

# CHIA- SUI

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PORTFOLIO

# HSU 2016



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***" For me, interaction is all about  
the flow of value between users and products."***

徐佳穗

**HSU, CHIASUI (ANITA)**

您好，我是徐佳穗！

今年畢業於國立成功大學工業設計所，專長為質性使用者研究，研究使用者與虛擬物件之間的情感關係，獲得口委們一致肯定並獲 HCII 國際會議錄取。個性積極且喜歡學習新事物。畢業後曾創立 Keefü Table 木府食堂並任職店長，實際驗證設計所學，協助餐廳在半年內達到經營層面的損益平衡。

Hi, my name is Anita. I am a user experience (UX) professional who currently finished my master degree from Department of Industrial Design in National Cheng Kung University. I had applied experience in qualitative user research of "emotional attachment" between human and virtual things, which was selected by HCI International Conference in 2016.

I am highly motivated and eager to learn new things. I had established and managed a design restaurant (Keefü Table) with friends for half a year in Tainan and reached the breakeven (operating) in five months.

## CONTACT

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# EXPERIENCE

I am an **open-minded** and **enterprising** girl who born in Tainan. I have great passion for design and aesthetic things. I love to learn and try new things for keeping myself **creative**. My professional skills were mostly developed when I was in graduate school.

I will briefly introduce two significant projects - **#1 TEGG- a new laundry system** and **#2 <Virtual possessions attachment> qualitative user research** in the following pages. The two projects had been done in two important period of my life. Therefore, this is not only my portfolio but also my life story. Hope you enjoy it!

ppl.6

## #1 DESIGN

10'

### GRADUATED FROM COLLEGE

I Graduated from Bachelor of Chinese Literature National Cheng Kung University, in Tainan, Taiwan

13'

I was a graduate student in YCT Cognition, Experience & Behavior (CXB) Design LAB in Department of Industrial Design, National Cheng Kung University in Tainan, Taiwan.

I participated in many design workshops, contests and academic conferences. Most of my design projects were created in this period.

14'

### ENTREPRENEUR PROJECTS

I was a member of "Planett creative residency" in Tainan, Taiwan.

It is a creative space for indie-designer to create, design and experience things in Tainan.



ppl.30

## #2 USER RESEARCH

*I finished an user research about “Virtual possession attachment”, the emotional relationship between individuals and their virtual possessions.*

*It is a qualitative user research using interview and coding techniques based on Grounded Theory.*

15'

### TRAVELING & DISCOVERING EU

*I had studied Sustainability in Minor Department of Sustainability in Leiden University in The Netherlands for half a year. I traveled, made friends, watched many great exhibitions and participated in many design festivals in this period.*



16'

### PUT INTO PRACTICE

*My friends and I established and operated a design restaurant in Tainan called "Keefü Table" which serves nice food with handmade furnitures and danish design chairs. I was responsible for managing and developing food and service.*



# #1

## DESIGN

I participated in many design events and activities in the first and second year in graduate school of Industrial Design. I grasped every opportunity to explore the different field of design such as product design, graphic design, service design and so on.

In the following chapter, I will introduce **TEGG, a portable laundry system** and the design process of it.





**i 繃 Interaction Design**

OpenHCI 2015 student-organized workshop

**“Kiss goodbye”- cultural observation**

“Mind the Gap” (NCKUxRCA)  
International Design Workshop  
project of Tainan train station  
Critic's Choice

**Magefier - a language learning machine**

Product & Service Design  
NCKU ID student exhibition

Selected sample

**TEGG- portable washing machine**

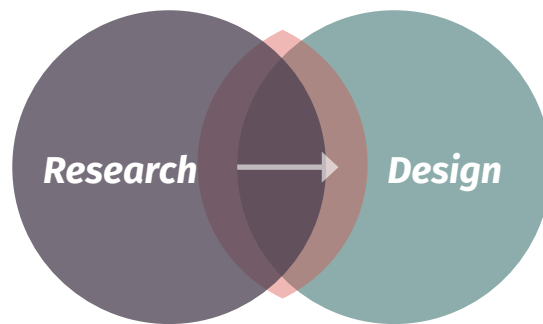
Product & Service Design  
NCKU ID student exhibition  
Excellent Kansei Design Award  
Conference of Taiwan Institute of Kansei  
Selected paper & Oral presentation

**好家在**

TiC 100 Smart City & IoT  
Innovative Application of Mobile Terminal & Home  
Internet in CHT Smart Home system

**咬 & 潤玉**

Cultural Creative Product Design  
2012 Culture & Creative Product Design Competition of  
National Palace Museum  
2 Finalist



### **Challenge**

Creating better public laundry experience by redesigning the washing machine and the process.

### **My Role**

This project was done with a Taiwanese student and two Singaporean students in 2013. It was an important experience for me to work through the whole design process with foreign designers. In this project, we applied Contextual Design as our design methodology. Further, in this project **we were not only discussing the “design” but also the “method”**. We applied some of our familiar methods, which may be in different terms but with the same functions, for improving the design process.

**The concept of parallel leadership was applied in our team.** Therefore, intensive meetings were necessary for better communication. As a class project, we almost did the whole project together. For example, in the phase of ideation, each of us need to proposed at least three ideas among every meeting. We iterated and modified the design process and eventually came out with the final idea together.

Afterward, I adapted this project into an academic research paper which was presented at the **Conference of Taiwan Institute of Kansei.**



# TEGG

## Innovative public laundry system

增進公用洗衣的情感與使用經驗之創新設計  
TEGG is a public laundry system helping user to have clean and fresh laundry effortlessly.



# THE PROBLEM



## How was your latest experience of using “public washing machine”?

We may have had the experience of using public washing machine when we lived in a student dorm or apartment. There are lots of common problems such as inconvenient, dirty, unsecure...such negative feelings while using public laundry machine. In this project, we focus on the public laundry machine in student dorm. **We aim to redesign the public laundry system for creating a better laundry experience.**



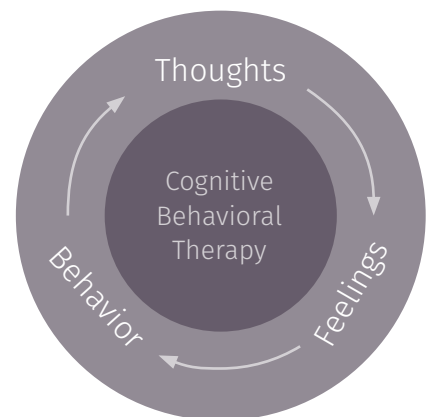
## How did users feel?

**Our goal is to make an innovative laundry system which can make users have better using experience and feelings.**

According to the Cognitive Behavioral Therapy, feelings are also an influencing factor to users' behavior. Therefore, in this project, we focus on not only functions but also “feelings” of laundry experience.

**We tried to consider all the possible affective factors in every part of the design process.**

For example, the emotional images from the appearance and style of the machine and emotional reaction while using the system.



## **WHAT**

A laundry facility provided for general public in public space.

## **WHERE**

Public laundry facility in student's dorm.

## **WHO**

Students who use the laundry facility in student's dorm.

## **WHEN**

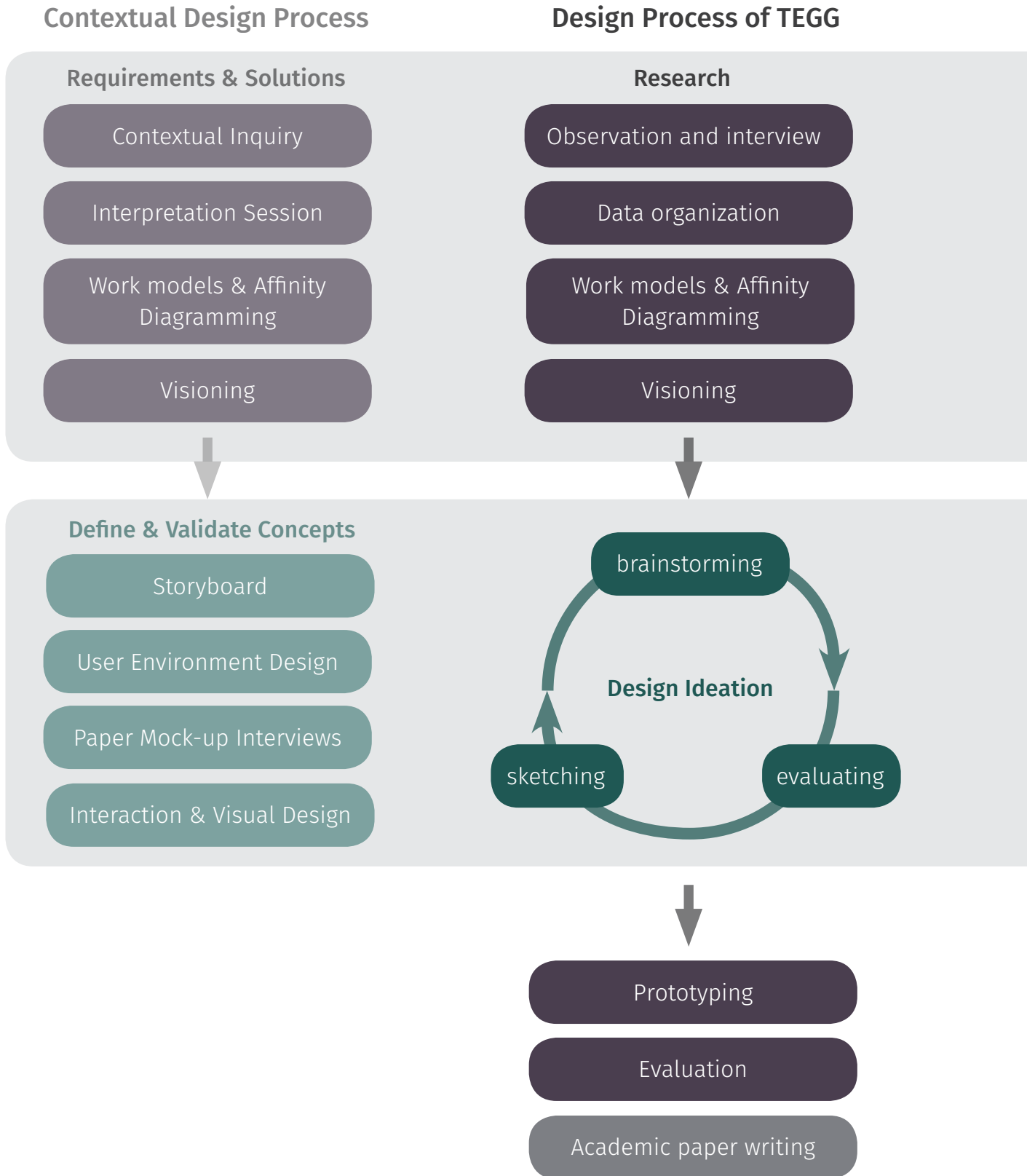
The whole working process of doing laundry.

## **HOW**

Researching and designing based on Contextual Design.

## OUTLINE OF DESIGN PROCESS

The research of this project is based on **Contextual Inquiry**. Referring to the contextual design process, we discussed design methods we had learned and **developed a design process that could fit to the condition of this project.** (Time and budget limitation, Class requirements...etc.) Following is the comparison of the processes. It lasts about 6 months from research to evaluation.



## Design method we used

### What matters to users?

To explore the nature context of users' work, the method we used in the initial phase (discovering the requirements and developing solutions) is almost similar with the process of contextual inquiry. However, since the limitation of time, **we applied "Shadowing" instead of "Participant observation" while doing contextual inquiry.** It might capture less contextual insights but more details from users' work in a short period.

Shadowing

Qualitative Interview

Brainstorming

Affinity Diagramming (KJ method)

### Product Design v.s. System Design

Since the class requirements (Product Design), the style and function of the product were more important than the environment and system. Therefore, we focused on the **physical and emotional issues** more. Also, in the phase of user testing, we applied **scenario and scale prototype** instead of paper mock-up prototype.

Storyboard

Persona

Brainstorming

Moodboard & Emotion map

### Keep improving

Since the requirement of academic presenting, evaluation was needed for this project. A small focus group with public laundry users was hold for collecting more user feedbacks. Several suggestions were proposed for improving the system in the future.

Focus group

## OBSERVATION & INTERVIEW

The inquiry was divided into two parts. First, we observed physical environment of the laundry room of the student dorm in National Cheng Kung University. Also, we observed how people doing their laundry. Pictures and notes were taken during the observation.

Second, according to the method - Shadowing, we followed two of our friends who live in the dorm doing their laundry. We recorded every detail by notes and video. Besides, we did a quick interview after they finished their laundry.





## Before Laundry

How often do you do laundry?  
How many load of laundry per session?  
When and where you usually do your laundry? Why?  
Do you separate your laundry for washing? Why and how?  
What are the additional things you bring along to the laundry room?

## During Laundry

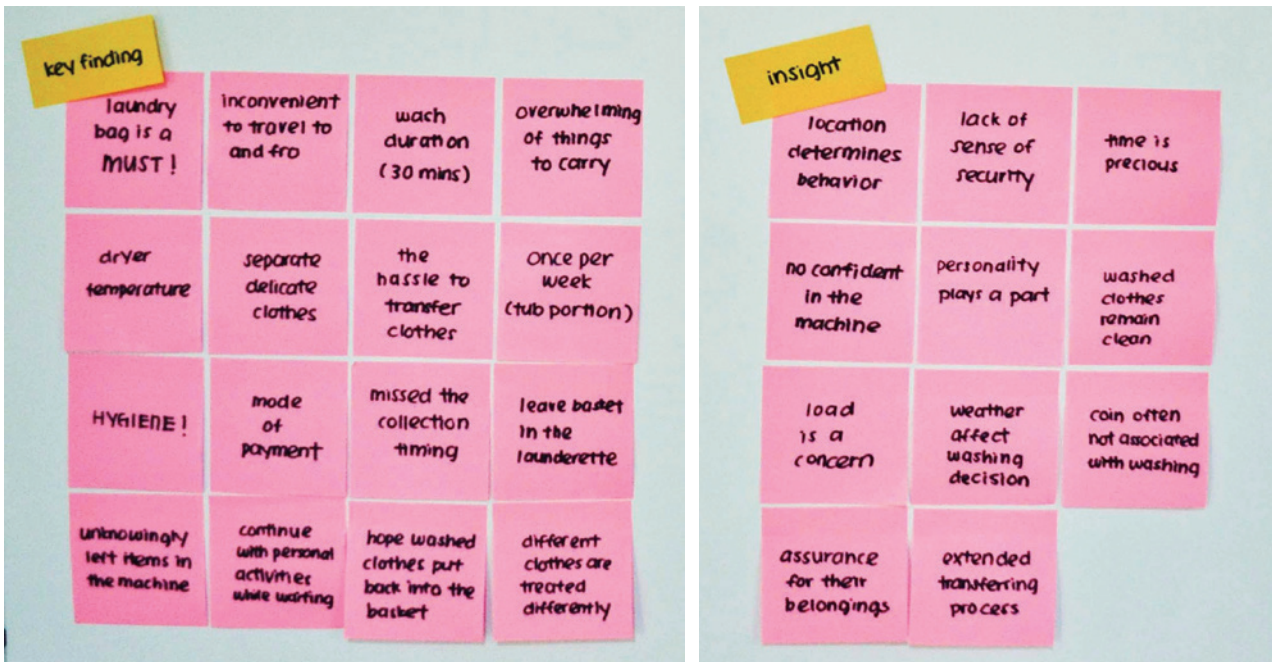
How long you take to wash your laundry?  
Do you wait at the laundrette room for the entire duration?  
What are some of the difficulties you faced while doing laundry?  
Are you worried that your laundry will get lost/ disappear?  
Have your clothes been removed by others before?

