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探索永續設計中說服力的影響脈絡

Persuasion in Sustainable Design

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摘 要

全球經濟的快速成長與科技的進步讓生活變得愈來愈方便，同時隨著世界人口的穩定爬升，消費的日與遽增，然而，大眾需求被滿足的同時，卻也忽略了人和環境之間重要連結，而帶來了浪費與資源短缺的情形。而這些環境問題到底不是明天就會發生在眼前也造成了消費者無關痛癢之感。環境的破壞無一不由車輛、工廠等各類明顯或細微的人類活動所造成，即便是生活中購買食材的習慣都高度相關。食物是生活中不可缺少的一環，而受現代科技所賜，進口食物比以前容易的多了。「食物里程 (Food Mile)」的概念，指的是我們嘴巴和食物原產地之間的距離。里程高，表示食物經過漫長的運送過程，一路上交通工具所消耗的汽油，和隨之而生的二氧化碳，破壞了環境。

近年來，由於環保意識的抬頭，永續設計逐漸為人所重視且慢慢地成為一股未來趨勢。如何在不可逆的消費型態下讓消費者重視並落實永續觀念則成為首要之務。然而，在設計師試圖以綠色設計等各類手法來傳遞觀念並影響消費者行為的動機下，消費者如何被影響、又是什麼得以成功影響等脈絡則為值得探索的領域。因此，本研究便以上述提及與日常生活最息息相關的一個活動議題作為開端，試圖探索永續設計平台中說服力（勸誘）的影響脈絡。

本研究透過文獻探討，對現有說服力科技（勸誘科技）的相關研究做一深入瞭解，接著運用理論框架中所選出的五類勸誘影響手法以及使用者為中心的設計方法為基礎，開展出一原型設計（Mixed-fidelity Prototype），並將此原型作為研究工具，用以探查潛在消費者族群對於永續設計的觀點。研究中透過受訪者訪談（In-depth Interview）與場域內情境式測試（In-situ Scenario-based user testing）作為資料蒐集的方法，並採用親和圖（Affinity Diagram）與（Means-end Chain）來將使用者陳述做進一步歸納，整理出勸誘手法的影響層面及對永續觀念所產生的價值觀。

根據研究結果所統整出的三個影響面向以及十二條重要的價值觀，我們可以對於潛在使用者面對勸誘式永續設計時被影響的脈絡有一全面性的瞭解。此外，本研究從了解受影響的動機與脈絡做整合，進而提出七個正向與三個負向等十條相關的設計原則，為灌輸永續觀念的勸誘設計上，提供更多具體的參考方向。

關鍵字：

說服力科技、社會影響、行為改變、使用者中心設計、使用者經驗、食物里程、永續設計

Keywords. Persuasive Technology, Social Influence, Behaviour Change, User-Centered Design, User Experience, Food Mileage, Sustainable Design

Abstract

The global economy growth and advancements in novel technologies are rapidly changing our society and lifestyle. In the era of consumption, our demand of ever-growing consumption of goods can be readily sufficed. As the consumers' need is satisfied, it brings the neglect of the awareness to the vital connections between us and the environmental issues, which are not an immediate urgency to be seen at present. Issues such as pollution and global warming are resulted from vehicles, factories to very subtle human activities; even our food purchasing habit in daily grocery shopping is highly influential. Food is indispensable for our lives. Modern technology had made food imports convenient and easy. The concept of "Food Mileage (Food mile)" is defined as the distance food travels from where it is grown to where it is ultimately purchased by the consumer - higher the food mileage, higher the fossil fuel consumption.

With the growing concerns in recent years, sustainable design has become critical and a future trend. It is a priority to make consumers keep this issue in mind and take eco-friendly actions under this irreversible circumstance. However, when designers attempt to express the right attitude and influence users with sustainable design, little has been discussed that how consumers were influenced and what is successful in changing their behaviours which are the areas worth exploring. Hence, start from this one of the most relative activities in daily life we intended to investigate the persuasion in service platform to change the behaviour for the better.

Through the literature review we have an overall understanding of the research domain on persuasive technology and the psychology of persuasion, and then five main approaches were selected according to the context as the testing fundamentals. On the basis of user-centred design method and persuasive technology framework, we have developed a mixed-fidelity prototype as a research tool to investigate the participants' perspective on sustainable concept. From the in-depth interviews and the in-situ scenario-based user testing, users' statements were coded by Affinity Diagram and Means-end Chain methods, three influential dimensions were summarised with a deep understanding of the twelve main values towards persuasive sustainable design.

With the findings we discovered the significant influential factors of sustainable design which mediate the user responses. Ten design guidelines (3 don'ts and 7 do's) for persuasive sustainable design were proposed. Furthermore, we foresee that these findings and a series of design principles can be referenced for future design/research regarding attitudes and behaviour change.

誌謝 Acknowledgements

過了這麼久，論文也該寫完了。

怎麼說，我其實是一個很不務正業的研究生，所以這兩年半來，第一個要感謝的就是鄧怡莘老師，總是很因材施教並且給我最大的自由去做想做的事情。（雖然我也一直很不好意思沒有跟到很多案子...老師以後有需要幫忙別客氣！）跟到鄧老是我念研究所最大的收穫，在學業上謝謝老師總是在我們當局者迷的時候留點時間讓我們自己去思考，真的卡死了才告訴我們答案。在生活、工作中很迷惘的時候，老師也是每一次都可以很神奇的用一句話就解開迷霧，比風靈珠還靈。跑去老師家跟老師和師母聊天一直都是很棒的一件事情，希望畢業以後可以一直再去打擾，哈。我從鄧老身上學到的不僅是真正的 User Experience，還了解到什麼是盡人事、聽天命的踏實。As a researcher, 老師超有涵養的，也超酷的（膜拜）！再來也要謝謝莊明振老師和李峻德老師，兩位老師很用心的幫我檢討論文，讓我看到很多沒有注意到的細節，也讓我再繼續琢磨了很多。

謝謝應用藝術研究所 IAA96 的同學，你們是集玩樂靠北與認真到破格於一身的一群最棒的夥伴（太饒舌了）。謝謝你們在我碩一工作過頭的時候超有義氣的罩我，這個恩情我三十輩子也還不完。謝謝同梯的秒咪，幫我在新竹一人跑兩人份的碩士口試申請還有離校手續，還有好多熬夜的討論跟互相打氣，沒有你我大概真的畢不了業，嗚。謝謝芊芊來自日本的好多小禮物，我一定會趕快把小鹿班比拼起來。謝謝我的新莊市好鄰居小嘉大車隊長達半年的接駁。謝謝溫芊芊跟阿絲的噗浪尋夢園聊天室，這一整年網友可不是做假的。謝謝課長去年跟我一起拼命、給了很多意見跟最後的叮嚀幫忙，雖然我半途~~陣亡~~延後了，可惜沒有機會跟你一起準備水果。謝謝陳姵常常陪我聊天、爆八卦和加油，每次講完心情都會變很輕鬆。謝謝采芳、小志的口試順利小禮物、可薰的加油噗、熊貓人、ㄆㄆ和課長的加油簡訊、還有口試前天+當天情義相挺的~~蚵腐~~珂莆、瑞大、歐佩、阿給和放克腳（IAA96 就交給你收尾了）。嗯，我能夠畢業，真的全都是因為你們。

另外也要謝謝拉拔我長大的 ASUS User Experience ~~辣薩~~ Team 的同事一路上的陪伴。還有尊絕不凡台科大的老同學家毓、瑋華、小詩、Xocial 學長，你們在噗浪上的加油和吵鬧，都是我寫論文不可缺少的零食。

Special thanks go to Roshan Peiris, who has been one of my strongest supports. Thank you for being so nice and tolerating my crankiness and whining when I was stressed out, and always encourage me and share the ups and downs whenever I needed. You are the most caring and patient person I have ever met. It means a lot to me.

My thanks go to Julia Howard, who proofread my 80+ pages thesis in a week, even though you were busy. You have made the sentences much more decent and readable – I really appreciate that.

I am also grateful of having been accompanied along my colleagues and friends in Cute Center & MXR Lab, NUS in Singapore. Thank you for your cheerful words and supports all the way this year.

最後要謝謝我的家人。謝謝爸爸、媽媽和妹妹一直以來都這麼相信我，並給我百分之兩百五的支持。你們是我最強力的後盾，讓我知道我永遠都有個家可以隨時逃回來，所以才更能放心的去衝。常常讓你們擔心我的生活作息，真是不好意思。還有謝謝軒豪哥、小金姐、蕙如姐、佳翰跟佳霖精神上的支持！

兩年半，總算親身證實了一個論述「IAA 太棒了，我考一百次也要念這裡！（溫千慧，2010）」

謝謝謝謝，我準備畢業了。

Once again, my deepest gratitude to everyone, I could not have done it without you.

吳佳欣 Cathie, Chia-Hsin Wu 謹致

中國民國 99 年 4 月

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Chapter 1

Introduction

Everything that has ever happened in all of human history, has happened on that pixel. All the triumphs and all the tragedies, all the wars all the famines, all the major advances... it's our only home.

Al Gore. An Inconvenient Truth, 2006

1.1 Background and Motivation

Since the industrial revolution commenced from the textile factories in England, industrial society has thrived within the last two centuries. The global economic growth and advancements in novel technologies are rapidly changing our society and life to be significantly more convenient and less expensive, as well as the world's population moving steadily up the ladder of mass consumption simultaneously brings the waste and the shortage of resources.

In the era of consumption, today's lifestyle readily suffices the demand of ever-growing consumption of goods. While consumers' satisfaction is measured only in terms of quantities of goods and services consumed, we lack the awareness to the vital connections between us and the environmental issues surround us. Clearly, the environmental implications of the global spread of mass consumption of resources use are staggering. The environmental problems regarding sustainability are indeed the major issue that the world is facing at present. Numerous global environmental implications have compelled us to examine the impact that humans have made on the earth. More than we could imagine, the severe problems such as pollution, ozone depletion and global warming are resulted from not only vehicles or factories but are also from very subtle and oblivious human activities- even our food purchasing habit in daily grocery shopping is highly influential.

Less than half a century ago, carriages or carrying by piggyback were used to transported goods to markets where the distance from the origin to the market was only about 20 kilometres. The advancements in international shipping and refrigeration techniques nowadays have transformed the transport of goods. The massive amounts of food import and export has become

a part of our life that we take for granted along with neglecting the environmental problems it could lead to. In 2005, 86.5% of total worldwide energy consumption was derived from the combustion of fossil fuels, which produce carbon dioxide (Statistical Review of World Energy, 2009). This has led to a significant increase in concern for environmental issues such as global warming, the greenhouse effect, energy use, etc during the past few decades (Pirog, 2004). Long distance food transportation is a major consumer of the fossil fuels, increasing greenhouse gas emissions, which contribute to global climate change.

