Filial piety

A new view for domestic product design

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Abstract

Filial Piety: A new view for domestic product design

In New Zealand, residential problems related to old age are of concern due to the increasing population of older people and the challenges that aging brings. These challenges include generational social expectations and intergenerational living, accompanied by cultural traditions of family, living and the home environment.

It is becoming common for younger generations to live away from their elderly family members in the western world, which can cause psychological, financial and safety issues for the older generation. In New Zealand's aging population, which includes Maori, Samoan and Asian people, these aging issues are approached in culturally specific ways.

This design-led research project explores 'filial piety', an ancient Chinese philosophy, in the context of an industrial design practice that embraces established principles and design processes related to product design, ergonomics, emotional design and universal design.

The design emerged out of an observation that New Zealand domestic environments do not typically allow for or attend to modes of intergenerational living, a societal attribute common in China where the philosophy of 'filial piety' leads families and their homes to be more generous and responsive to the physical and spiritual needs of all, in particular, the needs of the elderly.

Developed using various modes of an iterative design practice including site analysis, sketching, drawing, digital and physical prototyping, observational analysis and physical body testing in addition to literature review, this research proposes a conceptual design for the design of a bathroom product, namely a bath tub and shower unit.

Contents

Chapter 1

Preface

This idea was inspired by, and developed from, my own experiences of living with my grandparents for many years and my vision of transforming their home for aged living.

I have a considerably strong relationship with my grandparents, because they took care of me when I was very young,, and served as my second set of parents.

After I became an adult and independent, I gradually realized that they were no longer able to live in their old home, as they needed more support. There is a variety of problems with their old house, in particular, the rooms are too small. The most serious problem was the bathroom – it is too shabby and dark, and also the floor is slippery. All of these problems raised my awareness of the needs of this distinctive, disadvantaged group (the elderly), because very few designers are focused on this specific demographic which is growing as the population increasingly ages. Therefore, my project and its underlying researches will have significant future application.

China is now facing the challenge of a significantly aging population, because of the "baby boomer" period and the one-child policy which began in the 1970s. New Zealand is now also facing a similar demographic challenge.

I am one of the 'only child' generation and my parents are middle-aged and facing retirement within the next decade. So the work I am now doing could help improve their living circumstances and enhance their future quality of life.

In this chapter I explore the following:

1. Exciting environmental research
2. Design exploration
3. Audience

Chapter 1

Exciting environmental research

The aim of this project is to help elderly people by understanding and exploring ways to improve their living environment. This required understanding the living situations of elderly people in New Zealand.

By visiting a number of Wellington houses and seeing at first hand how the elderly live in their homes and the challenges they face in going about their daily lives, and by immersing myself into their real-world context, I was motivated to research design solutions which would make a practical difference for the elderly.

I chose six typical Wellington houses for my initial study. These houses are all for sale, so I was able to go inside to take photos. I chose them to visit as they repesent typical different construction types, ages and styles found in Wellington. They helped me to think about which ones might inhabited by an intergenerational family and which has the most potential to be renovated to accommodate intergenerational living.

They are representative examples of Kiwis' conventional living situations. This gave me insights into layouts and living environments in New Zealand homes, and helped me to analyse the existing and latent problems for intergenerational dwelling.

Figure 1

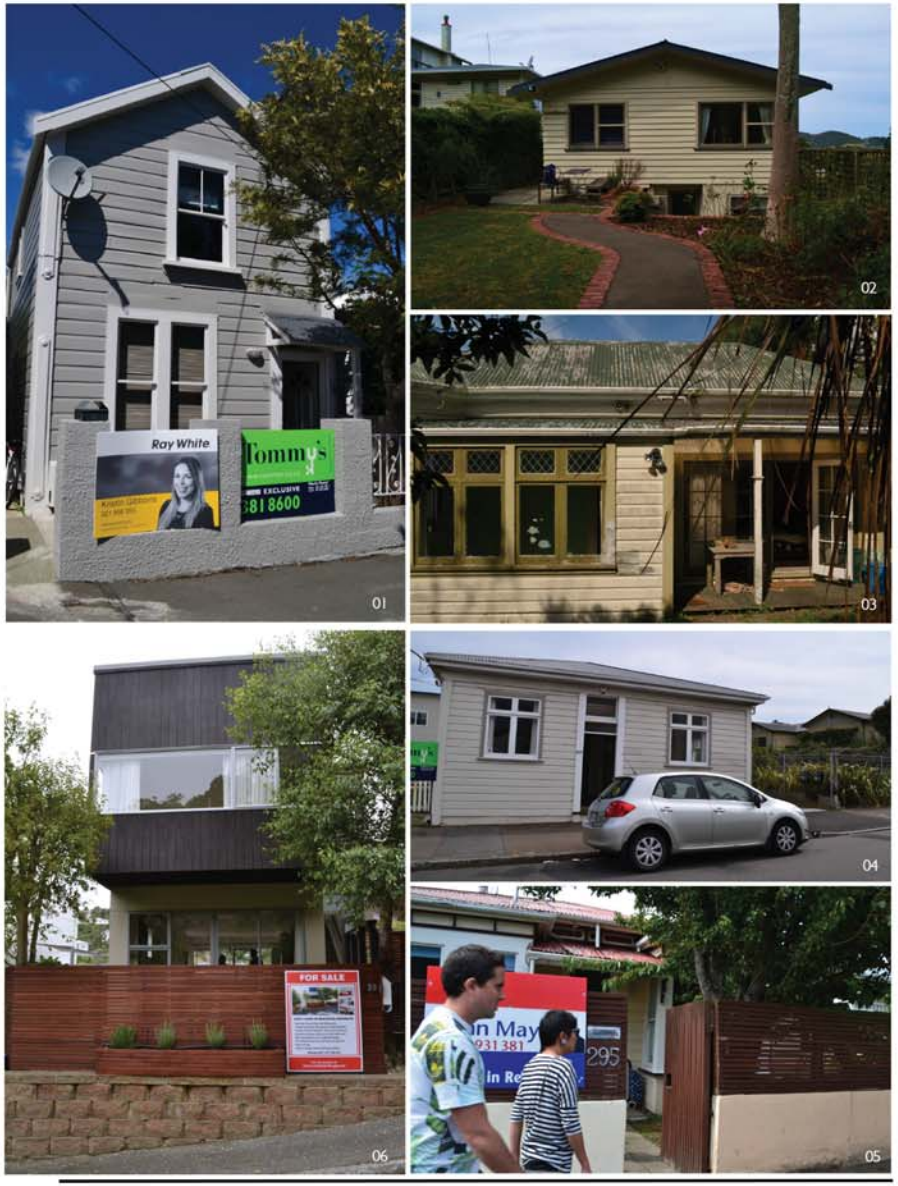
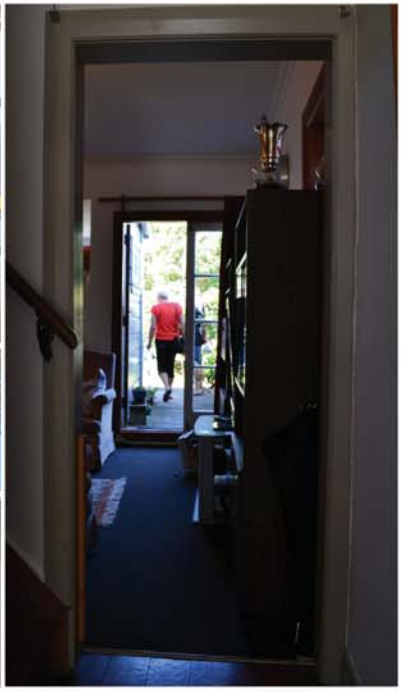


Figure 1 : Six examples of houses in Wellington, from No.1 to No.6. Wang, S. (2015).

Chapter 1

The hallway is too narrow, there is not enough room for a wheelchair to pass.



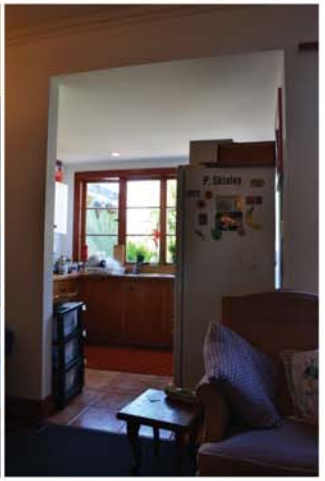
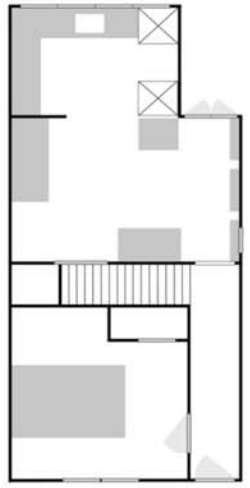


Figure 2

Living room is crowded and full of barriers.



First Floor

No.1

Figure 2 : Series of photos of house No.1's first floor and floor plan. Wang, S. (2015).

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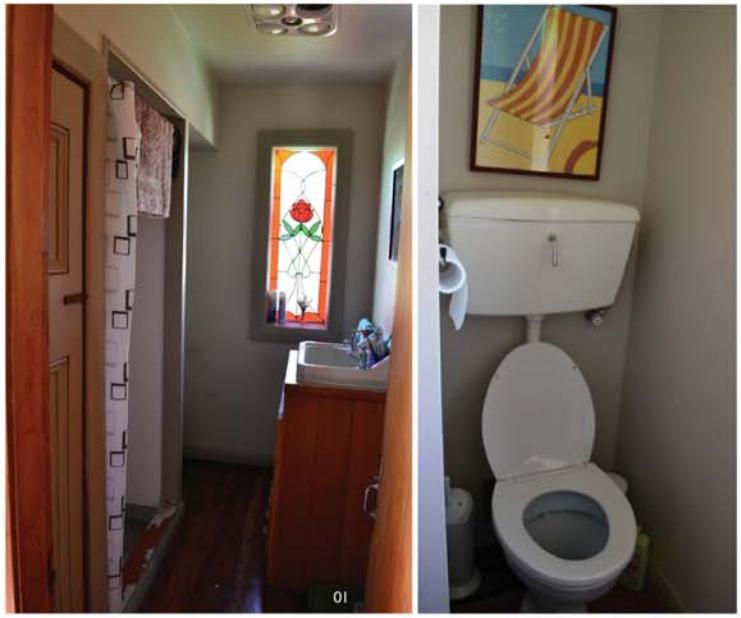
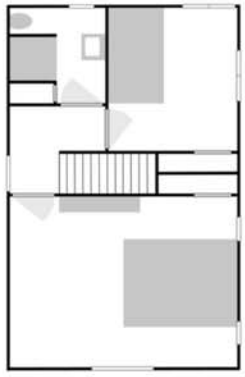


Figure 3

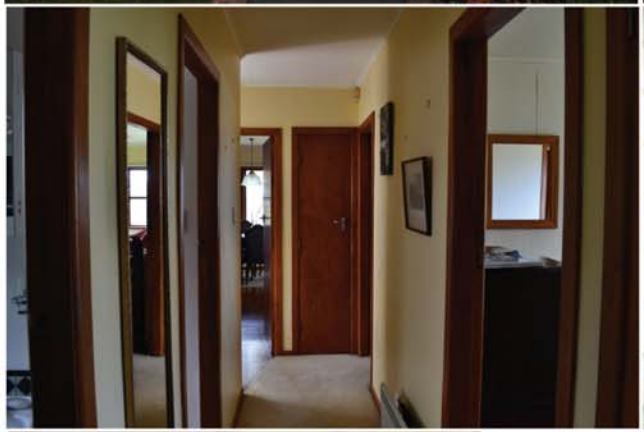


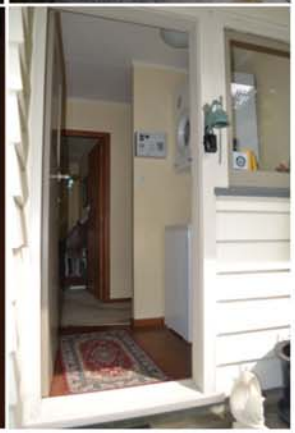
No.1

Second Floor

Second floor' s layout is too tight
Bathroom is extremely narrow.
Stairs are too steep.

Figure 3 : Series of photos of house No.1's second floor and floor plan. Wang, S. (2015).





The entrance way has a step up.

The toilet and bath are in separate rooms, which is not easy for elderly person.

Huge space could be more flexible for wheelchair.

Ground Floor

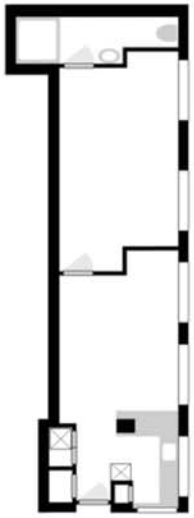
No.2

Figure 4

Figure 4 : Series of photos of house No.2's ground floor and floor plan. Wang, S. (2015).

There is no internal access between the basement and ground floor.

Figure 5



Underground Floor

No.2

Figure 5 : Series of photos of house No.2's underground floor and floor plan. Wang, S. (2015).

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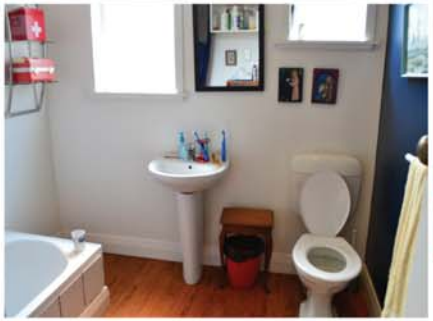
Very old house with poor foundations. Wasted space, the main thoroughfare gets plenty of natural light but the bedroom is dark. It has a laundry in the basement but unfurnished.

Figure 6

Ground Floor

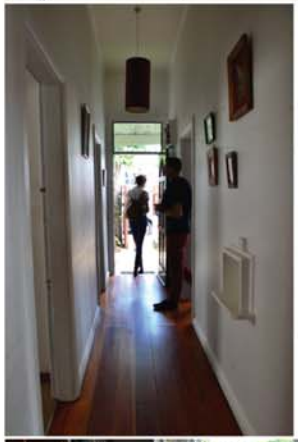
No.3

Figure 6 : Series of photos of house No.3 and floor plan. Wang, S. (2015).

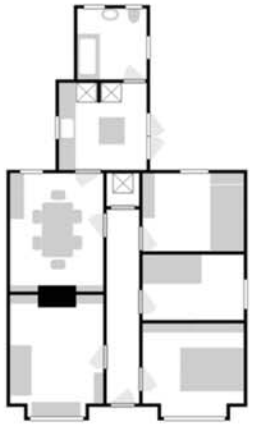


The bathroom is at one end of the house and was added in later years.

The living room and kitchen are separate rather than a combined, open-plan area.



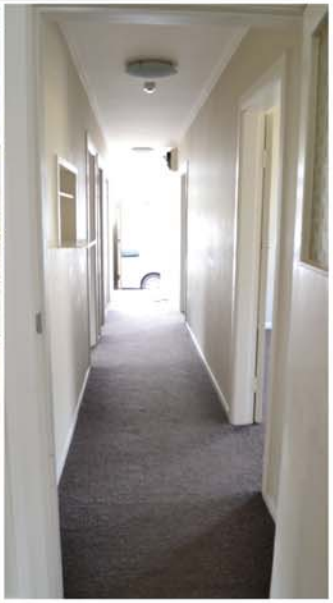
Very traditional layout.



No.4

Figure 7

Figure 7 : Series of photos of house No.4 and floor plan. Wang, S. (2015).

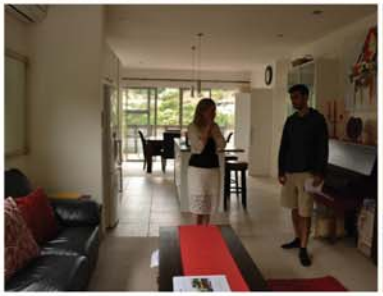


NO.5

The No.5 house has the same layout as the No.4, but the kitchen and the living room form one large space. However, the house has only one small, dark bathroom.

Figure 8

Figure 8 : Series of photos of house No. 5. Wang, S. (2015).



No.6

No.6 house is a small, modern house, Contemporary layout, simple, only needs a few changes. The house could easily be adapted for intergenerational living.

Figure 9

Figure 9 : Series of photos of house No. 6. Wang, S. (2015).

Chapter 1

Design Exploration

Through my research into New Zealand household composition and environments, I gained insights into how families live and how the traditional New Zealand home environment is often poorly suited to accommodate the elderly or disabled. In the next few chapters I will discuss cultural diversity and how the living needs of the elderly are accommodated in various cultures.

Of the six above examples of Wellington houses, the third one (No.3) is the oldest, but represents a typical example of a conventional New Zealand house layout. I therefore decided to explore its renovation possibilities by applying universal design processes to create an intergenerational living environment, as demonstrated in my drawings below.

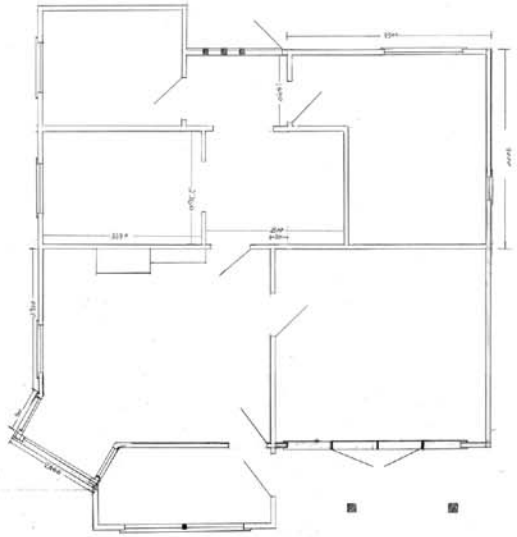


Figure 10

Figure 10 : Painting - structure map. Wang, S. (2015).

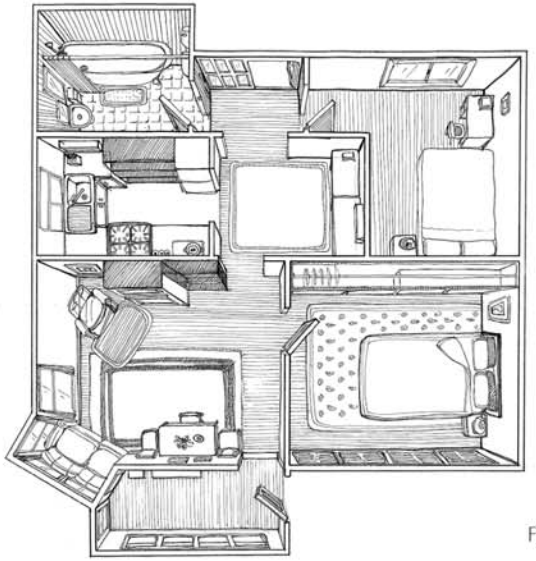


Figure 11

Figure 12

Figure 11 : Painting - existing plan. Wang, S. (2015).
Figure 12 : Watercolour painting - plan. Wang, S. (2015).

Chapter 1

Figure 10 and Figure 11 illustrate the existing state of this old Victorian house. It is small, narrow and has an unusual structure, since it has been partially altered.

All rooms lead off a central hallway. However, it is no longer only a hallway, it is also part of the living room and the main door is on the side of the sunroom. The house also has an unfurnished basement laundry with no internal access but an entrance outside. For these reasons, the house needs major layout changes.

Figure 12 is my suggested redesign. Positives include; room for card table in the sunroom, an elevator provides internal access to the lower level, there is an open kitchen opposite the bedroom which enables the caregiver to see and communicate with the resident while preparing meals.

In Figure 13 there is no elevator but a wide and gentle stairway. Natural light from the north side streams into the lower level to make the house bright and warm.

The design in Figure 14 expands the kitchen space and removes the wall between the sun-room and the living room to make large, open-plan living space, which is easier for someone confined to a wheelchair.

Figure 13

Figure 14

Figure 13 : Painting - plan 2. Wang, S. (2015).
Figure 14 : Painting - plan 3. Wang, S. (2015).

Figure 15

Figure 16

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In Figure 15 there are both stairs and an elevator. The elderly have more options to suit their level of mobility. Also, the elderly have the option of living downstairs because of the elevator and the wide hallway.

In Figure 16 the design of the kitchen is much wider, this allows the wheelchair to turn around, and go down stairs. It also has a removable wall that divides two bedrooms for guests and family to stay.

Nocturia, a condition that results in frequent night-time use of the toilet, is common with elderly people. Therefore, all bathrooms are positioned beside the bedroom to enable easier access at night. So if the bathroom is well designed, it can provide greater convenience for the elderly.

The entire house was designed with the assumption it is an intergenerational living environment. While the elderly are the principal focus of the design, the needs of all household residents have been taken into account. This awakened in my memory that this kind of care is part of the Chinese traditional virtue — Filial Piety.

Figure 15 : Painting - plan 4. Wang, S. (2015).
Figure 16 : Painting - plan 5. Wang, S. (2015).

Figure 17

Chapter 1

Audience

For the elderly, their physical ability and mental alertness lessen as they age. This has a direct impact on their daily behaviour patterns. Only by fully understanding the physical limitations, emotional needs, lifestyle and family structure of the elderly can the designing principle 'regarding people as the base' (which also is the basis of 'Filial Piety') be employed to address the usability of bathroom products for the elderly. Before undertaking design work for the elderly, it is first necessary to gain a thorough understanding of their particular needs and optimal living arrangements.

Through my experience of living with the elderly (a volunteer job in Te Hopai Home & Hospital) and research into the physiological and psychological aspects of the elderly, the following design criteria have been developed (Liu, 2008, P15):

- From a physiological perspective, their ability to perform the activities of daily living declines (physiological needs);
- Increased time needed for indoor living activities (adaptability requirement);
- Greater requirements for indoor health management functions (physiological needs);
- From a psychological perspective, greater need to feel safe in their homes (security needs);
- Need to be respected and loved (need for affection);
- Need to maintain self-sufficiency (need for independence).

