living alone and low scores in cognitive function tests (Yaffe et al., 2009). However, other studies assessing the relationship between living alone and cognitive ability report no association at all (Wang & Dong, 2015). Cognitive and physical health can be adversely affected by poor social relationships due to the loss of a spouse (Kiecolt-Glaser & Newton, 2001). Housework, paying bills, cleaning and answering phone calls require a certain level of cognitive input (Jekel et al., 2015) and those living alone, unlike people living with others, have a greater level of responsibility for such tasks. Those who are unable to manage independently are likely to move to nursing care homes (Cornelis et al., 2017). Living alone may not be a risk factor for those in good health and with adequate social connections, and this state may even be positive as it reflects the maintaining of functional independence (Mazzuco et al., 2016).

Building social contacts and interactions between individuals can enhance their levels of cognitive function (Berkman, 2000) and a broad social network and engaging in social activities can benefit cognitive ability (Evan et al., 2018). People living alone may have healthy friendship networks even if their family networks are limited (Evans, 2019). However, elderly people with cognitive impairment living alone need more care and assistance, particularly from those they love and trust. Home care can be positive and acknowledges that those living with dementia can also be independent and live alone if appropriate services are provided (Kitamura, 2019).

Primary care home visits were common practice in family medicine (Kao, 2009), but became less frequent in the second half of the twentieth century (Chan, 2002). However, the rising older population and the difficulty in accessing care centres has sparked a resurgence in medical home visits worldwide (Stall, 2013). Home visits can alleviate the pressure on hospitals by providing risk assessment and medication and can ensure people receive advice from health professionals (Unwin, 2011). The availability of home-based care has increased and is expected to further expand in scope (Akhtar et al., 2019).

Home visits can reduce unnecessary hospital treatment for those with MCI. A recent study indicated that the level of home visits was still low and suggested that additional incentives should be given to encourage primary care physicians and healthcare professionals to conduct home visits (Palmer, 2019). A primary care programme involving healthcare professionals, social workers and family caregivers can benefit people living with MCI and dementia. They may not recognise their impairments and so friends or family members may need to identify its presence and symptoms.

Through home visits, community-dwelling older people can live safely and well in their own homes. The likelihood of MCI transforming into early dementia will also be reduced, thus helping to improve their quality of life. MCI is often not recognised, and even if it is recognised it may not be addressed, although it is clinically important (Tong, 2017). Medical records can hold information regarding MCI, which could be invaluable to other carers or healthcare professionals, and to avoid any mismanagement of their health requirements.

6.1.2 Awareness of Universal Design Principles

The Alzheimer’s Association defines MCI as involving cognitive change that is serious enough to become noticeable, but that is not severe enough to affect daily life and independence. Many individuals are aware of their memory problems and will compensate by relying on calendars and notes as immediate support. Some living with MCI may have minor difficulties with daily activities, but for those who go on to develop dementia their memory loss will disrupt their daily lives and living alone will no longer be safe.

The seven principles of universal design constitute an ideal that that can be practically applied to everyday objects such as can openers and scissors. Many new products available in the market meet universal needs, but in terms of homes and furniture, such developments are limited. Prior research suggested that universal design principles should be implemented by first conducting evaluations of interiors, second, setting up a project incorporating universal design principles and integrating these into standard building criteria and finally by incorporating universal design into education curricula as a required subject (Preiser, 2009). Although universally designed homes are available, the design profession and the building industry continues to resist adopting such principles (Young & Pace, 2001). Still, there are some people believe that universally designed homes are not aesthetically pleasing at all.

Housing is a central focus for many people, and particularly those living with physical and mental disabilities. More studies of cognitive-friendly design for public housing are required as the population continues to age. Older people may prefer to stay living in their own flats and continue to be part of the community, so their independence, security and universal access should be supported (Verwer, 2012).

Rehabilitation or restoration in housing increases the quality of life of each individual, as many prefer to stay in their homes as part of the community, so designing public housing that makes the living environment more easily accessible is essential. The needs of those with multiple disabilities in terms of accommodation differ from those of the able-bodied. Disabilities can be classified into those related to vision and hearing, independent living and cognition (Hoffman & Livermore, 2012). Universal design can provide many possibilities without the need for any specific adaptations (The Centre for Universal Design College of Design (CUDC), 2006). It can thus be a guiding principle for designers, developers and potential buyers. Residential interiors should be of an appropriate and reasonable size so they are safe and usable (Park, 2006).

The current design of public housing in Hong Kong fails to satisfy the needs of older people living alone with MCI. Much of the public housing in the New Territories was built nearly 40 years ago. The large estates are still inhabited by many local elderly people, and no substantial changes or refurbishments have been made. Tenants can request that the Housing Authority fills wall cracks, repairs door hinges and restores other damage, but universal design principles are not effectively applied in standard public housing development.

The universal design pyramid illustrates different levels of abilities and shows how housing should provide a place for all kinds of people including those with cognitive disabilities. They have the right to be treated like anyone else and have an accessible living environment. Dementia is covered by disability discrimination legislation, which states that the human rights of disabled and non-disabled people should be equivalent. Universal design principles are non-discriminatory and therefore should be effectively applied to future public housing. The quality of life of older people living alone with MCI can be improved if design practitioners fully utilise the universal design framework. As illustrated in Figure 6 (in Chapter 3), the framework reveals the relationship between the application of these principles, which facilitates social interaction, and daily activities, along with various interventions that provide cognitive-friendly interiors and furniture.

6.1.2.1 The Need for Participatory Design by People with MCI and Dementia

Older adults are not typically consulted in the process of design and product development

(Wilkinson & De Angeli, 2014). Traditional methods may not be sufficient to develop products for them that are well-defined, easily accessible and usable (Rebola et al., 2013). This results in older people being reluctant to experiment with newly designed products (Wilkinson & De Angeli, 2014).

In a participatory design process, various opinions are considered to establish the most viable design (Lee et al., 2017). Participatory design emphasises the involvement of users throughout the project life-cycle, encouraging the engagement of users as co-designers during the ideation phase and eliciting creative input and criticism through participation (Cozza, 2016).

Appropriate and Visible Areas for Storing Keys

CP had a few times that she had placed the door keys in the wrong place and she could not easily find them. She also forgot to take her wallet when going to the wet market. She therefore needs a good design solution to support her. Home furniture with a designated area, such as the surface of a TV cabinet, for holding keys would be beneficial. This can also apply to a shoe cabinet, which is typically next to the front door. Participants including CP, CH, FY and WH have no such designated area. They put their keys in random places, such as their shoulder bags, on top of dining tables or in dishes containing other objects such as candies, mugs and glassware, where they may be difficult to find.

Accessible Home Furniture with Clear Doors

Home furniture design should be based on the universal design principle of ‘simple and intuitive use’, which suggests that design should be easy to understand regardless of users’ experience or level of concentration. The principle of ‘perceptible information’ should also be considered, which suggests that a design should communicate necessary information effectively to users, no matter what level of sensory ability they possess (Mace, 1985). The researcher conducted a participatory design workshop with stakeholders to gather first-hand information about the problems older people living alone with MCI face, which can inform how universal design can be seamlessly immersed into their lives.

When incorporating such principles into their living environments, others such as carers and domestic helpers who visit them daily should also be considered. Thus, home furniture should be usable by all people, and the application of universal design principles can help to eliminate social stigma.

CH was quick to ask for assistance when she met the researcher for the first time. She had attempted to buy a replacement fluorescent tube, but was unsuccessful. Although the tube she bought was similar to the original, it was not the correct size. The changing of light bulbs is a common issue that most people have to deal with, and is not generally a problem for those who are able-bodied. However, CH is a typical person living alone with MCI, which is likely to progress to become dementia. She could not reach the light and so she could only guess at the size and bought a replacement that was bigger than the original. If CH had no light source in the evenings, she may risk injury due to fire after lighting candles or from obstacles in the darkness. In this situation, one will be less aware and thus more at risk. Applying participatory design can reveal the genuine needs of the target audience, but designs currently available in the market rarely satisfy these needs or address the difficulties faced by those living alone with MCI.

6.1.2.2 Applying Universal Design Principles to People with MCI and Dementia

Gibson's ecological theory of perception suggests that the perceptual characteristics of the environment can serve as affordances that provide information about opportunities for action, which depend on individual abilities (Gibson, 1986). An environment that is perceived as usable has the potential to promote healthy behaviour (McCormack et al., 2010). Identifying perceptual affordances within an environment can encourage an active lifestyle, thus benefiting cognitive health in later life. The ageing process in general and cognitive impairment will lead to a marked decline in orientation and navigation abilities (Lester et al., 2017).

Spatial orientation and navigational skills start to deteriorate early in the process of ageing, although there may be no obvious deficiencies in other physical abilities (Harris & Wolbers, 2012). WH lived in public housing within the Single Elderly Persons Priority Scheme, and the interior design and layout are typical of public housing in Hong Kong. Although the automatic lock on the wooden door enabled older people to close it firmly and thus it was relatively safe, the design was poor as it could accidentally lock older people living alone out of their homes.

Requiring a Low Level of Physical Effort is Not Enough

Theoretically, the door design did fulfil universal design principles, as it requires 'low physical effort', or even none at all, to close the door. However, it was not entirely appropriate for elderly people living alone, particularly those suffering from MCI. If they forget their keys due to their poor memories when taking out the trash they may get locked out by the automatic door.