As a threshold, in 2005, long-time vegetarians and environmentalists Alisa Smith and J.B. MacKinnon practiced a concept called "100 Mile Diet". They decided to spend a year eating only food grown within a 100-mile radius of where they live after discovering that the food eaten by the average North American travels 1,500 gas-guzzling miles from farm to grocery stores. Thereafter, the concept of "Food Mileage (Food mile)" has become a practical awareness for public. "Food mileage" is defined as the distance food travels from where it is grown to where it is ultimately purchased by the consumer or end-user (Pirog, Pelt & Enshayan, 2001). The higher the food mileage, the higher the fossil fuel consumption, thus, in our day-to-day life, food mileage is one of the vital issues concerning environmental sustainability. Consumption, however, is a necessary evil and thus drives the capitalistic "need lifestyle" to acquire more and more stuff- all of which holds profound implications.

Food is indispensable to our lives. Due to modern technology, food can be even more easily imported than before. Statistics show that approximately 385,000 tons of vegetables, 567,000 tons of fruits and 1,590,000 tons of potatoes have been imported to Taiwan in 2006, which consumed considerable energy (Accounting and Statistics, Executive Yuan, Taiwan, 2000). The supply mode of hypermarkets in Taiwan is also traditional and fixed. Regional agricultural products must be transported either to northern, central, or southern distributors, and redistributed to the supermarkets in each region. Such repeated transportation modes do not only increase the pollution caused by the emission of exhaust fumes, but also reduce the quality and the freshness of food. Thus, under these irreversible circumstances, individuals must consider to take appropriate measures to make the best use of the resources effectively in order to reduce environmental destruction and reach the sustainable prosperity between mankind and the environment.

There is no doubt that individuals play an important role in the local environment. Yet it is likely for people to neglect the severity of environmental implications, as the consequences are not striking or closely related to our life. Situations such as the polar bears extinction due to the sea

level rise, or the ozone depletion resulted from over-using the air conditioning are not desperate enough because honestly, it does not harm us in the coming 30 years. On the other hand, even following the eco-instructions to take actions, for instance, to use less air conditioning, people still do not feel any good impact on the environment. Consequently, even though people have the eco-awareness in their mind, "eco-friendly" is still a beautiful slogan rather than an actual action that they will carry out every day.

Sustainable Design (Eco-Design or Green Design) originated due to the environmental and ecological consequences of modern technology in human society. It also represents the designers' moral values and social responsibility. For a long time, commercialised industrial design has created a higher quality of lifestyle and a better living environment, as well as become a medium to encourage people's uncontrolled consuming desires. Not until the rising attention on sustainable awareness in recent years designers cannot avoid the fact that industrial products accelerate the consumption of the resources and energy, which result in tremendous damage to the ecological balance of the earth - they have to face up to the problems and rethink the responsibilities and role of industrial design.

Victor Papanek emphasized designers' social and ethical values. He addressed that the most valuable effects that design brings about is not creating commercial benefits or highlighting the competition in respect of packaging and design style, but instead an appropriate element in the social changing process, i.e. to deliberately consider the limited resources of the earth and to commit services with the environmental consciousness. Chapman and Gant also mentioned the subjective sense of sustainability in their book *Designers, Visionaries and Other Stories*- that the same as consumption, sustainability is an issue that should be viewed in both subjective and objective angles, otherwise the trend would be difficult to be well formed. Designers should rack their brains to implant their customers a proper sustainable idea, rather than solely promoting the value of the design itself. Hence, as a current design student and a designer to be in the future, we should not blindly follow the fashionable design style, beautiful shape or novel functions like we used to do.

Sustainability in design is an important trend for the near future; it not only concerns an element in the brand image, but also a social responsibility that designers have to take. We must think carefully, how to use the design contents to change and influence people's fixed behaviour and lifestyle unobtrusively and imperceptibly under our current situation, in order to make people easily accept the eco-friendly concepts and carry them out in their daily life, in a natural way. Just as

the marketing tactics surround us, sustainable attitudes and actions are also things that need to be persuaded and promoted to ordinary people. Since designers attempt to change the behaviour for the better, it is important for them to adopt effective persuasive approaches in order to successfully mediate consumers' acceptance.

1.2 Thesis Objectives

In the HCI (human-computer interaction) field, there have been studies regarding changing individual or public behaviour and attitudes through persuasive technology approaches. The overall objective of this thesis is to probe into the context of persuasive methods to influence users' attitudes towards the sustainable concept. Our research focuses on observing the mental model change under the framework of getting involved in the eco-design and understanding that to what extent the persuasive design acts upon people's mindsets. The research is conducted with User-Centred Design (UCD) approach ensuring that we build experiences and insights that are firmly rooted in the perspective of the user.

We expect to reveal different outcomes that different approaches bring about at the certain phases – that is, in the genre of the interaction design, in regarding calculating sustainable attitudes, which is the most effective? Which is the most acceptable? Which generates engagement? What mediates not only behaviour, but also the mindset? In addition, this dissertation aims at identifying the properties of sustainable design, which are capable of allowing individuals to easily be conscious of regarding the impact of their own behaviours, to raise the awareness of their surroundings and to effectively cultivate and urge people to practice those actions as well as affect others' actions over time.

As a result, we believe that such a study may expand and improve the impressions towards sustainability, and hope to draw a conclusion to collect the design directions and principles regarding the susceptibility towards eco-design based on the findings in the research, which can be the reference for designers to facilitate the appropriate design in the future. The following list describes the general objectives of this thesis:

1.3 Thesis Structure

This thesis consists of six chapters. The remainder of the thesis is structured as follows (see Table 1-1).

This chapter introduced the research background and the motivation, the problems and challenges of sustainable design for influencing people's behaviour and outlined the goals and contributions of this thesis.

Chapter 2 illustrates the scope of this research work and develops the theoretical and technical background. First, the theories central to persuasion techniques and behavioural changing are reviewed independently. Second, the sustainable designs relevant to localization are described.

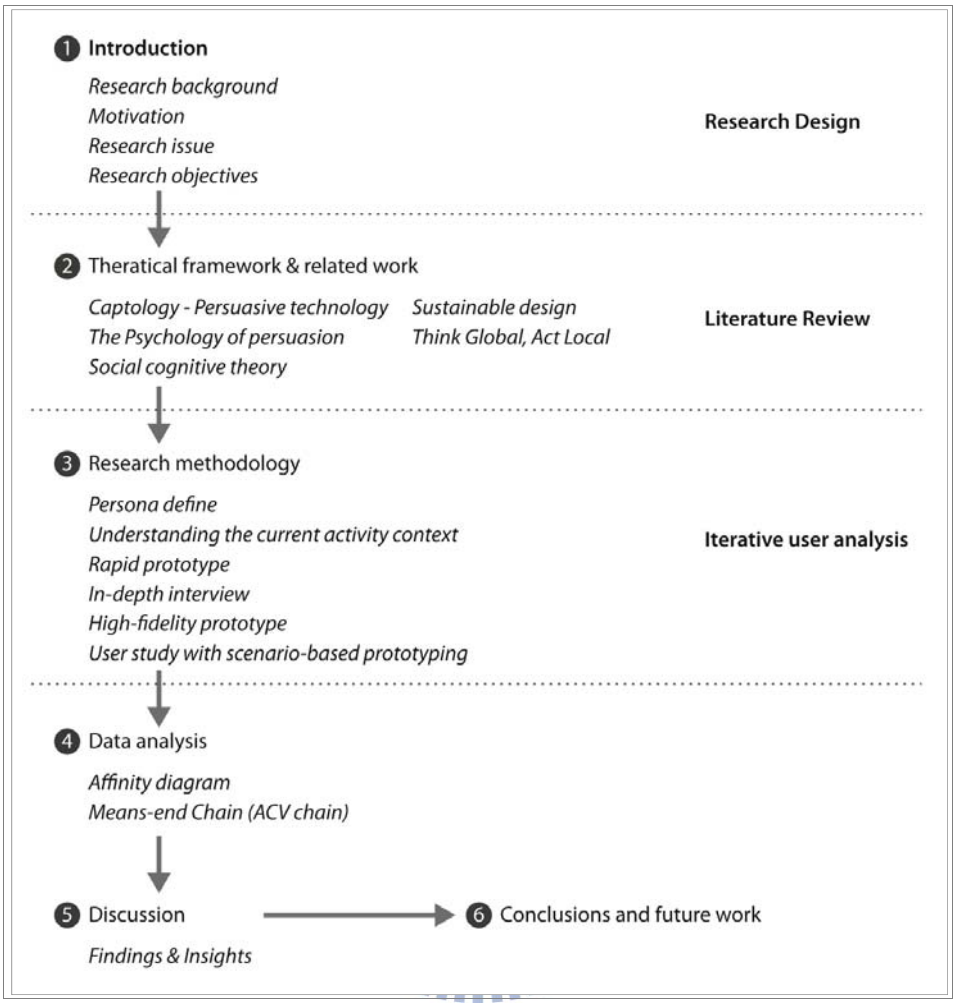
Chapter 3 describes the methodology of the user study and data collecting in qualitative research and analyzes this research in detail. The former study grounded is by the user-centred design method and elaborates the users, activities, context and information flow.

Chapter 4 presents the findings extracted and summed up from data coding.

Chapter 5 summarises insights in terms of persuasive design and delivers the implications and suggestions for influential sustainable design in the future.

Chapter 6 lastly specifies the conclusions and identifies further work to be done in this field.

Table 1-1. Thesis Structure



1.4 Research Limitation

Everyone in this planet is connected to the environmental protection, from individuals to government organisations, or enterprises in the industries are all responsible. In this study, we may only include the consumers (end-users) as our objects due to the research scope. Also, issues in sustainable design are various. In our study we chose food-mileage to be the design concept in our testing platform so as to link with our potential users' daily activities.

Chapter 2

Theoretical background

2.1 The research scope of Persuasion

Every day we are confronted by persuasion. Food makers want the consumers to buy their newest products, while movie studios want them to go see the latest blockbusters – the persuasive outside source is such a pervasive component in our lives, and most of this persuasion is very subtle and naturally stimulates our hidden needs, wants and motivations for a better and more fulfilling existence.