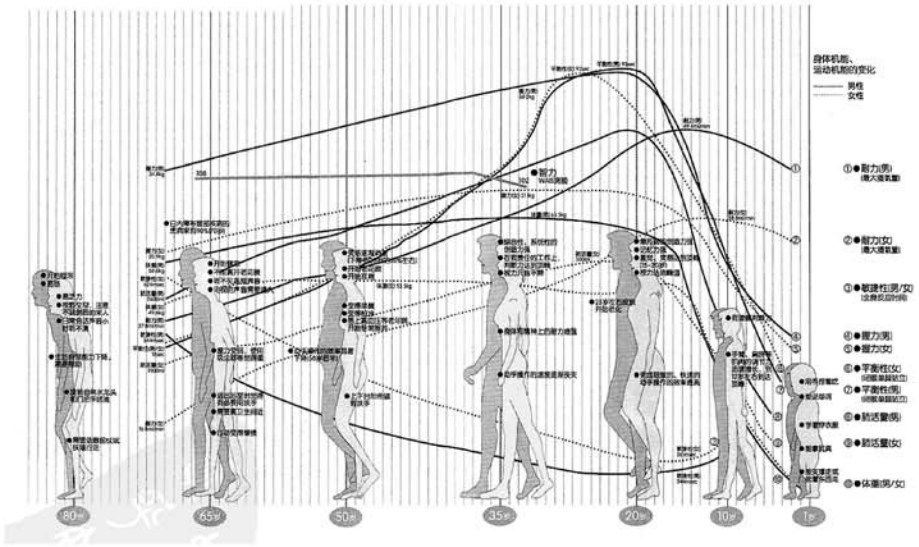


Figure 18 : Chart showing different levels of physical abilities from the ages of 1 to 80 for women and men. Zhou,Y., Chen, X., Lin, J., & Lin, J. (2011).

Figure 19

Chapter 1

Audience Questionnaire

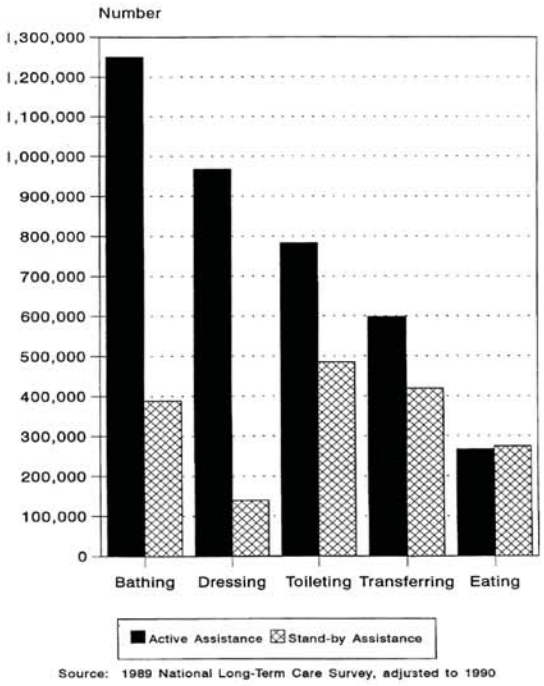


Figure 20

Figure 31 documents the activities which elderly people with ADL (activities of daily living) impairments have the most difficulty with on a daily basis. The most common challenge is bathing without assistance.

A 1994 US, study of resthome residents found around 1.6 million elderly in the community could not bathe without help from caregivers, and nearly 1.3 million needed assistance with toileting.

From the online question (see Figure 21), "How often should an elderly person shower?", the elderly people who were the subject of the questionnaire all want a daily shower, so far as this is possible, as it makes them feel "normal" by being able to continue their usual daily routines. From the caregivers' point of view, they also want their loved ones to be healthy and clean.

As can be seen (Figure 20), a considerable number of the ADL-impaired elderly also require assistance when using the toilet.

As can be seen from the data and discussions (Figure 21), the bathroom occupies a significant role in the intergenerational living environments. This attracted my attention and prompted me to undertake research into domestic bathroom product design.

"I have to say mum showers every day foor 2 reasons. The first and foremost is me me me I am afraid - I find it easier to shower her because I have a large bath length shower which is fine now but soon wont be as there is no way on gods earth I could get a wheelchair in there. I also find it easier to then take her into the bedroom and I use two hairdiers to dry her more tender areas (on a slow warm (not fast or hot) speed and temperature) while she stays cosy warm wrapped in usually two towels. The hairdryer works well on her feet and between her toes - I have tried using a towel but she says it hurts her and as for the more tender intimate places if I tried to use a towel to rub or in actual fact pat dry it tends to trigger a wee so we end up having another wash.

"My second reason for the shower is thet every day I cram my mums body from head to toe. I use a nice middle of the range moisturiser for her face. I use again a middle of the range nice smelling body butter for the rest of her - I do the whole body and it seems to a) make her skin more supple and less prone to tears b) stop the pain in her knees a little c) ease her back pain and actually does help her pass a stool sometimes too and finally d) is the only physical contact she will ever have. I wash her hair once a week and then hse has a full oil head massage the night before the shampoo and then we get it all washed off leaving her hair really shiny.

"I guess I am doing something right for the hospital said she had the best skin they had seen on a 92 year old - not one tear no sores nothing. Mind you she was only in for a week and came home with 4 tears all in the groin area but they were soon sorted when I went back to our old routine."

'I am 75 years old, I used to take a shower everyday and as a woman ive always enjoyed my daily shower.Nowadays my lower legs are disabled, nor my knees but I walk like a Penguin`so for tha past 5 years I use my little 3 pound walker and with that I walk just like I did in my youth. When my husband of 57 years takes me out to dinner he insists he push me in a small transport chair in lieu of a wheelchair. It works very well and otherwise I am in phenomenal health. By the was I have been a type 2 Insulin dependent Diabetic from age 35 to the present. Hey all of you Diabetic`s know you can live your life to the fullest get to your doctors and do as they say. Last week I had a barage of Blood tests all were great. My A!C was 4.2.
"I am the mother too 6 adult children and 3 Grandchildren. We are so blesses. Come on senior`s you can do it. Many blessings many healings."

"Daily! One needs to stay clean. Since we are neverending caregivers, we installed a walk in shower, a bath chair, lots of grab bars and safety mats."

Figure 21

Figure 20 : Number of Elderly Persons with ADL impairments. Burwell, B. & Jackson, B. (1994).
1. ADL: Loss of activities of daily living function.

Figure 21 : Online survey answers from the elderly person and their family mambers. www ageingcare.com. (2009).

PERCENTAGE OF THE POPULATION AGE 60 AND OVER BETWEEN 2000-2025

Figure 22 : Statistics regarding the global aging population. Stuff.mit.edu. (2006).

Figure 22

Chapter 2

Global Aging Problem

This chapter aims to summarize the international situation of aging populations and people's different living attitudes. Once it has been considered what it is to be 'elderly' and the elderly are viewed by society, it becomes clearer how to address their physical and emotional needs through design.

In this chapter I explore the following

1. Changing demographics
2. Different living attitudes

Changing demographics

According to the WHO (World Health Organization), a country or region will be defined as 'aging' when the proportion of people over 60 exceeds 10%, or the proportion of over 65s accounts for 7% of the total. Furthermore, a country is defined as 'senile' when those aged 65 and over comprise 14% or more of its population. According to a 2007 WHO forecast, by the middle of this century people aged over 60 will number two billion, or 22% of the global population. France, Germany, Britain, Japan and America in the 19th Century and 20st Century were already classified as "aging" countries (see Figure 23) (Zhou, Chen, Lin., & Lin, 2011, P15).

New Zealand is no exception with its increasing proportion of people in the older age groups since the Baby Boomer period and - like many developed counties - a declining proportion of children. The number of New Zealanders aged 65 and over increased between 1981 and 2006 from 309,795 to 607,032, according to information released by Statistics NZ after the 2013 Census (Statistics New Zealand, 2013).

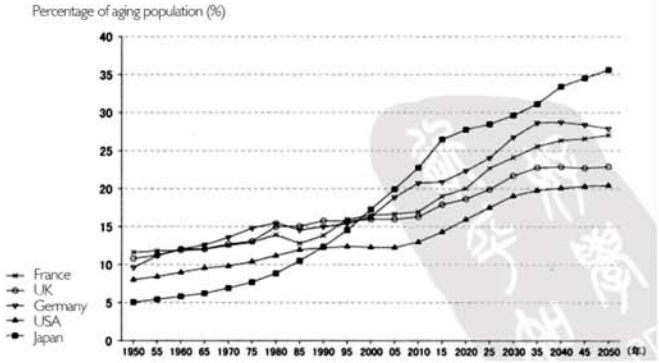


Figure 23

Figure 23 : Aging trend in some developed countries. Zhou,Y., Chen, X., Lin, J., & Lin, J. (2011).

Chapter 2

The 65+ age group comprised 10.8% of the population in 2001and 12.1% in 2013. By 2043 they are forecast to comprise 19.7%. At the same time, the proportion of the population under 15 has decreased from around 33% in the early 1960s to 21% in 2009, and is expected to fall to 18% by 2031(Statistics New Zealand, 2013).

People have gradually become aware that the aging of populations is both a challenge and an opportunity for all societies. For instance, to deal with the shortage of labour, people have improved all kinds of production technology to increase efficiency. At the same time, the aging society has changed the composition of consumer groups with the elderly becoming an increasingly important consumer market (Zhou, Chen, Lin., & Lin, 2011, P16). So aging populations are not just a sociological phenomenon, they are also an economic phenomenon. To cater for this growing group, researching and improving product features and design for the elderly is becoming particularly important.

Different living attitudes

"Living independently is rare among older people in developing countries, but is the dominant living arrangement in developed countries."

(United Nations, World Population Ageing , 2013, P.54)

According to Figure 24, living arrangements of the elderly can be classified as 'co-residence', 'living alone' and other kinds. Living arrangements are fundamentally affected by demographic change and, in particular, by population aging.

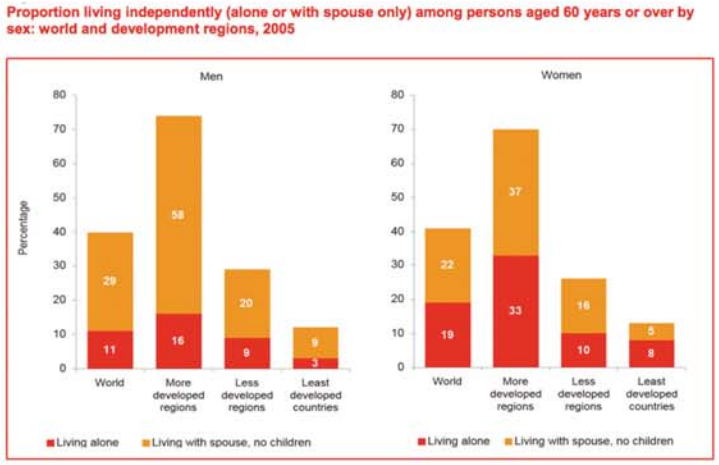


Figure 24

As illustrated in Figure 24, 60% of men and 59% of women live with their family or live in elderly communities in the world, while the rest live either alone or with their partner. Most intergenerational living arrangements occur in developing counties, while co-residence and living alone situations occur mostly in developed counties(United Nations, 2013, P.55).

Figure 24 . Proportion living independently (alone or with spouse only) among persons aged 60 years or over by sex world and development regions. United Nations. (2013).

Chapter 2

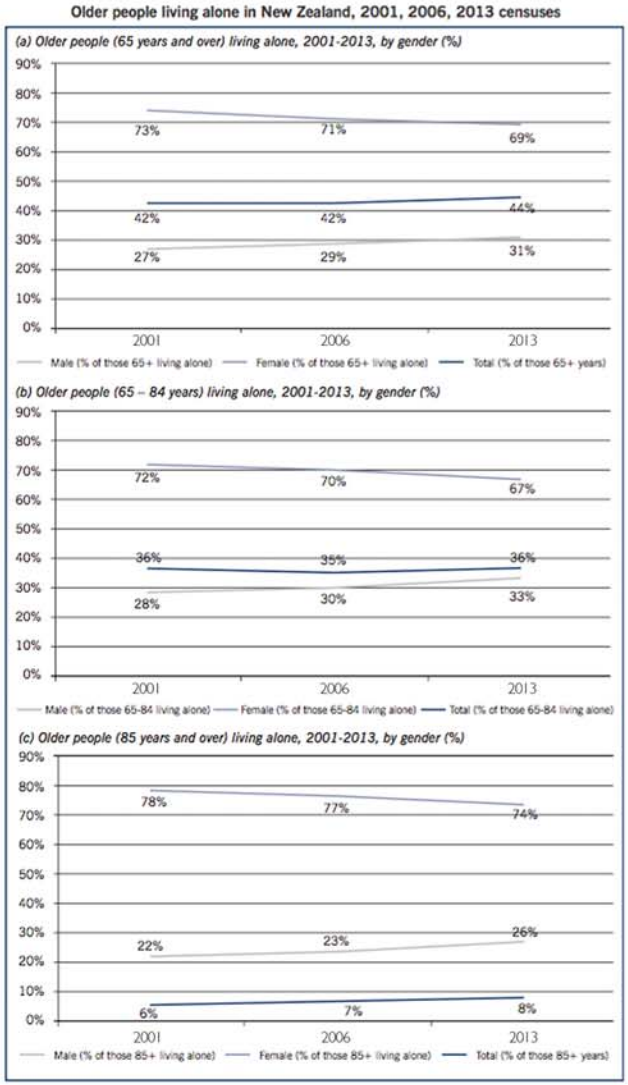


Figure 25

In New Zealand in 2013, 44% of older people over 65 lived alone (Figure 25). It has become a prevalent lifestyle not only because people live longer, but also because there continues to be a longevity gap between men and women - with most women being younger than their male partners and women having a longer life expectancy (on average, women live four years longer than men according to Statistics NZ's 2014 National Population Projections).

New Zealanders have a high rate of home ownership, so the elderly are more likely to own their home. About 75% of 65-79 year olds owned their home with or without a mortgage, according to the 2013 Census (New Zealand Government, 2013, P.14). This gives the elderly people more flexibility to consider cost-effective accommodation options as they grow older and their need for care and access to support services becomes greater. Furthermore, New Zealand is diverse in its ethnic make up, and different cultural expectations also influence people's options. For instance, in Asian, Māori and Pacific culture, it is quite normal for older generations to live with their children. However, in European New Zealand culture, people of different generations generally prefer to live separately.

In New Zealand, Europeans comprise the largest proportion of over 65s at 83.8% in 2013, Māori comprised 5.3%, Asians 4.5% and Pacific 2.3%. These proportions are forecast to change in the future due to higher growth in Māori, Asian and Pacific groups (New Zealand Government, 2013, P.14).

However, while the welfare and income of elderly people in developed countries are quite high, they have still significant challenges when living alone. According to data collected by AARP (American Association of Retired Person), most of the elderly (nearly 90%) want to live in their own home for as long as possible. But when one is over 65, with both physical and psychological health increasingly deteriorating, this is not always possible (AAPR, 2012, P.4).

Figure 25 . Older people living alone in New Zealand, 2001, 2006, 2013 censuses. Koopman, P., & Moosa, S. (2014).

Chapter 2

Living alone will often no longer be the best choice, due to the following issues:

- Medication management issues
- Poor eyesight
- Social isolation
- Forgetting appointments
- Unable to keep up with daily chores and housekeeping
- Poor nutrition or malnutrition
- Home safety hazards such as poor lighting and loose carpeting
- Unable to pay bills on time

Stevenson, S. 2015, *Danger of seniors living alone*. Cited in http://www.aplaceformom.com/blog/2013-4-1-dangers-ofseniors-living-alone/

In addition, around 59% of elderly people (65-plus) in New Zealand have disabilities to the extent that they are classified as disabled. However, disability rates differ across ethnic groups: 58% of the New Zealand Europeans are disabled, compared to 63% of elderly Māori, 74% of elderly Pacific people and 50% of elderly Asians (New Zealand Government, 2013, P.3).

To summarize, living alone is the main living status in New Zealand. However, it is not the ideal situation for all elderly people.

Chapter 3

Culture Comparison

In this project, the discussions of diverse managing attitudes on the elderly living drive on different cultures. Cultural comparison as part of the overall research process can provide previously unexplored perspectives which can prompt the development of products that recognize, reflect and respond to the values and beliefs of different target markets and audiences. Understanding the differing perceptions and expectations different markets have of products can enable the designer to design products appropriate for those markets (Milton,A., & Rodgers, *Research mothods for product design,* 2013. P.53)

With personal and published accounts to reveal differences in behaviors and artefacts between national or other cultural groups, which helped me to understand cultural factors their insights when designing for New Zealand or global markets.

New Zealand European perspectives on intergenerational relationship

The western family structure is relatively simple , and nuclear families are the most common form. In nuclear families, parents are the centre and children leave home in their late teens or early twenties. Every family member has his or her own property. When the parents die, most of their property is usually passed on to their children.

In modern western society, the idea of individualism has become a cardinal principle. This principle acknowledges human freedom, equality and individual independence, which can be reflected through all sorts of relationships, such as between men and women, old and young, superior and subordinate, colleagues and peers etc. Between parents and children is no exception: they treat each other with 'love', like friends, which embodies the spirit of freedom and equality.

From a western perspective, from the perspective of the elderly, 'old' often implies close to the end of life, loneliness and a burden on their children and/or society. In order to prove their value, many elderly people in western countries keep working after retirement age to show they are still valuable to the society and to prevent being isolated.

So, from another aspect, do older people often suffer discrimination and outright prejudice? From some perspectives, the answer is Yes. One reason is the protestant work ethic, which places a high value on work - so older people who are no longer working are not given the same respect, or do not feel they are respected much as they were. Another key reason has to do with equality and independence. As people become old and less independent, others may instinctively look down on them or treat them more like dependent children who need caring for.

Chapter 3

Māori and Pacific perspectives on intergenerational relationship

As the indigenous people in New Zealand, Māori made up around 5.3% of the total 65+ population in New Zealand in 2013, which ranks a distant second to European New Zealanders (83.8%) (The Family Centre,Pacific Perspectives on Ageing in New Zealand, 2014, P.5) . Māori society describes elder Māori as kaumatua, pahake, taucke, kuia, koroua, reiputa, mata puputu, poua, taua and ruruhi. All these terms generally imply a certain respect towards the elderly and the belief that an individual will be equipped in terms of experience and cultural knowledge to fulfill expected roles. Thus, it is evident that Māori elders have high status in their society(Edwards, W, *Taupaenui Māori Positive Ageing*, P.20).

For example, the term kaumatua, is described by one participant interviewee in Taupaenui Māori Positive Ageing as follows:
"I think all elderly Māori people have the right to be called kaumatua regardless of their status, regardless of their importance to other people. Having attained that age is in itself a password the praise of just having survived for that long because everybody at that age has some little snippet that nobody else has." (Participant 15, Edwards, W, P.178)

According to this participant, the elderly have achieved the status of kaumatua, as they are survivors, unique, and have a contribution to make which is apparent from the meaning of the word "kaumatua": people who have the knowledge and wisdom. Elders in other Pacific cultures have a similar status.

Pacific peoples in New Zealand make up 7.0% of the total population, but only 2.3% of those aged 65 and over, according to the 2013 Census. The Pacific population in New Zealand is younger than other ethnic groups with a median age of 22.1 years, compared to 41.0 for European/Pākehā and 23.9 for Māori (The Family Centre, P5).

In Pacific ethnicities, advanced experience and maturity of the elderly are signalled by the metaphor of 'white hair'.

'We put our Elders with whitening hair the first consideration'
Tokelauan men's Fa'afaletui (The Family Centre, P.11)

Eldership encompasses the roles of leadership as in a Samoan Matai or Tokelauan Kaumatua. Elders are responsible for leading family, extended family, village and church communities. (The Family Centre, P.17)

Elders have a prominent role in the traditional decision-making processes of Pacific peoples. The role of older people includes drawing on their wisdom, knowledge and experience of older traditions and ways of explaining and teaching to guide the younger generations.

As 'fa'a Pasefika', being over 65 is the time when people are deemed to have reached the peak age and make an invaluable contribution to their families and communities. (The Family Centre, P.17). Consequently, elders mostly live with their families as valued members in intergenerational households.

In contrast to western cultures, Māori and Pacific perspectives on the elderly have many similarities, with respect and reverence for elders integral to their societal values and behaviours. This is also the case in Chinese society.

The global phenomenon of population aging has major ramifications for societies and governments around the world. In New Zealand, efforts to address the impacts of population aging and consequent societal changes include the government's Positive Ageing Strategy which articulates a vision of a society *"where people can age positively, where older people are highly valued and where they are recognised as an integral part of families and communities."*

Chapter 3

Chinese and Asian perspectives on intergenerational relationship

In Asian countries, as people age, they will gradually withdraw from social activities and retreat back to the family life (mostly helping the young couples). Nearly 80% of the elderly (65+) are living with their children in Japan, similar as in China (Jiang, Z, Elderly and Family.2004).

Chinese society has traditionally been agrarian-based. In farming societies, older people usually are the leaders and acknowledged as the people most knowledgeable about politics, medicine, religion, language, songs and dances. For traditional societies without writing, the elderly are also the repositories of traditional information. Therefore, in their traditional blood relationship, patriarchal clan system, which also can be called 'departmentalism of the old', they respect the elderly as the ancestor and source of experience and knowledge (Xiao, Q, *Filial piety and fraternity, the differences in Chinese and western parent-child relationship the differences in Chinese and western parent-child relationship*. 2001, P.3).

China has long exerted a significant influence on many Asian counties and their societal values. 'Filial Piety' is a prime example of this. It can make younger people grateful for what the older generation represent and can give them. From an objective perspective, children are very vulnerable - as are the elderly, who are now in their sunset years. From infancy to old age, every stage of human life should be valued and nurtured. Just like the parents' self-sacrificing and self-denying, to care for their children, we should have the same attitude to caring for the elderly in their sunset years as well.

To integrate the value of Filial Piety into design is to create a relaxed, peaceful environment to support intergenerational living environments where the physiological and psychological needs of the elderly are met and younger generations are also able to live at ease.

Comparison and analysis

"Aint the aging means experienced, worldly-wise and sophisticate? In Chinese, these words are all used to compliment people. If the success or failure of a society depends on experience, the elderly will never be eliminated."
" In the West, we canonize novel innovation and standardization. In the East, people advocate tradition and experience. That's the difference." (Xiao, Q, 2001, P.1)

A conversation between Mr. Fei Xiao Tong (a noted sociologist in China) and a Professor in America highlights this difference: America and American ,(Published by Sanlianshushe).