Such a risk will be reduced if they live with their family members. CP, CH and WH had all paid for locksmiths to come out and open the door in the night. CP and WH said that they did not want to bother their children as they needed to go to work early the next day. CH has no choice but to pay for a lock replacement service as she left her key at home.

A Lack of Tolerance of Error

The automatic locking system met the universal design principle of low physical effort, it failed in this particular application. Thus, its operation system failed to fulfil 'tolerance of error'. Many older people, including those with cognitive impairments, currently live in the New Territories. The Hong Kong Housing Authority should reassess the public housing infrastructure and organise a campaign to gather feedback from people living alone and particularly those with MCI or early dementia, to identify their special needs and ideas in terms of the basic requirements for interior designs. Public rental housing stock currently consists of over 660,000 flats, so the quality of life of each resident, and particularly the elderly, can be improved through more considered design.

6.1.2.3 Design Opportunities

Architects and interior and product designers should revisit the design of interiors, home furniture and product design in typical public housing. Potential design features that can benefit people with MCI living alone are illustrated in Figure 17.

Housing Features		Characteristics	Benefits	Related to UD Principles	Visible Reminder
Main	Details				
Entrance	Metal gate	Provide hooks for hanging various items including plastic bags	As a final reminder to residents to pick up and take the items hanging there	Simple and Intuitive Use	+
	Wooden main door	Two-step/ semi-automatic locking system	Includes a buffer so residents can choose whether the door is nearly or completely closed	Flexibility in Use	
Living Room	Shoe cabinet	12cm x 12cm recesses on the surfaces of the shoe and TV cabinets	Provides a designated area that is visually accessible where residents can leave keys	Simple and Intuitive Use	+
	TV cabinet				
	Lighting and switches	Fluorescent tube size and dimension	Clear information on luminary for easy replacement of	Simple and Intuitive Use +	+

		shown on the luminary	fluorescent tubes every 2-3 years	Tolerance for Error	
	3-storey display cabinet for storage	Using transparent rather than opaque door with handle	Allows residents to see the packed snacks and other items on the shelf, so know what needs replenishing	Simple and Intuitive Use	+
	TV remote control	Simple solution, only relevant keys are visible for each operation	Avoid complicated combinations for each operation, as they can confuse the users	Simple and Intuitive Use	+
Bathroom and toilet	Handrail	Provide pre-installed two sections of handrail – one inside the toilet and one on the side wall of the aisle towards the toilet	Allows residents to hold on and move safely and independently	Low Physical Effort	
	Taps	Simple single-lever handle, with time/volume control	Easy to understand, easy to open, requires less force to operate	Low Physical Effort	
	Space	Clear floor space	Space that allows a carer to assist the resident when taking a shower in a comfortable posture.	Equitable Use	
Kitchen	Kitchen cabinet	Using transparent rather than opaque door with handle	Allows residents to see seasoning bottles and dishes inside the cabinet, so that they can remember their location for daily use	Simple and Intuitive Use	+
	Cooking gas hob	For flame cooking, the flame should be visible while cooking, and operated by physical knobs for on/off control	Allows residents to see the flame when cooking and make sure it is off when finished.	Simple and Intuitive Use	+

Figure 17. List of housing features and their characteristics and benefits for cognitive-friendly public housing, based on universal design principles and visible reminders

A visible reminder is an element that supplements the universal design principles to ensure they effectively fulfil the genuine needs of older people with MCI living alone, particularly in terms of interior, furniture and product design. Recognition of information is important, and such reminders can be personalised to account for lived experiences, and thus are often more valuable than technology-based solutions (Gibson et al., 2014).

When acting as a reminder, customised design should have a level of familiarity and inherent utility for those living with cognitive impairment and should be meaningful and familiar to them (Evans & Collier, 2019). Elders O, A, L, N, Q, J, M and F believed that memorable and visible elements could help them more easily remember tasks and recognise a procedure when they encounter it again. Elder A mentioned that she put snacks and personal belongings on her desk so that she could easily recognise them, but she also wanted a clean and tidy living environment and did not want to see any cracks in the wall. By following universal design principles when designing home furniture and incorporating visible reminders, such items can significantly benefit people with MCI who live alone.

One example is a tall cabinet with a glass front that enables the contents to be clearly visible. This can benefit those with cognitive impairment and carers and family members, so they can use it together with no stigma attached. Carers should also understand what information people with MCI require when using modified furniture, and the level of cognitive effort required. This can address the poor memory typical of those with MCI, and such low-cost interventions supports the government policy to ensure people with cognitive impairment have the right to live well (Department of Health, 2009). Figure 18 provides a conceptual diagram showing how to address the areas that universal design principles cannot completely support as theoretical contribution of the study.

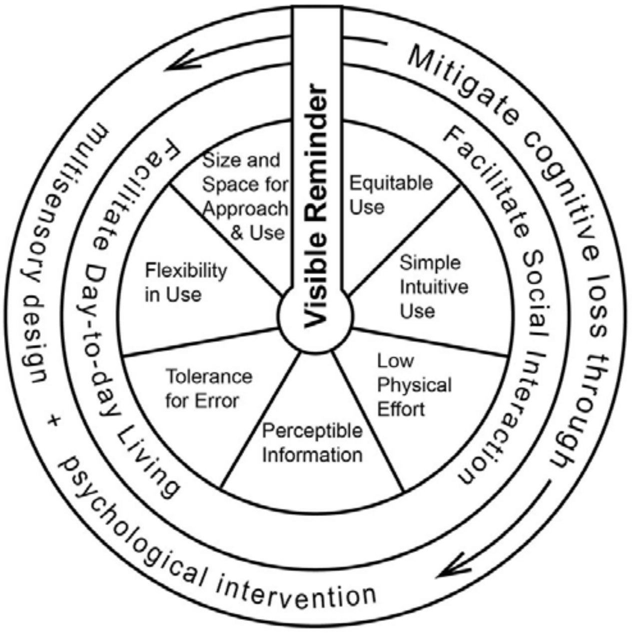


Figure 18. A conceptual diagram showing the relationship between universal design principles and visible reminders that facilitate social interaction and daily living with various kinds of intervention

The Inclusive Design Cube addresses the cognitive abilities of those who need to be assisted by carer, supported with special designs, modular design and user-aware design. Inclusive design for older people living alone aims to minimise exclusion through considering usability and the impact of product and home furniture design.

Visible reminders can be applied across the four boundaries (i.e., assisted by carer, special purpose design, customisable design and user-aware design) without deliberately catering for a specific group of people. Such reminders have no substantial additional costs. Various household designs maybe simple and intuitive to use, regardless of experience and concentration level. However, the short memories of such users mean they are unlikely to retain basic knowledge about a product, even if they have learnt about them and have opportunities to practise. They may not remember the best way to operate it safely and effectively. A visible reminder can serve as another element, if universal design principles are applied to public housing. Such a reminder can also compensate for factors that universal design principles cannot fully address when considering the needs of older people with MCI living alone. According to the theoretical framework mentioned in Chapter 3, adoption of visible reminder (new element) with universal design can further improve people's quality of life. If design practitioner, the builder and the government body fail to apply it appropriately, it might not be sustainable to the overall remodelling public housing programme even if the decision of remodelling is made. Further, if application of utilizing such new model is rejected, the quality of life of people with MCI living alone will not be improved. Even if there is late adoption, the result of improvement might be affected due to other changing factors with time.

The Enabler, developed by Steinfeld et al. (1979), is based on a checklist of 188 environmental features, and 15 specific functional impairments of the human body were identified. These were used to assess levels of ability in terms of building use. The difficulty in interpreting information is a functional limitation that affects many daily activities. The application of universal design principles can assist people, for example after suffering a 'severe loss of sight' or 'difficulty reaching with arms' mentioned in the Enabler, by providing solutions in terms of products and interiors that aims to achieve a 'tolerance for error' and to provide 'perceptible information'.

Universal design principles should be the basis of the creation of furniture suitable for all people, without stigmatising those in need, incurring any extra costs or sacrificing aesthetic considerations. The Enabler model highlights the difficulties of people with various disabilities, in which the idea of a 'visible reminder', as identified in this research, contributes to those living alone with cognitive impairment as an affordance, i.e., how an object can be used. This can provide valuable feedback to design practitioners who should consider interaction between products and users (Gibson & Carmichael, 1966).

6.1.3 Expanding Social Networks and Engagement

The concept of active ageing involves maintaining active engagement, including social, recreational and leisure activities, volunteering and lifelong learning. To maintain active ageing in later life, older people need to have good physical and psychosocial health, which requires maintaining a healthy lifestyle through a healthy diet, exercise and regular social engagement.

The District Elderly Community Centre and the Neighbourhood Elderly Centre under the Elderly Services Programme Plan both promote active and healthy ageing, but the strategies aimed at improving the quality of life of older people could be more effective. The District community centre aims to provide older people with a comprehensive support service that includes community and health education, network and volunteer development and carer support services. The neighbourhood centre provides older people with a more comprehensive range of support services, such as information on community resources, educational and supportive programmes on dementia, and also counselling services. M said that a helping hand at the right time is important, as people with MCI have poor memories and may forget the simplest of things, such as appointments or scheduled events, and will thus lose out.