## After Laundry

Is your laundry clean after each wash?  
Has your clothes damaged before after wash?  
Do you use dryer to dry your laundry after wash? Why?  
What do you feel about sharing the laundry equipment?

## INSIGHTS

Based on the observation and interview, we organized the data by “Affinity Diagramming” and came out several insights. These insights point out the similar difficulties user had met. As a result, three main design requirements came out – simplified Complexity, assurance and humanizing experience. Also, we concluded the “affective attributes” from our contextual inquiries and user interviews.



## REFLECTION

I did the contextual inquiry and data organizing together with my teammates. It is an interesting experience because it is the first time for them to use the laundry system in Taiwan. Because of this cultural background, **we found several different during the observation and discussion.** We discussed and made them into more specific insights.

Designing better laundry experience is a very wide topic. We also observed problems and issues from various perspectives. In this project, I had learned that observation could be open-minded and general. However, the hardest part was we need to decide what issue we are going to focus at. Therefore, **working models and persona was vitally required for us to make correct decisions.**

The design requirements had been slightly modified many times during the process of building work models and persona. **We had to repeatedly review the insights and data so as to explore more details and correct the design direction.**



Simplified Complexity

Assurance

Humanizing Experience

- Quick
- Easy
- User friendly
- Efficiency
- Payment
- Technology
- Intuitive
- Innovative
- Duration
- Transferring
- Productive
- Intelligent
- Hassle
- Convenient
- Portion

- Temperature
- Hygiene
- Clean
- Durability
- Quality
- Environmental
- friendly
- Worry
- Unsafe
- Uncertain
- Security
- Confident
- Trustworthy

- Flexible
- Reminder
- Categorization
- Approachable
- Fun
- Satisfaction

bring lots of coin  
unhygienic to share  
once per week  
do not separate his clothes  
clothes were removed and thrown on the table.  
do not want anymore bad experience  
troublesome to carry clothes thru and fro

basket → laundry bag  
save coins  
dirty washing tub  
afraid that clothes would go missing  
wait at the laundrette room  
bring comic to kill time

shelf → laundry  
30 mins wash  
all wash  
dryer not hot enough  
purchase detergent from machine  
left her contact details

clothes string  
clothes all tied up together  
clothes might drop out during the journey  
stretch the clothes

laundry in afternoon  
collecting his clothes on time  
dryer during bad weather  
laundry in the morning  
factor: garment  
go to laundry  
leave clothes in laundry room to conventional  
other

laundry in afternoon  
collecting his clothes on time  
dryer during bad weather  
laundry in the morning  
factor: garment  
go to laundry  
leave clothes in laundry room to conventional  
other

dryer 60 mins  
wishing to have a machine that can wash and dry  
coin, detergent & two laundry bag  
delicate clothes in one laundry bag

washing 30 mins  
check for machine cleanliness  
undergarments in one laundry bag  
uncomfortable to share the machine with others

forgot to bring lose items  
forgot the timing to transfer clothes to dryer  
return to his room while washing  
lazy to bring the basket back

one basket full  
clothes been removed and placed in his laundry basket

separate by type  
washing duration & back to room  
drawer → laundry bag

hang up 15 minutes  
wash 30 minutes  
separate by colour  
delicate fabric (hand wash)

clothes been removed!  
forgot the timing  
find it a hassle for going up and down  
missing socks

unhygienic  
once per week  
leave the clothes out even raining  
coin & detergent

clothes will damage or stretch

## BUILDING WORK MODELS

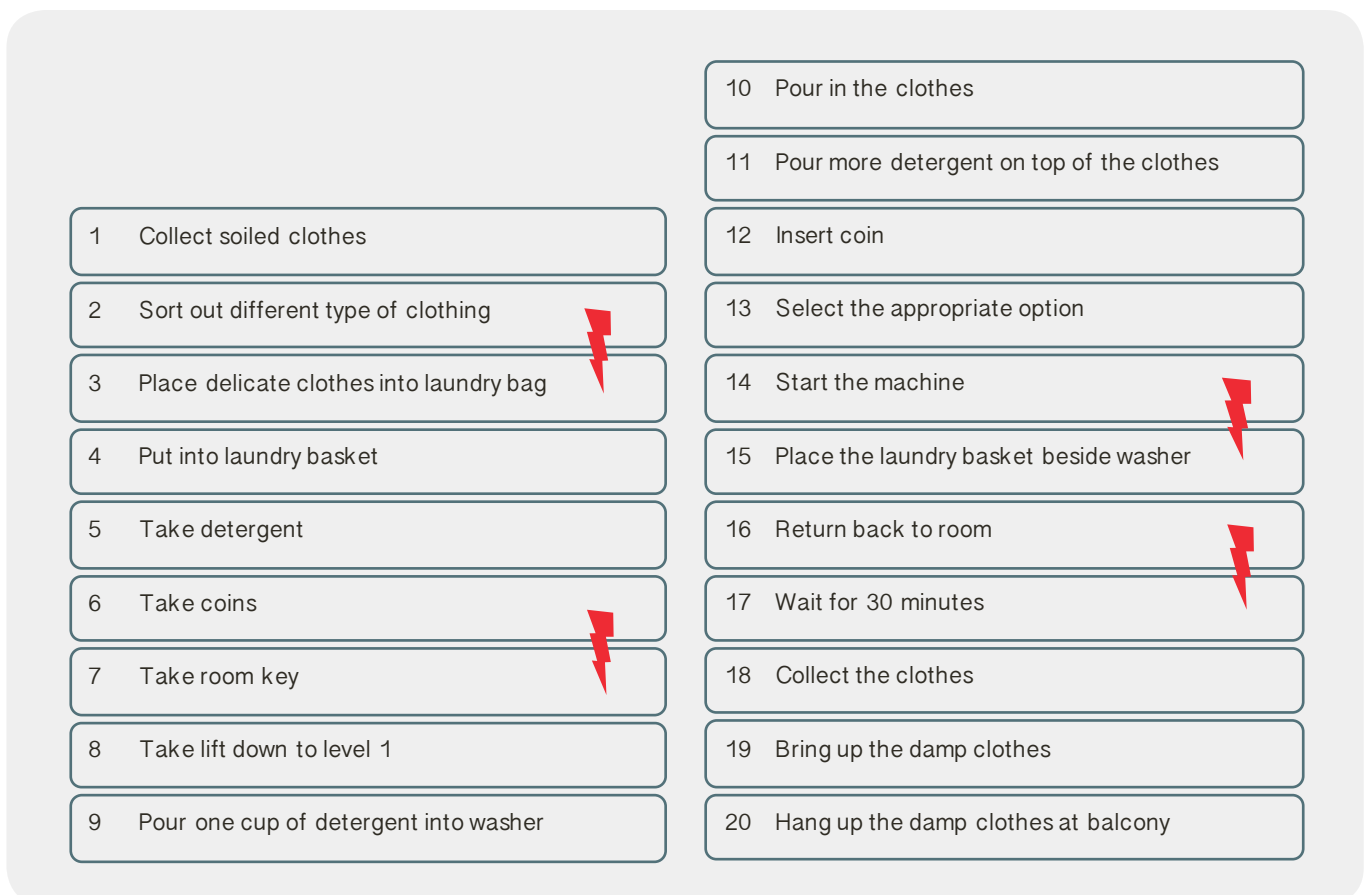
To capture more details of users' work, three work model based on Contextual Design were built. The sequence model, cultural model and physical model present the process, cultural issues and physical environment while users doing their laundry. Related information we observed were listed in each diagram and "small red lightings" were marked as the difficulties and conflicts during the process. As a result, the models were very helpful for group discussion, especially for the following brainstorming. Following are the three work models of user 1.

### REFLECTION

Based on Contextual Inquiry, consolidated work models according to each type of work model of every user need to be built for summary of diagramming. However, because of the limited time, the consolidation work models did not be built completely. Instead, we walked through all of the work models and directly used them as reference while visioning and brainstorming.

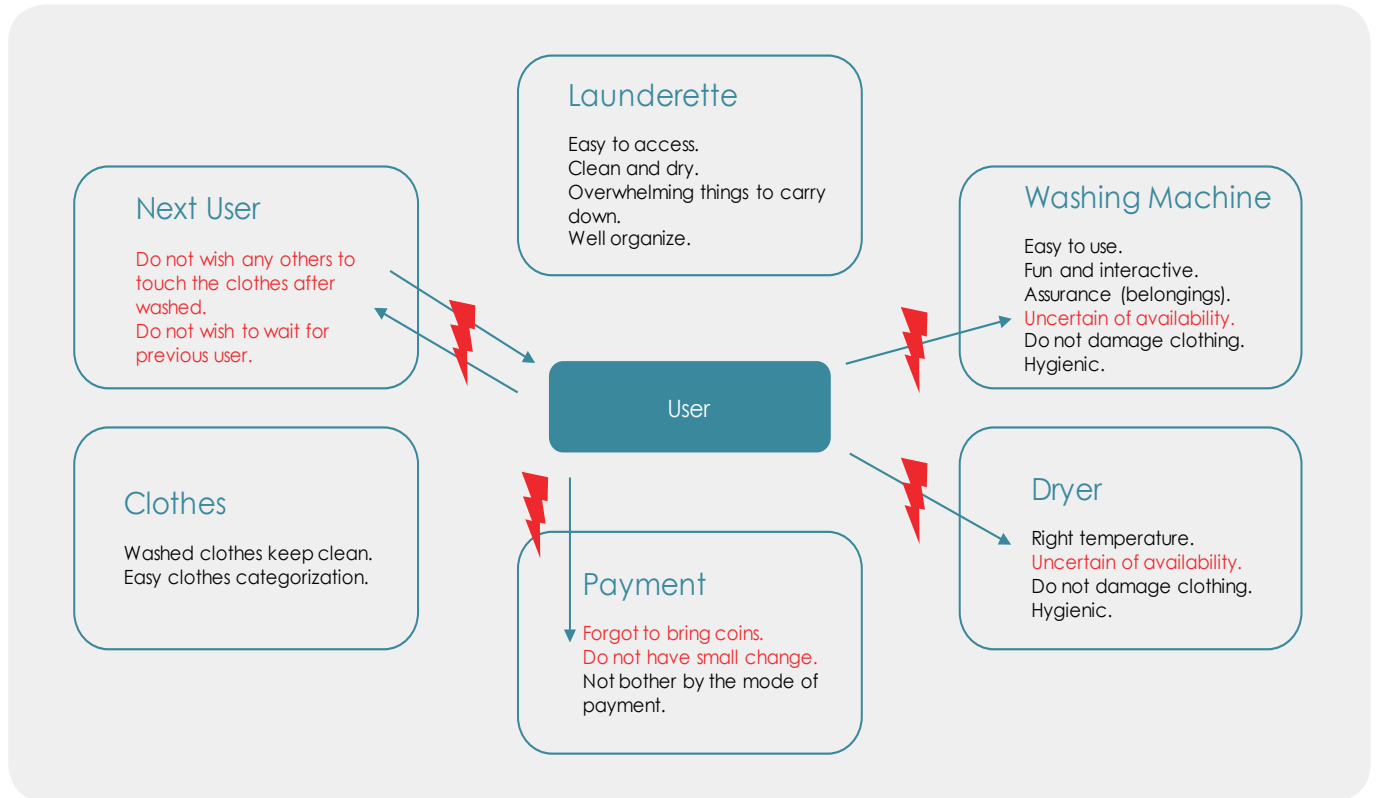
### Sequence Model (User 1)

The sequence model presents the process how user doing their laundry. The process is divided into several parts, presenting each task that user have accomplished while doing laundry. In this model, we found the different strategies that users had taken when they met the difficulties.



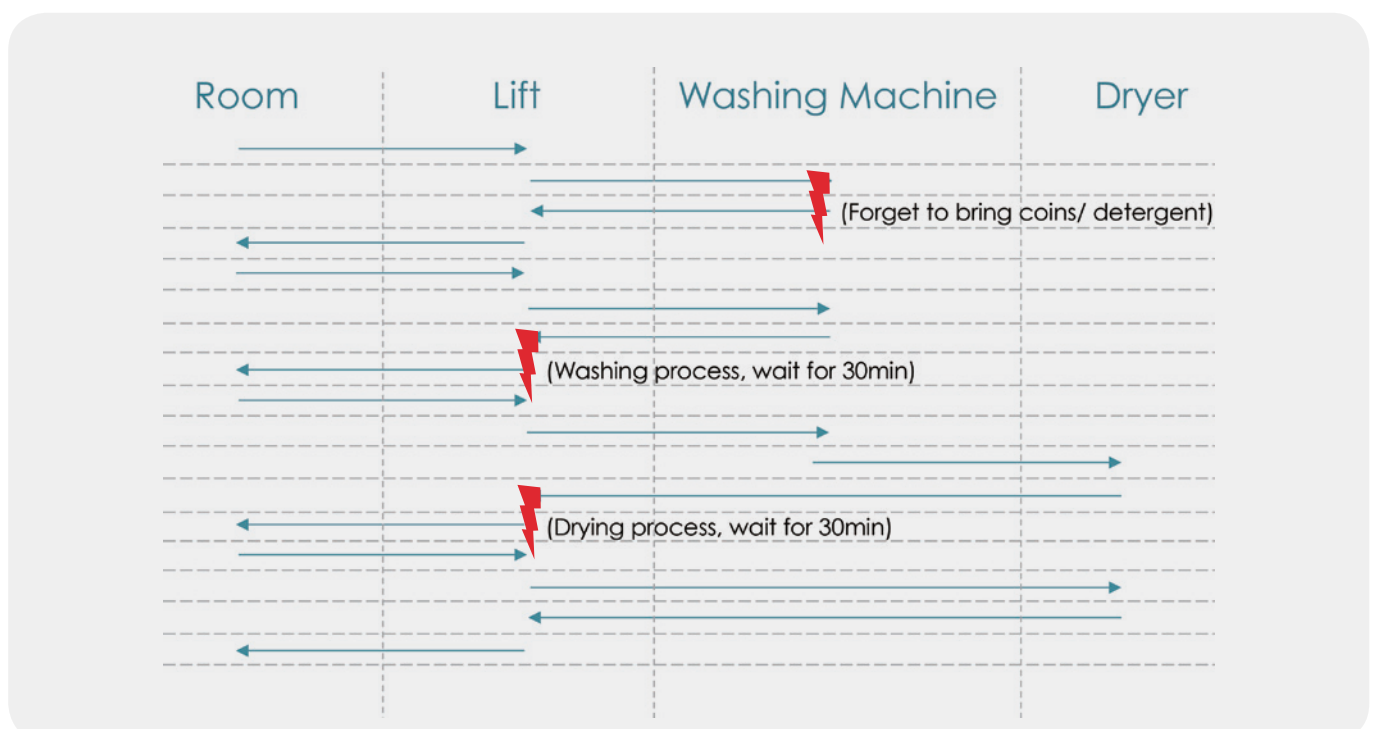
## Cultural Model (User 1)

The culture model shows the constrains and policies that users meet and how they deal with them while doing laundry. We found lots of similar constrains referring to different users.