The fundamental theory of this study is social science and psychology theories with respect to persuasive technology and the psychology of persuasion. "*Persuasion is not simply the product or outcome of a message sent by a source to a receiver. It is a dynamic activity, a process in which both source and receiver, send and receive messages* (Perloff, 1993)." Persuasion signifies changing others' attitudes and behaviours with intent, as Perloff states that the act of "persuasion" must be an intentional act, include a message, and be accepted by free will (Perloff, 1993). Through different media, persuasive techniques attempt to influence one's intentions, behaviours or the identity toward any issues or other people within the society. Former studies have discussed this theory involved in attitude influence, motivation, behaviour change, which is regularly used in marketing fields such as advertising, sales, diplomacy, politics, public health, and management. Cialdini also introduced the six principles of ethical persuasion, and how marketing tools work on the public with scientific and psychological foundations. With the boom in computing speed and the Internet, various forms of computer technologies have infused into our life. Interactive technology enables the possibilities for people to interact with the contents in digital media, and simultaneously generates the impact on people derived from interaction. Hence, Fogg pointed out that the cross over and the overlapping space between "persuasion in general" and "computing technology" and the studies in the field of "persuasive technology" have been broadly defined as a class of technologies or interactive computing systems that are designed to change attitudes or behaviours of the users in human-computer interaction (HCI) domain ever since (Fogg, 2003; Ijsselsteijn et al., 2006).

2.2 Captology - Persuasive Technology

"Captology" is a new term coined by the psychologist BJ Fogg that refers to the study of computers as persuasive technologies and describes the overlap between persuasion and computers (Fogg, 1996). He founded the Persuasive Technology Lab at Stanford University and proposed the classification of three "basic ways that people view or respond to computing technologies" categorised by the dimensions of functional roles - as tools, media, and social actors - or as more than one role at once. (Figure 2-1)

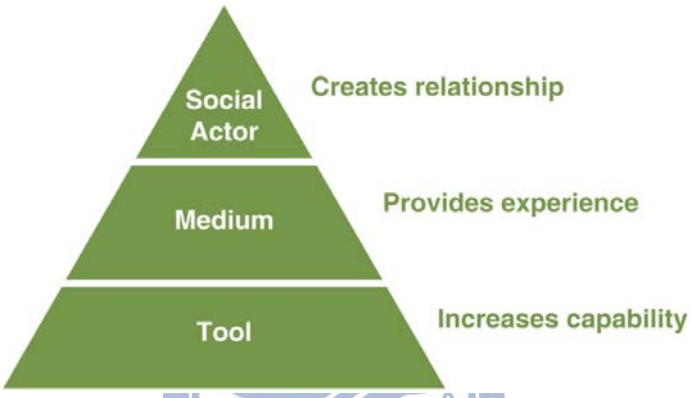


Figure 2-1. The Functional Triad of Persuasive Technology

2.2.1 Computer as Persuasive Tools or Instruments

Most commonly used as a tool, the computer application provides people with new ability or power, allowing people to do things they could not do before, or to perform target behaviour much easier.

There are seven types of tools to increase capabilities (Fogg, 1998). "*Reduction*" urges people to be more willing to do something through simplifying the procedures, e.g. the "just one click" button on the webpage allows users to have maximum gains with minimum actions. "*Tunnelling*" guides users to accomplish a specific task via designated steps, e.g. an installation wizard provides clear steps for the whole process with intervening encouraging words to influence task completion. "*Tailoring*" prompt the action through customization, e.g. recommends certain items to specific type of users, which may make them feel that the information is customised for them. "*Suggestion*" provides the right information at a right timing, e.g. showing user's driving

speed on the speed limit board in comparison to the current speed limit effectively tells them to drive safely. "*Conditioning*" reinforces behaviours with incentives. "*Self-monitoring*" and "*Surveillance*" influences people through the observation of others or themselves. In general, persuasive tools increases self-efficiency reduces barriers (time, effort, costs), provides information, advice for better decision-making and changes users' mental models. An example of a product using the persuasive tool is the *Polar Heart Rate Monitor* - an exercise device that sounds an alarm when a person's heart rate falls outside a pre-set zone. The device not only can motivate a person to change behaviour during exercise, but it may also increase efficiency about one's ability to exercise effectively, thus increasing the likelihood of attaching it to an exercise program.

2.2.2 Computer as Persuasive Media

As a media, the computer provides first-hand learning, insight, visualization and promotes the understanding of cause/effect relationships and additionally motivates. Persuasive media can use both interactivity and narrative to create persuasive experiences that support formed behaviour, empathy, or the exploration of causal relationships (Fogg, 1998). Three types of persuasive media influence people by different dimensions. "*Cause & Effect Stimulations*" allow people to access non-available experiences or to be aware of the impact through how they act. For example, "floe" is an interactive website which intends to educate people about how powerful the daily carbon consumption can affect the earth. While users answer a few questions about their actions in current life, it shows a melting iceberg scene by gauging their current carbon consumption. In order to influence player attitudes they are shown the effect caused by the decisions they make during game play. "*Environment Stimulations*" uses external physical settings to influence people. For instance, some specific kinds of treadmills have a screen on them, where people can see the beach scene or tropical track while jogging as they are pedalling to explore the virtual environment as if you were on a journey. "*Objects Simulations*" expresses abstract ideas with concrete objects. It usually works effectively on tricky user groups to present ideas, which are difficult to persuade, such as using the Drunk Driving Simulator to allow people to experience how dangerous it is to drive while intoxicated. A computerized exhibit *HIV Roulette* at the San Francisco Exploratorium allows visitors to make hypothetical choices about sexual behaviour and then vicariously experience how those choices would affect their chances of contracting HIV. This exhibit attempts to motivate people to avoid unsafe sexual contacts. Overall, interactive technology provides experiences.

2.2.3 Computer as Social Actors

Technologies can also function as social actors to create relationships (Reeves & Nass, 1996). Users seem to respond to computers as social actors when computer technologies adopt animated characteristics (physical features, emotions, voice communication), play animated roles (coach, pet, assistant, opponent), or follow social rules or dynamics (greetings, apologies, turn taking). It establishes social norms; invokes social rules, dynamics, and expectations; provides social support to influence people via five types of social cues (Fogg, 1998). "*Physical cues*" are the representation of the object. Research confirms that a more attractive technology (interface or hardware) have greater persuasive power than an unattractive one (Berscheid & Walster, 1974; Chaiken, 1979). Besides, it is reasonable that attractiveness produces a "halo effect" which makes computing products physically attractive and more persuasive than unattractive ones. If an interface, device, or onscreen character is considered physically attractive, users may assume the product is also intelligent, capable, reliable, and credible (Dion, Bersheid & Walster, 1972).

"*Psychological cues*" can imply that the computing products have emotions and personality; it can be as simple as a text message on the website that conveys empathy by presenting "We're sorry…" Or as complex as the Similarity Studies conducted in Stanford University which evidenced that in the Affiliation Study, participants who worked with a computer labelled as their "teammate" considered the computer to be smarter and more similar to them, and that it was friendlier and offered better information. They also were more likely to choose the solutions recommended by the teammate computers (Fogg, 1996). "*Language cues*" are also used to motivate users' behaviour by expressing social presence. Common examples are those dialog boxes which carry spoken languages such as "Welcome!", "Are you sure you want to cancel it?" "You've got a mail!" or congratulating sentences when you complete an installation task, thus to infer to users that the computer is animated in some way. One of the important rules with the potential persuasive power in "*Social Dynamic*" is reciprocity. This social rule states that after people receive a favour, they tend to pay it back in some way. Computer can also act as "*Social Roles*". Such positions may make users feel more convinced and is more influential- for example, a doctor's image for a tooth paste advertisement, in which a metaphor suggests the dentist to be authoritative and trustworthy; the help link on IKEA's website "Asking Anna" represents a smart and helpful young lady - more persuasive than just saying "Contact" or "Assistant".

Table 2-1. Primary Types of Social Cues

Cue	Examples
Physical	face, eyes, body, movement
Psychological	preferences, humour, personality, feelings, empathy, "I'm sorry"
Language	interactive language use, spoken language, language recognition
Social dynamics	turn taking, cooperation, praise for good work, answering questions, reciprocity
Social roles	doctor, teammate, opponent, teacher, pet, guide

2.3 The Psychology of Persuasion

Persuasion techniques have been studied and observed since ancient times, but social psychologists began formally studying these techniques early in the twentieth century. While there are numerous different persuasive technique, the majority fall within six basic categories according to Cialdini, termed "six weapons of influence" (Cialdini, 2003). Each of these categories is governed by a fundamental psychological principle that directs human behaviour and, in so doing, gives the tactics their power. These tactics include *Reciprocation*, *Commitment and Consistency*, *Social Proof*, *Authority*, *Liking*, and *Scarcity*.

Reciprocation is one of the most significant behaviours in our interpersonal relationship. In general, an individual has to return the favour others have given to them (Gouldner, 1975). Thus in marketing, there is pervasiveness of free sample offerings. This has not only helped maintain the fairness of the social exchange between two parties, but also has become an approach used to influence others. Another study concerns how to affect people, making them take on another's philosophy. Studies have investigated the environment and strategies that could yield to compliance. It is argued that the skills used to make others more compliant have something to do with our understanding of others, our own social status, and the nature of requests (Feningstein, Scheier & Buss, 1975). Associated factors include: a more likelihood to be compliant in good moods (Isen, 1983), when reciprocity occurs and when given an acceptable reason or cause (Regan, 1979). In public kindness experiments (Fehr & Gächter, 2000), it has also been demonstrated that the potential for reciprocal actions by participants increases the rate of contribution to the public good, providing evidence for the importance of reciprocity in social situations.

Commitment and Consistency describes that once people commit to an idea or goal, they are more likely to honour that commitment, even if the original incentive or motivation is removed after they have already agreed. Cialdini often takes the car sale for example, that suddenly raising the price at the last moment works because the buyer has already decided to buy. While within *Social Proof*, people tend to do things that they see other people are doing, and believe what other people identify with. It is also called *Informational Social Influence*. This effect/phenomenon occurs in ambiguous social situations when people are unable to determine the appropriate mode of behaviour. Making the assumption that surrounding people possess more knowledge about the situation, they will deem the behaviour of others as appropriate or better informed. A famous experiment (Milgram, Bickman & Berkowitz, 1969) shows the power of social influence that the experimenters placed groups of people on a street corner looking up at the sky and only 15 gawkers made 45% of bystanders also look up. Asch's conformity experiments (Asch, 1951) also demonstrated the conformity phenomenon in groups. In the experiments, students were told that they were participating in a "vision test". Unbeknownst to the subject, the other participants in the experiment were all confederates, or assistants of the experimenter. At first, the confederates answered the questions correctly, but eventually began providing incorrect answers. Nearly 75 percent of the participants went along with the rest of the group at least one time, even the answer was obvious wrong. *Authority* is that people tend to obey authority figures, even if they are asked to perform objectionable acts. Such as the Milgram experiments in the early 1960s, where he developed an intimidating shock generator with many switches labelled with terms including "slight shock," "moderate shock" and "danger: severe shock" (Milgram, 1963). Participants took the role of "teacher" to deliver a shock to the "student" (experimenter's confederate) every time an incorrect answer was produced. The result shows that 65% of the participants in the study delivered the maximum shocks under the instructions, even seeing their "students" acting painful or complaining about their heart condition. In the market, for instance Michael Jordan as an endorsement for sports products or a person in doctor outfit as a recommender for medical products advertisement usually brings high commercial effects. *Liking* shows that people are easily persuaded by other people that they like. The last, perceived, *Scarcity,* may generate demand. For example, "limited edition" or "offers this month only" usually encourages sales.