Social Networks Provide Social Support to People with MCI

Those with MCI often do not develop good social networks, although these play a crucial role in slowing the progression of dementia in later life (Penninkilampi, 2018). The benefits of active social participation can be due to decreased physiological stress (Seeman, 1994). As Sanchez (2016) noted, the International Classification of Functioning, Disability and Health framework states that environmental factors such as good social support and social competence can have a positive effect on cognitive health, thus improving the quality of life of older adults living alone with MCI. Social support plays an important role in the detection of MCI and its progression into early dementia.

Cohen et al. (2020) suggested that social support can be examined objectively or in terms of subjective experience such as feelings of loneliness. Poor social relationships are found to be associated with people living with MCI (Kuiper et al., 2015), and that they have a lower level of social support and satisfaction compared with able-bodied people (Zamora-Macorra et al., 2017). Declining cognitive function deprives people of the willingness to socialise, thus leading to a loss of the essential skill sets required to maintain social networks (Lu et al., 2021).

Family members and friends can provide both emotional and physical support (Winsor, 2014). Some studies suggest that friendship is a factor that affects cognitive health (Dunbar, 2018). The basic interpersonal and communication skill sets required to receive social support may be more likely in those with a relatively higher level of education. Retaining social relationships is more difficult for those living with MCI and dementia (Lang, 2001). Friendships can lead to further social engagement, and are thus related to cognitive skills that promote both physical and mental wellbeing, and have the potential to reduce the cognitive effects of ageing (Demir, 2012).

The pandemic impeded the building of relationships as many people worked from home in many major cities, to reduce the risk from the virus. Mask-wearing further hampered the establishment of social networks and social engagement. Reduced social support can affect both the acceptability and accessibility of interventions for those living with mild cognitive impairment (Krueger et al., 2009).

6.1.3.1 Insufficient Resources for Activities and Cost Considerations

M said that the centre she worked in provides various activities and training for its members, but the programmes are relatively small-scale and so many older people living with MCI were not able to get into them. Thus, they miss out on the opportunity to expand their individual networks and receive constructive feedback from others when they face problems. They may stay at home much of the time and wait for the next round of applications, which could be in three to six months' time. CP indicated that she would only participate in centre activities that were free of charge. She preferred to join free cognitive-related activity groups but usually they became fully booked up very quickly.

The centre staff should assess the capacity of the programme to ensure that local older people can use the activity to expand their social networks. Many live in nearby public housing estates and share similar life experiences, so when they do connect their social networks can be effective in terms of mutual support. SK valued the full-time programme she had participated in for a year. Although she is 79, she still enjoyed outdoor activities and was committed to active ageing. She applied for training from another community centre as she was on the waiting list for YOT programmes. CP felt frustrated when she was not among the first few intakes enrolling in the cognitive training programmes.

She eventually refused to apply for popular programmes. Social networks are of the utmost importance and are a key component in healthy ageing, particularly for those living alone with MCI. Research suggests that relatively fewer social contacts can lead to poorer cognitive functioning and a more severe degeneration in cognition (Crooks, 2008). In addition, there is evidence of the positive effect of having friends and that one's social connections become a form of protection (Zhang, 2021).

As people age, their social networks typically diminish and building new relationships becomes harder (Thomas, 2011). The cognitive decline brought by losing neighbours and friends can be mitigated by increasing the presence of family members within a social network (Aartsen, 2004). Research suggests that having a large number of contacts, including friends and educated family members, is associated with a lower risk of cognitive deterioration (Zhang, 2021).

6.1.3.2 Losing Abilities in Daily Living

CH needed someone to fix the fluorescent tube as she could not handle it by herself. She bought the wrong one could not easily get advice as she lives alone. She had been waiting until someone visited her so she could ask for assistance. She also needed help with her mobile phone settings and enrolling in activities at the centre. CP relied on her neighbour if she forgot her key when going out. This relationship with a neighbour was built on trust. Studies indicate that mental health benefits can be gained from social interaction and support

(Seeman, 2001).

Thus, evidence of a link between social networks and cognitive function has been offered (Beland, 2005) Cognitive impairment makes it difficult for older people to maintain a social network and can lead to their withdrawal from social interaction, which can result in increased feelings of irritability and anxiety and thus affects other abilities (Gow et al., 2013).

6.1.4 Revisiting Public Health Policies

Standards are required to ensure cognitive evaluations are sufficient to determine the degree of an individual's cognitive impairment. These should involve psychiatric and medical measures, and the social context of the impaired people and the medical setting should be considered. Recognising cognitive impairment and understanding each individual's strengths and weaknesses is the first step in achieving effective treatments, as no one is identical. Annual cognitive health assessments are important for high-risk individuals and can improve the recognition of MCI in general, enabling earlier interventions to take place.

Many neurologic disorders put potential sufferers at risk of cognitive decline, and cognitive screening tests are recommended following Parkinson's disease, stroke and neurologic hospital care (Latorre et al., 2017). Adults over 65 have a higher risk due to ageing, and those with cognitive impairment are at even greater risk. Over one-third were found to be impaired, which represented a three-fold increase in the diagnosis of dementia and cognitive loss (Rosenbloom, 2016). Doctors fail to recognise nearly half of the patients in their practice that have significant and considerable cognitive deficits, and thus miss the opportunity to offer an evaluation followed by proper medical treatment (Boustani, 2003).

Awareness of the benefits of assessing the cognitive health of people aged 65 and above is increasing in the US (US PSTF, 2019). The Advisory Council for Alzheimer's Research, Care and Services stated that identifying the early stages of dementia including MCI should be a national priority (US DHHS, 2018). The Hong Kong government should enhance community and home care services and revisit subsidised residential care services, to ensure people live with dignity.

Policies about mental health are regularly reviewed, and directions for the future development of mental health services in Hong Kong involve constructive measures and joint recommendations with the Review Committee on Mental Health. Integrated Elderly Services Centres are expected to be developed in the coming years through a pilot project. This will aim to provide one-stop and multi-disciplinary healthcare and social services for older people in need. Government bodies are expected to increase the number of subsidised residential care places through the use of spaces in subvented homes, building new homes on a contract basis and identifying other appropriate sites. A good public health policy can alleviate the pressure on subsidised residential care places by promoting ageing in place for people living with MCI.

Challenges Faced by the Government when Raising Public Awareness about the Concerns of People Living Alone with MCI and their Carers

Keeping cognitively, physically and socially active in mid-and later life is an effective way to protect against MCI and dementia. Acting fast in terms of dementia prevention and care is wise, as it can improve the quality of life of each individual with dementia and also their family members by reducing the pressure on the public health care system.

In Hong Kong, The Social Welfare Department provides a wide range of services such as residential care, day care service, community care service and carer support for both dementia patients and their carers through centres for the elderly, subsidised residential care homes and day care centres (Legislative Council Secretariat, 2022).

In 2016, the average waiting times for admission to a subsidised residential care home for the elderly and day care centres were 36 months and 10 months, respectively. This is expected to worsen with the gradual increase in those with dementia. Community care services for people with dementia and MCI should be improved and should provide more medical-social collaborations and support. They and their carers should be provided with training and care support, according to their individual care plans.

Inadequate Provision

The waiting times for various services provided to people with dementia and their carers are therefore long. CP said she would only join centre programmes that are free of charge. However, these attract many members and are very often full, so getting a place on a year-long cognitive training programme was unlikely.

As the main objective of such training programmes is to mitigate the cognitive decline of people with MCI, CP's quality of life and cognitive ability will be affected. In addition, government should put more effort into public education and early diagnosis for those older people who have symptoms related to cognitive impairment. A report indicated that health care professionals should be trained to recognise dementia and thus enable early diagnoses, and that assessments of cognitive function should be included in regular health checks through primary care (Legislative Council Secretariat, 2014). Raising public awareness of cognitive loss and dementia and the concept of MCI is essential to reduce and eventually eliminate social stigma. However, many barriers remain.

Carers play a central role in supporting those with cognitive impairment in the community, and particularly those living alone. Policy-makers should increase the support for carers in terms of professional training and also ensuring they can maintain both physical and psychological health over the long term. Since bottom-up approach encourages the participation of the target group, unlike top-down approach, adopts bottom-up approach to make policy should include public participation but not rely on central decision. To ensure the economic and social burdens on society due to the ageing population do not increase, more effort should be placed on health promotion, and particularly in terms of MCI and dementia. Bottom-up policy making is essential for effective implementation on a long-term dementia care strategy and also a service provision plan for the people in need.

6.1.4.1 Advice for Family Carers from the Government and Service Providers

Assessments of cognitive function can help distinguish MCI from less significant cognitive complaints and from dementia syndrome (Petersen, 2018). This distinction can be established during an initial evaluation or in follow-up visits, and more accurate assessments over time can be recommended in medical records. Cognitive impairment leads to a loss of independence and the ability to be active in society, and thus many daily responsibilities can shift to other people such as care givers, who then feel pressurised (Marshall, 2011).Assessing daily activities routinely can help healthcare professionals identify deficiencies and offer treatment earlier, thus slowing the declining in cognitive function. The daily problems faced by families and sufferers can also be addressed more accurately.