## Physical Model (User 1)

The physical model shows how users organize the environment (the laundry room and their dorm) to help themselves do their laundry easier.



## VISIONING - technology solution

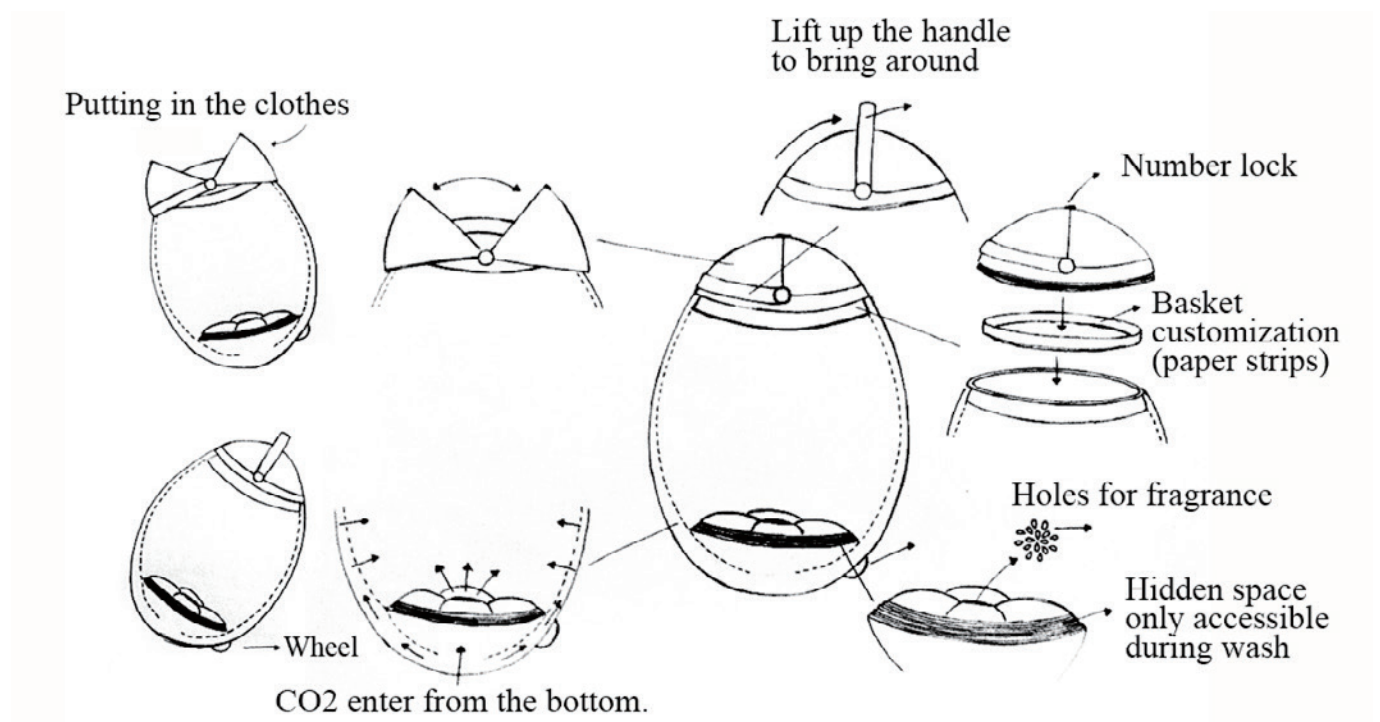
This phase is the most difficult part for us. Since the unfamiliar to laundry technology, we searched a lot of technical paper and discussed which is the best solution for us. Design ideas had been not very clear yet in this phase. Therefore, **several possible technology solutions were kept in order to support the process of design ideation.**

" In visioning, the team uses the consolidated data to drive conversations about how to improve users' work by using technology to transform the work practice. This focuses the conversation on **how to improve people's lives with technology**, rather than on what could be done with technology without considering the impact on peoples' real lives." -Interaction Design Foundation

### Liquid Carbon Dioxide washing technique

A washing technique using Liquid Carbon Dioxide had been chose for our most possible technology solution. The property of it had been considered while brainstorming design ideas.

- 郭子禎 (2006)。環保洗淨新技術 -CO2 的神奇應用。科學發展 ,400,30-35。
- 鄒金台、黃傳興、林文信、羅新衡與李松宏 (2010)。洗衣機發展趨勢與性能提升技術可行性探討。冷凍空調 & 能源科技期刊 ,61,62-68。台北市：台灣大電力研究試驗中心。



# PERSONA

According to our initial inquiry and insights, **we built two personas: students Rachel and businessman William.** We listed all the characteristics of them as following.

This two persona led us to **develop our design ideas and help us making decisions** when we need to know the priority of design requirements.



## Narrative

Twenty-two years old Rachel is an undergraduate student at National Cheng Kung University (NCKU), Taiwan. Currently, she stays alone in campus dormitory as she is taking the summer exchange programme offered by NCKU. Rachel believes this exchange programme would be a life-exchanging experience for her as study abroad alone allows her to be independent and also provides her the opportunity to tour the neighbouring countries. Besides, it also allows her to know another culture first-hand and affords her the opportunity to make friends around the world.

## Lifestyle

Spend large quality of time in school.  
Enjoy spending her free time in bookstores and café.  
Loves online shopping.

## Attitude

Influenced by teachers and friends.  
Want quick and easy solutions.  
Open and outgoing.  
Independent.

## What Are They Like

Would be very attentive to new things.  
Wants value-for-money food and accomodation.  
An insatiable appetite to know new things.

## General Interest

To travel the world.  
To learn more about different countries.  
To experience cultures.

## Frustrations

Hate things doesn't work out the way she planned for.  
Dislike the process of waiting.

## Goals

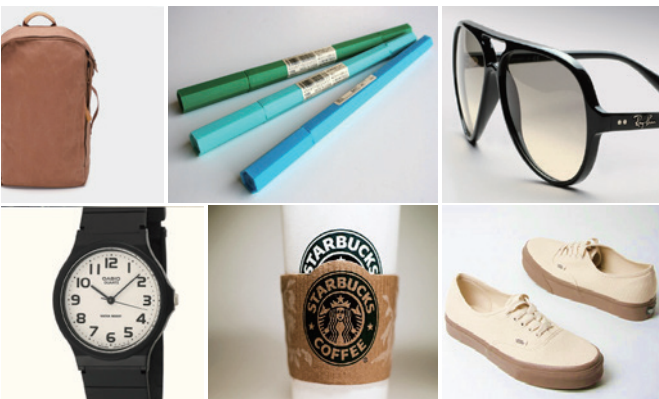
Enjoy her exchange in NCKU.  
Lead an enriching life.  
Cultivate good habits.

## Technology and Domain Skill

Has average IT knowledge.

## Demographic and Other Variables

Funded by parents.







## Approachable

*Vividness  
Welcoming  
Friendly  
Less rigid  
Smoothness*



## Contentment

*Inner satisfaction  
Faithfulness*

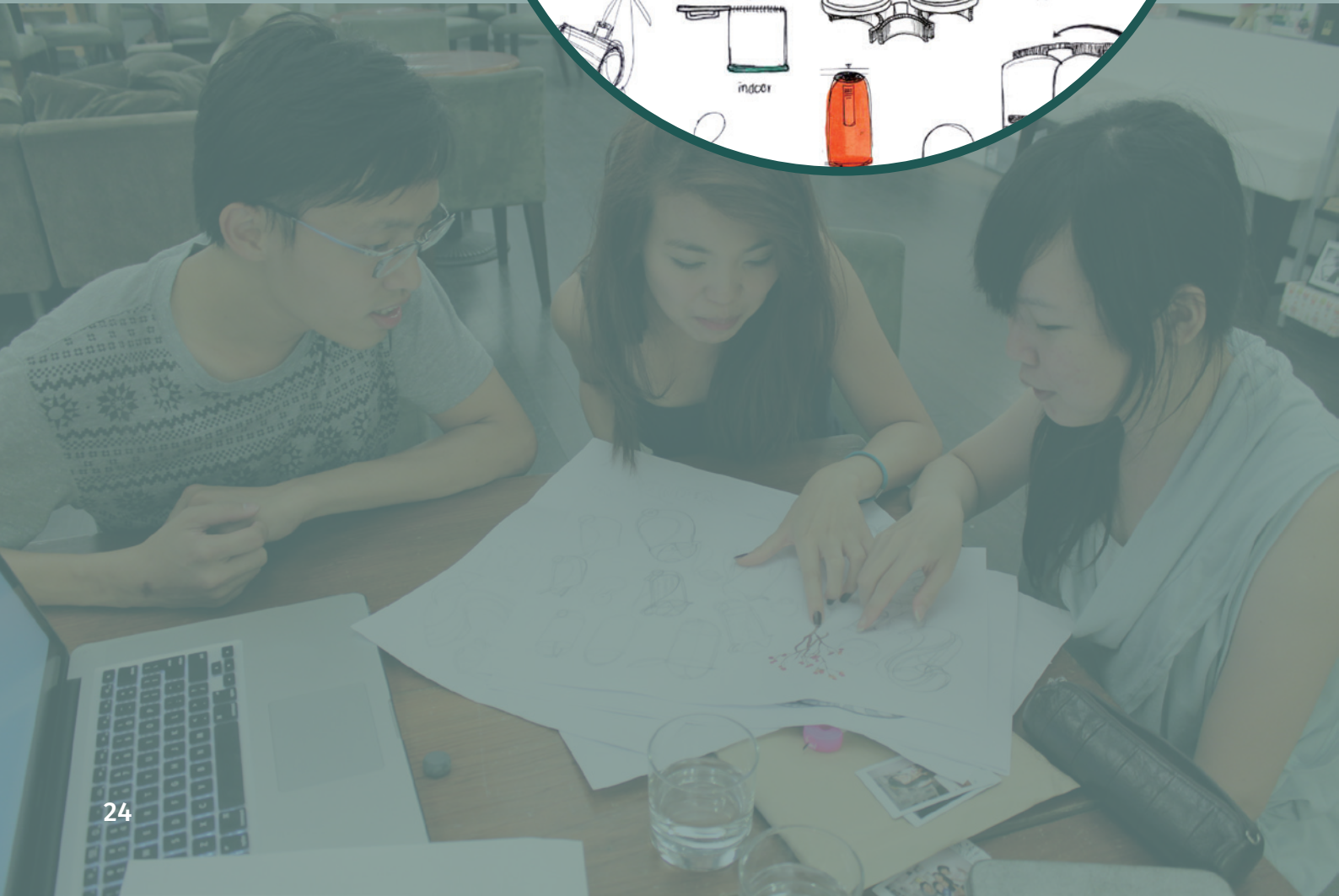
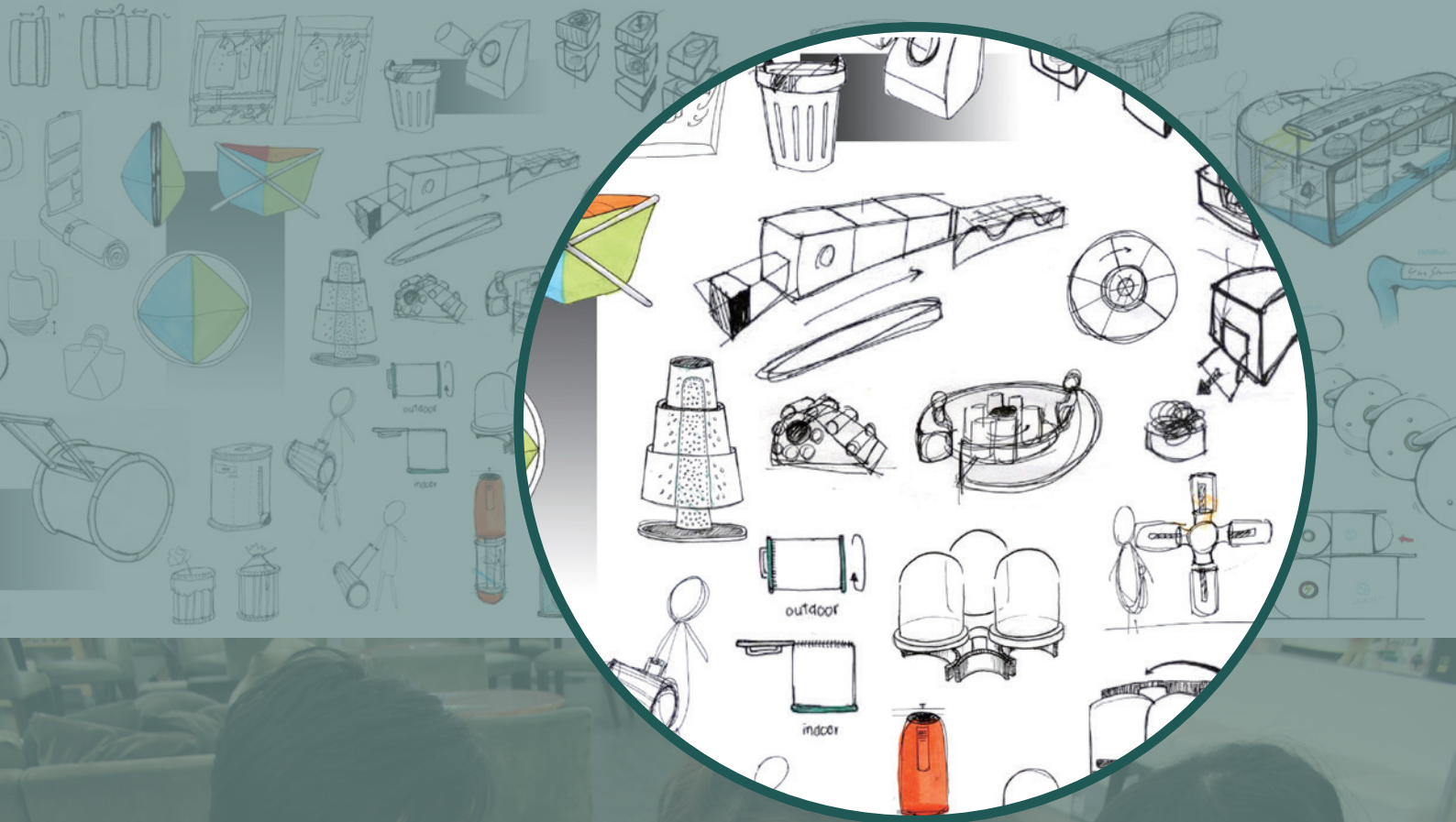


## Reliance

*Trustworthy  
Steadfast  
Secure  
Lasting*

## IDEATION

Based on the insights and persona, we did brainstorming together and sketched great amounts of design ideas. Several design ideas were selected after many times intensive discussions.