To conclude with a comparison of different ethnic groups' attitudes on aging in New Zealand, it is easy to see that western society is a contractual society of equality, The European way is to consider the years after 65 as a time when elders are 'rested' or retired because they are considered to be less active and less able to contribute. However other ethnicities such as Maori, Pacific or Chinese, view the elderly differently.

European culture respects the place of young people as family member, but does not have the same respect or esteem for the elderly which corresponds to the Chinese 'Filial Piety'. Rather than say European society is an equal society, it is more accurate to say it is a youth-focused society. But for the elderly who have reached their "use-by date", the culture can be relatively cruel. However, in Chinese, Asian, Maori and Pacific societies, people highly esteem the elderly, as they are the bearers of experience and source of traditional knowledge.

Through design-focused research into history, ethnography and comparative cultural contexts, the practical applications and "usability" of the concept of Filial Piety became evident.

Figure 26 . Two stories in '24 Stories of Filial Piety',

Chaper 4

Concept - Filial Piety

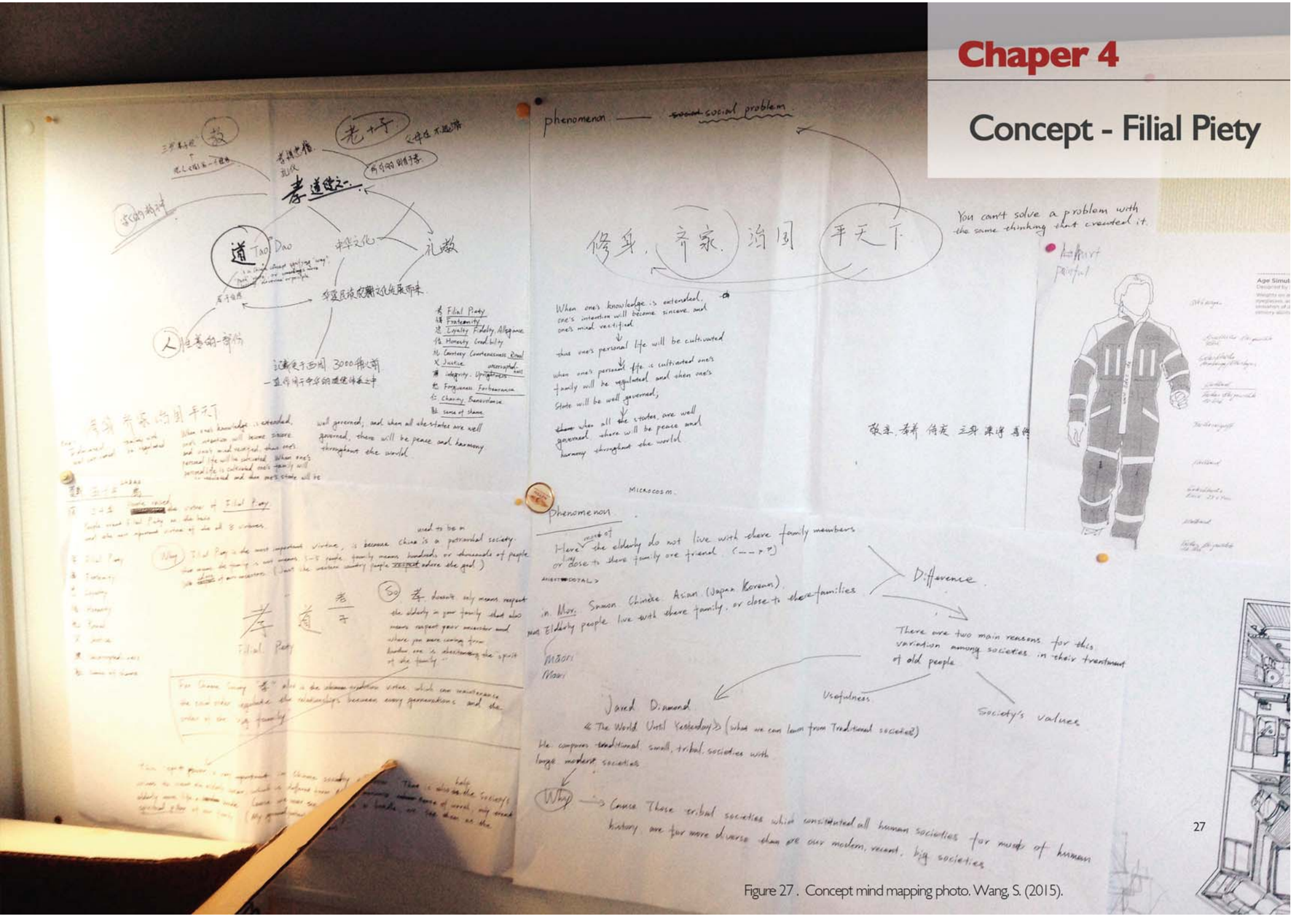
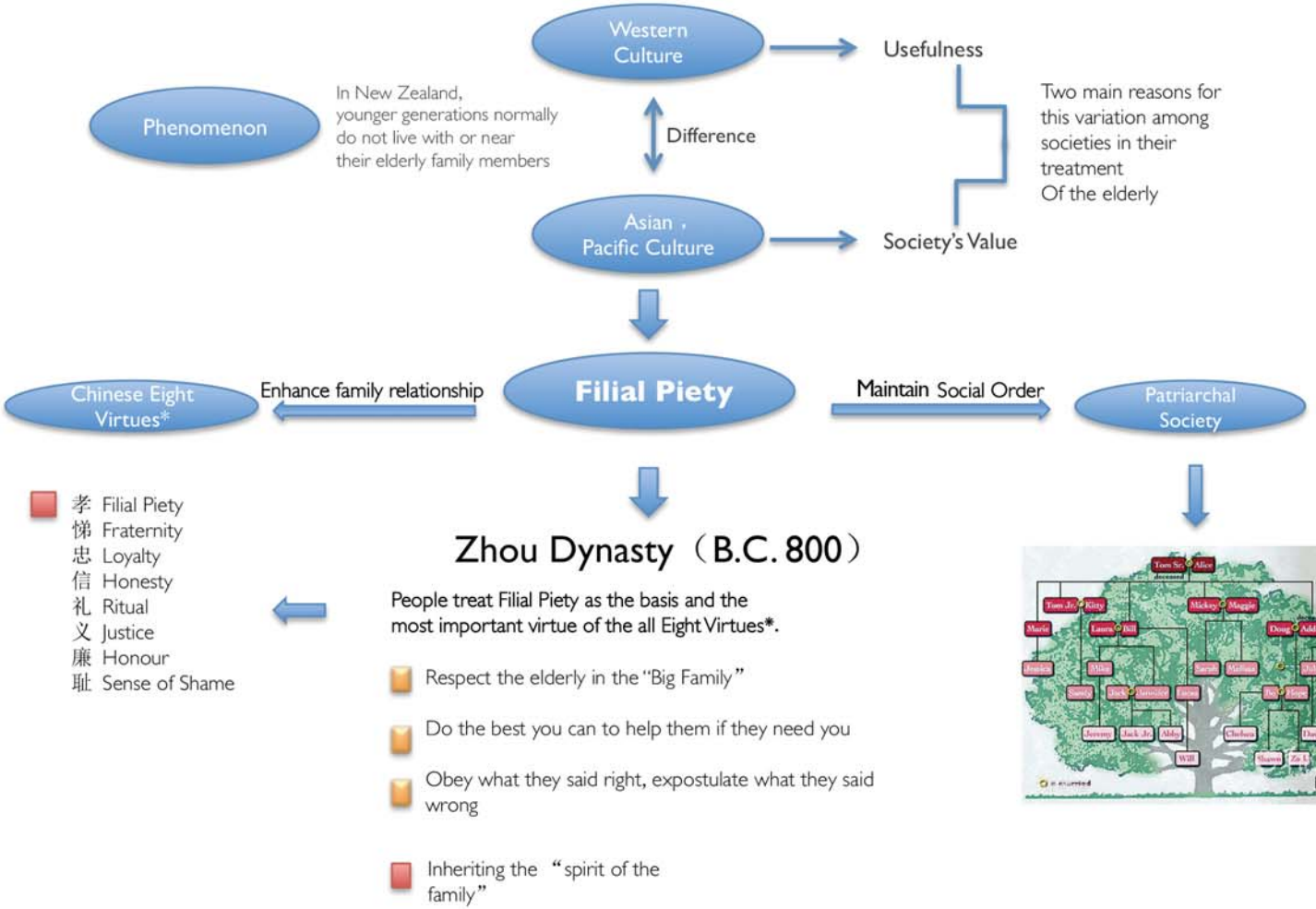


Figure 27 . Concept mind mapping photo. Wang, S. (2015).

Chapter 4

Concept mind mapping



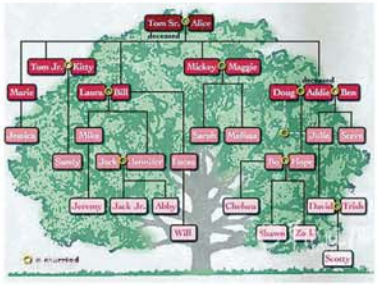


Figure 28

Figure 28 . Family tree, (2011).

Chapter 4

Filial Piety

"Every design for a piece of furniture needs a fundamental and legible design concept. Without that concept all new design remains trivial."

—Mathias Seiler (Red Dot Design Yearbook 2015/2016.working P.28)

'Filial piety' is a moral value in Chinese culture, which guides people's behaviour and provides principles that address interpersonal communication between the older and younger generations.

It is the overriding duty of younger generations to respect and support their elders physically, emotionally and financially. For example, in 2013 China passed a law requiring young people who live apart from their elderly parents to visit them frequently.

'Filial piety' was first referred to in the great Chinese Confucian philosophy book Xiao Jing around the Qin-Han period (3000ED). It describes what Xiao (Filial Piety) is and how it can be used to establish a good society though its principles. (360doc. Filial piety's Culture and Social Harmony 2004)

As a set of moral guiding principles, it encourages the younger generation to support their parents and take care of them to show love and respect. This is also extended to all elderly people in society. To provide an example, there is a famous collection of stories, The Twenty-four Filial Exemplars (Ershi-si Xiao) written by Guo Jujing. This book is a collection of Twenty-four Filial Exemplars of people who have shown great dedication to their parents. It describes examples of how children could demonstrate filial piety.

Filial Piety pervades Chinese culture. In regard to philosophy and religion, it includes 'ancestor veneration'—a traditional Chinese custom of venerating deceased ancestors who are considered to still be a part of the family.

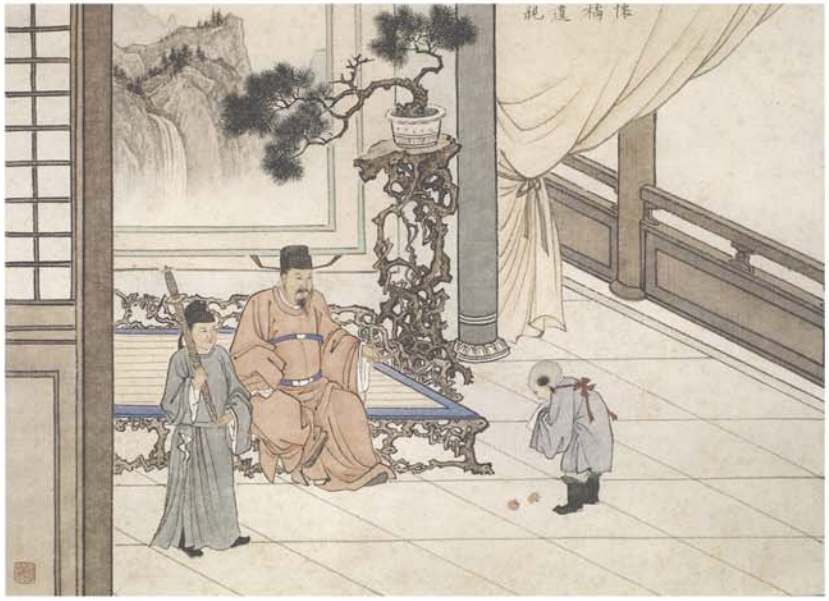


Figure 29: One of the stories in '24 Stories of Filial Piety'

China is a clanist culture that began as a tribal farming society. This means that Chinese people respect their ancestors, as they were the life source and they remind us of where we came from. It is also is a major difference between Chinese culture and Western culture since Western culture was strongly influenced by Christianity during the Middle Ages, (that people were created by God, and they were bound by church law). (Xiao, Q. 2001. P.3)

In Chinese culture , the young have an ethical duty to look after the elderly. However, in Western society, the elderly are sometimes perceived as a cost or burden. (Video 4.1, TED Talk - Diamond. 2013)

Chapter 4

Nowadays, western developed countries are becoming increasingly aware of the elderly – in part due to the mounting financial costs to the state of meeting the living costs and care facility costs of the elderly. For example in the USA, the elderly people have a huge disadvantage in accessing hospital care due to the explicit policy of 'age-based allocation of healthcare resources', giving preference to younger patients over older patients on the grounds that younger patients are considered more valuable or useful to society. (Video 4.1)

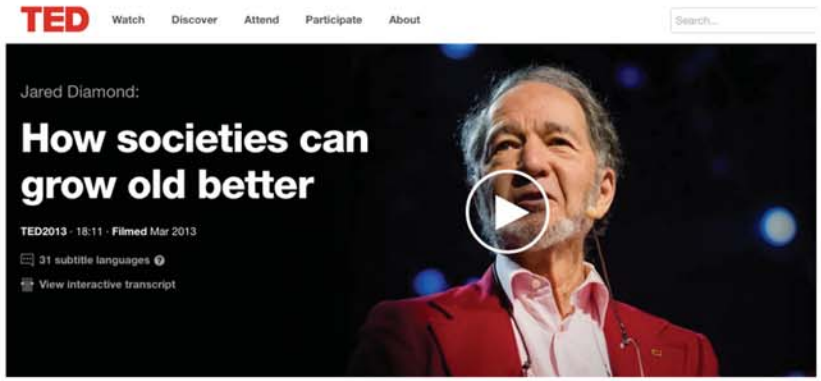
Arthur Henderson Smith, in his book *Chinese Characteristics*, observes "the relationship between the families in the western country has gradually tended to fade". Therefore, there is a need to rediscover the traditional Chinese value of Filial Piety. Respect for elderly people can foster high standards of social conduct and build up a healthy social atmosphere. Filial Piety was decreed as the state policy in Han Dynasty 3000 years before in the Confucian Book of Rites.(Xiao, Q. P.3)

"When one has investigated things, one will have extended one's knowledge; when one has extended one's knowledge, one will have made his intentions sincere; when one has made his intentions sincere, one will have rectified one's mind; when one has rectified one's mind, one will have cultivated one's person; when one has cultivated one's person, one will governed well one's state; when one has governed well one's state, one will have pacified the whole world."

— *Traditional confucian saying*

The philosophy of Confucius deals with how to maintain harmony in the world, and stresses the value of 'Filial Piety' as well.

In China, family does not only mean three or four generations combined, but also the greater relationship spanning up to thousands of years. In clanist society, the family is a microcosm, an important element in the fabric of the country. Therefore to maintain family harmony is essential for maintaining the harmony of the country. For this reason, ' Filial Piety' plays a pivotal role in Chinese culture.



Video 4.1, TED Talk - Diamond. (2013).

Chapter 5

Aim & Objectives

Research Question

The main question addressed in this study is:

What value does the Chinese ideal of 'filial piety' bring to the concept design of a domestic bathroom product?

Thesis Objectives

This project aims to apply 'Filial Piety' to product design to a) make intergenerational living easier and more harmonious and, b) instill this ideal in people's understanding.
The objectives of this research are:

To illustrate how the ideal of 'Filial Piety' can be widely accepted and reinforced by the universal design theory for care of the elderly to enhance their confidence, independence and mobility, and make intergenerational living environments more feasible and mainstream;

To illustrate how 'Filial Piety' can be presented as a principle in emotional design to build and strengthen the spiritual links and bonds between family members to create a better experience for all.

Chapter 6

Design Theories

Bathrooms are foremost functional – people wash in them. But they can also be hazardous places. According to ACC's *Taking care in wet areas* publication, there are 17,000 bathroom accidents in New Zealand every year, mostly from slips, trips and falls. This is more of an issue for the elderly because they are more likely to suffer falls and the consequences of falling are more serious for them. (ACC, 2011)

"Each year, about 350,000 Americans fall and break a hip. Of those, 40 percent end up in a nursing home, and 20 percent are never able to walk again. The three primary risk factors for falling are poor balance, taking more than four prescription medicines, and muscle weakness. Elderly people without those risk factors have a 12 percent chance of falling in year. Those with all three risk factors have almost a 100 percent chance." (Gawande, A, *Being mortal – illness, medicine and what matters in the end.*, 2013, P.147)

Therefore, it is not surprising that bathroom design for the elderly is often mainly dominated by a focus on safety issues. However, the elderly generally want more than just to be safe – they also want to feel that their lives having meaning.

"The terror of sickness and old age is not merely the terror of the losses one is forced to endure but also the terror of the isolation. As people become more aware of the finitude of their life, they do not ask for much. They do not seek more riches. They do not seek more power. They ask only to be permitted, insofar as possible, to keep shaping the story of their life in the world – to make choices and sustain connections to others according to their own priorities. In modern society, we have come to assume that debility and dependence rule out such autonomy." (Gawande, A, 2013, P106)

Two design theories are relevant in this project with 'Filial Piety', universal design and emotional design, they work with this concept from two different perspectives. One for social communication and usability, and the other for humanistic perspective and affective satisfaction.

Chapter 6

Universal Design

A single product will often be unable to address the entire range of different user needs that exist within the potential market.

At the mention of product design for the elderly, we need to refer to the methodology that applies throughout the design 'Universal Design'.

As the impact of aging has become a global issue, 'How to build a safe, comfortable, healthy, happy later-life living environment for the elderly' has became a significant research topic. The term 'universal design' was first used by the staff in the Centre for Accessible Housing at North Carolina State University in the 1970s (Null, R, *Universal design : principles and models*, 2014, P.2). The bathroom is the most hazardous and most likely place for accidents to occur in the house, thus there is high demand for 'safe' bathroom facilities for older people.

The first standard of disabled accessibility was published in 1961.(Goldsmith, A, *Universal Design*, 2000, P. 5). Previously, people with physical impairments needed to adapt to the environment, rather than the other way around. With the advent of accessibility laws and regulations another consideration entered the design world.

Universal design pioneer Alexander Kira thought that even basic bathrooms should be designed with present and potential medical issues in mind, and should include safety features where possible. His work preceded and was a factor in the development of early 'universal design'. While at the same time bathroom ware makers realized the potential market and began to develop a wider range of suitable products. For instance, In 1965, American Standard publicized the Stan-sure 'skid-resistant' bathtub, which was influenced by Kira's recommendation that all bathtubs should have non-slip surfaces.(Penner, B. Bathroom. 2013. P.220)

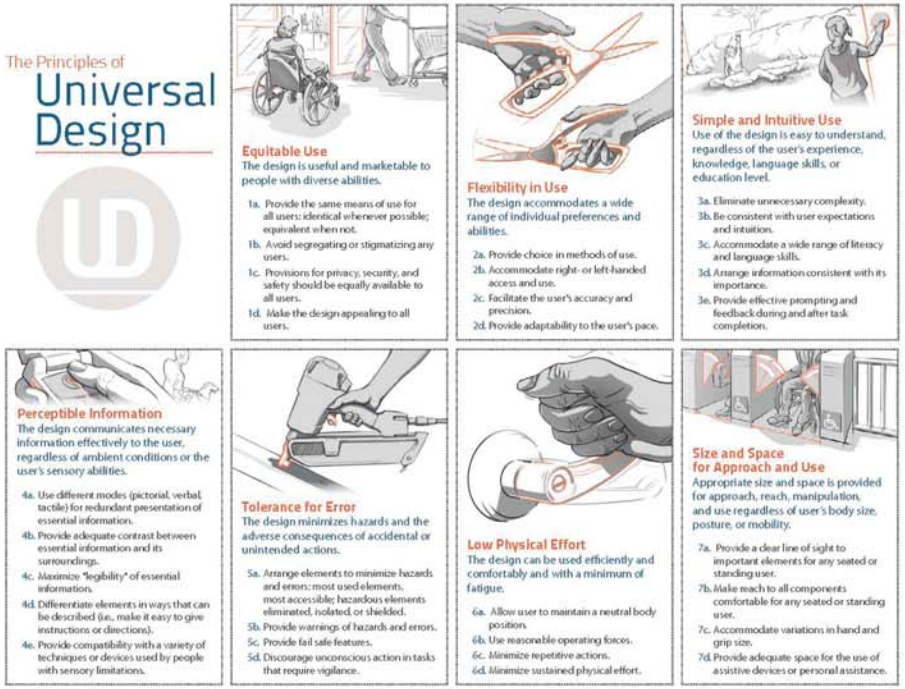


Figure 30. Seven universal design principles. (2012)

Chapter 6

Universal Design Product

With in-depth application of Universal Design to health and economic concerns, the research focus of the traditional bathroom space itself has changed as well. It has moved from concentrating on 'How to improve the usability of bathroom products for the elderly?' to 'How can the space be designed to meet the competing requirements of relaxation, safety, accessibility and emotional comfort?'

The common physiological and psychological needs of the elderly can be divided into physiological needs, adaptability requirements, safety needs, affection/emotional needs, and independence needs. Several design trends in the aging product market address now these requirements.

Nocturia (the need to use the toilet at night) is a typical feature of aging, so easy access and safety when using the toilet at night have become particularly important. Therefore, in order to prevent night-time accidents, a 'safety guarantee' is very necessary.

For example, Batra, a washstand produced by Daelim Bath Korea, has round edges designed to prevent possible injury to children or elderly people. The bottom part of the washstand features a storage cabinet to minimise the risk of bumping into storage spaces within a relatively narrow enclosure.