In our study, the context that we intend to investigate is where activities take place in public, hence, we chose **Social Proof phenomenon** as one of the persuasive design approaches to examine users' responses toward sustainability.

2.4 People, other people and the environment

Aside from the conformity, compliance and obedience among the above mentioned Social Influence Theories, in terms of influencing by the external surroundings, earlier studies such as Social Learning Studies (Miller & Dollard, 1941) had argued that people perform much learning by watching and copying other people. Miller and Dollard claim that humans have acquired certain behaviours through observation. By imitating the observed behaviours, the observers would fossilize the acquired behaviours and obtain positive reinforcement (Miller & Dollard, 1941). The studies regarding observational learning and vicarious reinforcement have been further expanded and theorized by Bandura and Walters (Bandura, 1977) called Social Learning Theory (SLT). Meanwhile the term "self-efficacy" has been addressed to emphasize the capability of performing certain behaviours, in other words, when one's own behaviour is rewarded, self motivations and positive feedbacks would then be activated, resulting in the reinforcements of the attitude.

The theory explains how behaviour is transmitted from one person to another; however, it neglects the impact of human intrinsic cognitive abilities. Regarding the oversimplification of the learning and influencing process- Bandura thereafter continued and built up the studies on the basis of SLT, and developed Social Cognitive Theory (SCT; Bandura, 2001). Under this framework he believes that how people motivate and regulate their behaviour is a process of constant interaction between individuals and their unique social environment. People absorb knowledge directly from social interaction as well as the experiences, and they are viewed as self-organizing, proactive, self-reflecting and self-regulating rather than as reactive organisms shaped and shepherded by environmental forces or driven by concealed inner impulses. From this theoretical perspective, human functioning is viewed as the product of a dynamic interplay of personal, behavioural, and environmental influences (Figure 2-2, Bandura, 1977, 1986).

Furthermore, it is also suggested that there is an inseparable identification between the observers and the pattern, claiming that learning would be more likely acquired when the observers could also well handle their self-efficiency (Bandura, 1977). Based on this theory, we intend to observe the pattern of how users interact with others and the external environments.

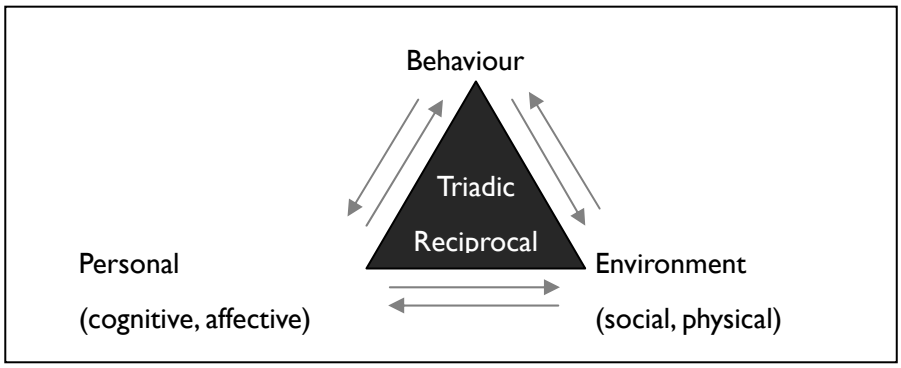


Figure 2-2. Bandura's Model of Triadic Reciprocility

2.5 Sustainable Design

Green design originated in the 1960's and it was first proposed in the book *Design for the Real World* (Papanek, 1971). The book emphasizes that use of the earth's limited resources should be a great concern in design, and the environment should be protected. With the development of technology and growth of material and spiritual civilization, human beings have been aware of deteriorating surroundings, gradual depletion of available resources and serious constraint of further economic advance. These problems have a direct impact on the progress of civilization and sustainable strategies thus far outlined. In the late 1980's, the new wave of "green consumption" swept the U.S. and later on the whole world. Green refrigerators, environmental-friendly colour televisions and green computers, etc. have been booming on the market. Many consumers have progressively advocated green products. Green design turned into a hotspot issue in modern design technology in the 1990s.

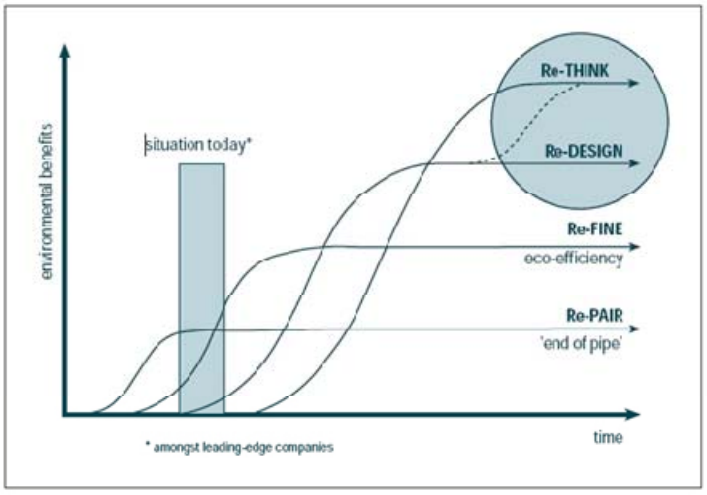


Figure 2-3. 4 Step Model

Green design is also called ecological design, design for environment or environment conscious design. Its principles are what have been generally acknowledged as the 3R rule - reduce, reuse and recycle – with the aim to reduce pollution, to reduce fuel consumption, and to recycle or to reuse products and components. It's been spread throughout all over the world since the campaign of 3R's was conducted in the 1970s. "Refuse" and "repair" were thereafter included in 5R's but as far as the current situation is concerned, this concept is no longer flawless. Sustainability will not stay in the level of eco-efficiency[1] but achieve the grander scale of eco-effective sustainable life[2] (See Figure 2-3.) and traditional viewpoints on design will be perfectly adapted into the perspective on sustainability. (See Figure 2-4.)

Figure 2-4. The Shift to Sustainable Design

"Localness" in sustainability, including politics, is an issue that people have recognized over the years. Mankind takes up efforts to harmonize human systems and industries with their surroundings, to tie local materials to energy flows and to link the local customs, needs and likes, including both the molecular level and the regional level (McDonough & Braungart, 2002). As far as sustainability and effective use of the environment are concerned, no matter whether an item, an interface, a system or service is designed, all utilized and consumed are not supposed to be the resources on the earth but in the region. Locality of sustainability is not constrained to material access but starts from there. It is similar to the concept of "Think Global, Act Local," which is based on local cultural, historical, technical and natural resources, etc. to enhance sustainable experience sharing and interaction of local livelihood, productivity, ecology and life through discovery and flexible use of resources; even disposal should be handled and sustained by the local environment. This may

[1] High efficiency of environmentally-friendly utilization, which is similar to the thought of "re-fine" but it is just damage reduction in order to seek "value increase" and "lower cost"

[2] Effective use of the environment, just like the abstraction of "re-think" and "re-design"

establish a sustainable circulation system of locality and each system is supposed to interact with each other. Interactive and mutual benefits among diversified sustainable systems is the point that keeps the influence of sustainability going on.

2.5.1 Sustainable Design Case Study

Over the past decade, many designers and researchers have been working on this prominent issue to put their new skills, experiences and knowledge into practice with the theme being "Think Global, Act Local". The aim was either to design products or conduct research projects that benefited and enhanced local conservation efforts or intended to raise the consciousness of sustainability. In SmartTrip, a small gadget used in mobile devices was developed, which adopts a simple method to combine multiple trips of transfer to a single route. It aims to lessen the conditions in which people may refuse carpool or take mass transportation services and thus use cars (Johnson et al., 2008). GreenScanner is a mobile device that allows shoppers to examine the effect of the goods on the environment in the store (Tomlinson, 2008). The following are the design cases and research issues concerning sustainable design.

Design Case 1. Aimulet LA – bamboo wireless speaker

The design is one of the winning products of Ecology Design Prize in Japan's Good Design Award 2006. It is a sound communication device of which cover is made of the green material – bamboo – and it is an amplifier to transmit sounds by infrared light without batteries. On the side of the device is a row of spherical solar cells, which can receive signals sent out from the LED floor, and transmit them into the small amplifiers inside. The design can be applied in public places such as museums.

Figure 2-5. Aimulet LA bamboo-made wireless speaker

(Information Technology Research Institute at Japan's National Institute of Advanced Industrial Science and Technology (AIST), 2006)

Design Case 2. Finland Temppeliaukio Church

Originally named Temppeliaukio Church, Rock Church in Finland was built in 1969 by architects Timo (1928-) and Tuomo (1931-88) Suomalainen who utilized a vast rocky highland located in a residential street. In order not to damage the natural landscape, the rock was excavated downwards, where the ingenious design of the church lies. In the initial design, their idea was to retain the original characteristics of the region and on the basis of not changing the surroundings of the rock, so the element of the church was natively added. Besides, the natural scenery of the rock cave provides the musical echoes that the church needs.

Figure 2-6. Temppeliaukio Church, Finland

Design Case 3. Shigeru Ban's Squared Toilet Paper Roll

Architect Shigeru Ban also turned his attention to re-conceptualizing the roll itself in a 2000 exhibition called Re-Design: Daily Products of the 21st Century. This design took the behaviour as a cue to imply the awareness of resource use. Ban heightened consciousness of use by reducing the amount of paper that rolls off the tube by making it square instead of round, a tug is met with resistance as the roll's squared corner encounters the edge of the metal dispenser, so that what you take is what you really need.

Figure 2-7. Shigeru Ban's Squared Toilet Paper Roll (2000)

Design Case 4. The Fun Theory

The Fun Theory campaign sponsored by Volkswagen (Sweden) has very clear goal in interaction design that is aiming to change people's behaviour for the better. Their projects Piano Staircase and The World's Deepest Bin show the significant effects of influencing people's fixed behaviours by the idea of making ordinary things more FUN.

Figure 2-8. Piano Staircase (left) & The World's Deepest Bin (right), (2009)

Design Case 5. Food Mileage Calculator

Not only the design field, a Japanese healthy agriculture company Daichio-Mamoru Kai (大地を守る会, The Association to Preserve the Earth) has also developed a Food Mileage Calculator website with the care of our environment. They invited grocery shops and supermarkets to input the mileage of their products so that by the original source and the weight, users can see the comparison of the CO2 consumption caused by the mode/ distance of transportation.