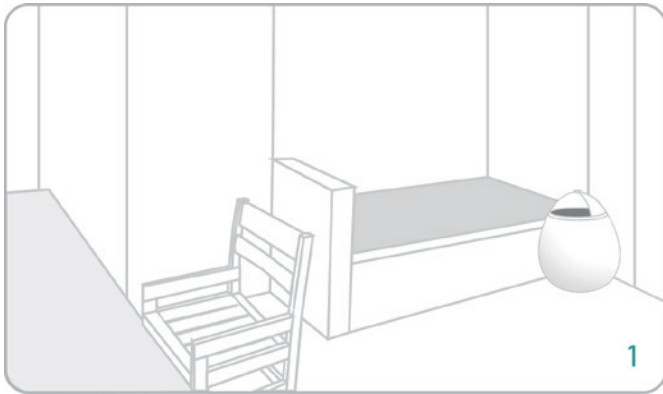




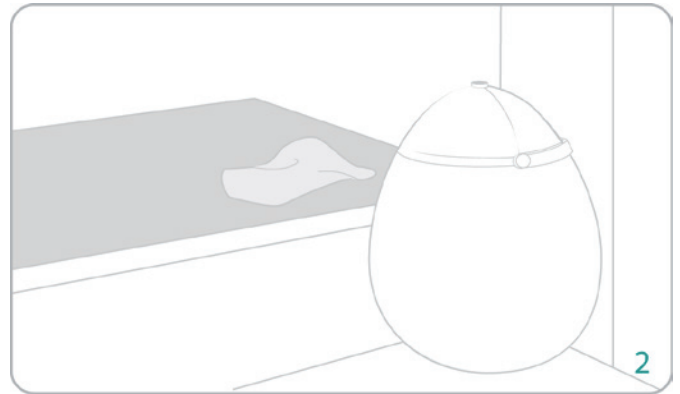
# SCENARIO

During the process of brainstorming, scenarios of some design ideas were built and were modified repeatedly in order to develop the final design idea.

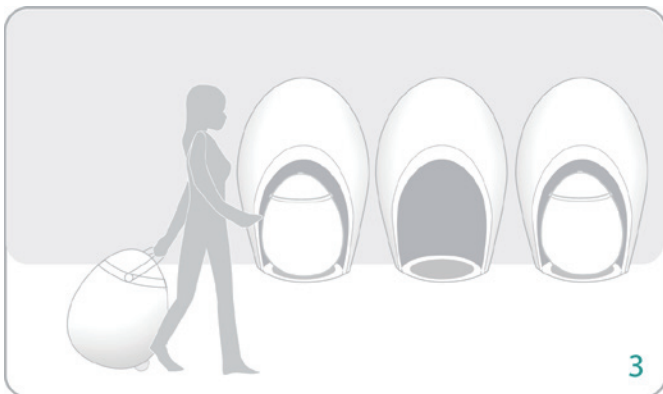
Following are the main scenes of final scenario.



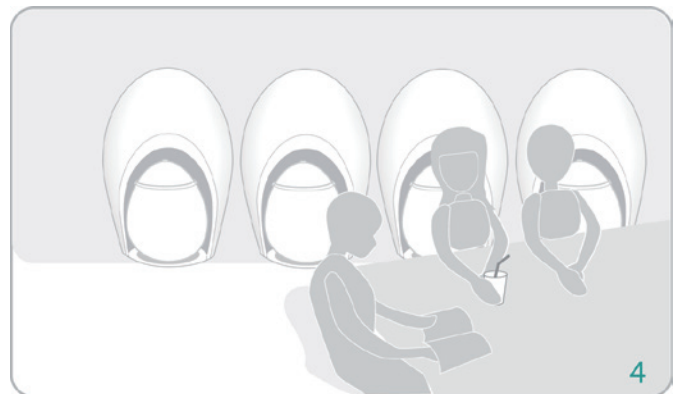
Scene 1 - Laundry basket is put in the room.



Scene 2 - Dirty clothes were put in the basket.



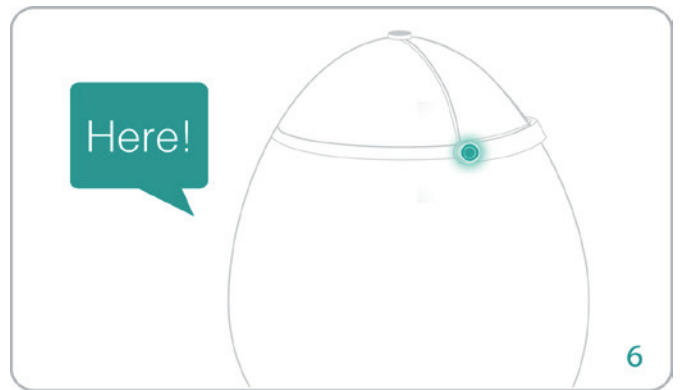
Scene 3 - User wheels the basket to laundry room and docks it with the available machine.



Scene 4 - Users can do whatever they want while their clothes are being washed. (or just stay in the comfortable and clean laundry area.)



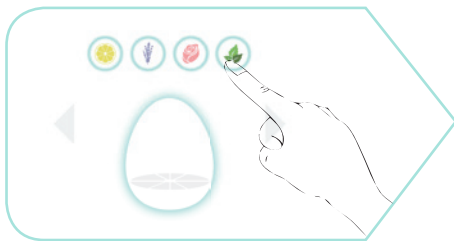
Scene 5 - User can track the washing procedure through the TEGG APP, getting a notification when the laundry has been finished.



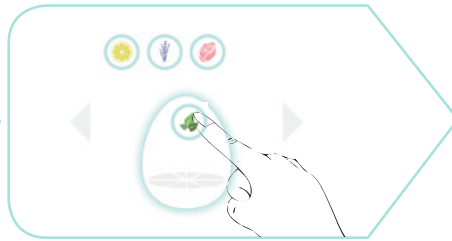
Scene 6 - User can look for his/her laundry basket by RFID sensor in laundry area when the basket has been moved by next user.

## INTERFACE DESIGN

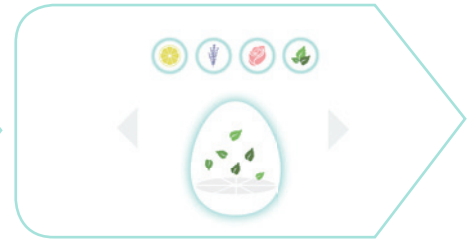
We did several paper prototyping for interface design, trying to simplify the working procedure. Following is the final interface and how it works. The icons and actions are designed to make people feel easy, simple and clean.



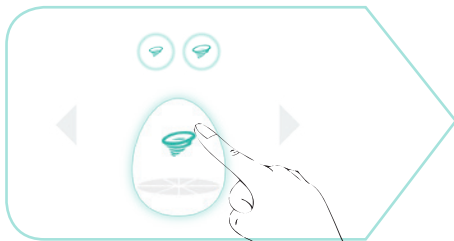
**Step 1** Select the fragrance options.



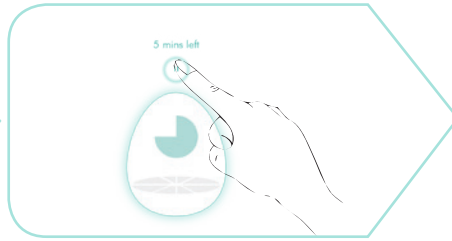
**Step 2** Drag the selected fragrance.



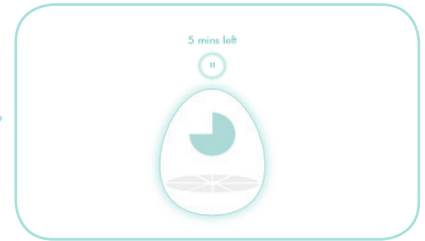
**Step 3** Release the icon in TEGG.



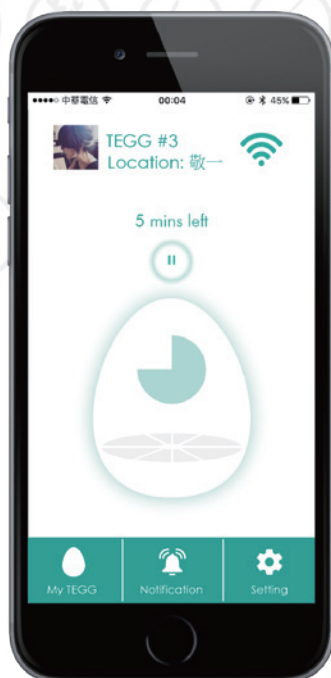
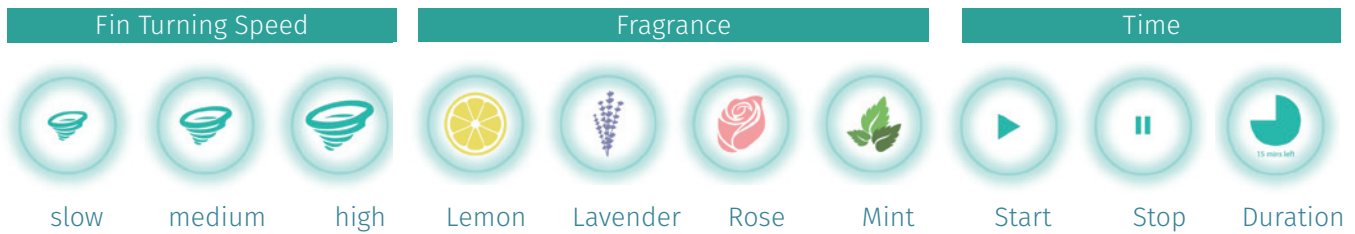
**Step 4** Drag the selected speed.



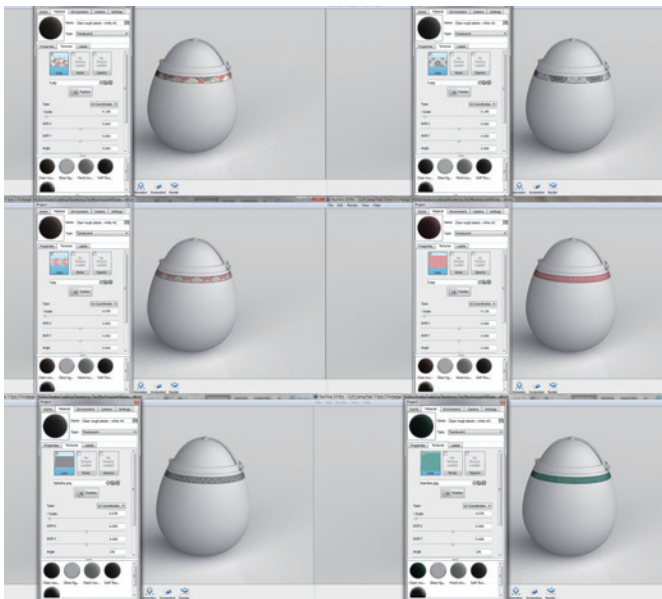
**Step 5** Press 'start' and the fin starts to rotate.



**Step 6** Waiting time is showed on the machine and APP.



# PROTOTYPING



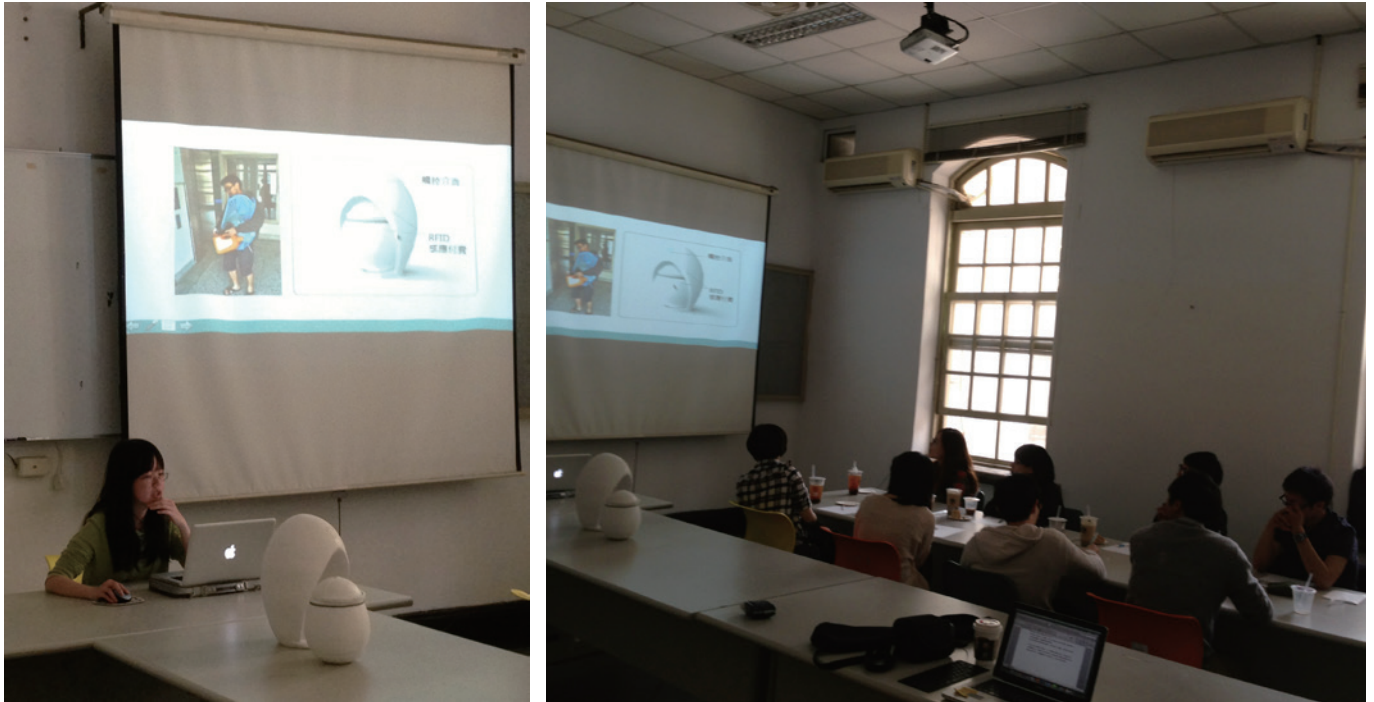
## REFLECTION

We prototyped TEGG by virtual 3D modeling and a physical scale model. In this phase, my role was to transform the draft sketches into digital versions, helping my teammate building the 3D model. It was a great practice for **transferring ideas to other professional who can help you prototype your ideas.** Also, we communicated with the traditional wood master worker in order to produce our physical model. It was a very important experience for me learning **how to cooperate with other professionals.**



## EVALUATION

Since TEGG is a conceptual project, we only made a scale prototype presenting our ideas. However, we still hold a small focus group for evaluating this design. The focus group consisted of the students who had lived in the dorm and who had the public laundry experience. As the result, they all have the positive feelings to our laundry system. However, the style and technology are the main issues that need to be further improved.