Those with MCI who live alone have the right to know about their condition so they can be prepared. They should ensure they are not being exploited, plan for care and monitor their conditions. Care support workers often avoid discussing the risk that MCI progresses into dementia with sufferers and their families (Petersen et al., 2001). However, understanding a diagnosis at an early stage is essential in terms of safety and planning for the future, monitoring and following-up on their cognitive health condition (Grill et al., 2017). Family members and carers typically provide care services to those with MCI who are living alone.

Family carers may not fully understand the specific symptoms, or how MCI will continue to evolve to progressive dementia, as all sufferers are unique. They do not have the knowledge to provide good quality care compared with health professionals. A study involving 1652 African participants with MCI indicated that about 53% used anticholinergic medication, which can interfere with memory (Campbell et al., 2010). The use of these drugs is common for older adults (Gray & Hanlon, 2016).

The education provided to carers and people with MCI is inadequate. Medical ethicists found that involving family members or close friends identified by patients with memory loss can promote well-being and autonomy (Nuffield Council on Bioethics). Family carers need more support such as discussions, MCI-related education and support programmes, as they are an important factor for effective coping as the illness progresses (Savla et al., 2016). TM said that safety grip bars should be installed in all public housing to enable those with dementia to shower by themselves or when assisted by a carer.

However, professional knowledge is required to install the grip bars in a good position, to effectively help those with cognitive impairment. If grip bars are installed too high or not at the same level, they will be difficult to use. While TM is at work, his mother is looked after by his Filipino domestic helper who spoke little Cantonese. She had received no professional training, but simply followed the instructions from TM. Those with MCI and dementia deserve to live with dignity and safety and thus remain healthy.

Design practitioners should develop products and living environments that can be used by all people to the greatest extent possible, with guidelines for users and carers. Regular seminars or activities should be organised and the government should take a leading role to disseminate messages regarding the importance of professional care taking through various groups. The Chief Executive tasked the Elderly Commission to formulate an Elderly Services Programme Plan to help those living alone with cognitive impairment, but the effectiveness of community care services and carer support for the majority of older people with dementia is still questionable. TM understood that no case is identical and each patient is different.

Those suffering from cognitive impairment may be hyperactive or distressed due to sudden mood changes. When people with MCI evolves into early dementia, although the sufferer is living, they may lose all memory. M, the centre manager of YOT, mentioned that such people may not easily understand things or recognise themselves. In addition, they do not have professional judgement to identify whether the level of impairment is mild or severe. They may not know if they can live independently or not until they have an accident. Precaution is better than cure.

6.1.4.2 Dementia Prevention Programme for People with MCI

Elderly people living alone are having a relatively higher risk of developing dementia (Livingston et al., 2017) and those living with MCI are more likely to develop dementia

(Rosenberg et al., 2013). In an ageing society, whether or not people are willing to participate in dementia prevention programmes can affect the development of dementia. Research reveals that the main consideration is a deterioration in health, but a lack of physical capacity can prevent older people from participating in preventive healthcare (Bethancourt et al., 2014). CH mentioned she was diagnosed with a benign tumour, which might affect her willingness to participate in the programme, as her physical ability is declining due to continuing pain. Although CH had a positive attitude as she believed she would be given priority when applying to an elderly nursing home if her situation became worse. She deserves to have good treatment for cognitive decline and the right to learn more about the dementia prevention programme.

The government should disseminate the benefits of launching dementia prevention programmes to service providers and involve them in promotion campaigns (Elderly Commission, 2023). Those living with MCI can then identify the programmes they should participate in when diagnosed and thus reduce the risk of dementia.

6.2 Practical Implications

The findings of this study have significant practical implications. They can inform the development of public housing, including housing for single elderly people. Further research that can guide design practitioners in the use of universal design supplemented with visible reminder and should aim to improve the quality of life of older people living alone with MCI through social participation. In this section, I outline the practical implications for people living with cognitive impairment, their family carers, day care service providers such as support workers and staff, social workers and physiotherapists who work in this field.

We have found that current interior and product designs in public housing for single elderly people, such as those of door handles, fail to fulfil universal design principles. Automatic self-locking doors were initially designed and installed to address safety in the home, but they may not fully support people living alone with cognitive impairment. Those living alone must remember their door keys to ensure they are not locked out, or they will face additional problems. The long corridors in typical public housing in Hong Kong (seven flats on each side) also create a hurdle, as they may have problems finding their own flats at night due to cognitive decline.

People living with MCI should be aware that they can use tools as reminders to help them live more easily. They can place key chains on doorknobs or carry a shoulder bag with a keychain attached at all times. A more practical solution is yet to be developed, but universal design principles supplemented with visible reminder should be considered. The equitable use of typical product designs, for example, of door handles and locking systems, involves the choice to have a self-locking system or not. The design itself can then become marketable to people with diverse abilities.

When design practitioners apply these principles, they should ensure the design is applicable to any and all users. They can enhance the experience by considering ergonomic factors without stigmatising anyone. The door lock design should provide a high degree of privacy, security and safety and be appealing to all users. In addition, people living alone with MCI and their carers must be aware of the need to keep keys in a prominent position, such as on a shoe cabinet or TV cabinet. They will then be familiar with the designated area and other people can use it during home visits.

Universally designed furniture can minimise the burgeoning cost of healthcare, as it can help older people with MCI live independently in their residential dwellings. The Centre for Excellence in Universal Design suggests that the application of a participatory design approach should be encouraged in the development process of cognitive-friendly dwellings for those with cognitive impairment and their care givers. Familiar design and visuals that are recognisable should be applied to meet user expectations, support the personalisation of living environments and provide unobtrusive safety measures. This can create distinct spaces for different domestic activities, which will be more memorable for people with cognitive impairment, thus facilitating better engagement (CEUD, 2015).

In addition to the cognitive health training found in typical elderly community centres, centre managers can consider developing new training programmes involving people living with MCI and qualified psychologists and social workers, using a participatory design approach. Such programmes are more affordable than treatments applied in long-term care and less restrictive compared with pharmacological management (Knapp, Lemmi, & Romeo, 2013).By expanding social networks and ensuring older people with MCI can easily access them at a reasonable cost, their social circles can be gradually expanded. They can then engage in a wide range of community activities after building mutual trust and support. People living with MCI, caregivers and also community centre staff can work together to support social engagement, thus maintaining people's identities and dispelling any negative assumptions.

Finally, the community should exert pressure on governments to revisit public health policies without neglecting the public, as the number of older people will continue to grow in the coming decades. In an ageing society, the willing participation in dementia prevention programmes by those living with MCI is a good starting point and can reduce the further development of dementia. Professional training for family carers in the field of dementia care can be given by qualified healthcare professionals. Both training about fundamental caring skill sets and the programmes and platforms available can help carers, and alleviate the pressure of caring for people suffering from cognitive impairment. Carers should also observe whether the sufferer is declining cognitively over time. Timely diagnoses of MCI and dementia should be available and accessible by people who require it when they or others notice a change in cognitive function.

6.3 Concluding Remarks

The sections in this chapter are linked together in terms of research output. Four themes were found to capture a common and recurring pattern, and thus form a coping strategy for improving the quality of life of older people with MCI living alone. These are *Continued Home Visit Care and Family Support, Awareness of Universal Design Principles, Expanding Social Network and Engagement and Revisiting Public Health Policy.* The research revealed that home visit care and family support are not enough for people live alone with MCI, who have a greater potential for depression than those living with family members. In addition to medication, social activities and cognitive training are essential, so they can have the opportunities to mitigate cognitive loss.

The needs of patients with MCI are not completely fulfilled, and many participating residents said that they have suffered from numerous product design mistakes. Continued home visits can prevent further social isolation and thus improve self-esteem. They can also effectively enable community-dwelling older people to live safely in their own place, giving them the opportunity to live with dignity without social stigma. Ageing at home enables one to maintain autonomy, however, the home setting should be defined and well-developed so that those with MCI can maintain ageing in place.

Through participatory design involving people with MCI, a conceptual understanding of the relationship between universal design and cognitive-friendly public housing has been achieved. A list of housing features with characteristics and benefits for cognitive-friendly public housing based on universal design principles and additional visible reminder is provided. Without the visible reminder stated in the conceptual diagram as mentioned in Figure 18, the UD principles will not be able to fully utilize in the design process to support the day-to-day activities of people involving living alone with MCI.

The long waiting time for the various services provided to people with cognitive impairment and their carers also hinders the participation in social engagement, and thus the potential for MCI to further progress to become dementia is greater. Government bodies and related service providers should take the initiative to provide support and advice to sufferers and family carers through dementia prevention programmes.

7 Conclusion

7.1 Summary of Proposed Research

The number of people aged 65 and above in Hong Kong is expected to reach 30.3% of the total population in 2041, which is double the current figure. Meeting health care and medical needs will be of paramount importance and is the most urgent task. The government of Hong Kong must review the current health care system, as the quality of life of older people with mental or physical illnesses can be affected by poorly designed living environments.

Long-term medical care and support is required, but this brings a significant financial burden through medical expenditure. Redeveloping public housing for single elderly with MCI in particular is required, by considering their genuine needs through universal design principles and involving them in participatory design workshops. Interior features such as self-locking door and visible cabinets integrated with key holders should be considered when applying universal design principles to those people living alone with MCI.

The findings of this research study address the application of universal design principles involving older people living alone with MCI, but they may not fully support their needs. The concept of visible reminders that supplements UD principles can be integrated into product, furniture and interior designs, to better assist those with MCI to live independently. Home visits and family support are important factors as older people living alone need extra care and support if they suffer from cognitive impairment. Building up and expanding their social networks through embracing UD principles and visible reminders as foundation in remodelling public housing can help alleviate loneliness and facilitate social connection.