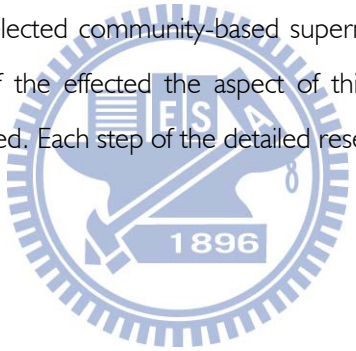
Figure 2-9. Food Mileage Calculator developed by Daichio-Mamoru Kai, Co. (2008)

As referred to the above case studies, numerous studies have explored the possibility of facilitating design platform on influencing people's behaviour or attitude for sustainable purposes. Yet, little has been widely discussed upon the value, appeal and leverage caused and generated in user experience design fields.

Based on the literature review and case study in this chapter, we had an initial understanding of the recent studies of persuasive technology and social influence theory, as well as the design with intention of changing behaviour and encouraging people to facilitate the environment in a friendly way. In the following chapters, through the user study will investigate susceptibility regarding the persuasive approaches towards sustainable design.

Chapter 3
Methodology

The objective of this study is to explore users' contextual response to the persuasive and influential factors of sustainable design. The targeted subject is *career mother* aged 30 to 50. According to the result of the pre-study interview, their concept of sustainable design can be categorised as "willingness to practice but having the lack of a right platform for them to easily work with". Because they have a motive for "being recruited" (the preliminary study of users recruited is detailed in chapter 3.1.2), they are selected as subjects in this study to investigate their responses to any kind of inductive method. A mixed-fidelity prototype was developed in this research and with the scenario-based method as described in 3.1.3. The *in-situ* prototyping testing and in-depth interviews were conducted in selected community-based supermarkets near residential areas. In the end, the results obtained of the effected the aspect of this group were analyzed and the objective of this study was achieved. Each step of the detailed research method is elaborated in this chapter.



3.1 Prototype Development

3.1.1 Sustainability, Food Mileage, and Supermarkets

Environmental issues related with sustainability in daily life are extensive, including the greenhouse effect, global warming, sea-level rising, ozone depletion and all kinds of pollutions. These consequences arise from different patterns of human behaviours, the high-level ones of which are plant operation, deforestation or abandoned motor vehicles and the low-level ones of which are unclassified garbage, overuse of air conditioners, or even excessive purchase of imported foodstuffs of high food mileage. The concept of food mileage was summarized in Chapter 1 and was brought in as the concept for the research tool in this study owing to its characteristic of close-relation and importance to our daily life. The influenced aspects of the public to green design were discussed in the platform use focusing on the issue of food mileage.

Moreover, supermarkets were chosen as the context for conducting the in-situ user testing because it is where the food purchasing (high and low food mileage included) behaviour usually happens.

3.1.2 Research Subjects

People have different levels of sustainable attitude. In order to understand the potential target user more deeply, we adopted *persona* - a user-centred approach to create a personality profile during the preliminary study process. As we set up the research direction, well-crafted personas helped us have a clearer understanding of the probable research subjects' characteristics, thus allowing the research direction to be more accurate. 11 individuals were interviewed at this stage regarding their exposure and value towards sustainable concepts. According to the engagement levels of the value and the attitude toward sustainability, the user groups are classified into three types: the **LOHAS**[3], the **Efficiency-oriented**, and the **Indifferent outsider**.

The **LOHAS** type is a believer of the eco-friendly concept. They are highly aware of it and take practical actions in their everyday life. They do not need other people to teach them how to facilitate; instead they educate their friends, family around them. The **Efficiency-oriented** type has a basic sense of sustainable knowledge and considers it to be an important issue. However, considering their pragmatic nature, they usually do not do it often, due to a lack of time, and they actually do not know the effective approach to facilitate. The **Indifferent outsider type** does not care about this issue too much. They are aware of the concept because of the media but they are not interested in caring environment and even tend to avoid it. (See Table 3-1.) In this study, **Efficiency-oriented** type of users is the potential users that we are interested in exploring so they were chose as our primary user group to participate in the user testing.

[3] Lifestyles of Health and Sustainability

Table 3-1. The Three Main Personas

LOHAS	**Efficiency-oriented**	Indifferent outsider
		
Nicole age 35 Freelance column writer I pursue the concept of LOHAS, my life is all about eco-friendly. I do whatever I can and I really want to encourage my friends and family to follow.	Laura age 31 Advertising Executive I'm a mother and a busy full-time worker. I care about my family's health so I cook every day. Eco-friendly is a concept that I would like to follow, but to be honest, it is not that easy sometimes.	Jessie age 27 Senior Hairdresser I spend my life the way I want. Eco-friendly? Heard about it but I don't really care that much... And it's so nagging that some people will keep telling you to do so.

Through the interviews and observations, we were able to identify the primary user group – working mother – adult female who has a stable job and whose youngest child is under 18. Statistics in a survey of labour participation and status of Taiwanese women that Taipei Association of Wage Earners published in the end of 2000 shows that more than 50% of women aged between 20 and 65 in the society have stable full-time jobs and more than 49.7% of them are working mothers. The role this type of woman plays is not only a busy full-time worker but also a housewife who shoulders two major responsibilities of the workplace and the family. According to the most prominent issues depicted within the primary personas, we were able to understand their characteristics, these users have to take care of both work and family so their life is usually hectic but in order to take care of their family's health, they still cook to prepare food. They don't have much time strolling in supermarkets after work during weekdays or on weekends and their concept of environmental protection is mostly based on rather traditional ones such as "less

driving", "less use of plastic bags", "less use of air conditioners" or "resource recycling". More importantly, they consider environmental protection really essential but do not actually put it into practice at usual due to the following two points:

1. Fossilized lifestyle

It is regarded that environmental protection takes extra time and it is not easy to fully put into effect (e.g. it is impossible to turn on the air conditioner less frequently and it is sometimes troublesome to do resource recycling), and the concept of sustainability is at times far-fetched in daily life (e.g. sea-level rising seems to have nothing to do with me).

The lifestyles and concepts formed throughout the years of accumulation are difficult to change. Habits such as diet, daily schedule, consumption, sports and recreation, could easily become fossilized. Behind all these selfish personal behaviours generally lie the concerns for the future of the individuals as well as the earth and environment. The fossilization of individual concepts and values could make it challenging for individuals to conceive the sustainable concept, which may further cause the rest of living environment be left to gradually disappear. Moreover, in today's society, people often concentrate merely on their own tiny space, so they may fail to detect their fossilized incorrect sustainable concepts, as well as their selfishness and ignorance.

2. Difficulty in implementing sustainable actions:

It is regarded incomprehensive how environmental protection is implemented and if there will be an effect after it is practiced, and the concept of "Low Food Mile" and "Local Production for Local Consumption" is currently still an unfamiliar and new field to Taiwanese people. Even though it has been introduced and carried out for years in North America or European countries, most people still have sustainable awareness in a traditional way. Most consumers do not understand today's highly complex global food system. Much of the food production and processing occurs far away from where they are consumed (Pirog, 2004). However, it has become customary that people buy imported goods from overseas in supermarkets for daily consumption. Even if some people are concerned about the environment, there is no a complete service platform for facilitating environmental protection and sustainability on grocery shopping and home cooking.

3.1.3 Mixed-fidelity Prototype

Based on the literature reviews, research domain on persuasive technology and the psychology of persuasion, and then five main approaches were selected according to the context as the testing fundamentals. On the basis of user-centred design method and persuasive technology framework, a mixed-fidelity prototyping system "SuperEco" was developed as a research tool in our study. Catering the supermarket customers, SuperEco is an eco-design based, on-screen platform that is attached on the shopping cart and encourages users to purchase low food mile products, as well as influences people's attitude towards sustainability. The design approaches were extracted from the insight of the literature review - the Persuasive Technology, the Psychology of Persuasion and the Social Cognitive Theory. Detailed approaches of in the prototype are listed as Table 3-2.

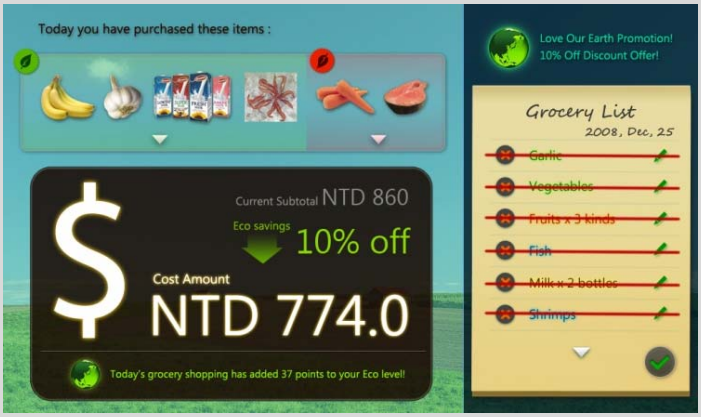
Table 3-2. The Prototype Design with the Corresponding Theories

Function	Essence	Design Contents
Persuasive technology as tool/instrument	increases capabilities	Dynamic map showing the low food mile zone 
		Tags for low food mile products 

		Recipes (of low food mile ingredients) provided in the low food mile dish 
Persuasive technology as medium	provides experiences	Seeing SuperEco shopping bags in different colours 
		Showing traceability information 
		Displaying the process of transporting of the products 

		Low food mile dishes tryout area 
Persuasive technology as social actor	creates relationships	SuperEco avatar 
		Promoted by a middle-aged woman 
Social proof	do things that they see other people are doing	Recommending purchasing (Customer who bought this also bought that) 

		Other people using SuperEco shopping bags 
		Showing the numbers of the participants 
		Numbers of the amount of people who have bought this item 
		Your neighbour had also bought this item

		
Reinforcement from [SCT]	Reward one's behaviour	Discount (if bought the low food mile products) 
		Experience point 
		SuperEco avatar's compliment
		Colour changing on upgraded avatar and shopping bag

3.2 In-situ Scenario-based User Testing & In-depth Interview

After the prototype of persuasive technology framework is established, eight working mothers aged above 30 and below 50 were recruited in the user testing. Participants must have the habit, which has lasted for more than three years, of regular foodstuff purchasing in the community-based supermarket and "in-situ scenario based user testing" adopted in this study had users simulate the scenario directly in the context.

The testing result is the solid basis of analysis and discussion. Besides, to better understand the interaction between users and the persuasive platform, the in-depth interview was adopted in this stage of user study in hopes of an overall understanding of the contextual influence on this group's conception and behaviour. "Semi-structured interview" – pre-prepared scripts – of the in-depth interview was adopted in the whole process in order to maintain the progress and the direction of the interview as well as to modestly adjust to the actual situation. The whole interview was recorded for data debrief and analysis.

3.2.1 Testing Process

The testing was carried out in a community-based supermarket Wellcome. The interviews were conducted according to the process and were audio-recorded. The numbers of the participants were 8 female, targeted users aged between 30 and 50 living near the supermarket. The testing time was about 50 minutes to an hour and NTD$200 cash was given as the reward for each person. The participants were also told to respond to questions by as much how they usually feel shopping in the supermarket as possible. Procedures of the testing are listed as follows:

First, the basic information about the participants and about their activities in foodstuff purchasing were collected, which were used to find out their pattern, frequency and familiarity with purchasing foodstuffs in the context.