The focus group was consisted of three phases: (1) Personal experience sharing, (2) Introduction of TEGG and (3) Discussion.

Personal experience sharing

Introduction of TEGG

Discussion

The discussion were divided into five parts:

- a) The laundry basket: 造形、個人化識別帶、提把、滾輪、密碼鎖、RFID 感應卡
- b) The public laundry machine: 造形、技術
- c) The interface: 圖像造形、操作流程、香氛
- d) Notification: APP 通知、亮燈回應
- e) Adaptation for public space: 造形與功能與公共空間之間的關係？

In every discussion, **we led the group to evaluate the design refer to the three design insights: simplified complexity, assurance and humanizing experience.**

We had collected lots of interesting and useful feedbacks from the discussion. Further, I adapted it into an academic paper which had been selected and oral presented in 2012 Conference of Taiwan Institute of Kansei as the title “增進公用洗衣的情感與使用經驗之創新設計：Innovative design for affective and using experience in public laundry.”

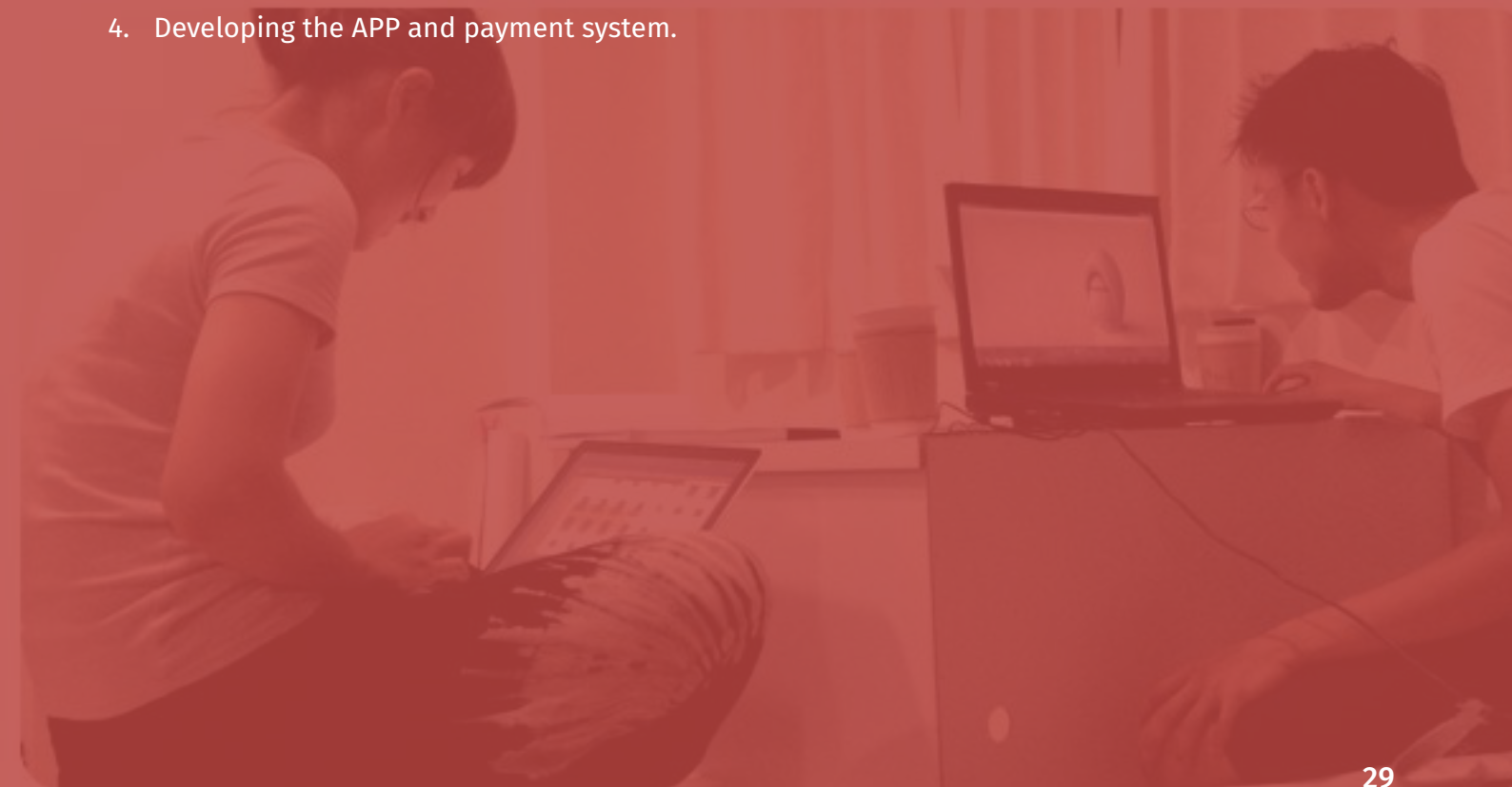


## WHAT I HAVE LEARNED...

1. From research to design, going through the whole process of contextual design.
2. Working with people from different background and culture.
3. Flexibly applying design method under limited time.

## FUTURE WORK

1. For better insights, the amount of laundry users for contextual inquiry need to be more and the interview questions need to be recorded and analyzed through transcripts.
2. The design requirements should be more clear for better evaluation.
3. Discussing the technology solutions with technical professionals.
4. Developing the APP and payment system.



# #2

## USER RESEARCH

I am interested in the **“emotion issue”** between human and their belongings very much. Therefore, in the beginning of this study, I had paid a lots of attention in **“emotionally durable design”** – a design focuses on the emotional connection between human and their beloved possessions. The characteristics of attachment could make products be kept for longer. I was strongly attracted by this concept and its application which relates to the sustainable issue of industrial products.

Hence, in summer of 2014, **I participated in an exchange program from Leiden University in The Netherlands for half a year.** It is a program given by Minor Department of Sustainability. I had exchanged my idea with students from various countries and the initial stage of my master thesis was born in that period.

After exchanging life, I devoted myself into the user research of “product attachment.” It was an impressive experience for me since doing research is totally different from doing design. **The process of doing user research had not only trained my personal traits such as patient and attention but also improved the ability of analyzing and collecting useful information.**



**<Virtual possession attachment: the emotional relationship between individuals and their virtual possessions.>**

Master thesis

**HCI 2016 Conference** *Selected paper*

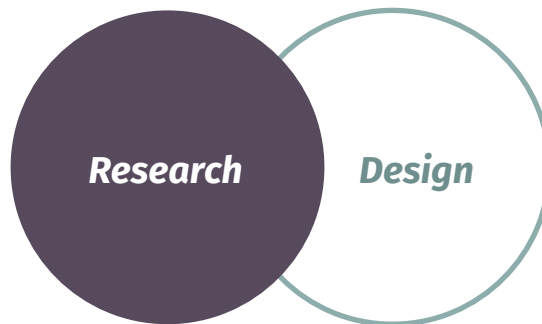
**Research Assistant**

YCT Cognition, Experience & Behavior (CXB) Design LAB

<Exploring the Relationship Among Information Visualization Types, Eye Movement Patterns and Affect Valuation Indexes - Making an Eye-tracker for Design Application> 2012

Course <Design Cognition> 2013

Course <Green Design> 2013



### **The challenge**

Understand the emotional relationship, including context and possibilities, between human and virtual possessions.

### **My role**

The research had mostly done by me. However, I definitely could not finish it without my advisors, my code team and all the people who had helped me on it. I **spent about a year developing the research questions**. I had **talked to many professionals in different domains and got various suggestions**. Also, **reading lots of related reference** helped me understand the progress of recent studies. Those methods made me **think wider and deeper to the phenomenon I observed**. Eventually, I came up the research context myself and searched for the adaptable methods that could help me answer my research questions.





虛擬擁有物的情感連結：人與其虛擬擁有物之間的情感關係  
Virtual Possession Attachment: the emotional relationship between individuals and their virtual possessions.

This research explores emotional relationship between individual and their virtual possessions by Grounded Theory. We conducted **24 in-depth interviews** with younger adults (under 20- year-old) and elder adults (above 40-year-old) in Taiwan. By understanding usage behaviors and feelings about participants' important virtual possessions, several findings came out.

The findings are presented as materials for building a theory of attachment development to virtual possessions.

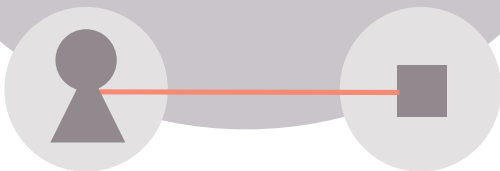
*Keywords: virtual possession, attachment, self-extension, human-object relationship*



## INTRODUCTION

### What is product attachment?

Attachment theory was first proposed by Bowlby in 1979 describing an emotional-laden target-specific bond between two persons. Furthermore, it has been applied to the relationship between human and object. This opens a novel perspective toward how we interact with our objects. In this regard, the interaction between an individual and his/her objects has not only involved functionality but also the perception and the entire context.



### Attachment theory (Bowlby, 1980)

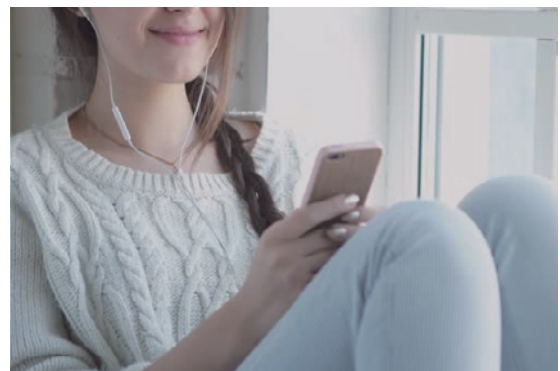
### Why do we attach to a product?

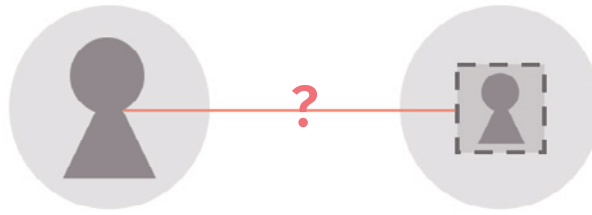
Belk (1988) proposed that people consciously or unconsciously extend their selves to their possessions. He organized a big amount of relevant researches and claimed that self-extension is the reason why people attach to their possessions.

*“Knowingly or unknowingly, intentionally or unintentionally, we regard our possessions as parts of ourselves” (139) (Belk, 1989)*

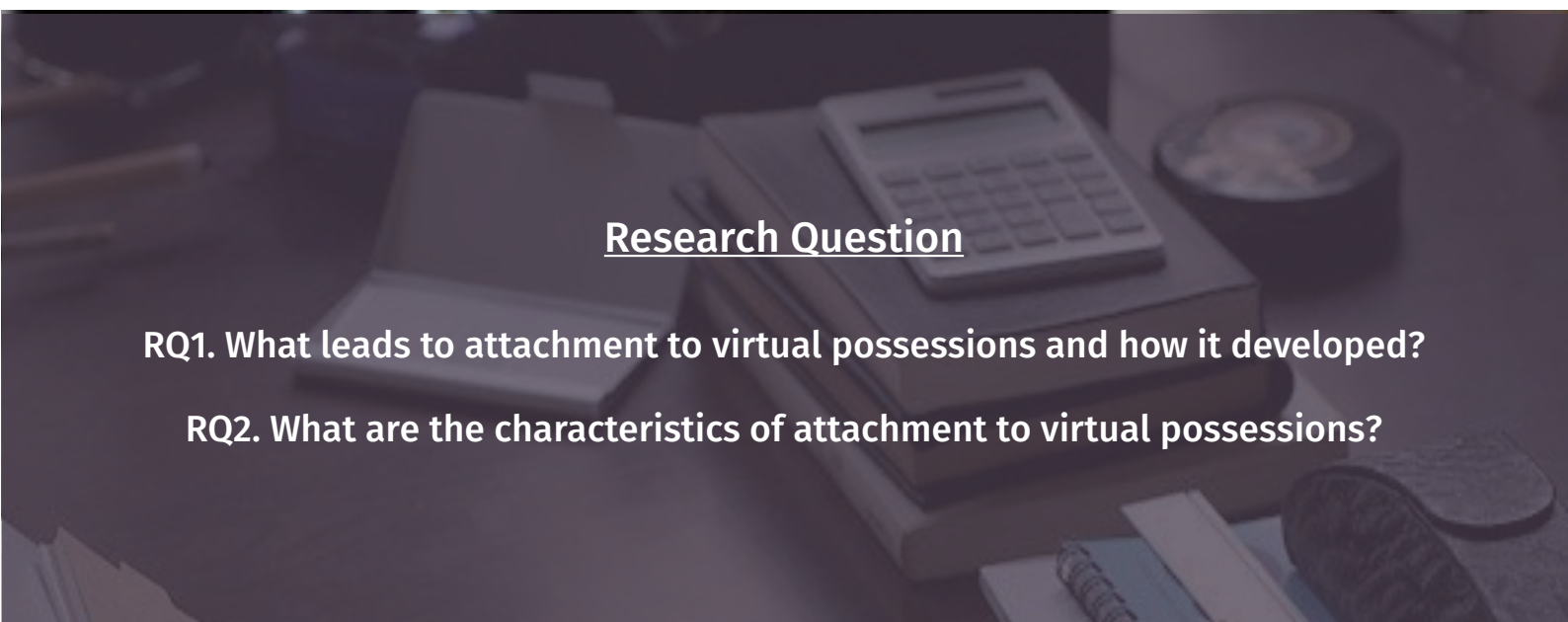
### Do the attachment exists between human and virtual possessions?