Figure 31. Batra, washstand. (2009)

Chapter 6

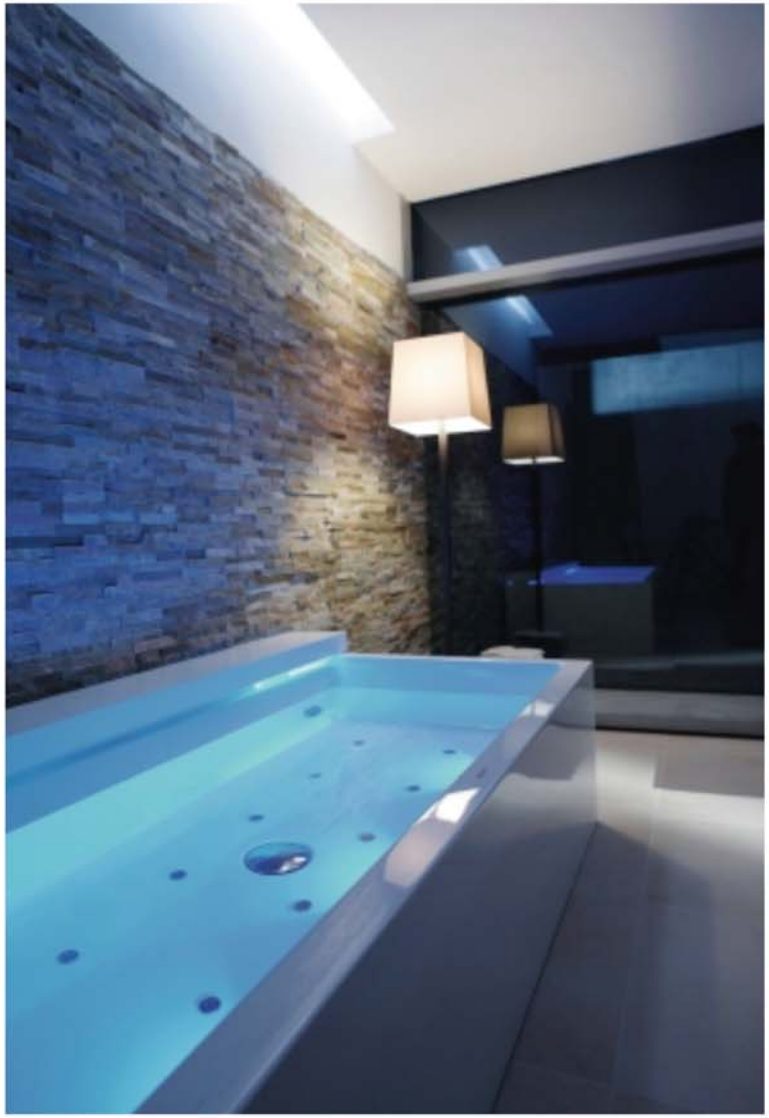


Figure 32. Nahho Floatation Bath. (2011).

With aging, people's bodies become less flexible and agile. Arthritis and other degenerative conditions often afflict the elderly. The healing effects of massage and baths lead to physical and mental relaxation (meet the physiological needs of the elderly).

For example, the Nahho Floatation Bath produced by Duravit Germany features a high-tech, cutting-edge design intended to make bathing a very comfortable, almost blissful, experience. It aims to give users the feeling of floating, almost of weightlessness.

Chapter 6

Research shows that as people age, maintaining their independence becomes increasingly important. To prove their self-reliance is as important as maintaining their dignity - not only for the elderly themselves, but also for the peace of mind of their families. Elderly people who live with their family want, as much as possible, to avoid being assisted by others as they wish to be independent.

For example, Range 805(Figure 33) is a set of barrier-free products designed by HEWI. It is also the typical universal design model used in recent years for elderly and disabled design. It provides a wide range of independence and safety for the elderly.

Though market research studies (mainly on safety, health management, independence and adaption) on bathroom functionality account for a relatively large proportion of market research on bathroom products, addressing mental needs is rarely the main concern of design for the elderly.

Figure 33. Range 805. (2007).

Chapter 6

Universal Design vs Elderly Specific

"I find 'design for special needs' a patronizing way to describe design specifically for people with particular impairment."

(Pullin, G, 2009, *Design meets elderly*, p.2)

As people age, a variety of disabilities are likely to develop or occur, resulting in reduced mobility and physical abilities year-on-year. Consequently, elderly people easily loose their confidence, their activities can be restricted and social participation limited. In the context of an environment or society that advocates equality and liberty without Filial Piety, elderly people are often labeled 'old' by society, regardless of the actual level of their capability. While it may not be intentional, this is a form of discrimination and can be very distressing and frustrating for many elderly people.

As often seen in the product market, many products for the elderly can stigmatise or embarrass the elderly. Because they feature very prominently how they cater for people who are disabled or less mobile means, they are too obviously identified as being designed for the 'old'. The symbolic language implies that 'you are too old to buy nice products'.

' Nobody wants to feel old as a result of choosing or using a particular product or service.'

(Herstatt & Kohlbacher, The silver market phenomenon:
Marketing and innovation in the aging society, p.295)

Especially for the families where the younger members live with and take care of the elderly, there is less scope for enjoying relaxed bathing.

Designs to accommodate the elderly should avoid stigmatising the elderly by unduly highlighting their reduced mobility and special needs. Safety is a major concern for many elderly, but this does not mean they have lost their fashion sense or appreciation for stylish products.

This therefore requires a design theory or set of principles guided by discretion, understanding and broad thinking. After all, there is no shame in being less abled.

One solution is by blurring the boundaries between the elderly and the more able person while sharpening the focus on design. This could redefine design for elderly and its relationship to mainstream design. G Pullin previously also reached this conclusion in her book, *Design meets elderly*.

Taking glasses as an example (Figure 34), fashionable eyewear has been influential in helping to all but remove the stigma associated with wearing what is, in fact, medical equipment to correct impaired vision. This has been possible by combining the skills of designers and fashion or cultural considerations in mainstream design. So surely universal products can do it as well for other types of products?

Figure 34

Figure 34. Cutler and Gross advertisement from the early 1990s.

Chapter 6

The boundary between universal design and mainstream design is always blurred and moving. Seeking a resonance between the requirements of the elderly and other members in the family could blur the boundary between design for elderly needs and mainstream design (Pulling, G, P.109)

Exciting opportunities could exist on this frontier of resonation design. Filial Piety embodies loving care principles and so resonates with universal design principles which seek to make mainstream design accessible to everyone. Design for elderly people needs to address this issue directly through an elevated emphasis on how people with special needs are specifically addressed without being condescending or patronizing.

Thus, applying Filial Piety to design can be a springboard or catalyst for changing how people view and value the elderly.

'Focusing on a particular culture is a goal in itself to produce appropriate designs, but it can also means to an end: initially designing for narrower subcultures might catalyze radical new approaches – approaches that might subsequently have more widespread applications." (Pulling, G, P.109)

Chapter 6

‘Filial Piety ‘ in Emotional Design

“Not many objects for the bathroom, in fact, be they large or small. Have really interesting, amusing, poetic design”, states Alberto. “Il Bagno Alessi takes this fact as its starting point and seeks to fill the gap.”(Alessi, ed. Loh, A., Wong. S, & Lee, C, 2009)

As was discussedin the previous chapter, addressing their emotional needs is rarely the main concern of design for the elderly, however for intergenerational living situation it is crucial.

After retirement, the social role of the elderly changes, social invitations dwindle and their circle of friends can shrink. So their whole focus will shift to family life. At the same time, some of their other elderly relatives and good friends may have died, so they will have more feelings of loneliness, loss and emptiness. Therefore, having loving care from their families becomes very important.

Therefore, ‘Filial Piety’ as a concept could be presented as a principle in emotional design to help to build and strengthen the spiritual links and bonds between family members to create a happier living environment. This needs to flow into the design of bathroom products.

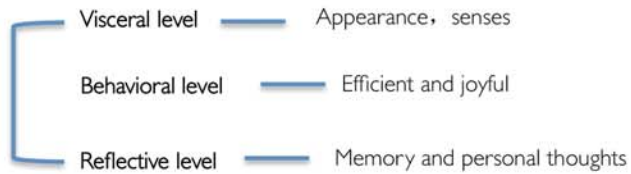


Figure 35. Three levels of the cognitive and emotional system mapped to product characteristics. Donald, N. A. (2004).

Emotional Design

In designing a product, several components are invariably considered as key points, including usability, aesthetics, and practicality. Designers have many factors to think about, such as materials, manufacturing method, practicality, how easy the product is to use and how people view it. However, one significant aspect which people can overlook is there is a strong emotional part to how products are designed and used. The emotional side of product design may be more critical to a product’s commercial success than its practical elements.

As be seen in this project, emotions have taken over a enormous area. Strictly speaking, even the concept ‘Filial piety’ itself is a kind of emotion as it recalls people’s deeper consciousness, affecting how you feel, how you behave, and how you think.

“Emotions are inseparable from and a necessary part of cognition. Everything we think is tinged with emotion, much of it subconscious. In turn, our emotions change the way we think, and serve as constant guides to appropriate behavior, steering us away from the bad, guiding us toward the good.” (Norman, D.A, Emotional Design, P.17)

People tend to narrow their thought processes and concentrate upon aspects directly to the problems when they feel anxious, when they feel relaxed and happy their thoughts are expanded, becoming more creative.(Norman, D.A, P.19)That is why this conclusion appears. “Attractive things work better.”(Norman, D.A, P.17)

Attractive things make people feel good, which can elicit peoples’ positive emotions that can help people to find solutions to address the problems they encounter. In another words, aesthetics in products can make easier use.

However, how do we have positive emotions? Or how do the aesthetics in

products affect our feeling? We need to consider how emotions are processed.

In Donald's Emotional design principle, human brain process the feelings through three levels,(Figure 35) from basic to advanced: Visceral, Behavioural, and Reflective. Visceral level is the basic level, it can fixed routines, where the brain analyzes the world and responds. On the behavioural level, the brain analyzes a situation and alters behaviour accordingly. The human brain can think about its own operations at the highest evolutionary level of development, the reflective level. This can be summarised in the following product studies. (Donald, N.A. P.21)

The transmission of emotions is intimately related to the exterior of the product design. As Donald A. Norman observed in his book *Emotional Design*, the emotional expression of product design corresponds to the Visceral Level Design, which is the basis of every design's purpose.(Donald, N.A. P.39). How to make people instinctively want to use the product and feel free and happy when they first see it is through the appearance of the product and how or whether it has 'appeal'.

For example, ANTONIO (manufactured by Alessi), is a set of human-shaped products designed by Venturini in 1996, which is characterized by the features of 'interesting', 'reliable' and 'adorable'.

The shape of ANTONIO is like a strong man reaching out both hands to say 'I can help you'. While using this product, the bright color and exaggerated movements capture you attention immediately. Meanwhile, it gives a humanized hint of reliability and safety from its human shape. At this stage, the appearance of the product, it can demonstrate care, love, reliability and mental happiness.

According to Donald's book, *Emotional Design*, design in behavioral level corresponds to the efficiency, usability and enjoyment of using it. As in this project, design at this level for the elderly is more likely to fulfill the physiological, independence and security needs due to its function. (Donald, N.A. P.39)

Take Alessi's Michael Graves Kettle as an example. It is an metal kettle, but with a plastic cement handle and an attractive little bird on the mouth of the pot. These plastic components protect people from burns and from contact with boiling water. You would not hear the sharp noise but the bird's tweet. All these features contribute to the kettle's function and efficiency, but also make using the kettle a pleasant experience.

Figure 36. Alessi - Guido Venturini - Antonio family. Antonio C Toilet-Roll Holder, Antonio S Soap Dish, Antonio Toothbrush Holder.

Figure 37. Alessi's Michael Graves Kettle. (1985).

Chapter 6

Furthermore, this kettle is in the "Graves Family" (Figure 37), The reason Graves named this set of kettles A 'Family' is: "Perhaps most importantly, with Alessi, tradition extends to the idea of family. Verganti, R. (2006). As a designer you and your people are brought in and treated as a family". This reminds me of my own family when I see or use this product; it evokes memories of being with my family.

The reflective level is the only one which consciousness, high levels of feeling, emotions and cognition all reside. At this level, both thought and emotions can experience the full impact. But on the lower visceral and behavioural levels, there is only affect involves. In another words, interpretation, understanding, and reasoning all come from the reflective level. (Donald, N.A. P.38)

A further example is the world famous Juivy Salif, manufactured by Alessi and designed by Philip Starck (Figure 38). This design is well-known by its alien appearance. Not only be used as juicer, but also a work of art, a warm-up topic on the table. It brings back your imagination, your thoughts, and makes atmosphere change.(Watson-Smyth, K. 2010).

"It's not meant to squeeze lemons, it is meant to start conversations."

— Philip Starck (Watson-Smyth, K. 2010)

These three levels all appear in design in different quantities. Some of the designs start from visceral level affecting other levels, though some focus on reflective level more than others. However, people in different cultures, region and education may interpret experience differently; what appeals at one may not work for another.

"A successful design has to excel at all levels."(Donald, N. A, P. 36)

Three levels interact with one another and modulating each other. When it starts from the lowest, visceral levels, it is called " bottom-up", contrarily, from the reflective level, it is called "top-down".(Donald, N. A, P. 25)

Figure 39

Figure 38

Figure 38. Alessi Juivy Salif (1990).

Figure 39. Alessi Graves Family. (1985-1993).

Chapter 6

In this project, I believe, Filial Piety supports emotional design to provide the potential to work through both 'bottom-up' and 'top-down'.

Human's affect, emotion, and cognition all evolve to interact with and complement one another, we cannot ignore these factors. Affect includes emotion and helps people to judge what is good and bad, also it is inseparable from and a necessary part of cognition. (Donald, N.A. P.20)

"Both affect and cognition are information processing systems but they have different functions. The affective system makes judgments and quickly helps you determine which thing in the environment are dangerous or safe, good or bad. The cognitive system interprets and make sense of the world." (Donald, N.A. P.20)

For the elderly, it is more efficient to start from the visceral level - 'bottom-up' way - as all we want is for the product to be easy for them to use. So the appearance needs to be attractive, and the sensorial experience also needs to be good.

Eyes, ears, nose, skin, touch and all the things we called sensory receptors, are actually factors which help us to take the initiative to explore the world.(Kenya, H.. *Designing Design.2007.* p69). They assist us to understand the world and get the cognition.

Take a baby for example, It's not that babies cannot see, but that their brain cannot understand the signals transferred from their eyes – so they have no visual cognition. By contrast, even the functions of the bodies of the elderly have deteriorated, but former cognitions could lead them to a better understanding. One slight stimulation may recall associated memories.(Kenya, H.. *Designing Design.2007.* P.102)

My design track for the elderly audienceinvolves: appealing through the physical aesthetics, stimulating the sensory system, mobilizing people's cognition, evoking people's thoughts of their family relationship, and eventually eliciting a positive emotional response.

For other family members, starting from reflective level is more helpful as 'Filial Piety' can arouse people's subconscious to assist and protect the elderly members. When their feelings are aroused through chemical neurotransmitters, emotions can change how the brain functions and influence behavior. Thus, cognition and affections, understanding and evaluation work together as a powerful team.(Donald, N.A, P.20)

Their relationship also been illustrate in another way in Anders Warren's Perceptual Product Experience Framework (Fig.40) as a evaluative system. Thus 'Filial Piety' as a concept should apply in these three aspects.

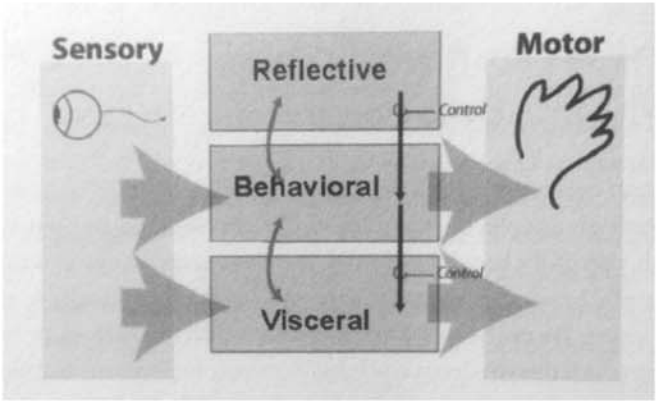


Figure 40. Three levels of processing: Visceral, Behavioral, and Reflective. (P.22)

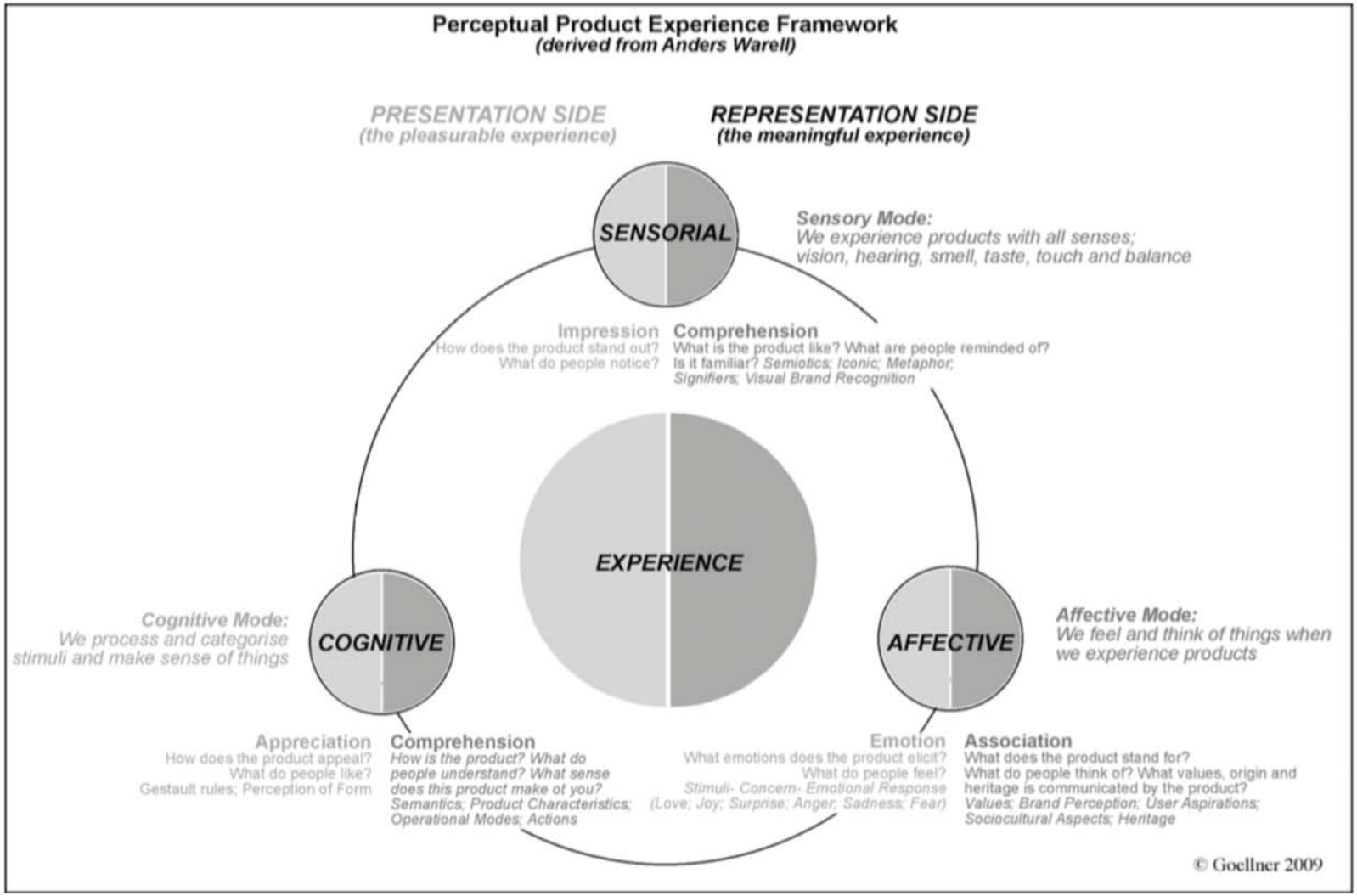


Figure 41: Warell's perceptual product experience model provides a means of breaking down the complexity of a product experience into discernable facets that can be mapped out.

Chapter 6

Case study

"Alessi is not a normal factory. I think of it as an applied arts research laboratory. The possibilities of creativity are immense and we have no limit on what we can do. For us, design is an artistic and poetic discipline."

Alberto Alessi
(Edge, C,1998,P.7)

Alessi Company was founded in 1921 in Omegna in north-west Italy by Alberto Alessi's paternal grandfather Giovanni Alessi. With previously expertise in lathe-turning,brass and nickel silver, Alessi started to design and manufacture durable kitchenware and tableware from 1930. In the contemporary era, its scope is more extensive. For instance, it includes designs of watches, ceramics, small household electrical appliances, electronic products, etc. Alessi designs cover a wide range of fields and objects, from environmental art building to automobiles and bathroom spaces. *(Edge, C,1998,P.8)*

IL Bagno Alessi is a typical, notable example of Alessi's ability to channel its creativity to stimulate audiences' imagination and build an extraordinary environment for the bathroom.

"The borderline is about risk. You can feel it, almost smell it, but it is not clearly drawn - and it keeps moving."

Alerto Alessi
(Edge, C,1998,P.8)

Figure 42. IL Bagno Alessi bathroom products.

Chapter 6

Alessi

As Alessi's World Art Laboratory, selecting the right prototype project and undestanding and appealing to people's real need were quite risky and challenging. "One of our distinguishing characteristics is that we choose to work very close to the borderline."

By exploring the borderline, you may create new fields and mark what people find intriguing and appealing, but if you move too far away from it, your design will no longer be interesting. Alessi made this mistake with its famous 'big fiasco' on the Hot Bertaa kettle design by Philippe Starck. Though it did not appeal to the customers, it provides a clear vision of the borderline to Alessi. (Edge, C, 1998, P.11)

After this setback, Alessi summarized the experience of the failure and devised a highly individual 'Formula of success': SMI (Figure 43) - the concept of "sensuality, memory and imagination". Alessi's critia are: is it pleasing to our senses and does it stir the emotions? There are five grades to rank for each of the components, for this element from 'unpleasant' to 'exciting'. The second one is how we use objects as a form of expression, from 'out' (for the obsolete or kitsch) to 'illuminating' (for designs with cult status). The other two components are price and function. This 'formula' is very useful as its a three-dimensional evaluation system, each of the components is constituted to build up the whole structure of the estimation and to mitigate the risks. And more importantly, it can be the standard to measure the designs in this project. (Edge, C,1998,P.11-12)

How does Alessi arouse people's inner affections?