After that, in order to guide the participants into the context of the platform use, a scenario was given in the first place: "*Today, as usual you go out for foodstuff purchasing to prepare dinner. You noticed a green sign of a newly-open supermarket near the one you usually go to, so you decided to take a look...*" Then, the testing session started as the participants were asked to get a trolley in which the prototype was placed onto. The images shown in the prototype are used to demonstrate this

sustainable platform in the context.

In the user testing, the researcher displayed the design of the prototype and at times induced the users to simulate how they themselves feel with scenario-based discourses according to each persuasive sustainable design, for example "*When passing the entrance, you noticed everyone carrying a special purchase bag...*" and "*When coming to the vegetable rack, you saw this kind of sticker on the package of vegetables...*". Meanwhile, questions about the concept of sustainability were brought up such as "*How do you feel about the way environmental protection is promoted?*" In this phase, understanding the different extent of the user's positive and negative responses to each persuasive sustainable design is the focus to be aimed.

Finally, the users were asked to explain their motives and reasons based on the different extent to positive and negative responses, so as to have a deep understanding of the whole persuasive context.

3.3 Debrief and Data Collating

Subsequently, the participants' ideas and their influenced aspects of each persuasive approach were sought out from the recordings of the interview and transferred into accounts which were itemized, assorted by similarities of characteristics and summarized by two methodologies - Affinity Diagram and Means-end Chain Theory. The expected analysis result of these two work modules is as the following:

Affinity Diagram: this diagram is mainly used to discuss the effected factors and the context influenced in the interacting process. By sorting the large clusters into subgroups, we can capture different aspects of the factors that are influential to the users.

Means-end Chain (MECs): this diagram is primarily used to understand user's perceptual orientation towards sustainable design under persuasive design. It is also used to explain psychological values that the design approaches can respectively lead to. With this method we can build up the Attribute-Consequence-Value Model by hierarchical value matrix to illustrate the relations between the design attributes and users' value, as well as to understand the elements that the users respect the most.

3.4 Summary

The users' acceptance and influenced characteristics upon against the method of persuasive sustainable design were identified after Affinity Diagram and Attribute-Consequence-Value Model were established through the qualitative interviews and then analyzed.

Chapter 4

Results

In this chapter we will present the data analysis. The transcripts were read once through to get a general feeling of the participants' experiences. Thereafter, the Affinity Diagram (AD) and Attribute-Consequence-Value Model (A-C-V Model) methodologies were undertaken as the process of coding whereby the data was coded line by line into a statement and was transformed into diagrams.

4.1 User profile

In this section we will present the user profile that we set for the participant recruitment in the user testing. The demographic data of the participants, their attitude and knowledge towards sustainability and grocery shopping behaviours are described as follows:

4.1.1 Demographic data of the participants

In our study, we recruited the "working mother" type of users (refer to 3.2 Personas), aged 30 to 50, who have had a grocery shopping habit for more than three years. Eight participants in total were included in the study, which took placed on 19th and 22nd of May, and 1st of June in 2009. The demographic data of the participants are summarised as Table 4-1.

Table 4-1. The Demographic Data of the Participants

SN.	Gender	Age	Occupation	Locale of Grocery Shopping	Duration
U01	F	50	Teacher	Supermarket (Giant, Costco & Wellcome)	10 yrs
U02	F	43	Teacher	Supermarket (Wellcome)	7 yrs
U03	F	43	Nurse	Supermarket (Wellcome)	8 yrs
U04	F	37	Admin-staff	Supermarket (Wellcome)	6 yrs
U05	F	44	Beautician	Supermarket	10 yrs

				(Wellcome & Costco)	
U06	F	45	Medical Specialist	Supermarket (MATSUSEI)	9 yrs
U07	F	33	Marketing Assistant	Supermarket (Wellcome & Costco)	4 yrs
U08	F	41	Accountant	Supermarket (Giant)	7 yrs

4.1.2 Attitude and knowledge towards sustainability and the grocery shopping behaviour

Participants' knowledge towards sustainability and their shopping behaviour vary to some extent, although there are some similarities. It can be seen in the interviews that due to their busyness, anything of a time-consuming matter is more likely to discourage action. They tend to be more efficiency-oriented, for instance, they usually do not spend a lot of time strolling in the supermarkets. Yet almost every participant has held quite positive attitude towards sustainability (they are very willing to facilitate) but they seek to do it more conveniently. The detailed statements are organised as follows:

Table 4-2. The Shopping Behaviour of the Participants

SN.	Freq.	Dwell Time	Shopping Behaviour
U01	1/week	Approx.1 hr	Brings along a shopping list; goes directly to find the products first, then see if there is anything else to buy. Likes to visit the tryout area to see if there is anything new.
U02	1-2/week	Approx.1 hr	Brings along a shopping list; finds the products she wants first, checks other stuffs on the way too.
U03	1/week	Approx.1 hr	Bring along a shopping list; gets the stuffs for a whole week but only buys what is needed.
U04	2/week	Approx. 30 min	Thinking what to buy on the way, goes directly to find the products.
U05	1-2/week	Approx. 30-40 min	Usually tries to get the stuff as soon as possible. Usually just shops in foodstuffs area but will check if it has any credit (CAS mark). Brings the daughter

			with her.
U06	1/week	Approx. 1.5 hr	Thinking what to buy while shopping, will browse to see if there is interesting thing or new event on the way.
U07	2/week	Approx. 1 hr	Thinking what to cook while shopping, knowing the product categories very well so will find a shortest route to what she wants. Likes to share the shopping experience with friend.
U08	2/week	Approx. 1 hr	Goes directly to check the frequent-visited area and buys the food. Will especially check out the trying out area to see what is introduced.

Table 4-3. The Participants' Attitude & Knowledge towards Sustainability

SN.	Attitude & Knowledge Towards Sustainability	Heard of Food Mile
U01	Recycling, electricity saving, using less air-con	Y, slightly
U02	Recycling, using less plastic bags	N
U03	Recycling, using less plastic bags, water saving	N
U04	Recycling, (time consuming)	N
U05	Recycling, conservation	N
U06	Recycling, (time consuming)	N
U07	Recycling, electricity saving (time consuming)	N
U08	Recycling, electricity saving	N

4.2 Data coding of the user testing & the in-depth interviews

In this section we present the results of the in-depth interviews in the user testing. Two methodologies - Affinity Diagram and Attribute-Consequence-Value Model were used in the data coding session. The former is used to investigate the influential factors and the context influenced in

the process while generalising the statements; the latter is primarily used to study what sense of value three types of persuasive approaches can respectively inspire users.

4.2.1 Affinity Diagram (hereafter as A/D)

A/D is used to investigate the effected factors and the influential context. After the interviews, the transcripts were converted into ninety 1st level statements, affinitised into related groups and named with headers (phrase or sentence). Finally we have created twenty-three 2nd level headers, nine 3rd level headers, and sorted into three 4th level super-headers, summarised as follows.

4.2.1.1 Influencing the Intention (See Table 4-4)

Before the users accept the concept, there are some influential factors to ***raise intention*** in the first place. To attract their interests, fun, eye-catching persuasive design approaches may attract users' interests and bring about curiosity (② in Table 4-4), while simplified process and easy-to-access may reduce the barrier and make the users more easily to accept, because it does not "look" like a waste of time (③ in Table 4-4). Besides, transmitting the concept in complete and clear way and providing the sense of joint participation resulted from others' participating behaviour (social proof), which can make positive impact and raise the identity (① in Table 4-4), as well as to "implant" ideas with various traces and cues that unconsciously influence people while they are involved in the contexts.

4.2.1.2 Influencing the Behaviour (See Table 4-5)

After the concept is introduced to the users, whether they will take action or not depends on if their practical needs can be satisfied (④ in Table 4-4) and if the supermarkets actually care to act as well (⑤ in Table 4-4). In terms of the products, what matters to them is that whether they are competitive with the high-food-mile products they are used to purchasing (e.g. are they suitable for cooking the exotic dish? And, are they as delicious?). When these requirements were satisfied, they will try to participate. Meanwhile, they will try to check the trueness (e.g. is it still an advertising or a

real eco-friendly action?) and decide whether it is worthwhile continuing.

4.2.1.3 Influencing the Attitude (See Table 4-6)

To root the concept and change people's attitude requires reliable, credible and trustworthy experiences (⑥ in Table 4-4). These kinds of approaches may construct trust and guarantee to encourage the users to become followers, then promoters. Besides, the incentives/positive feedback/encouragement would make users feel that they are "doing the right thing", "being eco-friendly to the Earth". And those approaches may bring about a sense of self-praise, self-satisfaction as thus to reinforce the engagement (⑦, ⑧ in Table 4-4).

Table 4-4. The Affinity Diagram for the Sustainable Design Service (see Appendix C.)

4th Level Super Headers	3rd Level Headers	2nd Level Headers	1st Level Statements
Influencing the INTENTION (Getting to Have the Intention)	**1** Others' participating behaviour and attitude would make positive impact on my idea	Other people's participating will raise my interest after I have the attitude in mind	[How many bought] After I have the low food mile idea, it matters to me how many people are buying eco-products [How many bought] More people buying it, more likely I will buy
		The sense of people's joint participation will arise my idea of participating	[How many bought] I feel it will raise my interest [Who else also buy] It is fun and interesting to know what's in others' [How many join] I can see many people are participating with me [Tag] What other purchase (in their shopping cart) can be my reference [How many join] I am curious to know what they are participating
		Other's participating is noticeable and I will identify with it	[Tag] I admire people who are buying products with eco-tags [Bag] Seeing people with the eco-bags makes me feel that others know [Bag] The eco-bag expresses customers' loyalty Knowing the info that how many people have bought this item makes me feel that people identify with this idea [How many bought] It seems many people are participating when I see the info that how many people have bought this item [How many bought] Seeing the info that how many people have bought this item will not trigger me to buy it [Who else also buy] It seems like everyone is participating
	2 Fun, eye-catching and uncomplicated new things may attract my interests	My curiosity makes me want to take a look	[Map] My curiosity makes me want to take a look [Map] Make me wonder what "low food mile" is [Bag] I will be curious [Video] It will attract me to go watch it [Bag colour +] At first I'm curious about it
		The creative way of giving feedback is very interesting and necessary	[Compliment] It is creative and makes me feel positive [Character] The character is necessary and fun
		Eye-catching and clear present is very easy to ecognise in a glance	[Map] Looks clear and obvious so that I can recognise [Tag] I can clearly recognise because it stands out from others
	3 The action is simple and convenient that doesn't need a lot of time to do it, which makes it easier for me to accept		[Map] Looks easy to get what I want to buy [Map] Convenient to drop by [Map] Looks very easy to find [Tryout] Will consider buying the product if it's easy to cook the meal [Video] I don't have much time here, so it'd better be short and easy [Video] It will make me easier to accept this idea
	Being influenced unknowingly	The complete information transmitting can help me accept the idea	[Source] It tells me how the food is transported, but not only a slogan [Source] This way is the most acceptable because it's very complete [Source] I can see the procedure (of how we have the products here) [Video] It educates me and helps me to understand and the idea
		Be influenced gradually under the atmosphere in the environment	[Bag colour +] Seeing people's bags in different colour, under this atmosphere for a while, I will want to upgrade [Colour +] I might be influenced under this atmosphere gradually
		Other's choice can be my reference	[Also buy] It can be my assorted reference [Also buy] It can be my recommendation if I'm new to cooking
		Trying out new dishes provides me various choices	[Tryout] It provides different/variety of cooking ways [Tryout] "Trying out" can make me buy things out of the shopping list