Many public housing buildings are over 40 years old, and so the features and interiors may not attain current international standards. The government should take a leading role and re-assess this housing category. Strategic groups can be established to collect feedback from older people with MCI who live alone, care givers, health care professionals and social workers who provide care support to older people. Utilizing bottom-up approach to collect first hand information encourages the participation of the target groups and facilitates social interaction with older people with MCI. More guidance should be given to family carers as they are unlikely to have formal training in MCI or early dementia.

People living in public housing are normally in rental basis where the resident is required to restore to its original design and interior when they moved out. Unlike public housing, people who live in private housing can have a better control of the remodelling process and thus, the flexibility is high. The affordability of the resident should take into consideration when designing and developing products, furniture and living environment, in particular, for those people who are aged, cognitive impaired and living alone. The majority of the participants in this research are not living in rich families that the daily expenses rely on the monthly old age living allowance under the social security allowance scheme. The design practitioners should pay attention to the genuine needs and concerns when proposing new solutions to people in need. The conceptual diagram incorporates the relationship between UD principles and visible reminders facilitate social interaction and daily living into the conceptual model of relationships among coping strategies for enhancing the quality of public housing and the quality of life, unmet needs, feelings and concerns of those living alone with MCI is mentioned in Figure 19.

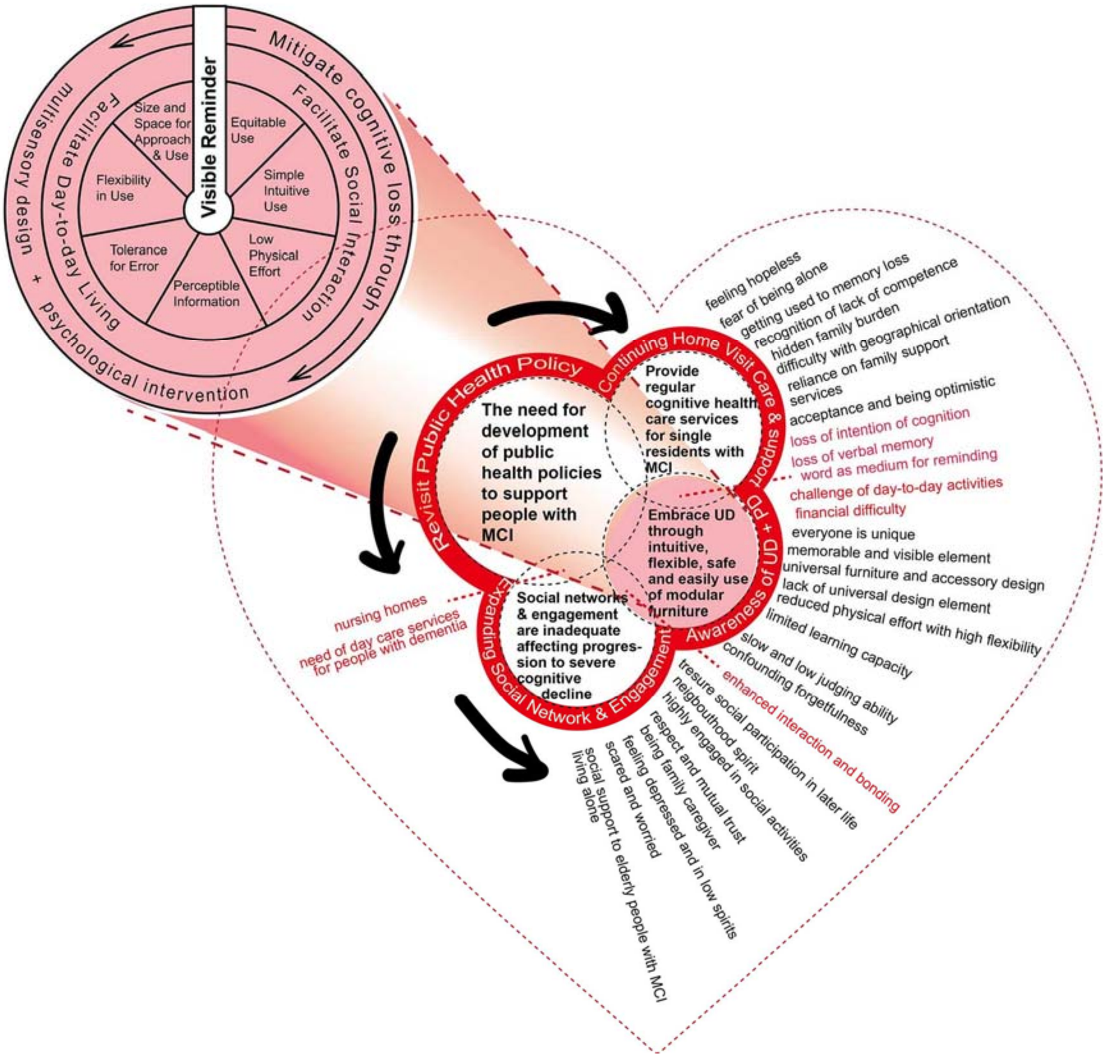


Figure 19. The conceptual model of relationships among coping strategies incorporates the relationship between UD principles and visible reminders for enhancing the quality of public housing and the quality of life, unmet needs, feelings and concerns of those living alone with MCI

The findings aim to address the knowledge gaps in terms of modified future public housing in Hong Kong, in response to the needs of single elderly people. The integration of universally usable features in furniture, products and interiors means that the needs of older adults with MCI living alone are indistinguishable. Universal design is not simply about styling or functional design, but rather a method that can enable cognitively (and also physically) disabled people to have a better quality of life without stigmatisation in all stages of cognitive illness. The study provides a coherent conceptual understanding of the relationship between principles of universal design and a supplementary element, the main difficulties that people living alone with MCI and care-givers may have and the potential future cognitive-friendly living environment should be. Visible reminder serves as a pillar and is placed into universal design diagram composed of seven sectors. It becomes an essential element that supplements UD principles to ensure that the design and development of interiors, home furniture and product design involving people with MCI living alone can be performed to meet the genuine need of each individual. Obviously, design practitioners might solely apply UD principles in the design process for home renovation are not enough.

This conceptual diagram as mentioned in Figure 19 can inform empirical research, and can thus be applied in other similar situation in other major cities. The data collected through participatory research, semi-structured interviews, participant observation and also my own reflective field notes allowed me to explain my theoretical framework, and finally generated an original conceptual model based on Rogers' Innovation-decision process model, identifies the missing element (visible reminder) to be applied with universal design principles, including multisensory design and psychological consideration benefiting the design and development of public housing involving people with MCI.

Adopting ethnography as a research methodology in qualitative research is ideal for exploring the collective perspectives and experiences of both cognitively impaired people and their caregivers. An enhanced health care experience in primary care can thus be achieved. By understanding these life experiences through a series of participatory design workshops and participant observation followed by in-depth interview with carers, the present study provides insights into the issues of health care services and public housing design, which can then benefit the society as a whole in a gradual progression. It is a conceptual framework for designers and other stakeholders to apply a new strategic approach for caring about people with MCI who are living alone, it will also support decision-making in health policy making.

7.2 Answers to Research Questions

Previous chapters review the literature on the diagnosis of MCI and dementia, the loneliness of older people living alone and the approaches to overcome it through the application of design. Public housing design in many countries including Singapore, the US and Sweden has been discussed. The principles of universal design, related studies of design inclusion and the benefits of psychosocial intervention for MCI and dementia are also reviewed.

This chapter concludes the research study and provides answers to the research questions formulated in Chapter 1. The future development of universal design principles and related strategies benefiting older people with MCI living alone and their carers are discussed. Further qualitative research studies concerning older people living alone with MCI and their care givers are also identified in the last section.

7.2.1 Q1 - Quality of public housing for the elderly in Hong Kong

According to the Hong Kong Housing Authority (HKHA), more than half a million people aged 60 or above live in rented public housing, which constitutes nearly 40% of the elderly population in Hong Kong. HKHS offers different types of residential priority schemes for harmonious families and senior citizen, including the long lease of independent living residential units for retired middle-income groups.

However, the majority of older adults are living in public housing estates that are almost 40 years old. CH, CP and FY lived in Yau Oi Estate, which is a signature public housing estate in Tuen Mun built between 1979 and 1982, with a population of more than 35,000. It is the largest single subsidised housing development in Hong Kong. CP said that the Yau Oi Estate is designated for poor people and many older people live in this district. As the population continues to age, the number of people living with MCI will increase. Thus, the number of people living with dementia will also inevitably increase because of the progression of cognitive decline.

The study reveals that current public housing design lacks any full consideration of universal design principles, and paradoxically does not provide the general public with a satisfactory quality of life. UD principles should be supplemented with visible reminders when considering remodelling public housing using the present conceptual diagram illustrated in Figure 19. In Maslow's hierarchy of human needs, the first level is physiological needs, such as health and a place for sleep, and the second level is the need for safety, i.e., whether one's living space provides the security that no danger can occur (Maslow, 1956).