The transmission of emotions is intimately related to the sculpted design of the product as only when the appearance and function of the product is combined with the feelings they evoked, do products gain aesthetic value. In other words, why people thinking art is beautiful is because it can evoke human affections, which explains why the art laboratory (Alessi) is doing an excellent job in the emotional design field.

	price	function	communication language	sensoriality memory imagination
	3—4	2—3.5	3.5—4	3.5—4
	1—1.5	0.5—2	4—5	4.5—5
	4—5	3—4	4.5—5	4—5

price (p) ...
too expensive——great value

1. *very (too) expensive*
2. *expensive*
3. *in line/reasonable/comparable*
4. *inexpensive/profitable*
5. *I buy two*

function (f) ...
(useless——useful)

1. *useless*
2. *questionable/arbitrary*
3. *standard*
4. *very practical and functional*
5. *brilliant*

communications language (cl) ...
(out——in)

1. *out*
2. *doughtful*
3. *acceptable*
4. *in*
5. *illuminating*

sense of reality, memory, imagination (smi) ...
(sensoriality—memory—imaginary)
unattractive i.e. (–)repulsive—neutral—attractive(+)

1. *unpleasant/repelling*
2. *ambigious/not very nice/unattractive*
3. *neutral*
4. *attractive*
5. *exciting*

Figure 43. Alessi 'Formula of success'-SMI .

DESIGN METHODS & PROCESSES

Mind Mapping

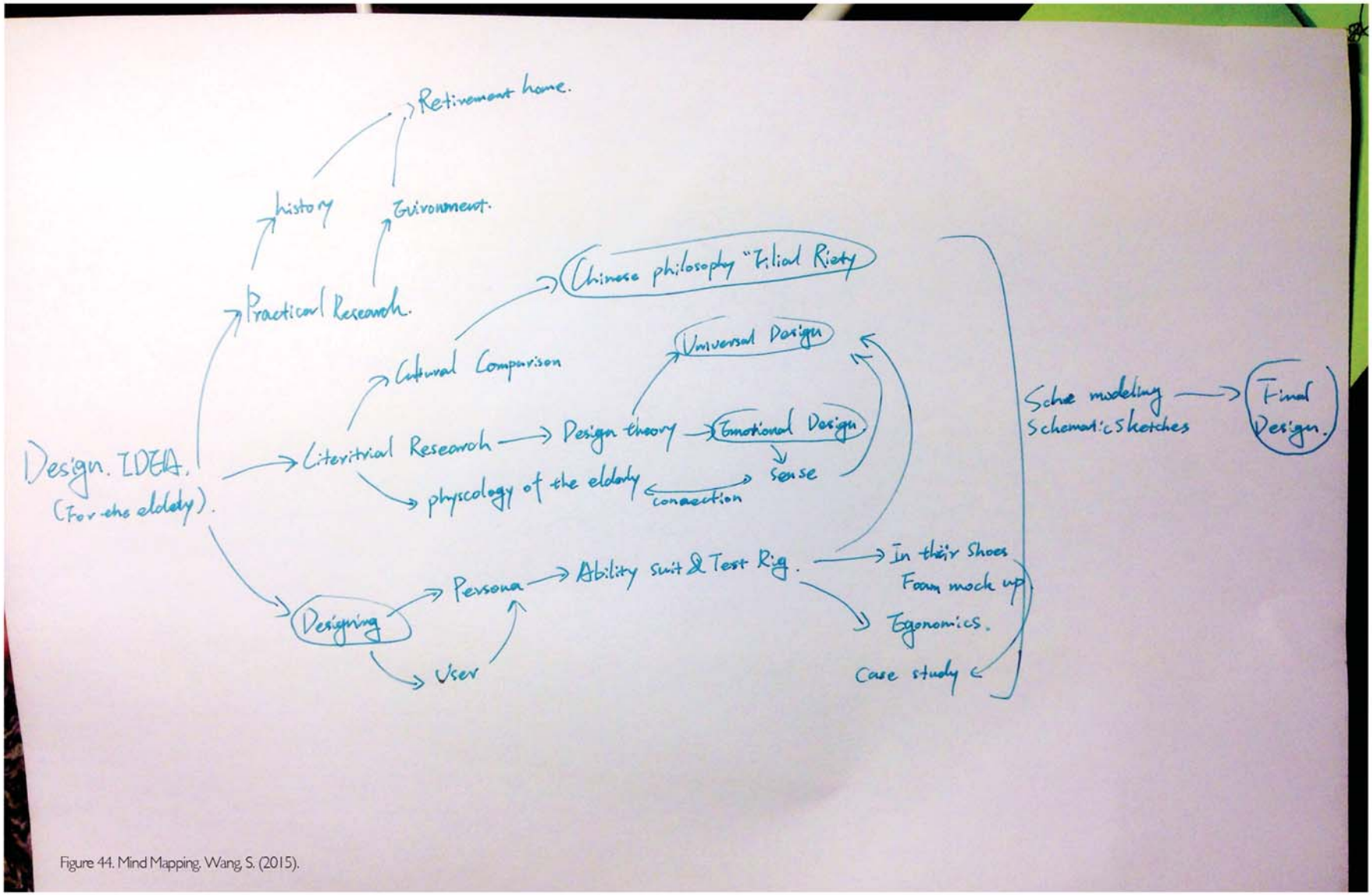


Figure 44. Mind Mapping. Wang, S. (2015).

Chapter 7

Persona

"The most powerful tools are always simple"

(Cooper, A, The inmates are running the asylum., P123).

A "Persona" is the most effective tool to ascertain the needs and wants of the users by formulating a precise description of our target audience and how they want to live. (Cooper, A, P.123)Through progressing the characters, relationships between family members and daily life scenarios, the persona becomes strikingly vivid and powerful. It narrates the problems of the target audience in novel ways throughout my work rather than relying on a single user.(Cooper, A, P.124)

This persona describes a range of needs and interactions between family members and interior contexts that were draw up through design investigations and reflects them in their daily settings. By 'telling the stories', pictures of design features, potential design requirements and latent markets became apparent.

The persona resonated with me because current products do not meet the market's need. They are cold, humdrum and expressionless because producers and designers concentrate heavily on keeping their products helpful, efficient and hygienic. This can be demonstrated through their brochures.(figure 45)

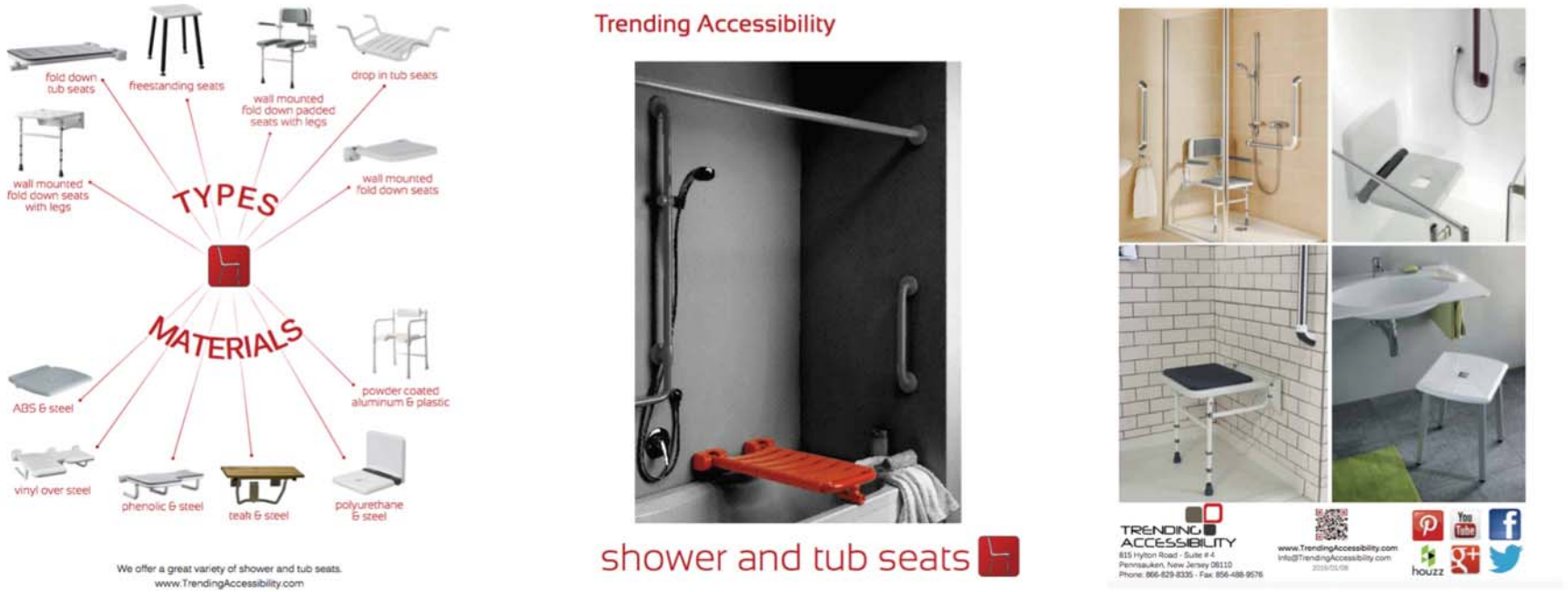


Figure 45. Brochures' advertisements. (2016).

Household Persona

Catherine (New Zealand Chinese)
Cheng — Teacher (retired)

Age: 77

Medical Condition: considerably good, mild lower back pain, weak-kneed, arthrophlogosis.

Condition Info: She hurt her back once, and It is hard for her to go up and down stairs, it is hard to do vigorous exercise.

Client's Scenario: Catherine came to New Zealand in 1966 . Her husband (Jay) bought their house in 1970 (46 years ago), where the whole family lived together. After her daughter shifted out she lived with her husband untill 2001, when her husband passed away. She lived alone till her retirement, but gradually, she felt that long time retired life without any kinsfolk around make her lonely and isolated, she always remember the time when all the family members still lived together.
Fortunately, Christine (her daughter) was also worried about Catherine's physical and mental health, so Christine and her husband went and moved back to the house to take care of Catherine .
In her old age, it is increasingly hard to do everything by herself, especially go to the toilet and take a bath, however those are the most frequently used spaces in the house. It is very difficult for Catherine, not to bother the other family members too much, but reasonable assistance does seem necessary.

Wants: Bathroom products that can reduce back and knees pain.

Bathroom products that do not look like 'cold' elderly design and all the members of the whole family can enjoy.

Needs: Bathroom products that are safe, comfortable and can help Catherine to be inde -pendent.

Bathoom products that make the interactions between family members more joyful and intimate.

Goals:
- Safe and comfortable.
- Allow the elderly to be in -dependent
- Reduce the family members' burden.
- Provide mental support
- Make eveyone happy to use

Christine (NZ Chinese and Maori)
Webster — Business Women

Age: 55

Medical Condition: good. mild arthrophlogosis

Jason (NZ European)
Webster — Civil Servant

Age: 60

Medical Condition: mild high blood pressure.

Condition Info: Christin got mild arthrop -hlogosis due to office work and not getting enough excerise. Jason's high blood pressure is genetic; needs a realatively comfortable envir -onment and atmosphere.

Client's Scenario: Christine is the only daughter of Catherine, after Jay (Christine's father, Catherine's husbund) passed away, Christine feel it is her responsibility to take care of her mother and Jason is totally respects the decision of moving together.
After living together, Christine found that she and Jason are gradually stepping into the old-aged group as well, The living circumstance of bathroom has become the most unconvenient place for them. As the physical and mental condition of Catherine deteriorates, the more heavy work they need to do for Catherine, moreover, sometimes Hellen and Tim's families (Christines and Jason's children and grandchildren) will come and stay for a short weekend, so the bathroom needs to meet all age groups' requirements.

Wants: Bathroom products that can reduce physical pain and are safe and comfor -table.

Bathroom products that can easily help to assist Catherine and make their works lighter.

Needs: Bathroom products that can reach all the family members' needs, products that are inclusive and emotional.

Goals:
- Safe and comfortable
- Assists to make the work (for Catherine) more easier and delightful
- Reach all age groups' usile requirements.

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Persona

This persona includes a 'daily bathroom usage schedule chart' (Figure 46) which lists activities and times of how and when the bathroom is used.

By observing the 'daily bathroom usage schedule' and the accompanying notes, the entire range of daily activities associated with bathroom products is described.

Catherine needs to go the bathroom at least seven times a day, including late at night. Midnight use was the most hazardous for her, due to poor vision and obstacles. Bathing time is the activity for which Catherine most requires the assistance of her family. These personas capture the struggles of Catherine, as she wants to maintain her independence, to not feel old and helpless, and not to bother other families members too much while maintaining a close relationship based on love and family ties.

This type of research method, usually seen in preliminary product strategic exploration, could be used to identify the possible barriers, of age, ability and condition, and create new products resonating strongly with each potential audience. This attempt to restore the real scene though illustration and interaction with the user could help encourage active relationships between user and product, and user and the assistor.

Furthermore, personas can produce an attractive brochure for potential customers to see how the product is actually used and how could it address any difficulties or challenges. The brochure could include a brief description of how the guiding principles (such as Filial Piety) were applied to the design process, as well as visual descriptions of design features.

While the persona itself can not tell us directly how the design should be, this experiment provided me with clear direction about how to narrow it down and guided me to design for emotional resonance.

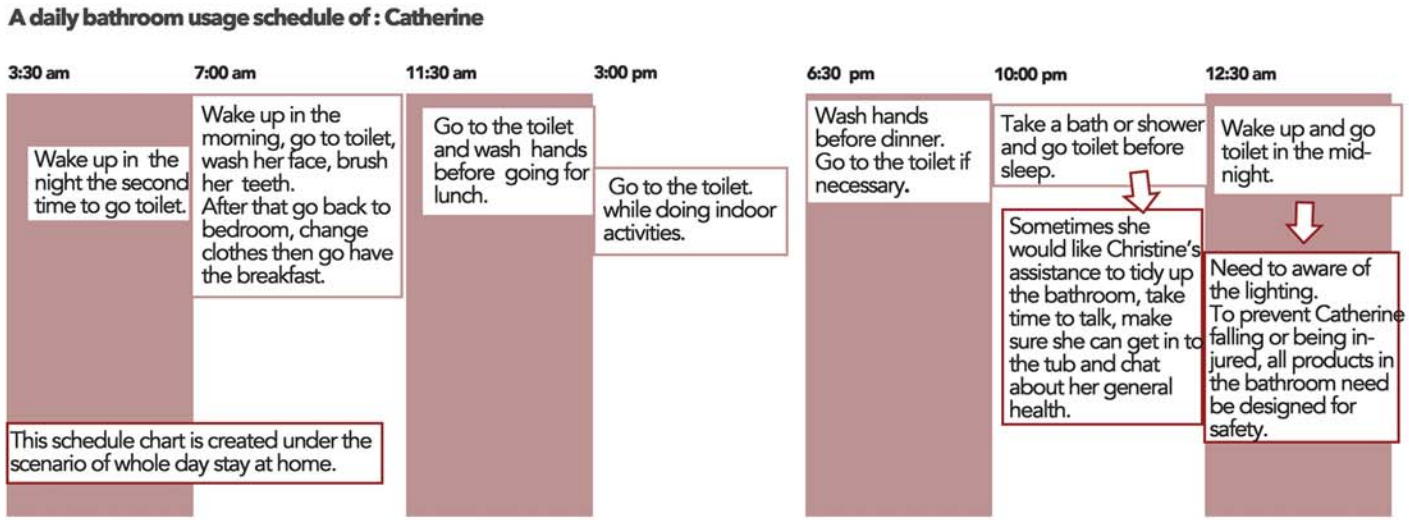

Figure 46. A daily bathroom usage shedule of : Catherine. Wang, S. (2015).

Chapter 7

In their shoes

'By putting yourself in the users' shoes, you can develop a better understanding of the issues that your customer will face, rather than merely looking at the product from a design perspective.'

(Milton, A & Rodgers, Research methods for product design, P, 2013, P.55)

In this project, after completing the personas and research into impairment, I decided to place myself in the users' shoes. This process was referenced and actually executed in the following experiments of simulated impairment (self-impairment) broadly following existing research findings which helped me to absorb and process new information and obtain a deeper understanding of bathroom products and potential needs of the latent user.

My research was inspired by Patricia Moore, SENTHA and TOTO Company.

Case study: Patricia Moore

Figure 47. Patricia Moore.

Patricia Moore is a well-known industrial designer, gerontologist and author in the USA. Her work focuses on designing inclusive and universal products in nature regardless of the user's age, ability or status, (CCA arts, 2010). Her motivation of designing for everyone was from a simple question she asked when she worked in the firm Raymond Loewy: "Couldn't we design the refrigerator door so that someone with arthritis would find it easy to open?" "Pattie, we don't design for those people," one of her more senior colleagues replied with disdain. She was incensed. "Those people?" After that she decided to conduct an "empathy experiment" and discover the realities of life as an old person. (Krznaric, R, 2009) To do this she embarked on her landmark study 'Visible'. She put on makeup, wore glasses, clipped on a brace, wound bandages around her legs, plugged up her ears, put on uneven shoes and walked with a stick. She then went shopping, ate out at restaurants, socialized with the elderly and young alike, so that she could experience life as an eighty-year-old woman and the positives and negatives of senior life.

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The result of her immersion, after physically experiencing some of what it is to be elderly, was an understanding that many of the consumer goods and available facilities in daily life failed to meet the needs of the elderly. This gave her the motivation and direction for her design. "Each and everyone of us is first and foremost a consumer and that quite frankly is where we have not been able to embrace graceful aging". These experiments revealed that the aging demographic is excluded and isolated from the society as designers lacked interest in them. (CCA arts,2010)

As a female designer, Patricia Moore's experiments gave me an extraordinary example of how to hear the elderly's voice, understand their struggles and "think myself" into old people's place.

Case study: SENTHA

Figure 48. SENTHA design experiments.

SENTHA is an inter-disciplinary research project involving several groups from different universities and institutions in Germany, (Technical University Berlin, the Berlin institute for Social Research, the German Center for Research on Aging, University of the Arts Berlin, the Brandenburg Technical University Cottbus, the Center for Technology and Society at the TU Berlin). Their research is built on empirical investigations of the special needs which elderly people face with everyday household products. Their aim is to develop new products that can better meet the requirements of both older people and, by extension, of others as well. (Sentha, Introduction of Sentha)

The works SENTHA have published demonstrate the processes for experimenting in order to get a deeper understanding of the target user.

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Case study: TOTO

TOTO established its Universal Design Research Center for Advanced Science & Technology in Japan in April 2002. This Center is tasked exclusively with promoting universal design and offers the architectural community insights and education gained from the company's concentrated research and testing.

TOTO has built up a network of more than 280 people of varying ages and physical conditions from inside and outside the company to test its products on a developing basis.

Further, in order to make the product designers, engineers and variety of testers experience reduced physical movements (self-impairment) of individuals with special needs, TOTO designed a system suit that adds weights to the joints of their arms and legs. In this age simulation suit, users are required to undertake a series of movements at the somatic level to empathise with the target users and understand their difficulties. (TOTO, Social Sustainability, retrieved from http://www.totousa.com/social-sustainability)

TOTO's experiment provides a new method for people who intend to put themselves in the position of the User. It inspired me to design and build my own age simulation suit.

Figure 49. TOTO experience.

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Try it yourself

At this stage, using a DIY approach gave me a real-life appreciation of how a design is experienced by actual users. It required me to make and design my own made-to -measure, simulation suit so that I could, as realistically as possible, experience the pain, frustrations and difficulties that they experience in their daily lives. This enabled me to more thoroughly research the practical implications of elderly impairment.

Age Simulation Suit
Designed by SD&C GmbH

Weights on arms and legs, tinted yellow eyeglasses, and earplugs help create the sensation of diminishing strength and sensory abilities.

54 Figure 50. Age simulation suit.

The Age Simulation Suit

Based on the previous research and references to the collections of the "Age Simulation Suit" (Figue 50), I designed and constructed my own age simulation suit. Overall, it was designed based on the impairments of the characters in my persona and few antitheses of the sequential degrees of impairment.

The suit-making processes helped me to understand which parts of the body are most affected by impairment, the degree of impairments, limitations and boundaries, and the emotional feeling brought on by older age and the feeling of deterioration.

Shopping in an age simulation suit: the author as guinea pig.

Figure 51. Age simulation suit-2.

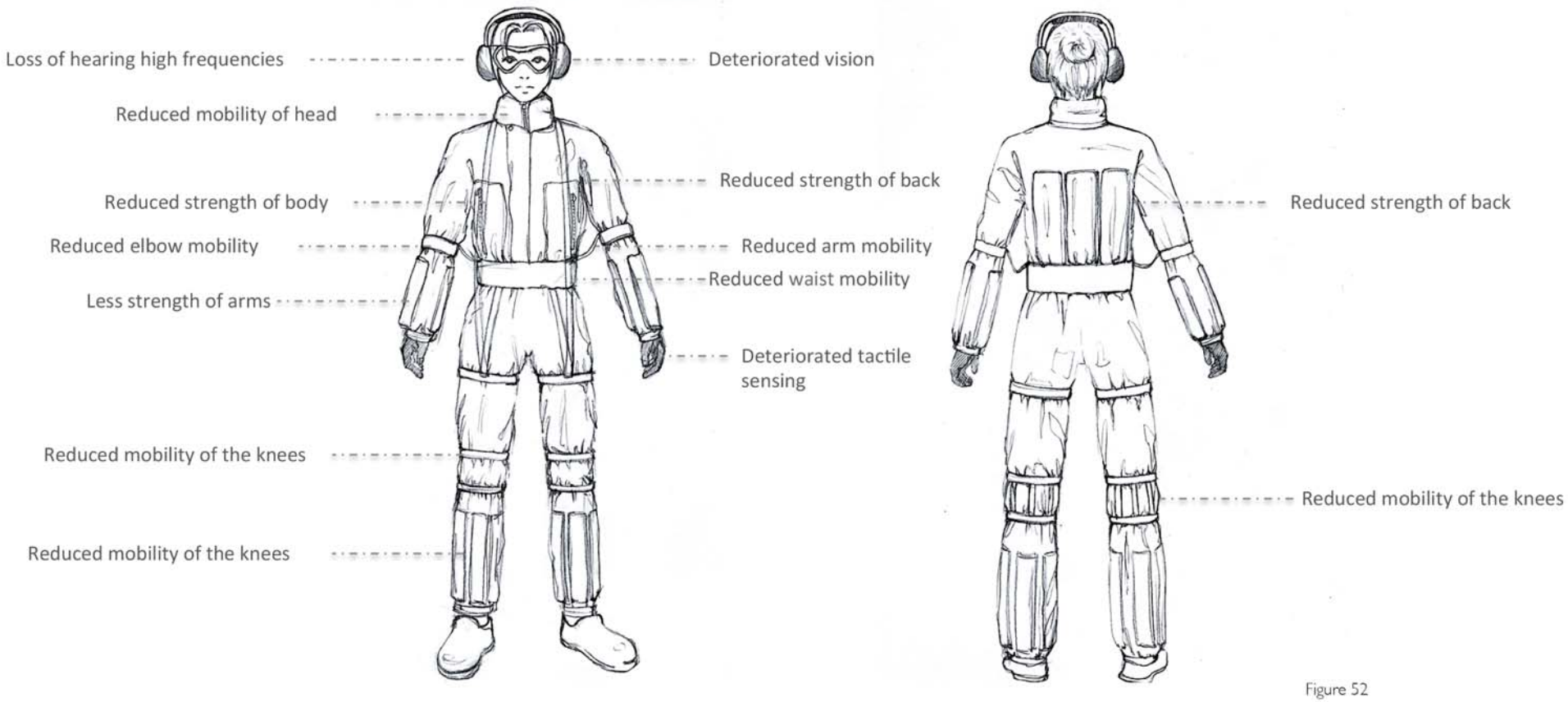

Figure 52

Figure 52. Age simulation suit designed by Shuman. Wang, S. (2015).