Belk (2013), who had proposed that self-extension is the reason for us to attach to possessions, addressed several changes of self-extension to virtual possessions by organizing recent researches. He indicated the according to the recent researchers, self-extension between individual and their virtual possessions indeed exist. Yet there are still some different between them and self-extension to physical possessions.





We are surrounded by an enormous amount of objects in everyday life. The notion of human-object relationship has been more and more complicated through the development of technology. To date, people have increasingly acquired virtual objects in their daily life. Researchers recently focus on the concept of how people develop emotional relationship to their digital object. However, **there is still an open question that how and why people attach to their virtual possessions and what are the characteristics of the attachment.**



### Research Question

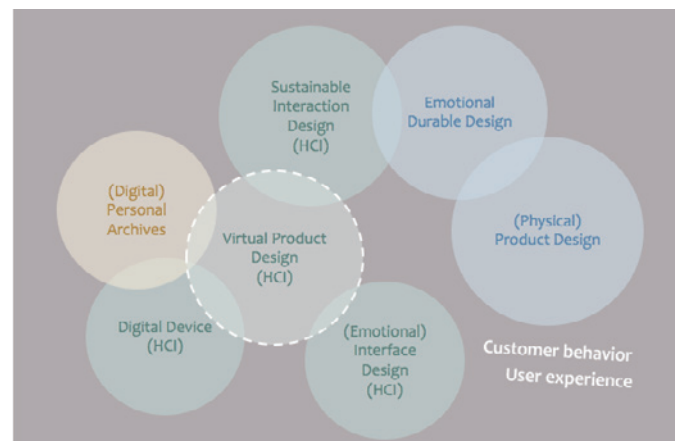
**RQ1. What leads to attachment to virtual possessions and how it developed?**

**RQ2. What are the characteristics of attachment to virtual possessions?**

### **REFLECTION** why this research topic?

After being two-year graduation student and one-year exchange student, I had explored various fields of design. I interested in the topic of “emotional issues” between human object interaction very much.

Therefore, I put myself into many research fields related to **“Human-object relationship.”** I found there is some similar concepts in different domains. For the interests in future technology, I decided to throw myself into **“virtual possessions” study.**





## OUTLINE OF METHOD

First, interview protocol was prepared and conducted with **five pilot interviews**. Few details were slightly modified and **twenty-four formal interviews** were following proceeded.

After data collection, based on Grounded Theory coding approach (Glaser & Strauss, 2009), three stages of coding procedure were done. In open coding, a code team (consisted of three graduate students and author) coded the **twenty-four transcripts** into conceptual labels and **classified into thirty-eight categories step by step**.

Moreover, during the process, **constant comparisons** had been done for possibly catching everything. After the thirty-eight categories were approximately confirmed, relationships between categories were coded by author. Furthermore, **three core categories were selected and a storyline were drawn for the preliminary concept of theory building**.

Since the data are huge and complicated, following I will introduce the method in five main procedures. References are available upon request.

### Before interview

Interviewee Sampling

Interview protocol design

Card-sorting task design

### Coding after interview

3 stages of coding

Findings

## REFLECTION Method Design: Why "Grounded Theory" ?

This is a very interesting and novel research topic. However, there were less related academic reference of it. After browsing various related study in different domains, I decided apply the methodology of "Grounded Theory" into my study. **Grounded Theory was known as an explorative method for widely exploring the possibilities of a phenomenon**. It is usually applied in Social Science and Anthropology.

The original process of Grounded Theory is very complicated and philosophic. It usually takes three to five years to complete a Grounded Theory research. However, **I combined the principles of it with Content Analysis, coming up with an outline of method design which adapted to my research requirements**.

## Data Collection

### Interview

5 Pilot interviews  
24 Interviews

### Data

Interview protocol

### Participants

Author

## Data Analysis

### Open Coding

#### Stage 1

Conceptual labeling  
Categorizing

### Data

4 interviewees (simultaneous\*)

### Participants

Code team (including author)

\*all the coders code the 4 same transcripts at the same time.

#### Stage 2

Conceptual labeling  
Categorizing

12 interviewees (separate\*\*)

Code team (including author)

\*\*each coder codes the 3 different transcripts at the same time.

#### Stage 3

Conceptual labeling  
Categorizing

8 interviewees (separate)

Code team (including author)

### Axial Coding

Finding relationship between categories

38 categories

Author

### Selective Coding

Selection of core categories  
Developing storylines

38 categories

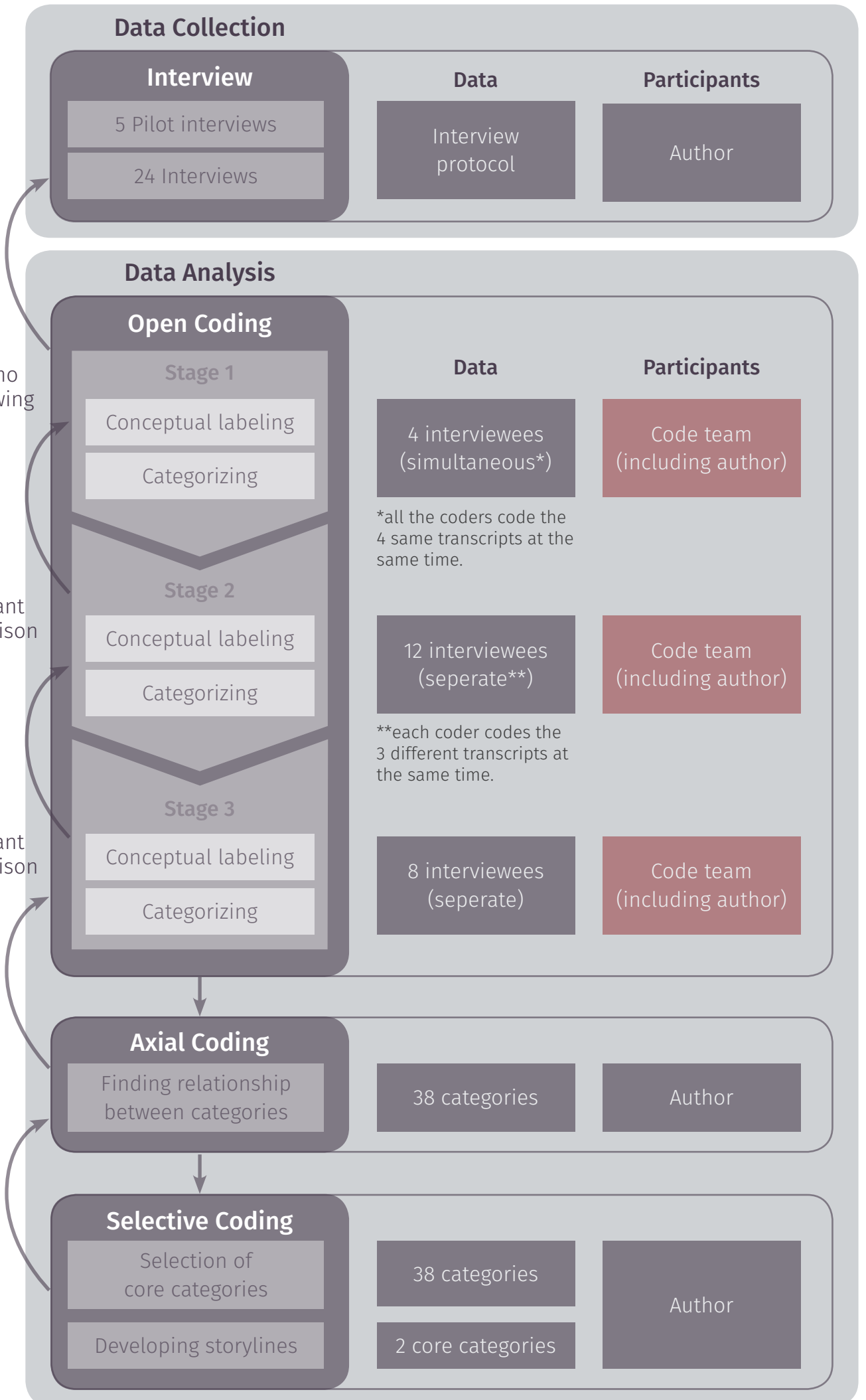
2 core categories

Author

Memo reviewing

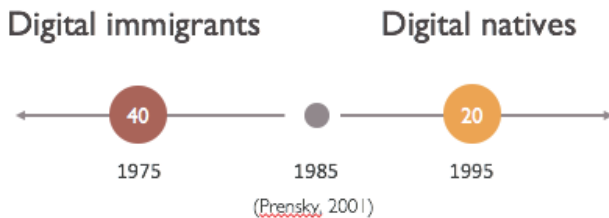
Constant comparison

Constant comparison



## METHOD - before interview

### Interviewee Sampling



### Gender and age

According to literature review in the previous section, data was collected by 24 interviews with younger adults (13-20 years old) and elder adults (40-51 years old) in Taiwan. In addition, **participants are requested to have at least one important virtual possession** such as digital photo, music, text messages, files and software, even the Facebook account.

In addition, according to previous studies of self-extension and attachment to possessions (Belk, 1988; Kleine et al., 1995), men and women extend to possessions differently. Hence, **we tried to make the tender of participants as equal as possible.**

### Online Questionnaire

**All the participants were recruited from the Internet with a poster.** Not everyone who signed up for the interview was ultimately selected for the participant. **People were asked to fill a prescreen questionnaire in advance in order to make sure their conditions are fit in this study.**

There are three main purposes of the prescreen questionnaire: information for participant's most important virtual possession, usage habit of digital device and personal contact information. Table 3.1 shows the questions in questionnaire and the justification of them.

Eventually, twenty-four participants were selected from the prescreen questionnaires. **They were following sent an email, inviting them to schedule a time for an in person interview with the researcher.** Every participant was offered 300NTD and a MUJI notebook for incentive.

**受訪者徵求**

您好!我是成功大學工業設計研究所碩士班的徐佳穗,研究論文為「虛擬物件的情感連結研究」。因研究需要,希望能徵求符合以下條件之受訪者。若您有意願協助我的研究,或是有適合的推薦人選,請不吝與我聯絡,非常感謝!您的協助將對於我的研究有很大的幫助。

**訪談內容(約一小時)**

卡片分類 → 訪談

- ▶ 訪談時需觀察您平常使用的智慧型裝置及其內容,手機、平板、筆電、桌電或PS4都可以。
- ▶ 所有資料都將匿名,只作為本人研究使用。

**需要的受訪者**

- 20歲以下 40歲以上
- 有自己覺得很重要的「虛擬物品」,例如:數位照片、音樂、文字訊息、檔案或軟體,甚至是Facebook的帳號(個人頁面)都可以。
- 摸不到-沒有物理特性的東西都算虛擬物。

**回饋方式**  
現金300元、小禮物與滿滿的感謝

**聯絡方式**

或直接填問卷報名!

<http://goo.gl/forms/gQkFkqBnbD>  
我會在收到問卷後主動聯絡您!  
衷心感謝您的幫忙!



## 訪談背景資料調查

您好，謝謝您願意協助我的研究！  
這份問卷是在訪談前的簡單資料調查，希望您能幫助我花一點時間完成它。  
我收到資料後會立即與您聯絡相約訪談時間。  
再次感謝您，有任何問題都歡迎用任何方式與我聯絡喔！)

\*必填

### 虛擬物

虛擬物定義：數位照片、文字、數位創作、音樂檔案、播放清單、軟體、遊戲上的寶物、Pinterest版上的資料、Facebook個人頁面上的所有物件...等都算是。

請列出身邊你認為「重要的」個人虛擬物品。\*

只要認為重要就可以列出來。

請選出並寫下上述對你來說你覺得「最重要」的個人虛擬物，並以它為依據回答下列問題。\*

你會在這個虛擬物不見了（或被刪除了）嗎？\*

- 會  
 不會

其他：

請問你平常使用的數位裝置有哪些？\*

- 手機  
 桌電  
 筆電  
 平板  
 遊戲機  
 其他：

你認為自己是「會管理自己的物品」的人嗎？\*

- 是

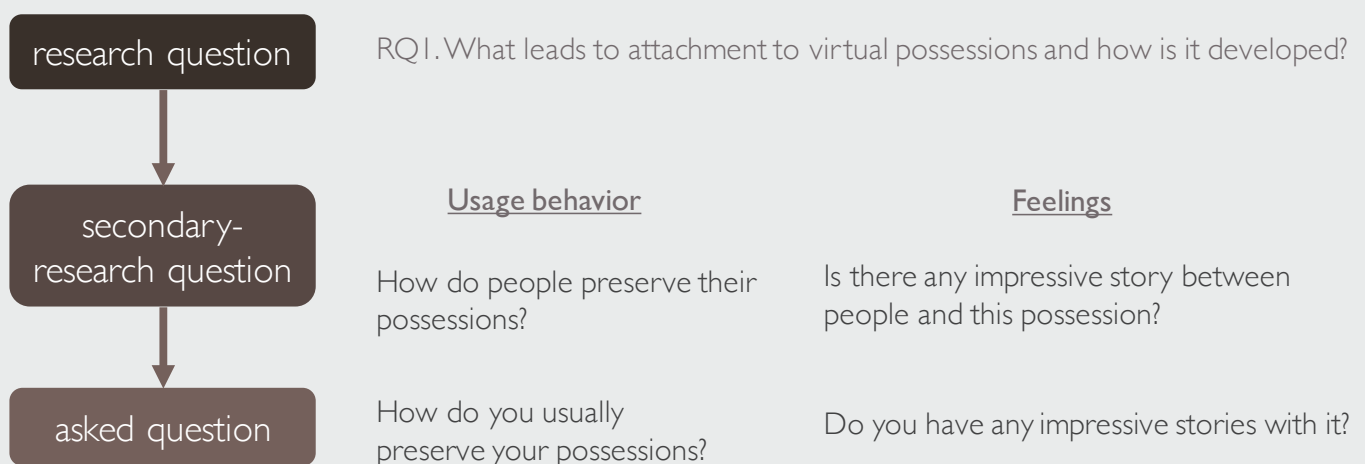
## METHOD - before interview

### Interview protocol design

A tentative interview protocol was design for 5 pilot interviews. Several problems were modulated and a primary protocol emerged for 24 formal interviews. **During the interview process, protocol was iteratively modified according to the previous one.**

To develop further research questions as interview questions, the justification of the research questions is required. The research questions have been deconstructed into several secondary-questions in order to specific in the interviews. The secondary-questions were designed based on the literature and pilot study.