Public housing should provide residents with a place to live that gives them a sense of belonging, so that they can more easily build up their social networks with neighbours in the district. Home is where the heart is, as the saying goes. Public housing that incorporates cognitive-friendly product and interior design can help to maintain the self-esteem of residents when they live independently, if they also feel safe and supported by neighbours. FY relied on family support as she could not remember where she put the door key when she returned home. Although she got a calendar as a welcome gift from YOT, she could not use it for reminders as she does not know how to write. A calendar is typically a simple method of scheduling events and serves as a personal reminder.

A calendar can also remind care givers, and can help to improve the quality of life of those with MCI who lives alone, as it can remind them to attend social gatherings at the correct time. Anything that hinders participation in social, community and civic activities will have a negative effect on quality of life, as opportunities to connect with other people and participate in a society may be missed, which will affect the level of support received (Sanchez et al., 2016).

FY, CH and WH adapted the design of the interior with a piece of nylon string, which fitted onto the existing hook on the door. This implies that the current setup could not satisfy the basic needs of all individuals. The self-locking door appeared useful and able to assist disabled people or those who often forget to close the door after leaving, but it was problematic when residents go out to throw away the trash without taking a key. This happened quite often to CP and CH due to their poor memories. CP said she found the wall cracks unpleasant and was upset when she looked at the black lines on the wall. As older people typically stay at most days for long hours, defects such as cracks in the wall will become an issue if they are not repaired.

The International Classification of Functioning, Disability and Health indicates that psychological distress will affect people’s quality of life (Sanchez et al., 2016). Various types of defects may induce such distress in older people living with MCI, as they may not ask for assistance. CP requested the Hong Kong Housing Department to arrange for the wall to be fixed, but she felt the long waiting time was not acceptable and therefore she decided to not get it repaired.

Poor interior modifications and home decoration may worsen older people’s quality of life as it might limit their activities, so the large-scale renovation of public housing should be proposed in executive council meetings (Trecartin & Cummings, 2018).

7.2.2 Q2 - Universal design principles were applied more effectively in developing future public housing benefiting MCI patients

The standard of housing design for disabled people including those with intellectual disabilities can affect their quality of life. For those living alone, home is the focus of their existence as they spend most of their time in it. Housing ownership is becoming more important, and thus provides more scope for universal design application in terms of buildings, interiors and products.

Universal home design can encourage people living with MCI to live independently while supported by care givers, and enables them to make their own choices about accommodation and support. Good design should include universal design elements so that people in need can be seamlessly supported without stigma regarding their impairments. Although such design underpinned developments may not help people with MCI in their rehabilitation, due to the nature of the disease, it may reduce the rate of cognitive decline and can help prevent accidents. Universal design principles could be implemented in different types of design as per the requirements of household. However, the current public housing design offered by the Hong Kong Housing Authority to most older people living in Tuen Mun fails to satisfy their needs. The existing interior and product design do not fulfil the needs of target users benefiting older people with MCI living alone, thus their quality of life will be affected.

The self-locking door system does not fulfil all the needs of the residents. The participant observation over the past months revealed that they do not always remember to take their door keys when going out to empty the trash. Their reduced cognitive ability will make the situation worse, and some participants had to call a locksmith to open it. Opening the door requires very *low physical effort* as the door will close in only a few seconds, but the residents deserve more in terms of design quality. The automatic door-locking system fails to achieve the *tolerance for error* under universal design principles, as the residents such as CP and WH should get a second chance to open the door when they return. This application could be supported by a digital system with a time limit as a supplementary design attached to the mechanical locking system.

CP held onto tiles on the walls to support herself when going along the corridor to the washroom, as there was nothing else for her to grab onto to balance herself. She is unable to install a safety grab bar by herself and therefore she is not living in safety. The Hong Kong Housing Authority as the landlord should provide basic assistance to single elderly people, such as a hand grip bar that accommodates various hand sizes and provides adequate space for the use of other assistive devices. Priority should be given to those who are living alone with physical and intellectual disabilities. Current interior settings failed to meet the principle of *size and space for approach and use*. In addition, TM explained that a safety grip bar should be installed in a position that is good for holding onto and posture when taking a shower and assisted by a carer. As an experienced caregiver, TM recognised that a safety grip bar is necessary for those with MCI as their sensibilities are getting worse along with their cognitive abilities, so an easy-installation design that can accommodate different positions is required.

A *visible reminder* could serve as a supplementary element, to ensure the needs of people with MCI living alone are fully met. The metal gate design should be revisited and provide hooks for hanging various items as a final reminder to residents to pick up and take the items hanging there in an explicit way. The shoe cabinet and TV cabinet should be proposed to include a recess on the surface so that a designated area is visually accessible where older people can leave keys. Fluorescent tube size and dimension should be visible and clearly shown on the luminary for easy replacement every 2 -3 years in average. The display cabinet aims at storing canned food and snacks should be equipped with transparent door with sturdy handle as it allows residents to see the goods clearly and know what needs replenishing. The remote control of TV set should be as simple as possible without complicated combinations for each operation that might confuse users. The design should only make relevant keys visible for each operation. Similar to the door mentioned earlier in the display cabinet, the door of kitchen cabinet should be transparent rather than opaque as it allows residents to see a series of seasoning bottles and dishes inside the cabinet. Thus, it provides an opportunity for users to remember the location of each seasoning bottle for daily use. During flame cooking in a typical day, the flame should be visible while cooking and operated by physical control knobs. This allows residents to see the flame clearly when cooking and make sure it is off when finished. All of the above housing features are not only related to UD principles, but also the visible reminders that contribute to the genuine needs of people with MCI living alone in a typical day. A conceptual diagram with different matched colors showing the housing features in relation to the corresponding UD principles and visible reminders is illustrated in Figure 20.

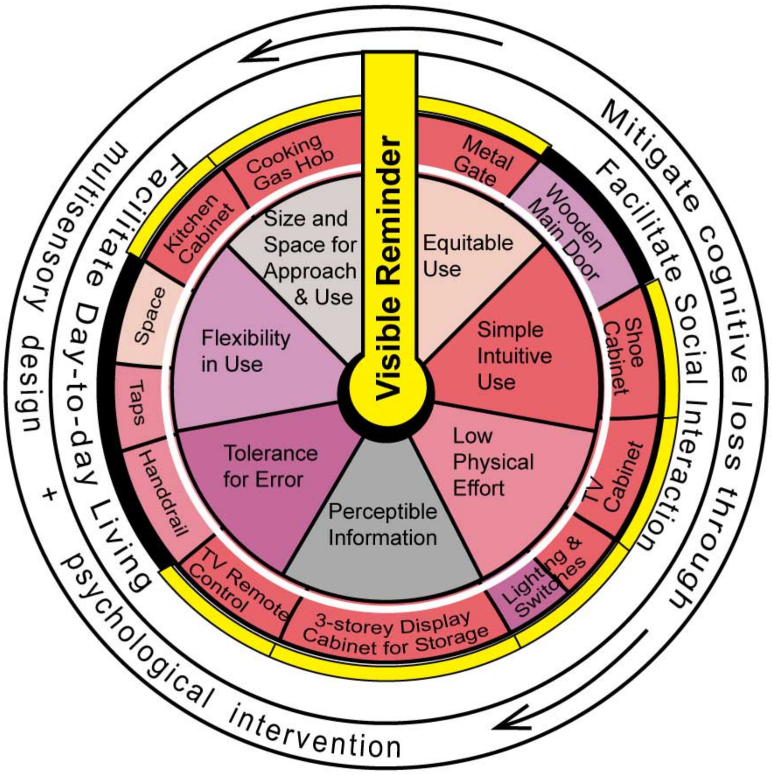


Figure 20. The conceptual model with different matched colors showing the housing features in relation to the corresponding UD principles (in purplish red) and visible reminders (in yellow)

Design practitioners, government officers and family members should make good use of the conceptual model mentioned in Figure 20 and consider visible reminders for new interior developments due to the rising number of living alone older adults with MCI in Hong Kong. Memorable and visible elements can help people remember objects and tasks where UD principles cannot fully fulfil this area to provide design of products and environment to be usable by all people. When a visible reminder is applied in a systematic and consistent way, it will become familiar and habitual. It should be integrated into people's daily lives so anyone can use such assistive designs to promote social connection without facing any stigma.

Although not all those with MCI will suffer from dementia, any person with cognitive impairment has the right to live well and safely, and on an equal footing with others. Losing memory and cognitive ability can lead to household injuries from objects, stumbling and falls, etc. Safety entails self-esteem and a sense of psychological well-being, and a good design involves an in-depth safety assessment that recognises the potential physical and psychological challenges that those with MCI may face each day.

Home furniture and product design should be developed to protect them from losing independence, while the interior environment should be sufficiently flexible to accommodate the changing needs and different abilities of people with MCI. A multi-modal intervention involving multisensory design and psychological aspects in terms of people's life journeys is required, in which narrative and instrumental methods can be essential reminders.

7.2.3 Q3 – Contribution to the design and development of cognitive-friendly products, home furniture and interiors through a participatory design approach, which can improve the quality of life

Many case studies following the participatory design approach as the research method are conducted in the west. Research generated in Asian cities using such an approach and focusing on people living with MCI and carers is limited. Traditional design methods may not be sufficient when developing housing and interiors for patients with MCI who live alone, so participatory design is an effective approach. This focuses on the opinions of the various participants to identify their needs and the design concepts that are appropriate for all stakeholders (Lee et al., 2017).