Figure 53. Designing processes of the age simulation suit. Wang, S. (2015).

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Role playing

By wearing this special simulation suit that I made by myself, I gained a better understanding of the elderly, their objectives and values, and what they feel in a very effective way.

In this 'what if' scenario, I put myself into a situation where I didn't have the same degree of physical control I am used to. This enabled me to anticipate some of the scenarios the elderly experience, and 'rehearse' my performance as a less abled, elderly person in order to shape the discussions and outcome. (Milton, A., & Rodgers, *Research methods for product design*, P.53)

In practice

"It is so cool, like an astronaut suit, but really makes you move like an old lady." "It's so hard to put this on." I needed to slide one leg into the suit carefully, then the other, zip it up, then my friend helped me tighten all the bandages connecting my ankles, legs, waist, and finally my neck. After they are on my neck, I cannot straighten my body. Then come the weights: I made 15 sand bags, each weighing 400 grams, making a total of six kilos of sand which I put on my suit. With the suit in place, I lost my strength, flexibility and speed.

I next put on goggles and sound insulation earphones. After putting them on, I could no longer see clearly or hear properly. Suddenly, the feelings of loss, loneliness, weakness and fear all came to me. Even with my friend standing behind, I felt extremely helpless. At this time, I could truly imagine and empathise with what old people feel every day.

The first trial was aimed at defining the usability and accessibly of a public toilet, experiencing the emotional feelings of an elderly people while, at the same time, testing the suit's capabilities. I experimented entering and exiting the public toilet, using the toilet and hand-cleaning facilities.

The second trial focused on experiencing the bathroom in an ordinary flat. I experimented with the flat's bathroom with its toilet, taps, wash basin and shower system.

The ultimate results proved the usefulness of the simulation suit. I felt uncomfortable, tired, struggling the whole day, but the time in the toilet was much more difficult and seemed to last a long time - I experienced the feeling of being old, less able and less sure of my surroundings. In short, I felt helpless, lost and lonely. I learned that there ae many areas in the bathroom that needed to be improved, but, putting aside the physical aspects, emotional fulfillment was the key missing element.

Figure 54. First trial-1 . Wang, S. (2015)

Figure 55. First trial-2 . Wang, S. (2015)

Figure 56. Second trial . Wang, S. (2015).

Chapter 7

These experiments highlighted the four key points of design improvement that need to be seriously addressed.

1. An assisted shower space
When standing below the immoveable showerhead, I could hardly see (not to mention, reach) the showerhead and the water flow coming out of it because of my limited neck movement. This kind of shower is commonly installed in domestic bathrooms. For aging people, this means they need to turn around more frequently to wash their body, which increases the risk of slipping.

To address this situation, a shower should be designed with a greater range of motion, not fixed in a single position and direction to enable helpers to use it when they are required to assist a person showering.

2. Safety angles
There are many cleaning implements and products in the toilet and bathroom. Sharp angles are potentially more dangerous in daily use, especially at night, in case elderly users bump into them. Safety with edges and corners is a vital point.

3. Pleasant to use
As noted in the users' requirements, the need for affection and respect can affect living quality as it closely impacts on the psychological health of elderly people. When I came into the bathroom with my reduced visibility and poor hearing, I felt disoriented and helpless. However, help sometimes can be undignified, especially when helping equipment is frequently referred as "elderly appliances" which strongly implies "disabled". On one hand, it is not pleasant for users, and on the other, it fails to create a harmonious atmosphere when the assistant comes to help.

Therefore, mental satisfaction needs to be considered as another key target in this project as it works to promote greater harmony and less friction between generations.

4. "Warm" space
Regardless of the physical aspects, the needs of emotional fulfillment are just as important to users. When using the bathroom in my experiments, I could not feel it was welcoming and friendly, but cold and soulless. The emotions I felt were reflected in the environment and affected my overall perceptions. I endeavoured to apply this experience to my product design.

The extent to which a environment, product or service generates a feeling of warmth, comfort and emotional security is key to designing for the elderly.

Therefore improving sensory capability (vision and hearing), cognitive capability (thinking and communication) and motor capability (locomotion, reach and stretch and dexterity) through design development is critical. (Clarkson, J., Coleman, R., Hosking, I., & Walle, S. *Inclusive design toolkit*, P.4-8, 2007)

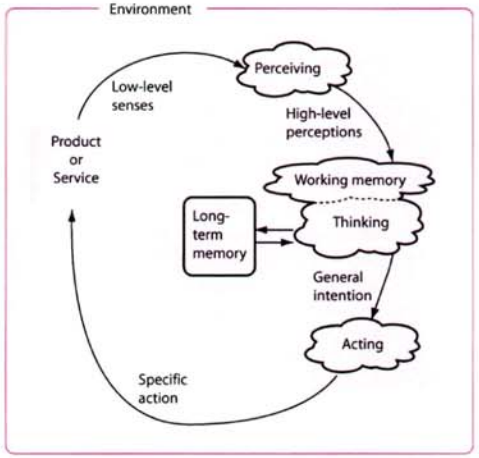

Figure 57

Figure 57. A schematic that depicts how the deffeent processes involved with thinking relate to each othe and to a product in the world.

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The final design was built on the requirements analysis in the previous experiment sections. In addressing the four key points identified, I was inspired by key elements of the brainstorm, several pioneer designers or brands that touched upon emotional and inclusive design and the test rig. Filial Piety was also an important consideration.

Figure 58 . Key points mapping. Wang, S. (2015)

Storyboard

After analyzing the potential issues, I used my imagination to create a scenario, then I did the storyboard to share my vision more clearly.

By doing the storyboard, every single detail and problem have been reconsidered and tidied up into a methodic map, which directly pointed out the key issues.

Figure 59 illustrates that before taking a bath in a conventional bathroom, the first thing elderly people need to do is hang up their towel, take off their glasses and place them away from the shower. Then they need a bath seat, which another family member needs to put inside the bathtub in advance. In addition, if necessary, the caregiver will still need to help the elderly person get into the bathtub.

In Figure 60, a more mobile elderly person could get into the tub on their own. However, they will still need a seat.

The next challenge is the shower. With a conventional shower, there is no distinct control system. Therefore while using the shower, it can be difficult for an elderly person to find the water control taps. There are also often no supports to hold onto.

With all these questions in my mind, and using 'Filial Piety' as a guiding principle, I started brainstorming on design.

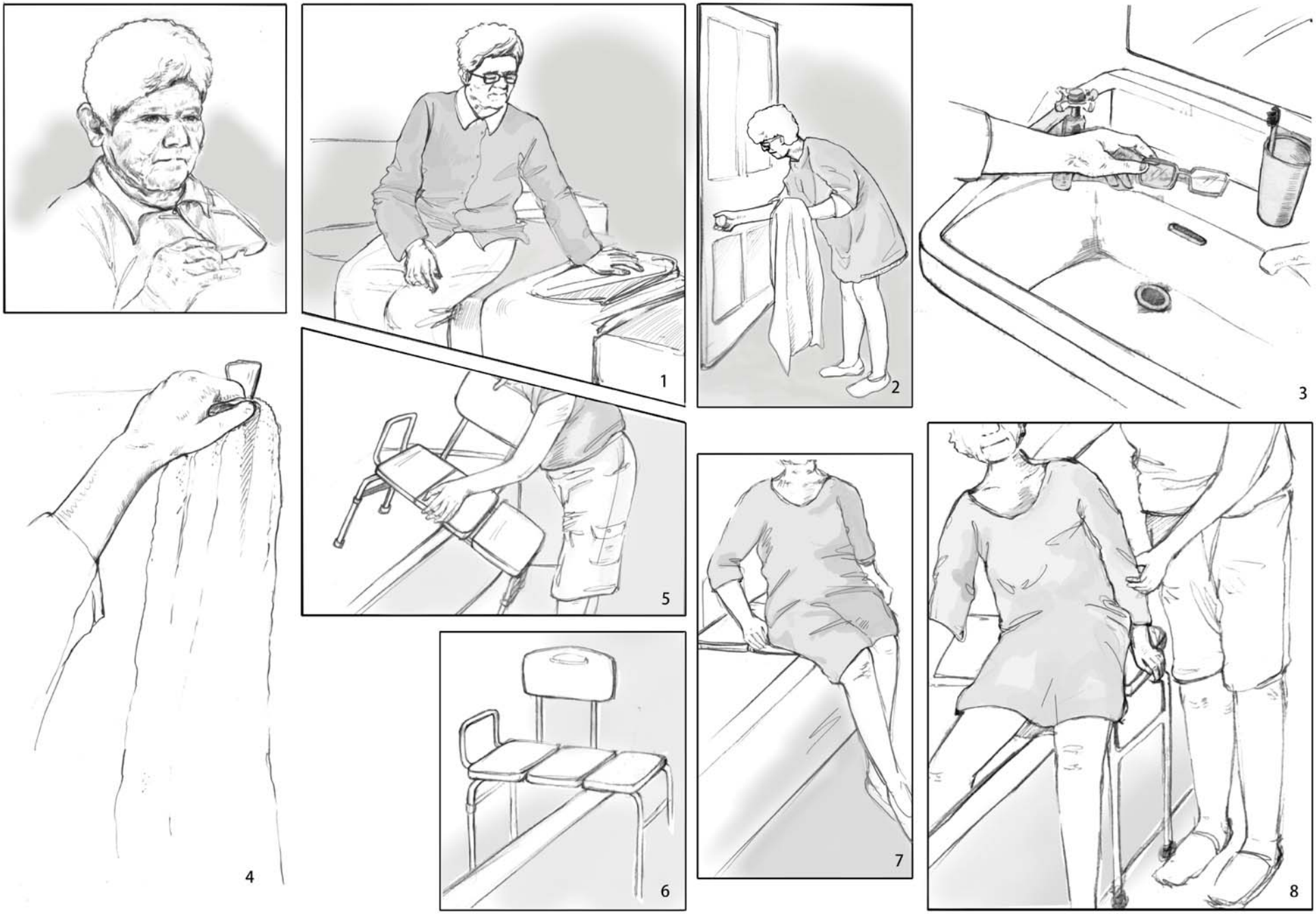
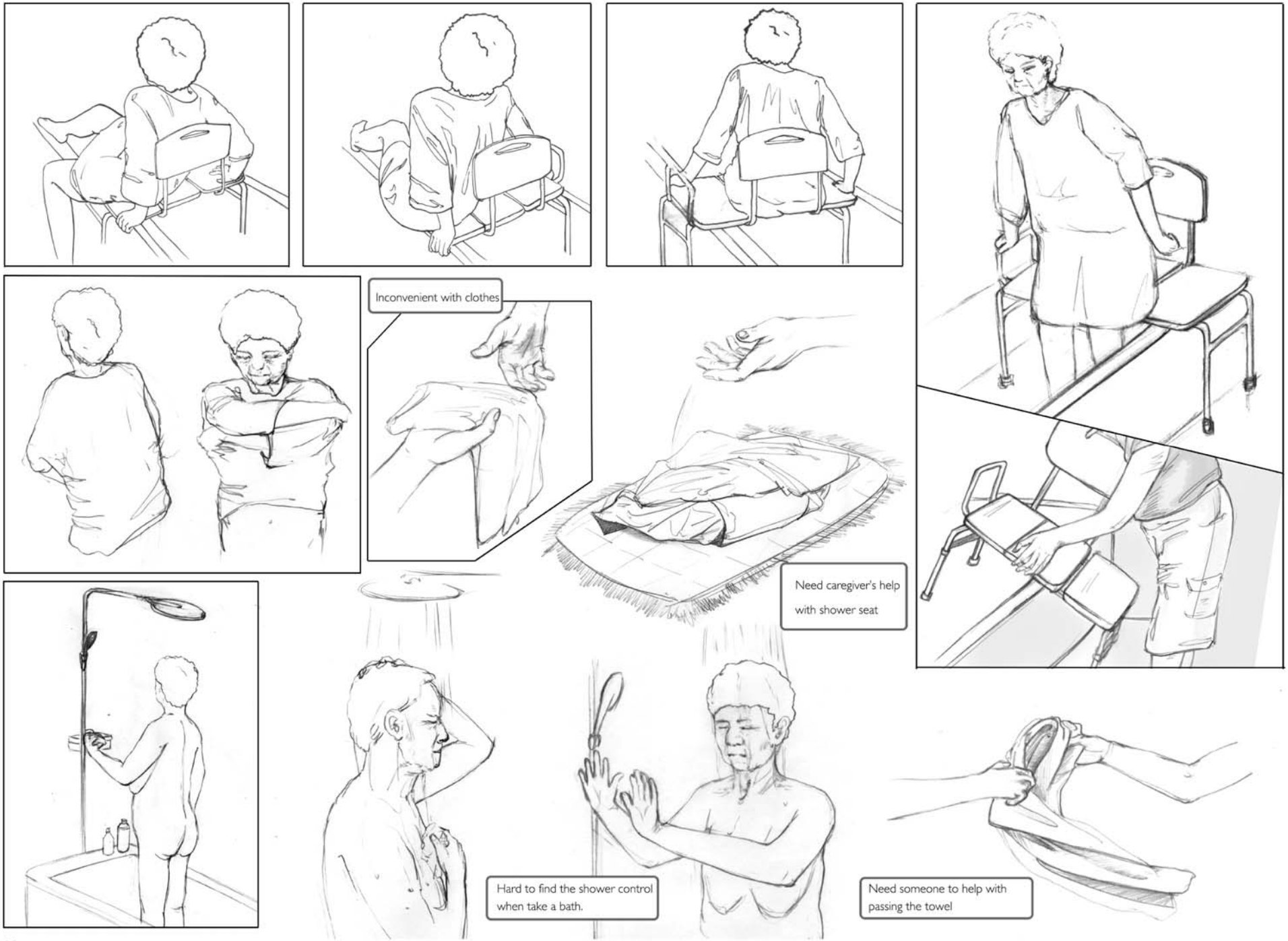


Figure 59. Storyboard - 1. Wang, S. (2015)

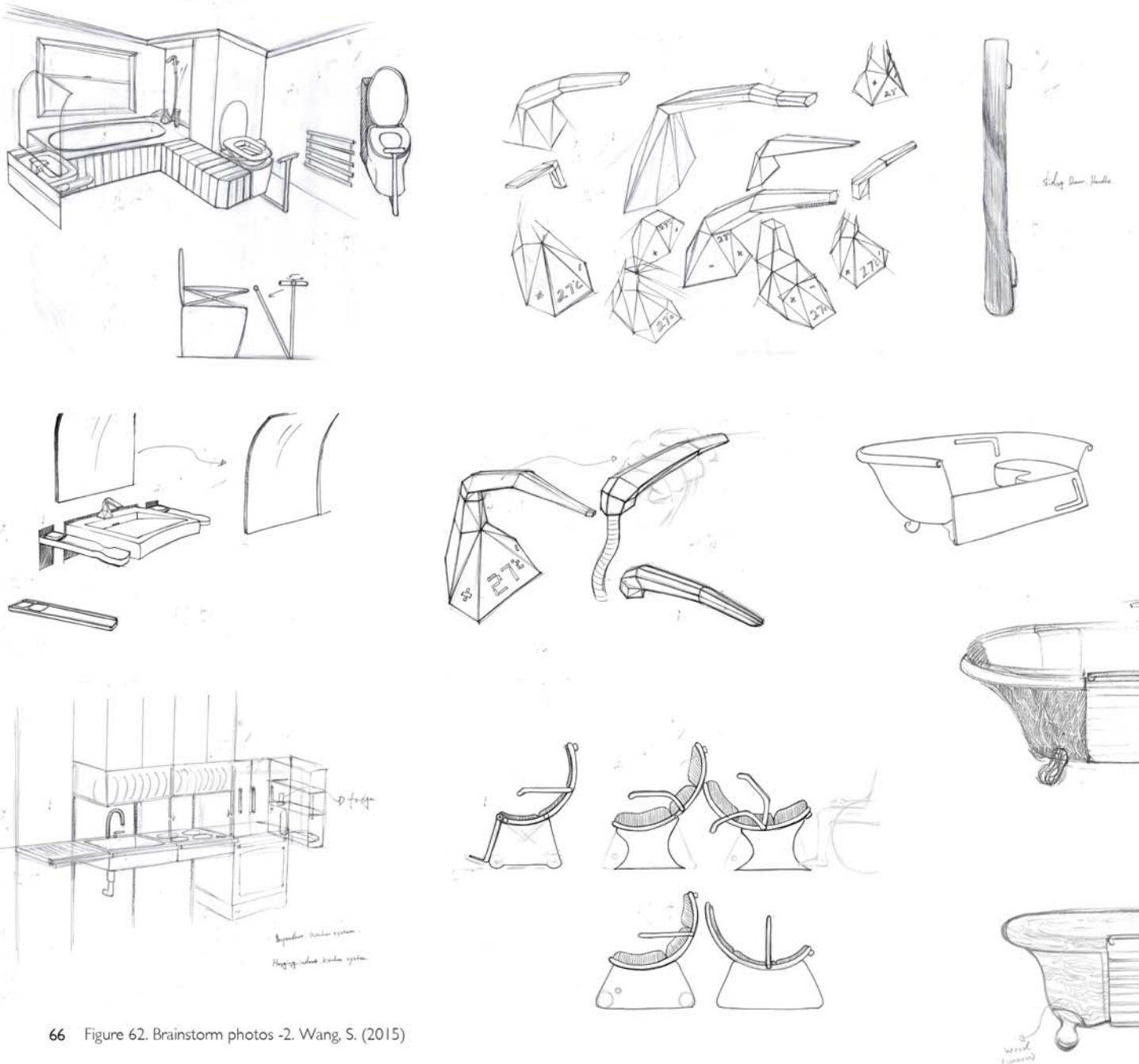


64 Figure 60. Storyboard - 2. Wang, S. (2015)

Chapter 7

BRAINSTORM

Figure 61. Brainstorm photos - 1. Wang, S. (2015)



66 Figure 62. Brainstorm photos -2. Wang, S. (2015)

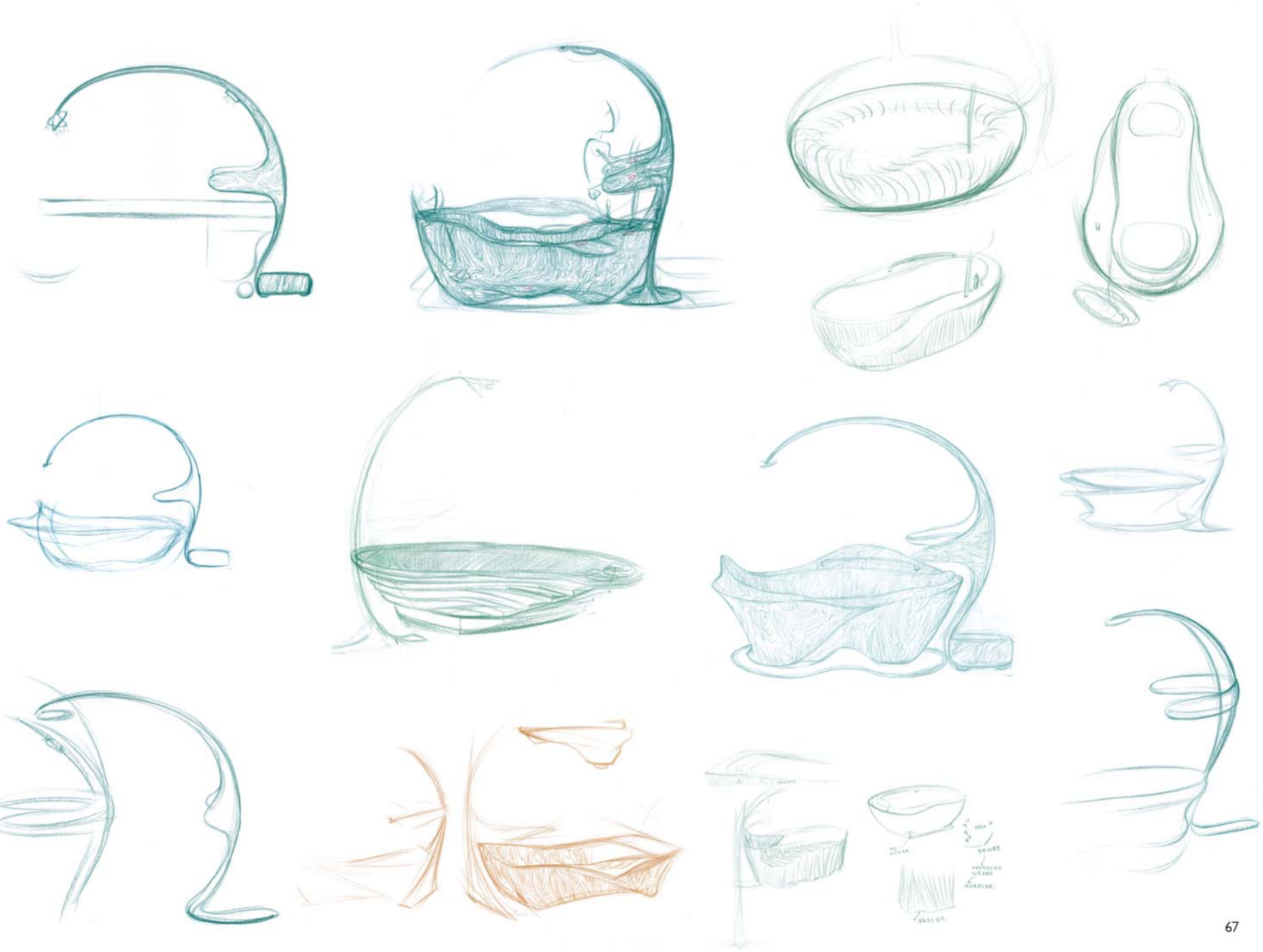


Figure 63. Brainstorm photos -3. Wang, S. (2015)

Foamed plastic prototyping

Test No.2.