The secondary-research questions were classified into three categories: usage behavior, feelings and personal value. Questions of understanding participants’ mindset were added in order to further understand the deeper reasons of usage behavior and feeling.



### Interviewing

All the twenty-four interviews were **audio recorded and transcribed**. Field notes and photos were taken when necessary during the interview.

Participant could **choose the preferred interview place** as long as it is quiet enough for audio recording. Thus, most of the interviews were conducted in public café or restaurant. Few of them were hold in participants’ home and work place.

The interviews were conducted in **semi-structure**. Thus, interviewer could **adjust the questions and their sequence depending on different conditions**. Each interview was hold approximately **1.5 to 2 hours including the card-sorting task**. Participants are encouraged to **bring and share their virtual possessions** while answering the questions.



## Card-sorting task design

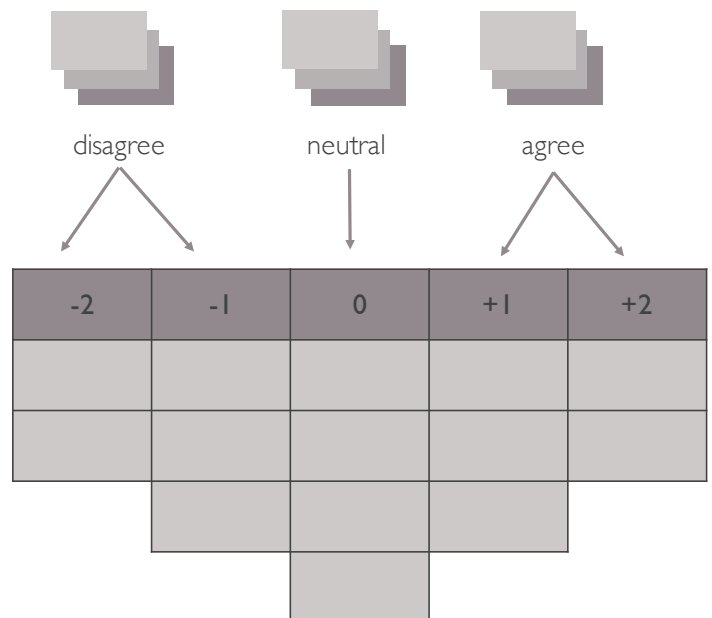
- (1) Help the participant adapt to the concept of “attachment to virtual possessions.”
- (2) Understand the emotional relationship of participant and their virtual possessions roughly before interviewing.

According to the pilot interview, we found it is not easy for participant to realize the concept of “virtual possessions.” Some elder adult cannot easily answer the question about “digital possessions (Cushing, 2012)

40 ×

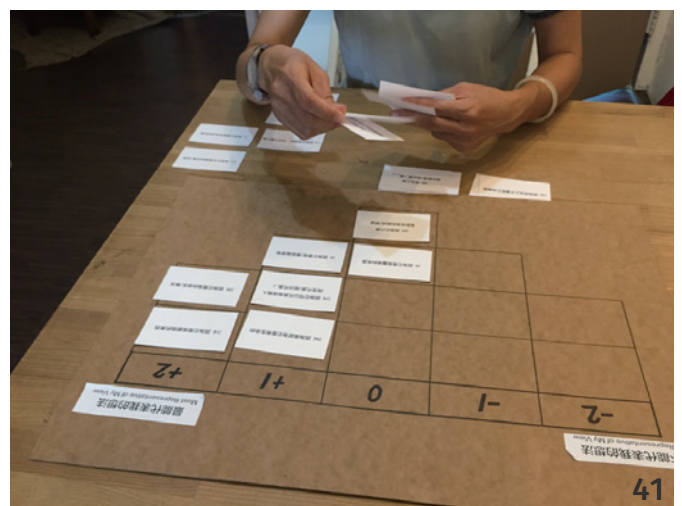
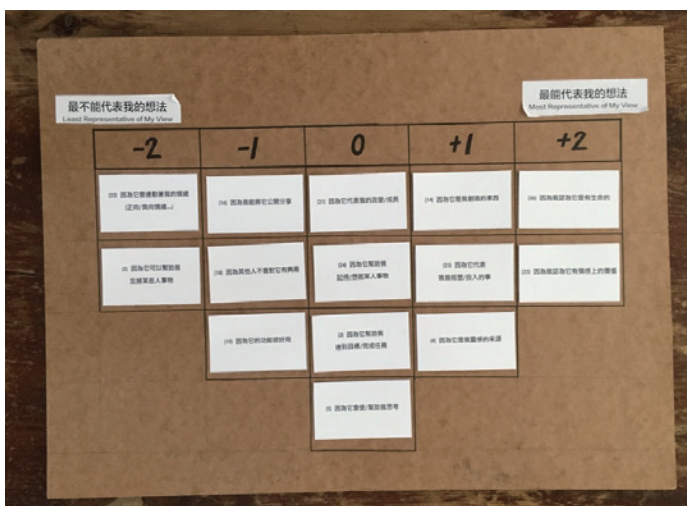
40 card statements  
“Causes of attachment”

- (1) It's useful as a record.
- (3) It helps me achieve my goals.
- (7) It keeps me connected.
- (9) It helps me communicate with people.
- (11) There is no hard copy of it.
- (13) It's for work/school, professionally related.
- (14) It's something I create.
- ⋮



I referred **Q method** while designing the card-sorting task. Q method usually used to elicit individual’s viewpoints by card sorting. The sorting task was hold in before every interview.

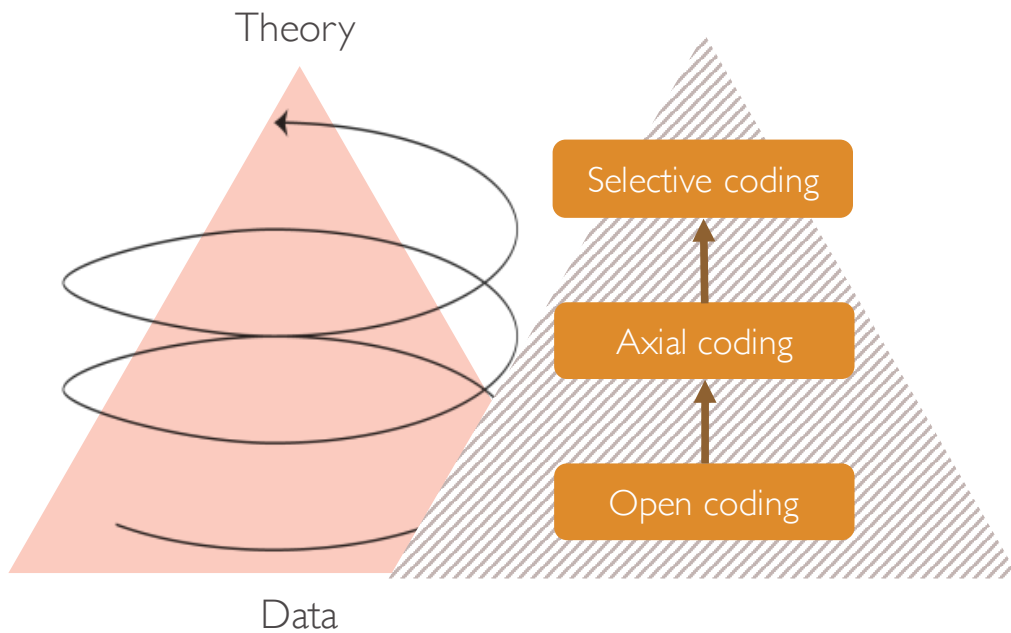
I was **taking notes and watching beside in order to answer all the questions** that participants might have with the statements.



## METHOD - data analysis

3 stages of coding

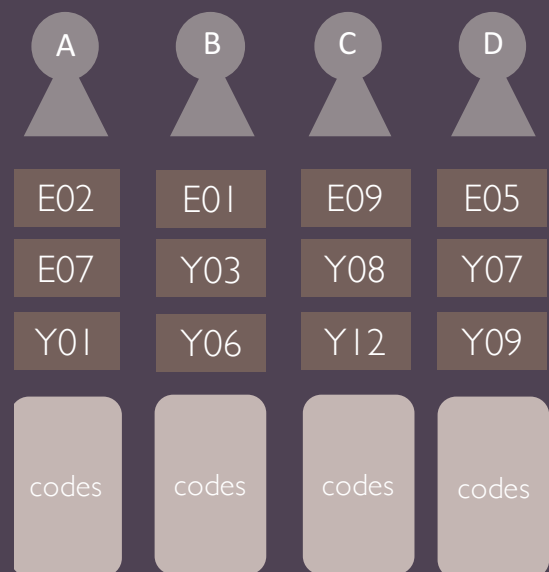
All the vocal data from interview were transferred into transcripts in order to be analyzed by coders. All of the transcripts and filed notes were analyzed by open coding, axial coding and selective coding. The three stages of coding is conducted for **extracting the core categories** of relationship between participants an their virtual possessions.



### Code Team (only for open coding)

For a better **reliability**, a code team was established in the stage of open coding. **All of the data were reviewed and discussed by coders repeatedly so as to prevent the viewpoints from over-subjective.**

There are four coders in the team consisted of three graduate students and the author. All of the coders are from Department of Industrial Design in Cheng Kung University but **with the different background, including Engineering, Phycology, Literature and design.**



▲ For example, in stage 2 every coder needs to code 3 different transcripts.

## Open Coding

Coding 24 interviews in one month was big challenge for me. It was fortunate that I had an effective code team. We had about 15 times intensive meetings online or face-to-face. We used Google sheet and Skype in order to code and discuss together at the same time.

The image shows two Google Sheets documents. The top sheet is titled '第一次編碼(All coders一起編 > 產出初步分類標題)'. It contains a table with columns for 'Text' and 'Code (概述)'. The bottom sheet is titled '第二次編碼分類(只編只PO一篇, 雖然好像天天都很精彩, 但是我不會每天PO...)'. It contains a table with columns for 'Category No.', 'Code', 'Text', and 'Note'. A large red circle highlights the first 18 rows of the main data table in the top sheet.

Text	Code (概述)
(E06) FB內容有相片, 文章, 充滿個人色彩。	臉書有個人色彩
(E06) 音樂對我來說比較不那麼重要, 因為隨時載就有啦。	可以隨時下載, 所以不會把手機照片刪掉
(E06) 相片的話, 其實我拍完選個一兩張我會把它不斷刪除, 反而是放到臉書上都是慎選過的。所以臉書上的照片其實幾乎才是經比如說拍五張一定選一張, 其他四張都是可以刪掉。	臉書上的照片是精選
(E06) 在手機裡刪掉是因為要把空間挪出來。不然一直拍空間不足那之後就會把手機照片刪掉	會把手機照片刪掉
(E06) 對話紀錄倒不是沒有很重要, 老實說我覺得FB應該是比較屬於個人色彩, 就是讓你看我個人的相片	臉書對話紀錄不重要
(E06) 對話紀錄我沒有覺得他很重要。	臉書對話紀錄不重要
(E06) 所以不見了也沒差? 哈哈這樣好像很對不起別人...但是是這樣沒錯。	臉書對話紀錄不重要
(E06) 是朋友推薦的, 說這樣好像比較方便做紀錄和增添生活色彩。	朋友推薦使用
(E06) 對, 像... 對一開始用就很適應了。一開始沒有PO很多文, 一開始好友也很少	一開始就很適應
(E06) 其實這要看個人心情心情, 好的時候就會比較多PO文。	心情好PO文
(E06) 現在會開始自我控制欸, 這個好像是在秀自己的生活, 控制PO(1-4裡)	控制PO(1-4裡)

Category No.	Code	Text	Note
受訪者背景資料			
	編號	E07	
	職業	高中老師	
	性別	女	
	覺得重要的物件	FB個人頁面PO文、創作、個人blog、有用的書籤	
	物件使用時間	FB約6年	
	情感依附對他來說是? (總結)	生命的紀錄/創作的作品, 重要的資訊	
a	科技產品使用習慣	電腦、手機, 基本文書處理, 沒在備份	
b	對科技產品的態度	中等熟悉 (只熟悉自己會使用的功能)、但不排斥	
c	生活環境	工作環境影響 (創作的環境)	
d	生活模式	幾乎每天都會創作、使用	
e	自我認知	自我反思力很高	
f	個人特質	管理很亂、永遠覺得時間不夠	
訪談編碼			
	所有的創作	(E07)我的創作, 我寫的詩啊, 或是沒有完成的小說。沒有完成的劇本。就是各類, 或是一些靈感	
	以前寫在稿紙上被丟掉	(E07)以前就是會寫成稿紙。我就是有一個經驗很深刻, 有一次寫一篇小說, 然後我不知道為什麼就是投稿出去了然後, 有影印, 然後那個	
	這些創作很重要	(E07)對! 所以那種感覺就是... 那搞不好是我的地一篇小說欸, 萬一以後我成名了, 那篇就不見了耶。然後就會覺得...	
a	以前都寫在稿紙上	(E07)沒有, 因為早期創作都是寫在稿紙上, 不然就寫在日記本, 然後寫在紙上, 就寫一寫。你要投稿的時候就是稿紙影印這樣。所以我的	
a	曾經因為不願轉換成數位輸入而失去工作	(E07)其實一開始是很排斥的, 我記得我以前有一個階段啊, 就是還蠻常在寫一個讀者意見, 那個還有稿費, 然後我覺得對我來講還蠻簡單	
a	曾經因為不願轉換成數位輸入而失去工作	(E07)就是, 我就有點抗拒那個時候, 我是覺得說, 可是我就還蠻習慣爬格子的, 然後就是說我那時候嘴巴硬說有沒有刊登出來都沒有關係	
	轉變過程: 創作在稿紙上的氛圍	(E07)所以就是慢慢慢慢就會了解到說, 真的, 因為我頭先是覺得創作是一個很... 就是你... 你有一些... 這真... 43... 點小癖好, 就是	
	臉書「即時發表」的特性, 讓他成功轉換	(E07)但是現在, 我是覺得用了臉書之後, 我覺得那個抗拒就會完全沒有了。我覺得臉書出來... 我會被臉書制約到, 有時我在想什麼...	