Co-designing supports the cross-fertilisation of ideas from patients with MCI, carers, design practitioners and social workers, and reveals the problems people with cognitive impairment might face and how they can cope when living alone. Participatory design workshops also provide opportunities for older people with MCI to connect with their neighbours and become a way to promote social participation. They can have verbal discussions, express their thoughts through drawing, making physical forms with assistance, draw on their past experiences in daily activities and generally be creative (Cozza, 2016).

Four themes were identified from the data and analysis, which constitute coping strategies for improving the quality of life of older people with MCI. These relate to better public housing quality, unmet needs and the feelings and concerns of stakeholders. They are *Continued Home Visit Care and Family Support, Awareness of Universal Design Principles, Expanding Social Networks and Engagement, Revisiting Public Health Policies*. A conceptual diagram showing the relationship between corresponding UD principles and visible reminders applied in housing features facilitating social interaction and daily living with various kinds of intervention is also proposed.

Family support is important for people live alone with MCI. CP and WH expected to have regular home visits from their daughters and sons, but due to long working hours and stress regular visits were not possible. Those living alone are more likely to suffer from depression than those living with their families (Finlay & Kobayashi, 2018). Participating in a wide range of social activities, including cognitive training programmes, can slow the progress to dementia.

Community centres should review the programmes they offer to ensure single residents living with MCI receive regular cognitive health care. The *recognition of a lack of competence, the fear of being alone* and *financial difficulty* are all burdens faced by the residents. In Hong Kong, the number of home visits remains low and so additional incentives and initiative programmes can encourage more visits by volunteers, social workers and family members.

The *application of universal design principles* is inadequate in Hong Kong. This *participatory design* research reveals that public housing fails to meet even the basic needs of residents. Universal design can be found in many everyday objects, but few accessible and cognitive-friendly homes and furniture incorporate such an approach. People with MCI are not good at remembering, so the seven principles of universal design and additional visible reminders can consider the needs of each individual and can be regarded as a new guiding principle. Such designs should also include multisensory features and psychological interventions, to ensure they are intuitive, flexible and safe. Many residents have *limited learning capacity, slow and low ability to judge and confounding forgetfulness.*

Older people living with MCI should *expand their social networks* and increase their engagement to ensure active ageing. The government established two centres to promote healthy ageing, but the message had not reached the majority of older people. Other research also found that government in every country should take serious action to revisit existing laws and regulation with major stakeholders that support people with disabilities (Shahrom & Zainol, 2015). Although numerous social activities are available, the capacity of each programme is limited. This can hinder social network development and thus affect the progression to severe cognitive decline over the long term. SK, CP and WH said that they valued *social participation in later life,* and felt that *respect and mutual trust* were important, but they also felt *depressed and in low spirits*. Another concern is the fee for each programme as older people are cautious about spending money on social activities after they retire. However, the more they participate in social activities, the less likely they will be to suffer from cognitive decline (Zhang, 2021).

The government should *revisit public health policies* so that extra resources and strategic planning can be directed to elderly people with MCI living alone. Prevention is always better than a cure. The government should take a leading role and commit to building and maintaining a healthy community, as the older population is estimated to reach 2.5 million, or 30% of the total population, by 2041. Stakeholders should ensure senior citizens live in dignity in their later lives and provide them with the necessary support and a sense of security and belonging, thus promoting their active ageing.

This study suggests that older people living with MCI can still participate in voluntary activities, but the numbers of places on cognitive training programmes are very limited. Healthy exercise and participatory cognitive training help older people live better. If they stay healthy, their medical expenses, residential care home fees and modified public housing will be significantly reduced and thus mitigate the pressure on public health. The government should work with the Elderly Commission to develop the Elderly Services Programme Plan to tackle the rise in cases of MCI. Dementia and cognitive health assessments should be organised regularly for potential sufferers and family carers.

Healthcare professionals should take a leading role in organising regular workshops, particularly in districts with high populations of older people. The government should reassess both the number and quality of day care centres (their ‘cognitive focus’) to ensure that they meet market needs, promote ageing in place and reduce the pressure to build new elderly nursing homes. Public health policies should be implemented in a bottom-up approach that encourages the participation of target group, to further support people with MCI before it evolves into dementia. The study also reveals that *inhumane treatment in nursing homes* is a concern, and the government should take immediate action before accidents occur. An evidence-based design combined with qualitative participatory research can inform the development and adaption of preferred home environments for those with cognitive impairment (van Hoof et al., 2010).

7.3 Limitations

The findings derived from our sample cannot be generalised to a larger population, as in typical quantitative studies using random samples in which comparisons between groups of subjects can be made. In our qualitative inquiry this approach is not appropriate as it is less structured and more flexible nature. The participatory research in the first part of the study was designed to maximise voluntary participation in a two-day workshop, but the lack of male participants in the sample was a major limitation. Some attended the introductory seminar, but only a single applicant was successfully recruited. Although the sample size was limited, the study reveals that older people living alone with cognitive impairment in Hong Kong do appear to significantly lack support in their later lives. Though older men may not be as outgoing socially when compared to older women, the gender ratio was extremely uneven and should be considered when interpreting the findings.

The backgrounds of the participants also suggest another limitation. For example, Elder I was born in China and speaks an indigenous language. She has learnt Cantonese to some extent since she has lived in Hong Kong, but she cannot pronounce it accurately most of the time. I had to ask the other participants to explain what she was saying so that I could correctly interpret her meaning. Their limited education does not exclude them from the participatory design workshop and participant observation, but for those who had no education at all, I had to explain the nature of the project slowly and clearly so that they could understand its aims and objectives, to ensure I collected genuine first-hand data.

Time constraints also placed a limitation on the research, as most of the dementia centre staff were fully occupied by scheduled training and consultancy projects that required a full team to support and follow up. Organising six sessions of the participatory design workshops was difficult. Social movement in Hong Kong also affected my original plan. Problems occurred on the New Territories transportation system, so I had to postpone some visits at short notice. Rearranging them was then a major challenge. Unsurprisingly, a few participants withdrew from the programme due to their gradual physical and mental decline. This made the study even more difficult to complete.

7.4 Suggestions for Future Research

Further participatory design research can be conducted with a group of people with MCI using smart technology. This can improve on current designs through the accumulation and cross-fertilisation of knowledge during the process. Participatory design is driven by social interaction as end-users and design practitioners work together to co-create and develop new ideas (Simonsen & Robertson, 2013). Social interactions among vulnerable populations can be encouraged through participation in activities related to arts and cultural history, which offer opportunities for enjoyment and creativity (Flatt et al., 2015).

This ethnographic study indicates that older people living with MCI are rarely adept at using digital and smart products such as smart phones, gas stoves with digital control or LCD TV with digital panels and remotes with complicated keys. Elder A, B and I did not know how to operate the keys on smart products. They finally gave up or asked their children for assistance. Participatory design that involves all stakeholders can explore the difficulties that people with MCI typically face when using smart products and appropriate design solutions can be proposed. In this case, an exploratory study on how UD principles supplemented with a visible reminder can be effectively applied to enhance user experience in operating smart products for daily communication can be suggested for future research.

The method of creating new products can be useful to support the expected user’s behaviour involving people with MCI living alone. Having an effective development of product and interior is one of the best ways to improve quality of life of each individual. Innovation in the product design and development comes from idea concept, detailed design and the method during the development process, has become a driving force to create new products satisfying human needs. User experience is momentary and a feeling of primarily evaluation when one is interacting with a product or service (Hassenzahl, 2008). When the design is considered with the context of product usage, well-defined target user and also the product itself, it can generate a better user experience to the target group. Identifying the method applied in the process of developing universal product design should therefore, has become of utmost importance to generate positive user experience of product solution to support expected behaviour of people with MCI living alone.

The gradual loss of cognitive ability leads to numerous challenges that vary according to whether MCI, early or late dementia has occurred. The user testing of new cognitive-friendly smart product designs based on the identified conceptual models also has a huge potential for further study. Older people with MCI and dementia, care-givers, social workers, physiotherapists, designers and manufacturers can together make improvements to the daily lives of all members of society.

7.5 Concluding Remarks

The chapter provides the major findings and a discussion of the research study. The study suggests that public housing for the elderly fails to satisfy universal design principles, which are essential in housing design. As the number of older people with MCI living alone increases, the urgency of remodelling public housing will increase so as to provide better and safer places for residents and promote aging in place. With the visible reminder supplemented to UD principles applied throughout the design and development process, interior and product design such as modified metal gate and wooden main door can provide people with MCI living alone a safer place for living, encourage social participation and thus enhance the quality of living of older people and make people’s life easier. As the ageing population continues to rise, the number of people with MCI and dementia will certainly increase, thus leading to social, healthcare and housing problems.

Home is where the heart is. The development of housing and interiors without proper consideration will lead to safety and security problems. Inappropriate interior designs may affect older people with MCI, discouraging them to engage in social activities and thus can have a negative impact on their quality of life and social support (Sanchez et al., 2016). Many interior features, gates, doorways and locking systems do not fulfil user needs, and the designs were not found to support single elderly people with MCI.

A visible reminder can be supplementary element to ensure universal design fulfils the needs of those with MCI. Such elements can help people remember objects and tasks and using them will become familiar and habitual. They can be integrated into daily tasks and anyone can use them without facing any stigma.