Test No.3.

Test No.1.

Test No.4.

Test No.5.

On Test Nos.1-5, I experimented with a textured exterior, which is seldom used on ceramic products. It makes the design less "industrial" and more organic with a natural shape. Also the sides are wider for sitting on in these test models.

Figure 64. Foamed plastic prototyping - 1.

Test No.6.

Test Nos.6 and 7 explored the idea of providing access via steps with organic texture.

Test No.7.

Test No.8.

Test Nos. 8-18 tried to follow the analysis from the 'In practice' section and address the problems from the 'Storyboard'. Using universal design principles which emotionally satify the users bring benefit to all members in an intergenerational family.

Test No.9.

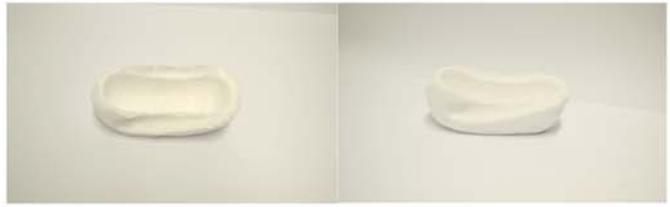
Test No.10.

Test Nos. 9-11 explored several different design styles.

Test No.11.

Test No.12.

Test No.13.



Test No.14.

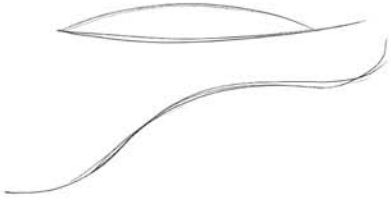
Figure 65. Foamed plastic prototyping - 2.

Test No.15.

Test No.16.

Test No.17.

Test No.18.



The model-making brainstorming process played a vital role in formulating both my practical design processes and overall inspiration. With this method, every concept can be exhibited in three dimensions at the same time, enabling an assessment of the feasibility and aesthetics of the design.

By the end of the development, all structure lines come to the same result (see Test Nos. 8 & 12-20). This means this is the "mother line" of my design and it is my subconscious answer. Also, at the final test No. 20 and No.19. The models' shapes imitate the form of human bodies: one is lying down and joined in to the bathtub, and the other is standing behind you with both hands stretched out to embrace you, with the two combining into a single, fluent and streamlined shape.

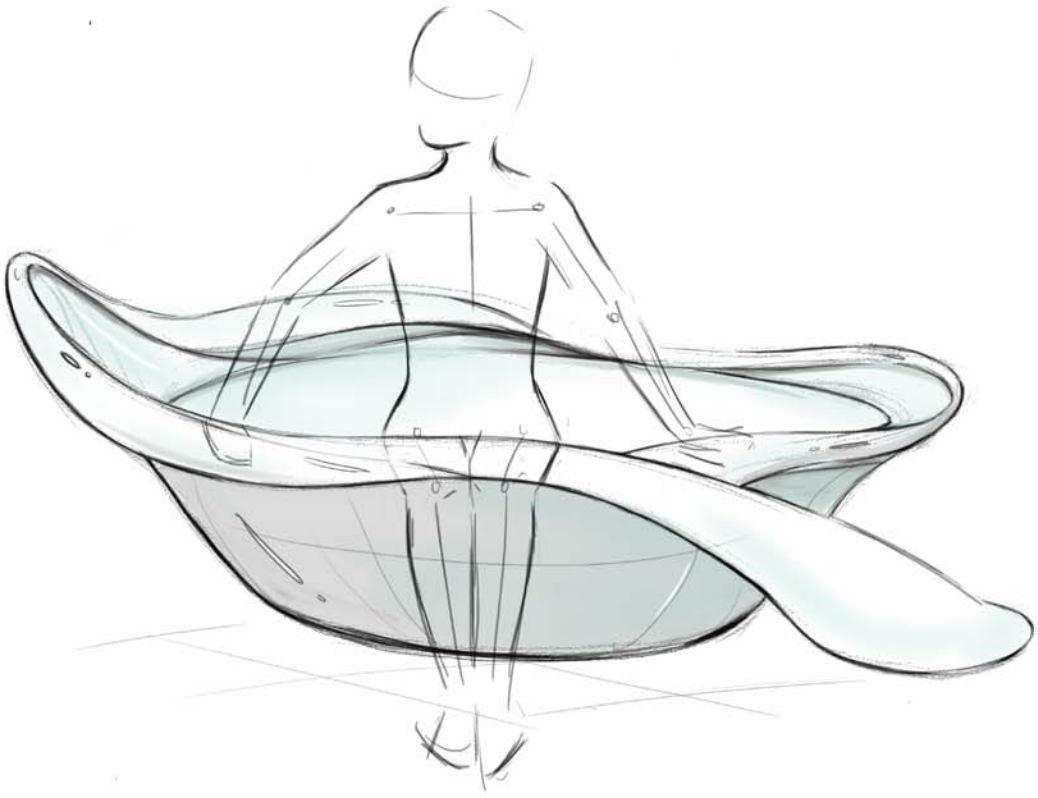
Figure 66. Foamed plastic prototyping - 3. Wang, S. (2015).

Test No.19.

Test No.20.

Redefining Sketches

In this section, all design ideas has been reconsidered and integrated with the 'Filial Piety' concept to govern all details and the final design shapes.



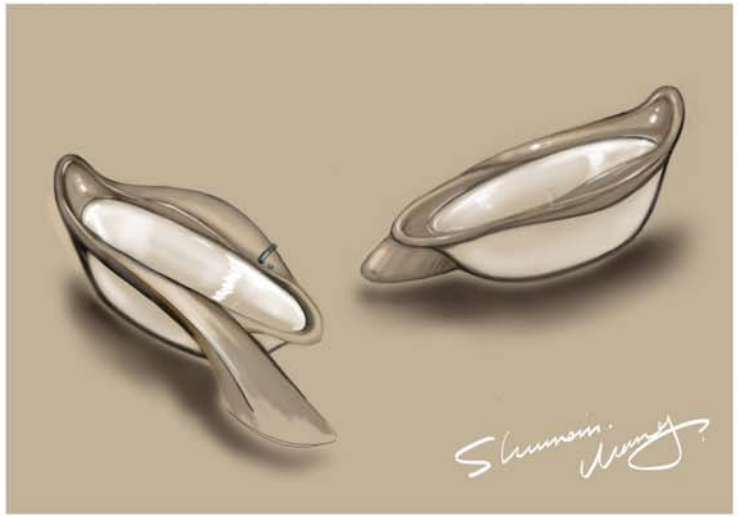


Figure 67

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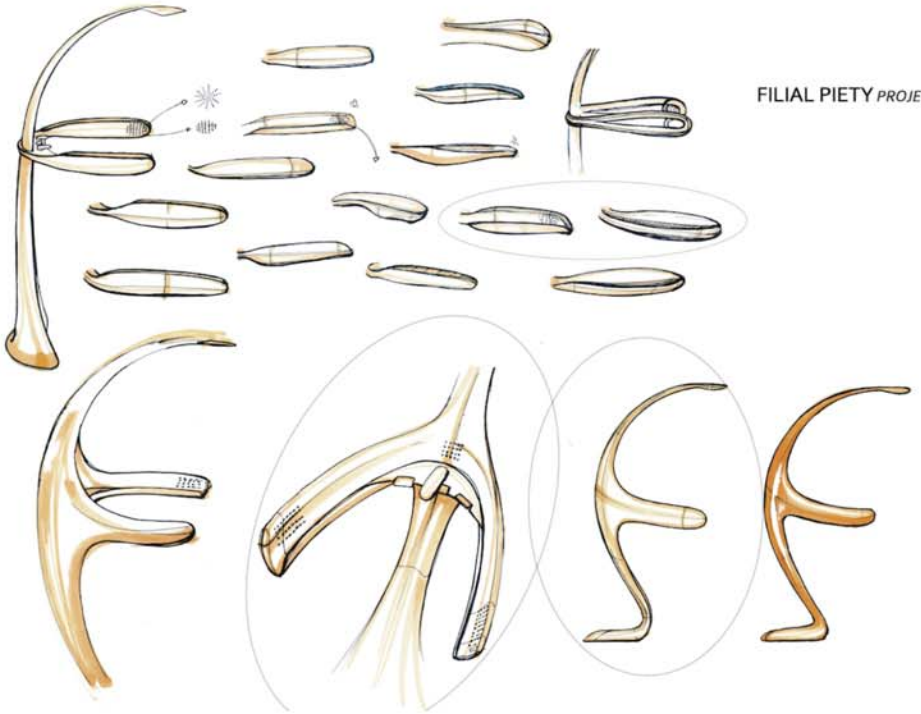


FILIAL PIETY *PROJECT*

Figure 68

Chapter 7

Ergonomics

'Ergonomics discovers and applies information about human behavior, abilities, limitations, and other characteristics to the design of tools, machines, systems, tasks, jobs, and environments for productive, safe, comfortable, and effective human use.'

(Cuffaro, D. *Process, materials, measurements.* P. 120)

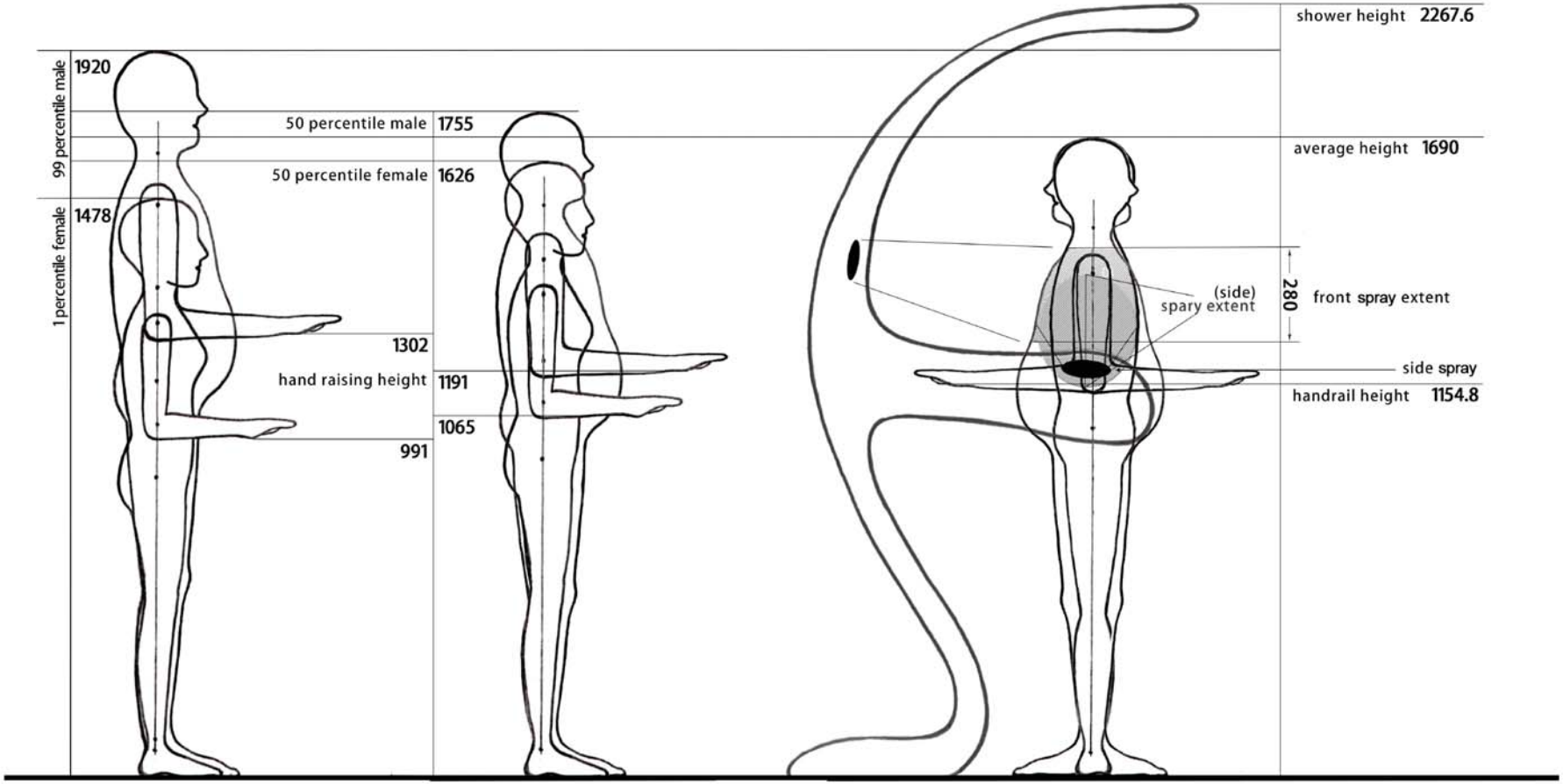


Figure 69. Ergonomics drawing - 1. Wang, S. (2015).

Chapter 7

Ergonomics

After the ergonomics, I gained an accurate understanding of the users' size requirements for the product, Then I made an experience prototype. This enabled me to learn from a simulation of the proposed product's use in a real context and gain valuable insights into how users will experience it. It gave me an intuitive answer about the design which helped me make the final adjustment.

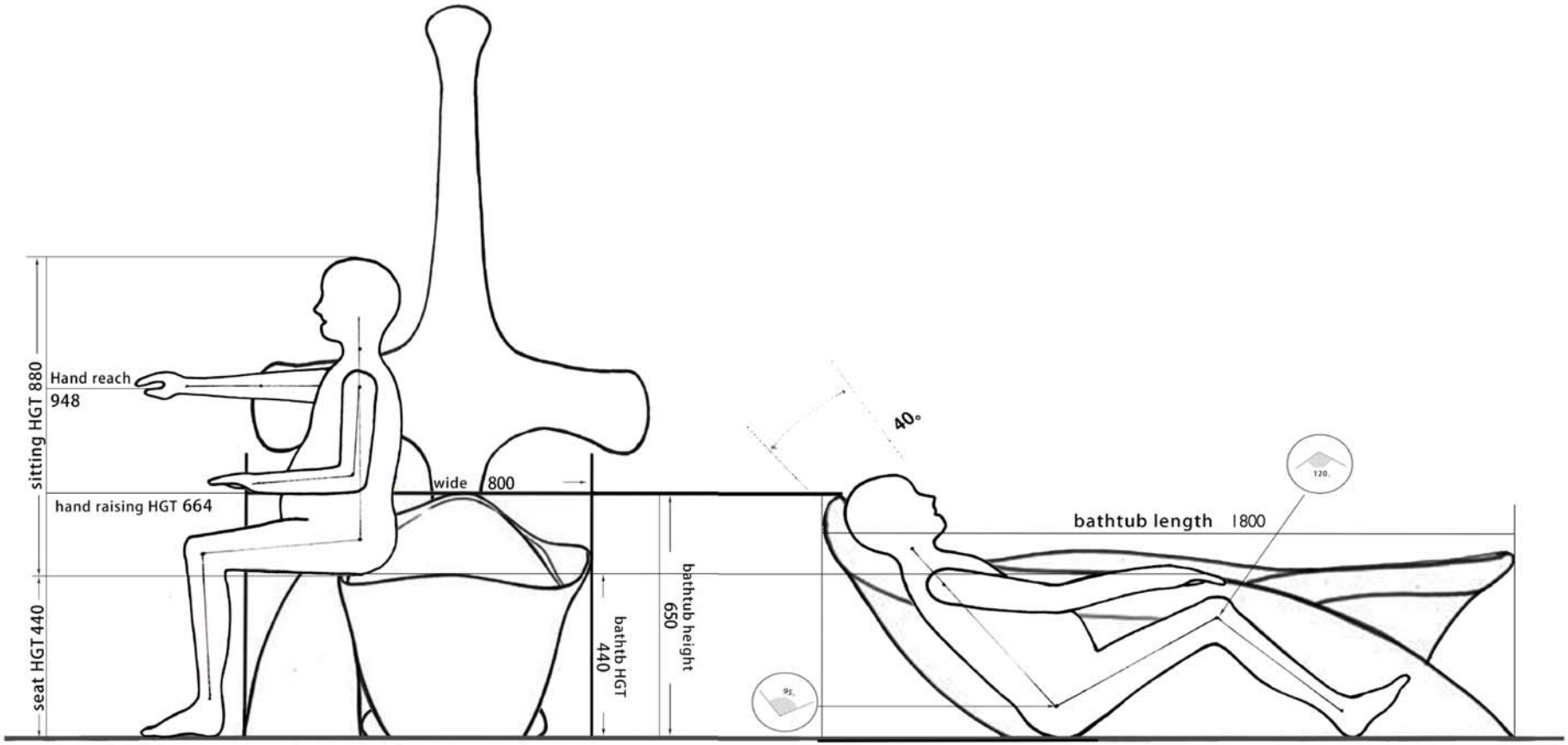


Figure 70. Ergonomics drawing - 2. Wang, S. (2015).

Chapter 7

Experience prototyping

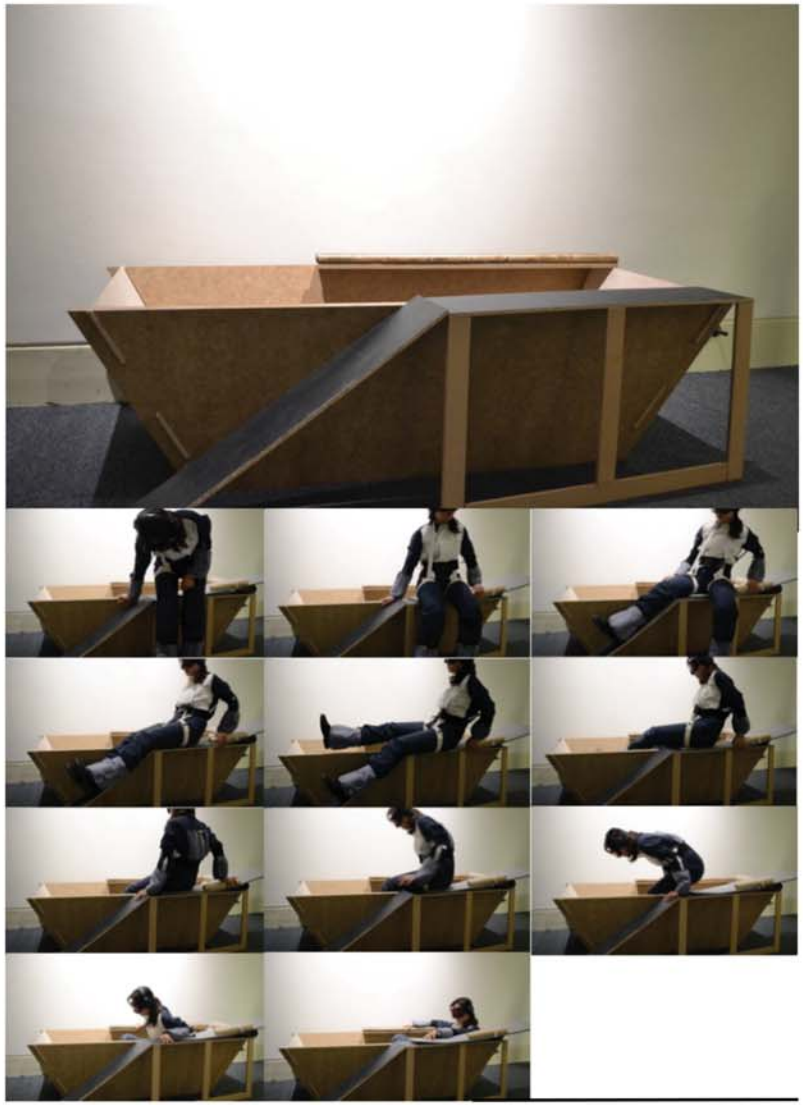
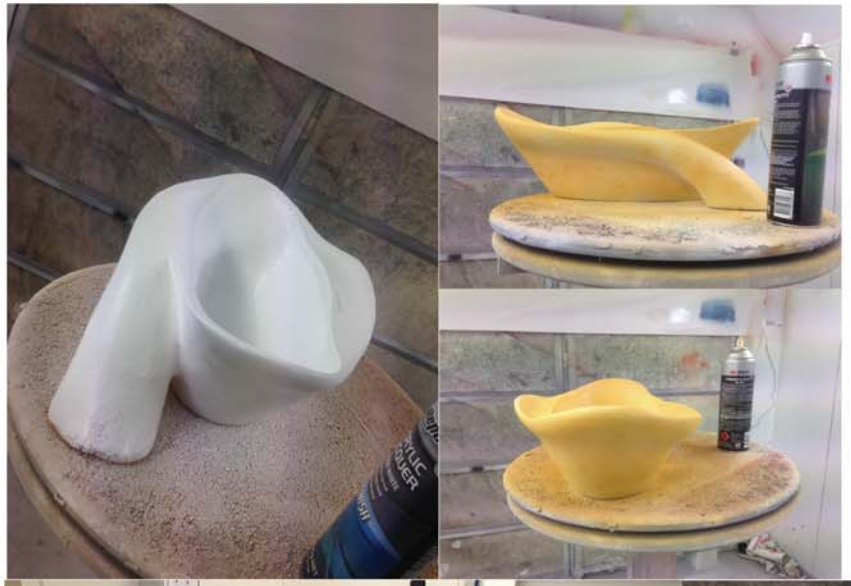


Figure 71. Full size test rig. Wang, S. (2015)

Figure 72. Full size test rig. making processes. Wang, S. (2015)

Chapter 7

Appearance models



The first appearance model was made to closely simulate the look of a production product. It is made of polystyrene, smothed with filler and then painted. It provided me with an initial impression of what the product will be like and how it will fit into its intended environment. It also enabled me to determine whether its physical characteristics were appropriate for the product's purpose. The first appearance model was quickly hand made over approximately 10 days.