4th Level Super Headers	3rd Level Headers	2nd Level Headers	1st Level Statements
Influencing the BEHAVIOUR (Give It a Try to Participate; also Confirm the Trueness)	I am attracted by the event	I want to join in the event because the atmosphere in the event is attractive not the people	[Map] Event-like atmosphere makes me want to join in [How many join] I am interested in the meaning of the event, not the number of participant
	4 My practical needs are satisfied	I will buy it because I also need it	[Who else also buy] I will buy it only if I need [Also buy] Buy it or not depends on my need [Tag] If I need it I will buy this (product with tag) Whether buying or not depends on my need not the number of people have bought
		I will buy it if these food are competitive in terms of taste and cooking	[Tryout] I will buy it if "local ingredients taste as delicious as imports" [Tryout] Feel professional of cooking exotic dishes with local food
	5 Observe and check whether it is real eco-friendly or just a commercial approach	The supermarket is actually making effort	[Discount] I feel that the supermarket itself also cares a lot [How many join] It makes me feel that this supermarket really cares [Character] It represents this supermarket's eco-friendly idea [Compliment] Seems lively that make me feel the supermarket is working on it
		I want to make sure if it is true or not	[Map] Want to check whether it is actually eco-friendly

4th Level Super Headers	3rd Level Headers	2nd Level Headers	1st Level Statements
Influencing the ATTITUDE (Getting to Believe the Concept)	**6** I support and promote things which are trustworthy	The sense of comfort will make me more likely to join in	[Source] Feel comfortable to join in [How many join] It will make me more relieved to join in
		The sense of credibility and guarantee will gain my trust	[Character] It looks reliable and trustable [How many join] It has a sense of credibility [Tag] The eco-tag way is trustable [Tag] I can trust it because it expresses a sense of responsibility [Tag] I can trust it because it expresses a sense of guarantee [Tag] It shows the products' identities [Tag] Products with eco tags are certificated [Source] It makes me feel that I can trust it [Source] It shows the products' identities [Source] I will definitely buy this because it has credibility [Video] It expresses a sense of credibility
		I want to recommend to friends the "source display" and "tryout area"	[Source] I will recommend it to my friends [Tryout] Will introduce the eco-friendly concept to family [Tryout] Cooking meals with this recipe can be good role model for children
	7 Positive feedback may reinforce my behavior and attitude	The actual positive feedback will strengthen my attitude	[Discount] It will strengthen the eco-friendly idea in me [Discount] I will feel that I am doing the right thing
		The virtual positive feedback information will make me come back again	[Colour +] If I identify with this supermarket later on, I will want to upgrade [EXP point] I will continue to work harder and participate more [Source] Feel protected so that I will come again [Discount] It is pretty much an incentive for me to join again
		I feel happy about the feedback because it makes me feel that I am pmaking rogress	[Discount] I can do good thing with simple effort in daily routine [EXP point] I feel that I have devoted something to our earth [EXP point] I will have self-praise feeling from even a little thing I did once I believe in this idea
	8 All kinds of feedback would generate self-satisfaction while doing good for the Earth	Positive feedback is very encouraging	[Eco character colour change] I feel that I am encouraged [Bag colour +] I feel encouraged [Discount] It gives me very high encouragement [Character] It looks that it is encouraging you
		Both actual and virtual feedback will make me feel that I have done good things	[Eco character colour change] I feel that I am making progress [Discount] I will feel that I am doing the right thing [EXP point] I feel so happy [Discount] This feedback is very positive telling me that I love the earth [EXP point] I feel that I am making progress [EXP point] It makes me feel meaningful [Tryout] Gain a sense of accomplishment [Compliment] I feel satisfied with I have done the right thing [How many join] It expresses positive information

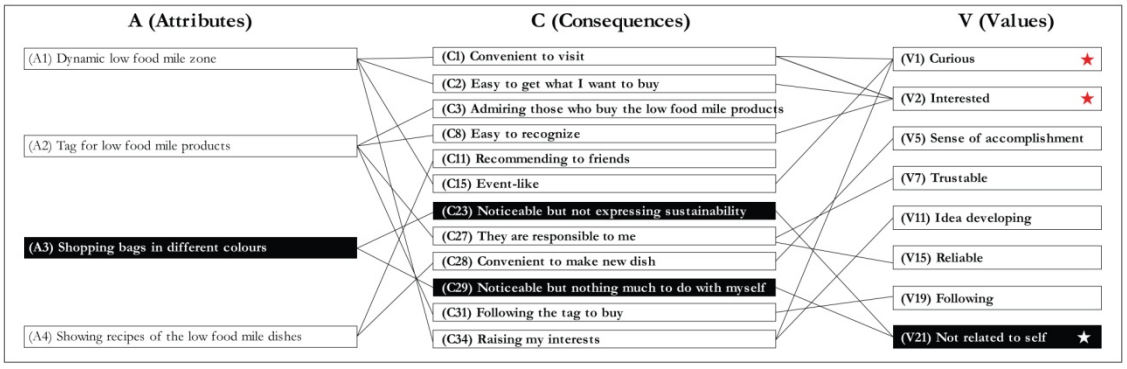
4.2.2 Attribute-Consequence-Value Model (hereafter as A-C-V Model)

After the interviews we collected statements referred to individual respondents' A-C-V linkages. We classified all responses into A-C-V levels and then broke down all responses into individual summary codes. By connecting all the chains that are formed by selecting the linkages we gradually constructed an aggregate hierarchical value matrix (Chart 4-6). This model reveals how attribute, consequence, and value factors ultimately lead to system use. A (attributes) represents the persuasive sustainable design elements in the platform; C (consequences) represents the user's behaviour outcome/ effects that the designs lead to; and V (values) represents the psychological feeling that generated from the ladders. Besides, from chapter 3 we know that the design attributes were derived from 5 aspects of the persuasive approaches from in our theoretical framework, thus, we analysed the 5 aspects respectively (Chart 4-1, 4-2, 4-3, 4-4, 4-5), in order to understand the main values that different approaches could bring about. We also discovered some negative consequences and values.

4.2.2.1 Model for Design Elements as Persuasive Tools

According to Chart 4-1, the main values revealed in response to persuasive tools in sustainable design are "*Curious* (V1)" and "*Interested* (V2)". Noticeably, the attributes "shopping bags in different colours (A3)" did not generate much positive feeling (they found it "not related to myself (V21)") when the users start to learn about the service.

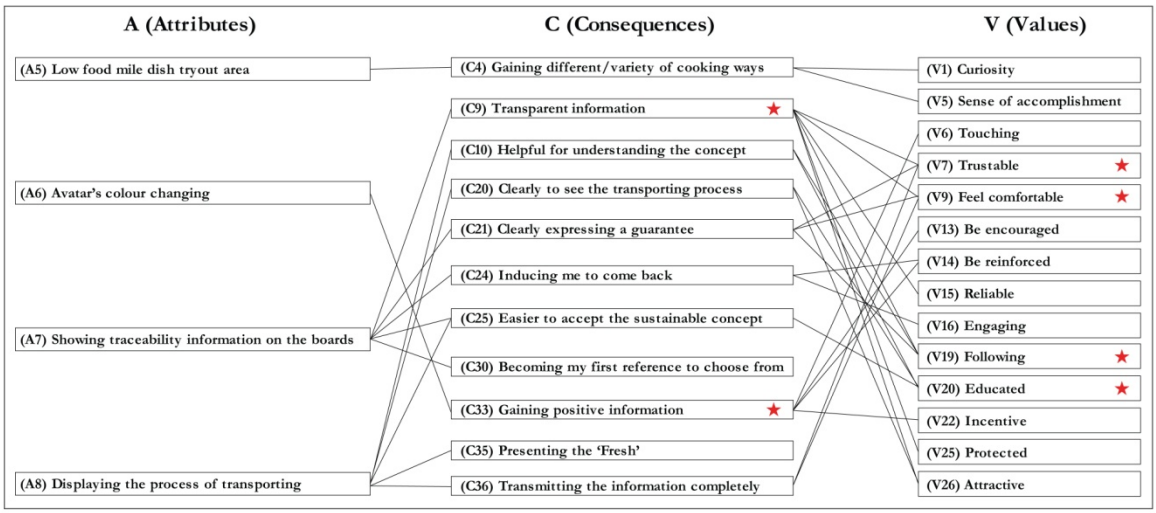
Chart 4-1. The A-C-V Model for the Design Elements as Persuasive Tools



4.2.2.2 Model for Design Elements as Persuasive Media

The main values that generated from persuasive media in sustainable design are "*Trustable* (V7)", "*Comfortable* (V9)", "*Following* (V19)" and "*Educated* (V20)". As we motivated the users by providing the experiences and transparent information, users felt that they are educated, and convinced by learning new knowledge. They tend to trust it, feel comfortable to take action and follow what they are told to do. Moreover, in Chart 4-2, we can see that "showing the traceability information (A7)" and "displaying the transporting process (A8)" which presented "information transparency (C9)", "guarantee (C21)" and "positive feedback (C33)" caused the most positive values.