## METHOD - data analysis

3 stages of coding

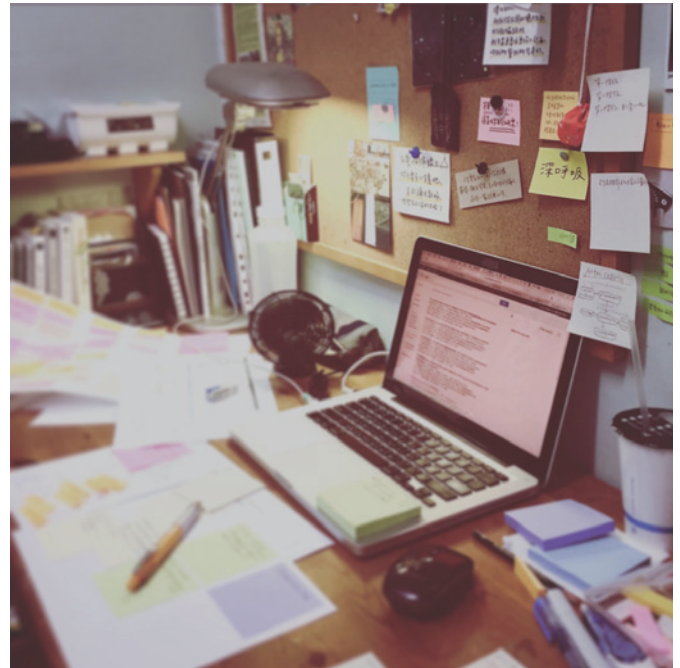
### Axial Coding and Selective Coding

In axial coding, the researcher has to **connect categories into one key element**, called “in vivo concepts” (Strauss & Corbin, 1990), which contain the researcher’s thoughts and ideas, and the concepts also have their own dimensions and properties.

After axial coding, several main categories were emerged. Based on the research question, **the core category - the attachment development of virtual possessions was formed and some categories were united and developed into a storyline.**

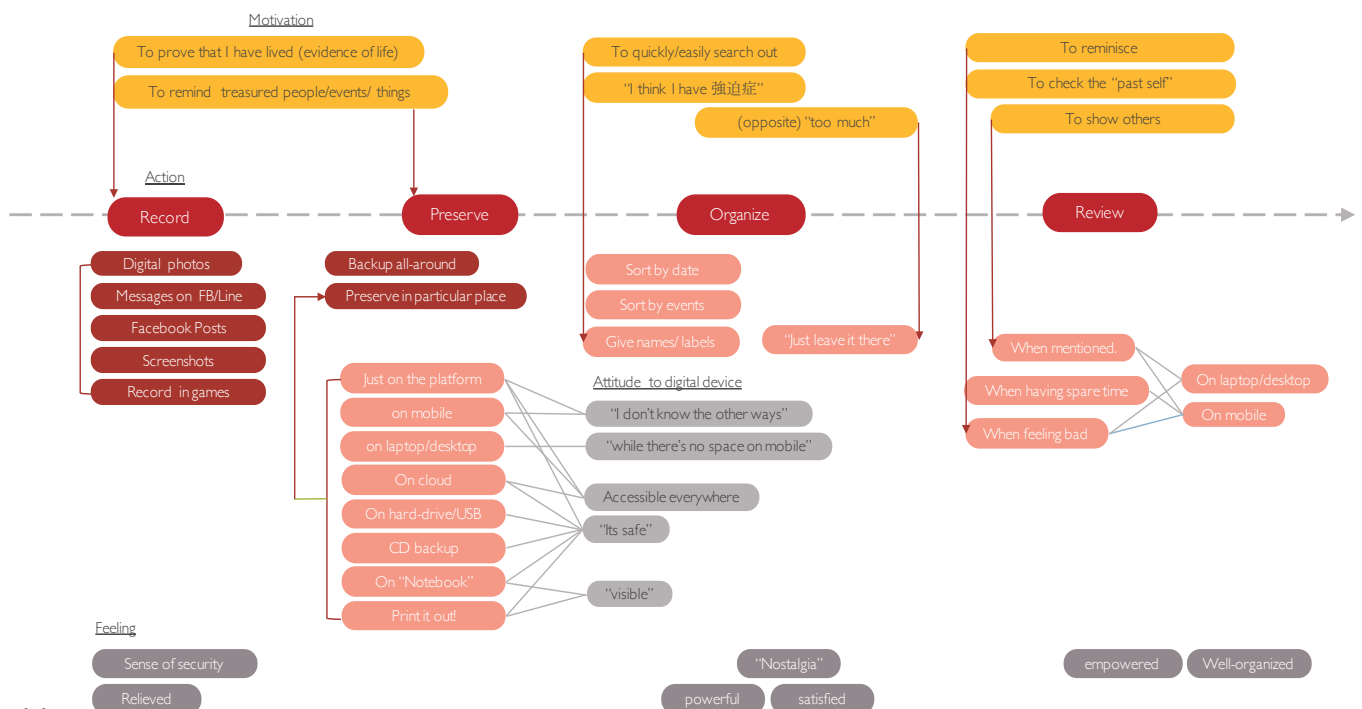
### Reflection

It’s challenged! In this phase, I analyzed all the categories and their relationship by myself. However, I had learned a lots about **how to get alone with my data and talk to them.**



▲ My crazy table while doing axial coding.

▼ A sample of axial coding of one virtual possessions - "valuable memories".



39  
categories

the **relationship** between categories

**Cause &  
consequence of  
attachment**  
(22 categories)

**Usage  
behaviors**  
(11 categories)

**Other  
factors**  
(6 categories)

core categories and storylines



# FINDINGS

As a qualitative research, there are a great quantity of findings and their meanings. Following I will briefly introduce the categories of the findings. However, the interesting and detail findings which need to be support with data and reference would not be presented here (also due to the copyright). Still, references are available upon request.

### **General Discussion of Attachment to Virtual Possession**

After understanding of causes of attachment and the relationship between attachment, self and usage behavior, we conclude that there are two key elements for developing an attachment to virtual possessions. We could found almost all the attachment in every type of possessions have the elements of sense of self-extensions and possessing. However, there are still some situations that not both of them exist at the same time.

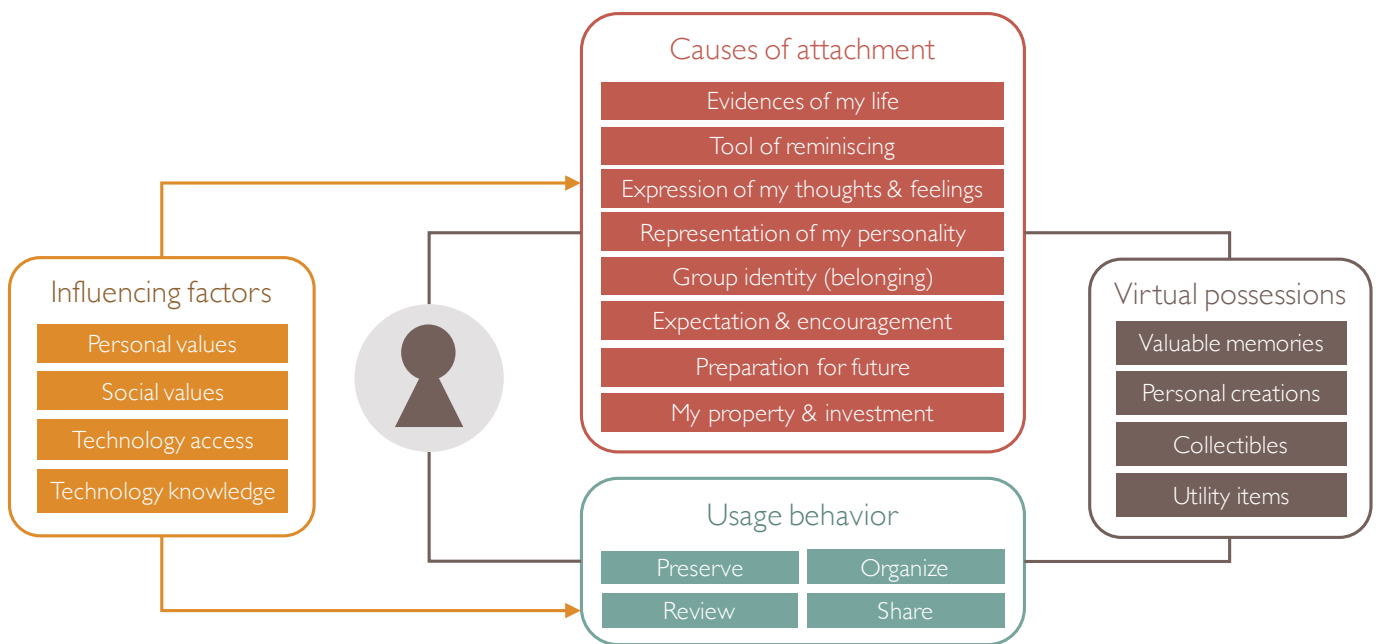
### **Interrelationship between Sense of Self-extension and Possessing**

Self-extension would become stronger or weaker and even develop to different kinds of relationship during the process of attachment development. The emotions generated by self-extension and some usage behaviors will facilitate the sense of possessing, and will further strengthen the emotional relationship. Finally, the emotional relationship becomes strong and durable enough to keep the virtual possession from being discarded.

However, even though the sense of possessing is not a necessary element to attachment development, there is one case in our study shows lacking of a sense of possessing may also weaken

the attachment development. The example is, even though participant Y12 feels the message histories are related to him, he finally accepted to discard them because there is no method for him to preserve them well. *“I used to attach to my message history on Line. But several times after formatting they were all gone. At that time I was very depressed but after a while I just thought it was not a big deal. Just felt relieved gradually.”* (Y12)

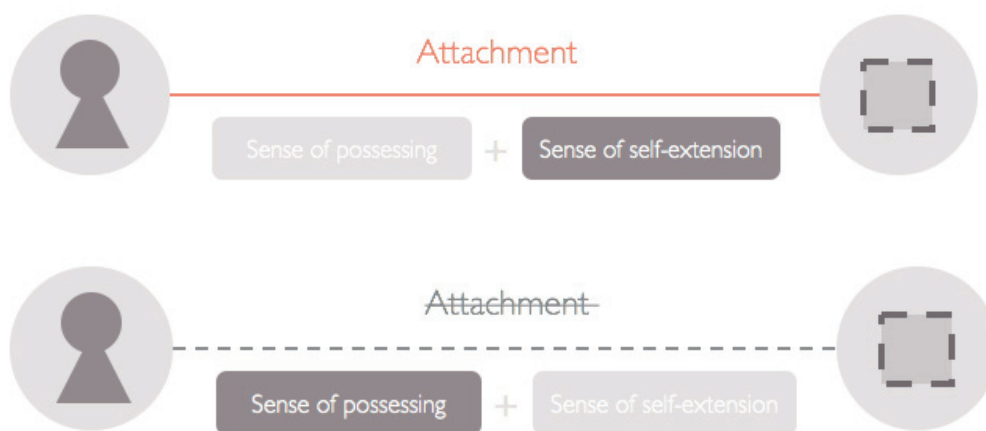
Overall, all types of the attachment that make the virtual possession durable need a sense of self-extension. Individuals build the relationship with a virtual object because of self-extension. Those motivations make individual have several usage behaviors and feelings, which may generate a sense of possessing and influence back to the strength of relationship. Finally, attachment has developed and the emotional relationship becomes strong and durable.



## FINDINGS

Two key elements for developing an attachment to virtual possessions were found: sense of possessing and sense of self-extension. Overall, **all types of the attachment that make the virtual possession durable need a sense of self-extension**. Further, "Sense of possessing" is not a necessary factor for developing attachment but it may effect the strengthen of attachment.

Individuals build the relationship with a virtual object because of self-extension. Those motivations make individual have several usage behaviors and feelings, which may generate a sense of possessing and influence back to the strength of relationship. Finally, attachment has developed and the emotional relationship becomes strong and durable.

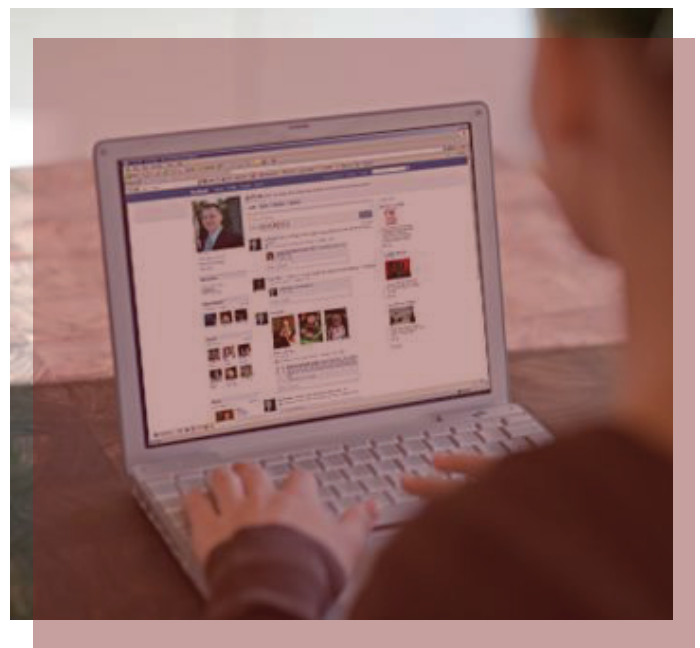


## IMPLICATIONS

Design an strong emotioanl relationship between huamn and their virtual possessions.

- 1 Make the connection to user's self
- 2 Make users feel a sense of possessing
- 3 Considering the influencing factors.

As a consequence, although creating a strong and durable attachment may need a big amount of user researches, there is still a chance to create a virtual possession that has the potential of attachment by understanding all the causes and factors.





## WHAT I HAVE LEARNED...

1. "I cannot do a complete research covering everything, but I can do a research having complete structure."
2. Having **an objective team** is very important while doing research. Especially when I am the interviewer.
3. Writing can improve the efficiency of thinking.
4. Time is always limited. **Be flexible with the method.**
5. Trying to probe deeper and insights will pop up themselves.
6. Influencing factors are everywhere. Do not try to avoid them but accept and analyze them.
7. Qualitative user research is like story-telling. We need to pay attention to **context and emotion.**
8. **User research is so fun and meaningful!**



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