Co-designing can effectively support the cross-fertilisation of ideas so that all stakeholders can participate in design workshops and contribute new ideas. However, many household products are not up to standard and can be improved. The suggested factors of improving public housing quality, and meeting the needs, feelings and concerns of stakeholders can help those live alone with MCI, through collaboration with government bodies, using bottom-up approach to formulate strategies for public housing and promote social engagement. A universally designed environment and sustainable community can promote social participation if the spaces are designed to accommodate a wide range of people involving people with MCI to form a local network to support with each other. Although the sample size is small, the study reveals the current situation in Hong Kong for single older people living in public housing that was designed and constructed 40 years ago. Further research can apply smart technologies to further explore the user experience and living arrangements of those with cognitive loss or dementia in relation to universal design.

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9 Appendixes

9.1 Information Sheet

THE HONG KONG POLYTECHNIC UNIVERSITY

Universal Design in Public Housing: An Ethnographic Study on Enhancing the Quality of Life of Older People with Mild Cognitive Impairment Living Alone

Information Sheet

Dear Sir / Madam,

My name is Alex King, research student in the School of Design of The Hong Kong Polytechnic University. You are cordially invited to participate in a research study conducted by my research team, entitled *Universal Design in Public Housing: An Ethnographic Study on Enhancing the Quality of Life of Elderly People with Mild Cognitive Impairment Living Alone*. The details of this study are as follows.

RESEARCH TEAM

Mr Alex KING, PhD candidate in the School of Design of The Hong Kong Polytechnic University(Principal Investigator, PI).

PURPOSE OF THE STUDY

This study is aimed at examining how product design and exercise training can be integrated into cognitive-friendly public housing for single senior citizens who are living with dementia. We also aim to identify the potential factors and themes contributing to product designs and possible exercise to improve the psychosocial engagement and functioning of people with dementia who live alone.

TARGET SAMPLE POPULATION

The Yan Oi Tong Woo Chung District Elderly Community Centre will select four people with dementia living alone aged between 65 and 85 to serve as the research subjects. An equal number of male and female will be sought by the elderly centre manager without any specific selection criteria. A centre manager who has been working in an elderly centre for at least one year and is aged 35 or above, either male or female, will also participate. Two care-givers who have provided care for elderly people with dementia for at least half a year, aged 30 or above, will also be included in this study.

PROCEDURES

First, the participant observation approach will be taken to collect data under a cross-sectional timeframe, which allows the Principal Investigator (PI) to compare different variables. The PI will observe five elderly people with mild cognitive impairment (MCI) living alone when they use the TV and radio, wash dishes, set the table and clean. Activities such as closing the bathroom door, turning off taps, pouring shampoo, getting clean clothes and putting on pyjamas will be observed over12 months, once a week. These observations will be conducted for 60 minutes per session.

Second, in-depth interview will be conducted separately with the manager of an elderly centre and a care giver who has recently looked after a person living dementia. Each interview will last for 45 minutes.

MINIMISINGPOTENTIAL RISKS / DISCOMFORT

Any information collected in the interviews or personal details gathered during the study will be kept confidential and used for research purposes only. No individual will be identified in any publication of the results and all descriptions of the experiences will be published under pseudonyms. Participation in the study is entirely voluntary. Interviewees are not obliged to participate, and they can decide to withdraw from the study at any time if they feel uncomfortable. No reason is needed for withdrawn from the study and interviewees are not subjected to any consequence. Data collected or typed transcripts will be given back to any interviewees who wish to withdraw.

POTENTIAL BENEFITS

The findings will contribute to the development of future dementia-friendly elderly public housing with the Hong Kong Housing Authority and Hong Kong Housing Society. The operating costs can be greatly reduced in terms of public health care associated with dementia. For example, a product design and training facility could be pre-installed in the living rooms. Elderly people with dementia living alone will then have the opportunity to train up their cognitive function independently when they are in the stage of mild cognitive impairment. Proper rehabilitation tools such as training activities can improve the healing process.

COMPENSATION FOR PARTICIPATION

No compensation will be given to the informants for participating in the research.

CONFIDENTIALITY

- All information obtained in the study will be kept strictly confidential and used for research purposes only.
- The identities of individual subjects will not be revealed or identified in any way in any reports or publications correlated to the study without the subjects’ prior approval. All

descriptions of their experiences will be published under pseudonyms.

- All audio-recorded interviews and the hard copies will remain strictly confidential and only authorised personnel will be able to access the data. Participants have the right to review both hard and softcopies of the data set. The interviewees have the right to ask the PI to erase their own set of data if they would like to withdraw from the study or feel uncomfortable during the research.
- All softcopies (typed transcripts and audio interview recording) will be saved and encrypted on the computer hard disk of the PI, and no duplicated copy will be made without the authorisation of the PI and the consent of interviewees. All hardcopies of the typed transcript will be kept and locked in the PI's office. All data will be kept for three years and destroyed afterwards.

PARTICIPATION AND WITHDRAWAL

Participation is entirely voluntary. This means that you can choose to stop at any time without negative consequences.

QUESTIONS AND CONCERNS

If you have any questions or concerns about the research, please feel free to contact Mr Alex KING at the School of Design, The Hong Kong Polytechnic University. Telephone: 9418 . Email: alex.king.hk@

Please kindly complete and return the attached reply slip to me at your earliest convenience. Thank you very much.

Yours sincerely,

Alex KING
PhD Candidate
School of Design
The Hong Kong
Polytechnic
University

9.2 Consent Form

THE HONG KONG POLYTECHNIC UNIVERSITY

‘Universal Design in Public Housing: An Ethnographic Study on Enhancing the Quality of Life of Older People with Mild Cognitive Impairment Living Alone’

<u>Consent Form</u>

Please choose <u>one</u> only by checking the box:

☐ I agree to enter the above study. The information collected will be used for the above-named research project.

I have been informed of the study’s purposes and method. I have been given the opportunity to ask questions and sufficient time to consider whether to participate or not.

I agree that the responsible individuals or relevant regulatory authorities may look at my data.

I understand that my participation is voluntary and that I have the right to withdraw at any time.

I have also been assured that strict confidentiality will be maintained and no reference will be made to my identity in reporting the findings.

☐ I do not want to participate in the above study.

Name: ____
Signature: ___________________________________
Date: _______________________________________

9.3 Interview Scripts

THE HONG KONG POLYTECHNIC UNIVERSITY

Universal Design in Public Housing: An Ethnographic Study on Enhancing the Quality of Life of Older People with Mild Cognitive Impairment Living Alone

Interview Scripts

Good Morning. I am Alex King, from School of Design, The Hong Kong Polytechnic University. You are invited to participate in a research study conducted by myself entitled *Universal Design in Public Housing: An Ethnographic Study on Enhancing the Quality of Life of Older People with Mild Cognitive Impairment Living Alone*

The Interview will be conducted in Semi-Structured Interview that will have a number of questions with priority as follows:

In-depth Interview with Elderly Living with MCI

- Can you tell me about yourself and how long you have been living here?
- What was your occupation before your retirement?
- What was the happiest moment of your life?
- What are some of the things you are most grateful for?
- What accomplishments in your life are you most proud of?
- Is there anyone to pay a visit to you regularly?
- Do you feel lonely when you are living alone? How will you overcome this?
- What do you do in a typical day?
- How do you find the household electrical products, sanitary facilities and other interior product designs?
- Are those designs easy to understand and recognise?
- Can you tell your good and bad experiences in (1)controlling the TV/radio, (2)washing dishes, (3)setting the table and cleaning up, (4)closing the bathroom door, (5)turning off water, (6)putting shampoo in your hand, (7)getting clean clothes, and (8)putting on pyjamas?

In-depth Interview with Elderly Centre Manager

- Tell me about yourself and how long you have been working with elderly people with dementia?
- What are your main responsibilities in this centre?
- What major challenges and problems do you face with people with dementia?
- In general, how should we communicate effectively with people with dementia?
- Can you describe how their behaviour is different from that of others?
- How should we communicate if they have short term memory loss?
- How should we communicate if they have difficulty expressing thoughts of any length or retrieving words from memory?
- What should we do if they are slow to understand, speak or proceed with an activity?
- What if they seem bored or engage in scratching or other repetitive actions?
- What should we do if they seem anxious, upset or difficult for no obvious reason?
- Can you describe a stressful experience you've had and explain how you coped with it?
- If you were delivering personal support to them, how would you maintain their dignity and respect?

In-depth Interview with Care Giver

- Tell me about yourself and how long you have been working with the elderly with dementia?
- What are the main responsibilities of a caregiver?
- Can you describe care for the elderly with dementia?
- What major challenges and problems do you face?
- In general, how should we communicate effectively with people with dementia?
- Can you describe how their behaviour differs from that of others?
- How should we communicate if they have short term memory loss?
- How should we communicate if they have difficulty expressing thoughts of any length or retrieving words from memory?
- What should we do if they are slow to understand, speak or proceed with an activity?
- What if they seem bored or engage in scratching or other repetitive actions?
- What should we do if they seem anxious, upset or difficult for no obvious reason?

- Can you describe a stressful experience you've had and explain how you coped with it?
- If you were delivering personal support to them, how would you maintain their dignity and respect?

Thank you for your participation in advance. If you have any questions, I will be more than happy to answer them.