The second model was made after 3-D model building. It was printed out by a 3-D printer, as this can produce the most accurate surface. I then needed to assemble all the printed pieces since the 3-D printer could not print on a 1:4 scale. The next steps were smoothing it with filler, hand-polishing and painting. I completed the whole production process within 30 days. The experience gave me a clear insight into the aesthetics and ergonomics of design, and helped me achieve detailed finishing, textures and stylish colour choices.

Figure 73. Appearance models - 1. Wang, S. (2015)

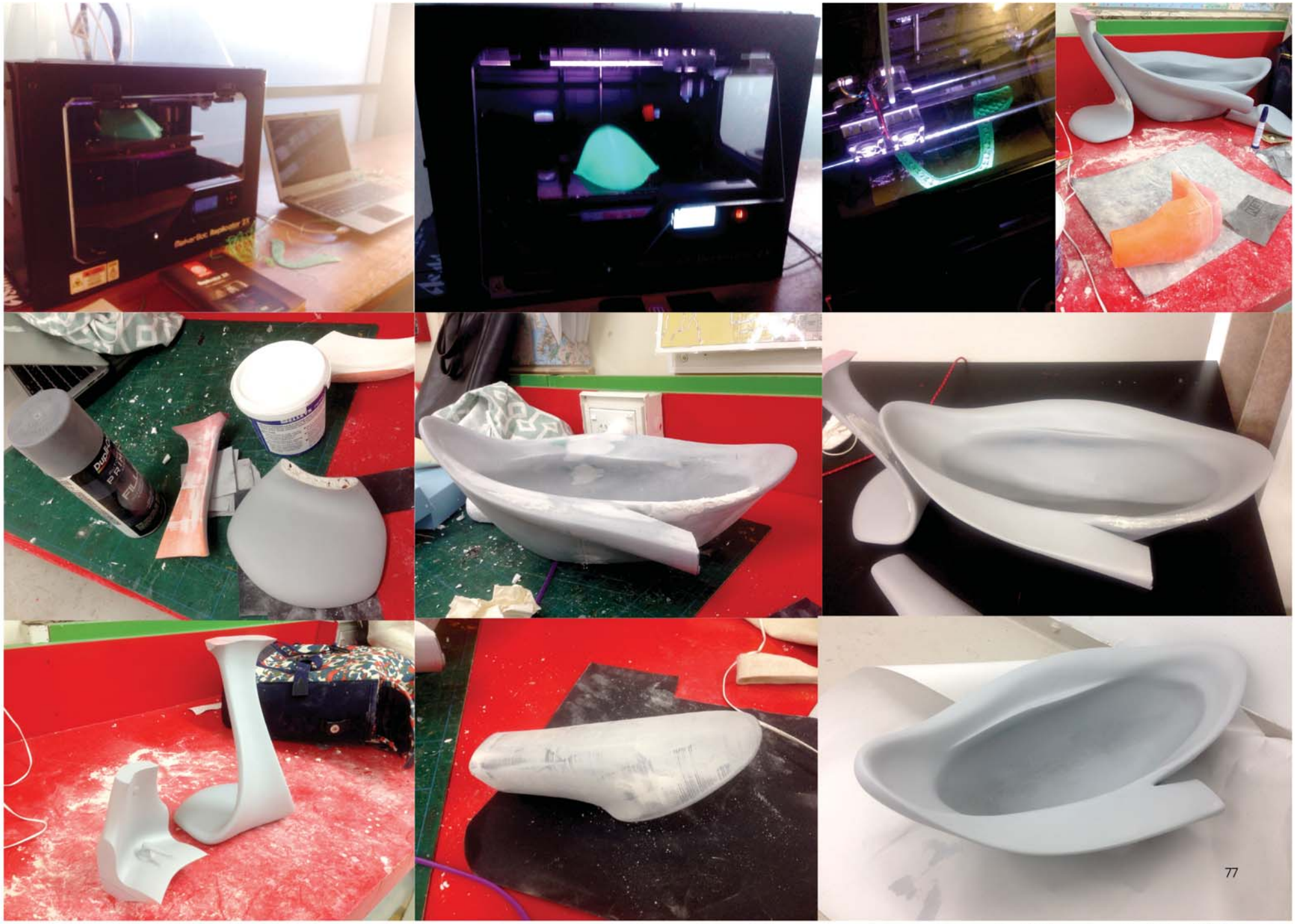


Figure 74. Appearance models - 2. Wang, S. (2015)

The Final Design

This product, exemplifying universal and emotional design principles, is designed for the whole family to use. The meaning of its appearance is that it holds, supports and comforts every member in the family. The bathtub design incorporates two human bodies with one leaning back on the other, while the one behind you reaches out its arms to support and embrace you. The body language which it shows provides safety, raise people's deeper memory of the spiritual love within the family, and the tight bonds between generations.

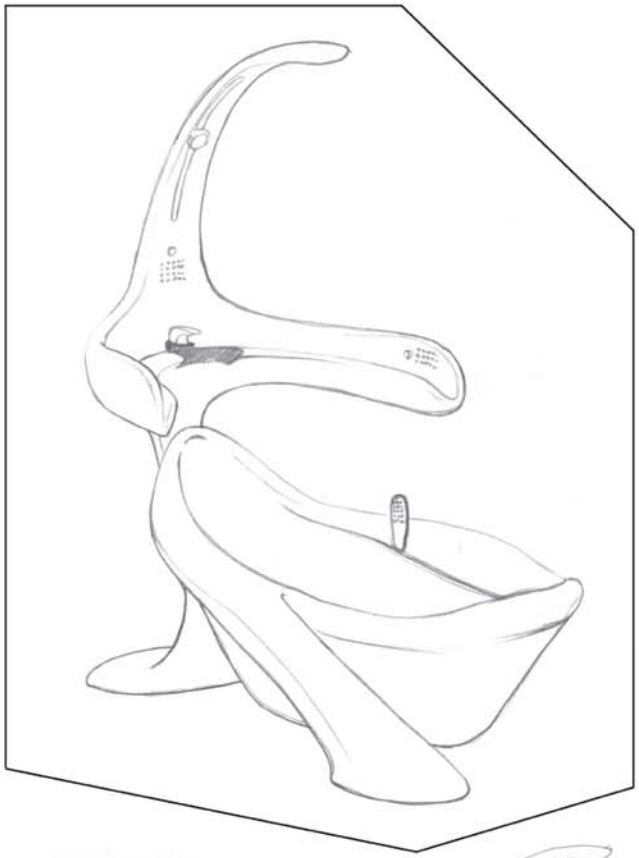
It is not only a product, but an art sculpture which conveys the concept and deeper meanings of 'Filial Piety'. It evokes positive emotions between family members encouraging them to support each other and love each other while also satisfying all of their functional showering and bathing needs.

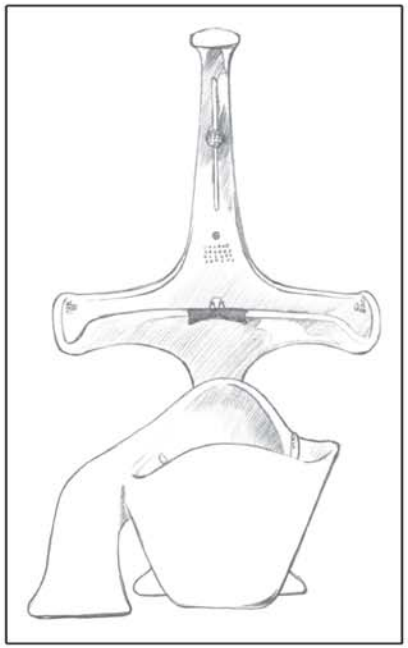
Figure 75. The final Design - 1. Wang, S. (2016).

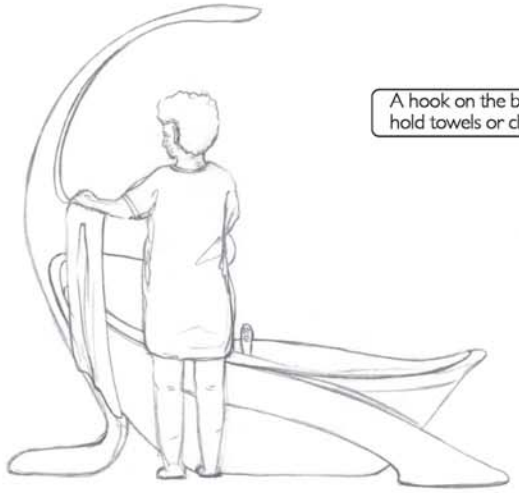
Figure 76. The final Design - 2. Wang, S. (2016).

Figure 77. The final Design - 3. Wang, S. (2016).

Figure 78. Rendered images with real sized person. Wang, S. (2016)





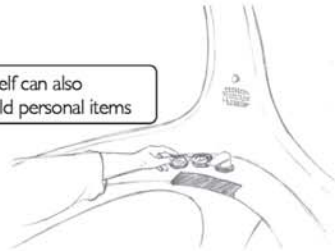


Towel can be held on the 'arms' when using the tub

A hook on the back to hold towels or clothes

'Arms' can be the invisible handles.

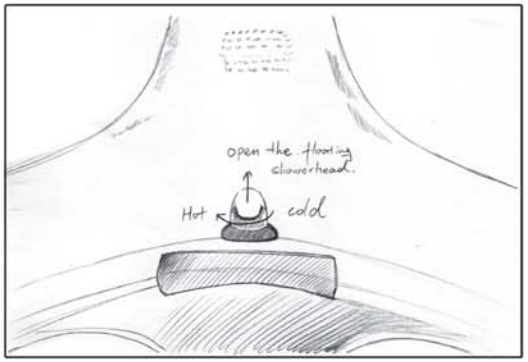
You can sit on the tub then take off your clothes.

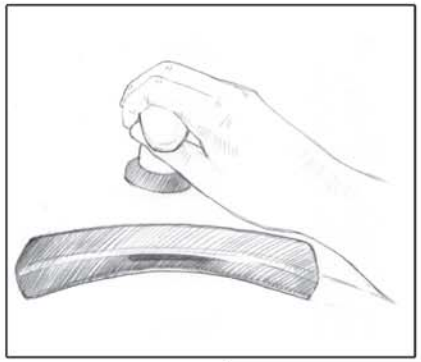


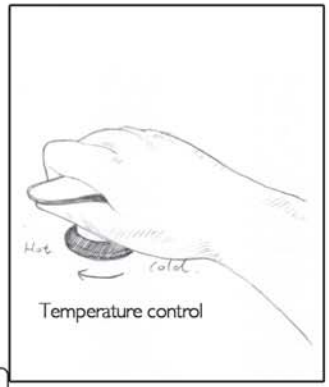
Shelf can also hold personal items

Users can hold the 'arms' to get into the bathtub.

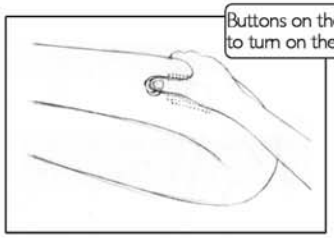
Figure 79. Instruction drawings - 1. Wang, S. (2016).

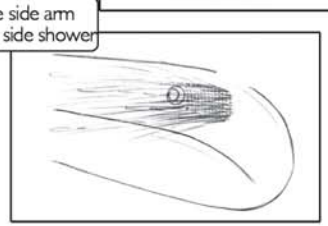


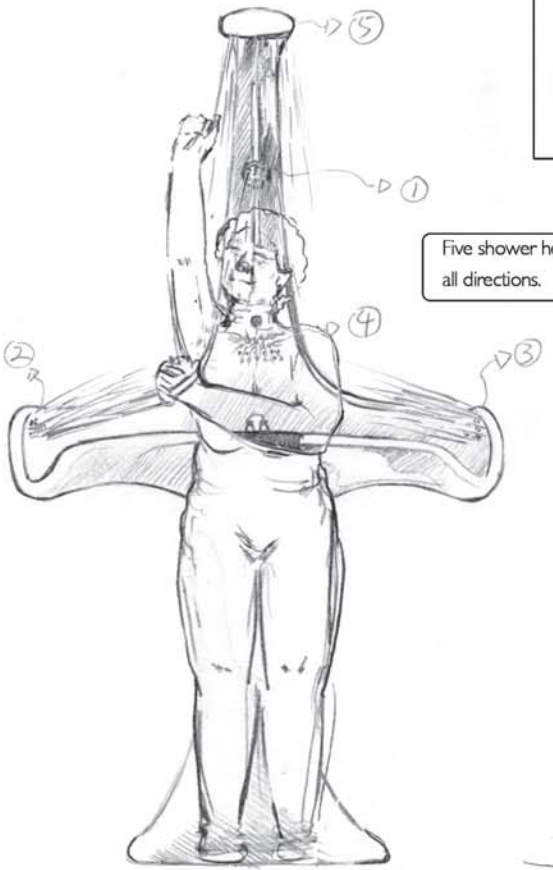


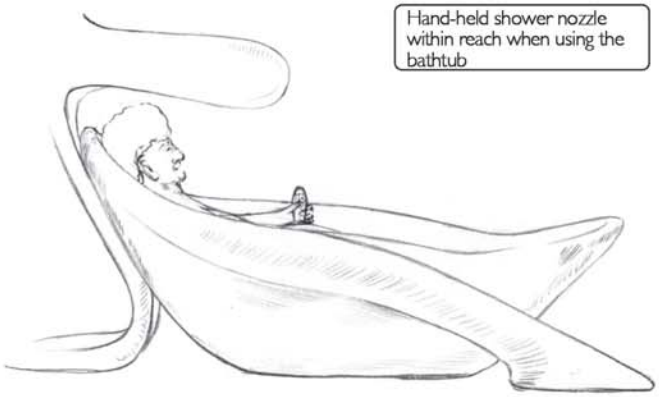


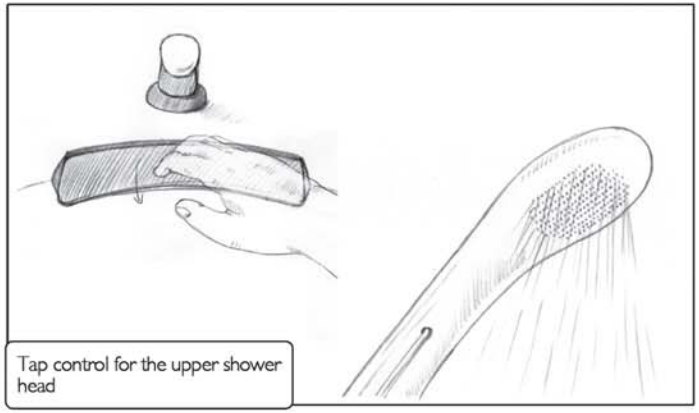
Diagrammes showing different uses of the bathtub/shower.











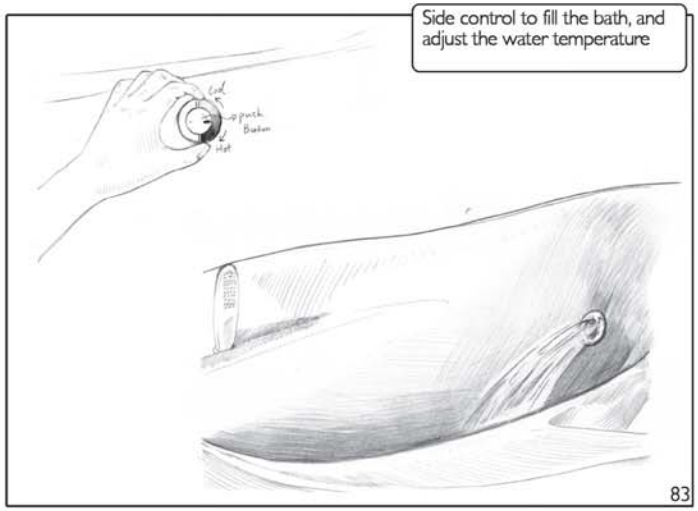


Figure 80. Instruction drawings - 2. Wang, S. (2016).

Figure 81. Rendered details - 1. Wang, S. (2016).

Figure 82. Rendered details - 2. Wang, S. (2016).

Chapter 8

Conclusion

As the demographic profiles of societies worldwide change, the "third-age" or elderly group is representing an increasingly large proportion of the population. Therefore, how make living environments easier for everyone (intergenerational living), especially for the elderly, has became a critical issue.

The initial starting point for this project was to improve both the living situation for the elderly and attitudes towards intergenerational living.

As a multicultural country, New Zealand has a range of attitudes towards intergenerational living.

For some cultures, it is natural and expected for younger generations to live with the older generation and to do as much as possible to help them spend their remaining years in happiness. However, for others, intergenerational living is not the norm, but rather there is an ethos of individualism where children move out when they are of age and most elderly people live alone, often in potentially hazardous circumstances.

Thus, it is difficult to address the safety issues in isolation from the cultural issues. For example, older people may have different schedules and routines or have some mobility issues, which can be an issue for intergenerational living.

Figure 83.

Chapter 8

As a product designer, while observing the daily routines of my target audience, I realized the bathroom is the place that receives the least attention from designers but becomes increasingly important for the elderly.

"Not many objects for the bathroom, in fact, be they large or small, have really interesting, amusing, poetic design," Alberto states (Loh, A., She-reen, W., & Lee, C. 2009). The function of universal bathroom product design has became more progressive, it is more functional and convenient, but one of the most important pieces of the puzzle that has been ignored — human emotions.

It is inevitable that people become less mobile and supple as they age, but that need not be accompanied by loss of mental health and happiness.

Current bathroom products for the elderly are functional, but they also stigmatize. Generally, it is too obvious they are for handicapped or old people. While it is good that they are designed to accommodate their reduce mobility and increased frailty, on the negative side their designs are often cold and unappealing.

While they meet the physical needs of the elderly, they do not meet their emotional and social needs of being treated with dignity and respect.

The challenge I have addressed in this exegesis study is how to combine function and safety with aesthetics and emotional appeal. That is, how can bathroom product designs seamlessly combine universal and emotional design to facilitate help intergenerational living in New Zealand? The answer is through introducing the concept of Filial Piety into design.

Filial Piety is an old Chinese value or ethic. It guides attitudes and interaction between older and younger generations.

So what value does the Chinese ideal of 'filial piety ' bring to the concept design of a domestic bathroom product?

Filial Piety makes intergenerational living more harmonious for all members of a household and is aesthetically appealing to everyone, both young and old, abled and less mobile. It blurs the boundary of age through universal design principles while also providing spiritual support to facilitate the harmony between older and younger generations through emotional design principles. It provides the elderly with the functionality needed to accommodate their reduced mobility , but without sacrificing aesthetics or appeal. It demonstrates that bathroom facilities can provide them with a safe environment without loss of comfort or physical appeal. This is equally important for the younger members of the household who may otherwise resent their bathroom having a clinical – and not a homely – feel.

By combining the concept of 'Filial Piety' with the principles of universal design and emotional design, I have achieved both objectives of this project, by demonstrating that is possible to satisfy the functional emphasis of universal design with the aesthetic emphasis of emotional design, by applying Filial Piety as the unifying principle.The former (univesal design) addresses social communication and usability, the latter (emotional design) addresses humanistic perspective and affective satisfaction.

The research processes and methods employed in the study included investigating past and present bathroom products, and eastern and western perspectives to enable a comprehensive, multi-disciplinary approach. The development process for my final product consisted of persona, storyboards, self-impairment, design brainstorming model, exploring, test rigs, case studies and applying the underlying philosophy and principles of Filial Piety to the design process.

The case study of pioneer designer and gerontologist Patricia Moore, Toto Company and SENTHA played an important role in assisting me to gain a deeper empathetic understanding of my target audience. Inspired by their innovations, I designed and built my own age-simulation suit which enabled me to compare – from a practical, real-life, aged perspective – existing bathing products and a test rig.

Chapter 8

These experiments enabled me to experience for myself the reduced mobility and physical impairment which are a fact of life for many elderly. I was then able to apply the insights I gained into the needs of the elderly to my project design.

Studying the Alessi company's design philosophy principles and Donald Norman's work on emotional design led me to conclude that incorporating Filial Piety into design is both justified and feasible. As a design concept it successfully meets the three levels of processing which, Norman asserts, are required for holistic design: visceral, behavioural and reflective.

Alessi provides great examples of how to combine aesthetics and design, and how emotional design can be applied successfully to satisfy people. In evaluating a design, Alessi uses the SMI formula "sensoriality, memory and imagination". These parameters or criteria embody the vital essence of being respected; reminding family memory, and being empowering, which are all key aspects of Filial Piety.

After developing my theoretical framework, I started brainstorming models. I believe that only by combining theory and practice can a great design be stimulated. While I was doing the model making, I explored hundreds of ideas.

Through extensive testing of human shapes and contours, I arrived at my end product. The idea of using the human body shape came out of the concept's inspiration: Filial Piety.

On the surface, this design looks like one person is standing with both arms open while another is lying in the bathtub. In fact this explains and exemplifies Filial Piety: correlative dependence, care, respect and love. Family members rely on each other, that is the emotional bond which family love always offers and gives you. It reminds you of the bond which family love always offers you and gives you. It reminds you of each other, the memories and loves.

On a functional level, my design has been tested against ergonomic criteria to ensure it provides the elderly with the highest level of independence, comfort and safety. The "arms" of the shower function as the handrail, but they also give you the emotional feeling of touching or holding someone's hand or arm. It protects you from slipping onto the floor and makes showering a more enjoyable and welcoming process.

The design of the bathtub has a gradient on one edge to offer a seat for the elderly to enable them to take their time getting into the bathtub. Combined with the support offered by the shower's arms, the seat ensures that more severely disabled elderly people can use this product, with only a small degree of assistance from a caregiver or helper.

The bathtub design also provides space for a family member or caregiver to assist with cleaning one's back a feature not included in most of the universal bathtubs currently on the market.

These designs features were all facilitated by my research and the creative processes I undertook.

By employing an empathetic approach, the concept of Filial Piety has been subtly applied to the product design using both universal design and emotional design methods. By combining aesthetic appeal with function, this design will support an intergenerational living environment and making the experience better for the entire family. It will address safety issues for elderly, less mobile family members while providing a more harmonious, aesthetically pleasing living environment for both the older and younger generations.

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