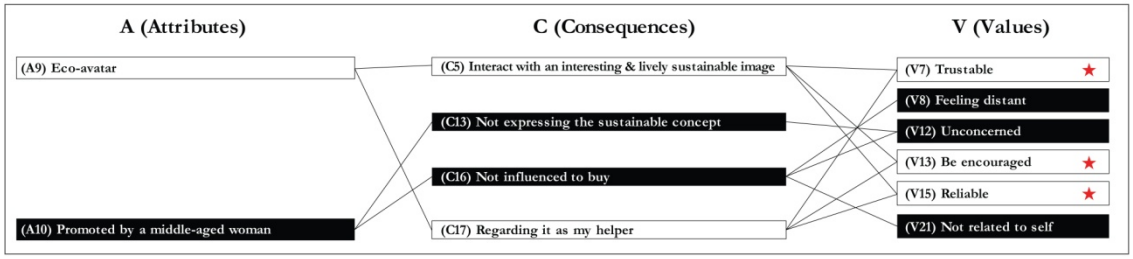
Chart 4-2. The A-C-V Model for the Design Elements of Persuasive Media



4.2.2.3 Model for Design Elements as Persuasive Social Actors

The main values in this model (Chart 4-3) are "*Trustable* (V7)", "*Encouraged* (V13)" and "*Reliable* (V21)" which generated from persuasive design as social actors (A9- Eco-avatar). Notably, in our research 2 different social actors have opposite influential effect. We discovered that users respect the social actor, which represents the sustainable concept and relies on it to interact with "sustainability". Therefore, a social actor, which is not related to sustainable concept e.g. (A10) someone who is alike to the users as a promoter, resulted in unconcerned and distant negative values.

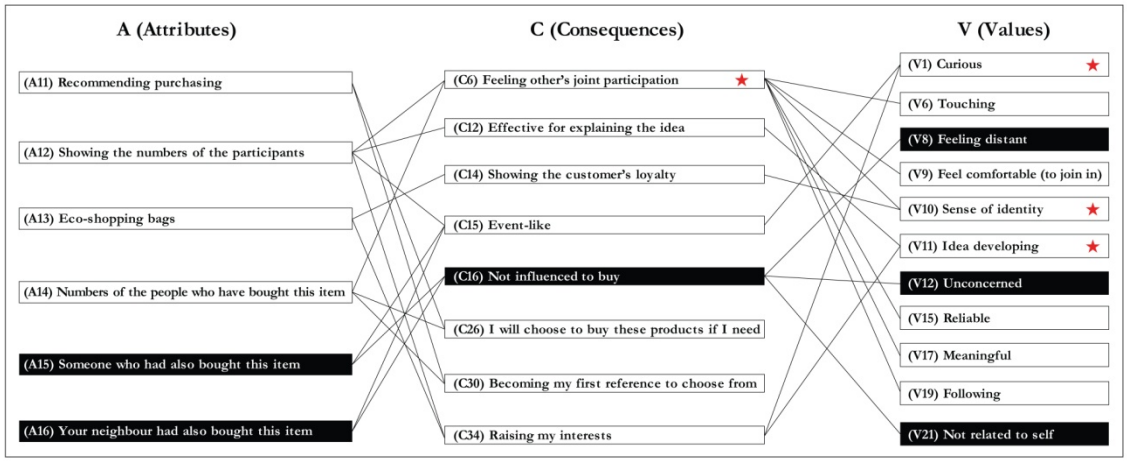
Chart 4-3. The A-C-V Model for the Design Elements of Persuasive Social Actors



4.2.2.4 Model for Design Elements from Social Proof Phenomenon

The main values in this model (Chart 4-4) are "*Curious* (V1)", "*Sense of Identity* (V11)" and "*Idea Developing* (V11)". The chart uncovered that in this context where there are many people around the users, "the others" are playing as a rather indirect catalyst that helps to develop their intention and make them more likely to identify with the concept and the activity. On the other hand, showing "who has also bought this item (A15), (A16)" generated negative values because users found it distant and not related to them.

Chart 4-4. The A-C-V Model for the Design Elements of Social Proof Phenomenon

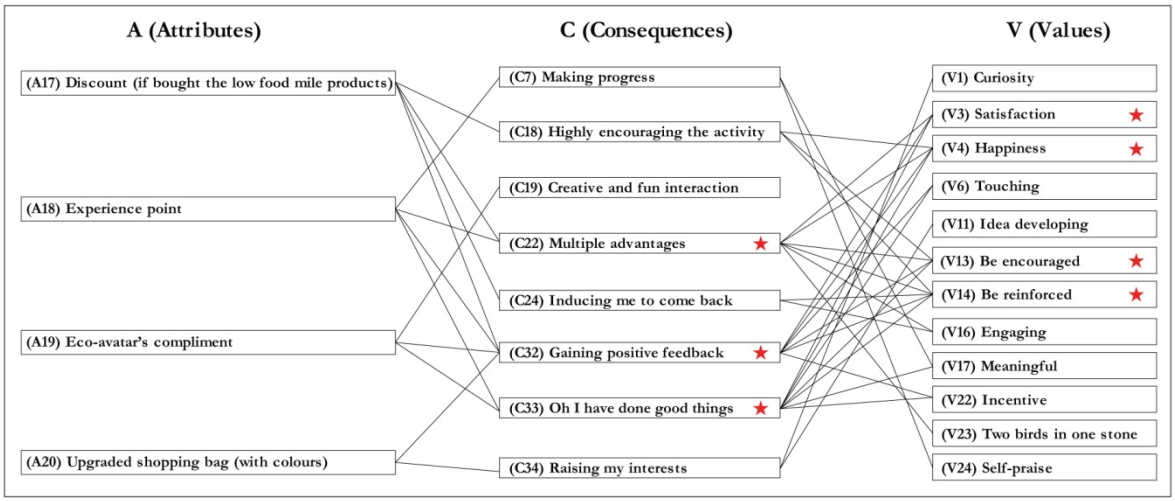


4.2.2.5 Model for Design Elements from Reinforcement Effect

From Chart 4-5, "*Satisfaction* (V3)", *Happiness* (V4)", "*Be encouraged* (V13)" and "*Be reinforced* (V14)" are the 4 main values that generated from the designs with reinforcement techniques. More importantly, we can see that certain consequences, which are "multiple

advantages (C22)", "gaining positive feedback (C32)" and "oh I have done good things (C33)" lead to the most various values.

Chart 4-5. The A-C-V Model for the Design Elements of Reinforcement Concept



4.2.2.6 Consolidated A-C-V Model

As we consolidated the A-C-V models of the five persuasive approaches, we were able to understand the most critical values that the users respect and from which consequences and attributes these values were constructed (see Chart 4-6).

Curious: Participants indicated that sustainable design as persuasive tools and social proof concept may generate their curiosity. According to Chart 4-6, we can see that not only introducing new things that are different from their ordinary routine but also the event-like climate may induce them to take a look.

Interested: From the interviews, we found out that users are highly interested in the new service; however the value may occur only under the premise that the service is easy and convenient to approach, and does not cost too much effort.

Trust: The study uncovered that users have a trusting feeling when they responded to some persuasive media and social actors. The former especially generated significant tendencies from the information transparency. Users trust it when the experiences are provided with guarantee and credibility. Besides, the social actor which, represents the theme (sustainability) may gain their trust.

Comfortable: Similar to "trusting" value, users indicated that the persuasive media which present guarantee, credibility and transparent information would make them more comfortable to participate.

Educated: From users' statements, we observed that persuasive media could lead to this value. They are willing to be educated and they appreciated it when they learned new knowledge through the video (video which shows the transporting process of the products).

Following: From the interviews we can understand that aside from the above three values, that persuasive media also induces users to follow. As they gained more clear knowledge about the concept, they gradually trusted and felt comfortable to participate in the activity.

Reliable: On the studies, a few users pointed out that the social actor that represents the theme (sustainability) is reliable. Noticeably, most of the categories have triggered this value from not only when interacting with the sustainable image, but also feeling the sense of joint participation, and seeing responsible and transparent information.

Sense of Identity: Nearly every user stated that when they are aware of other people's participating and loyalty, they tend to identify with this idea easier. It revealed that when social proof phenomenon occurs, the users would be more likely to be persuaded.

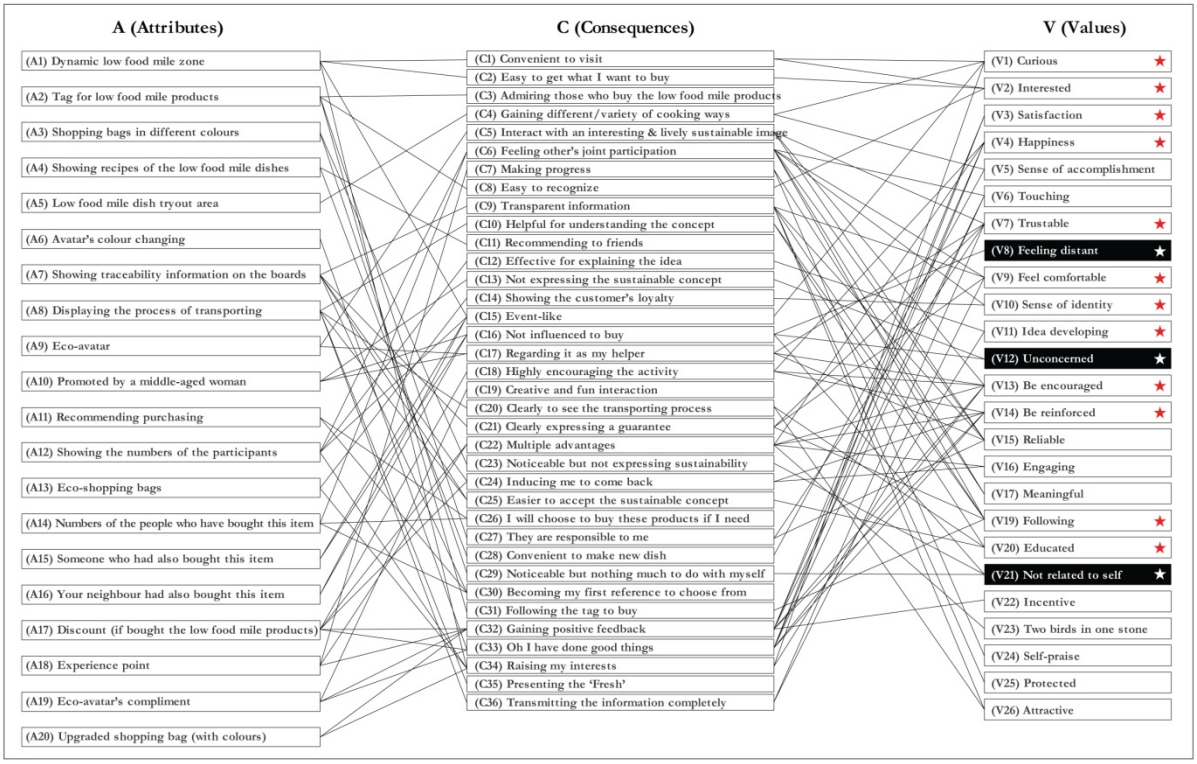
Idea Developing: Similarly, social proof phenomenon has the capability of assisting users to cultivate the ideas and intention. Seeing others' participating would raise their interests and effectively being influenced.

Satisfaction: As we examined the effect of "reward/incentive", it was found that Satisfaction is one of the significant values that can be seen from users' responses. Users feel satisfied when they gain multiple benefits, positive feedback and feel they have done good thing.

Happiness: Is another important value that users respect. The multiple benefits, positive feedback and encouraging feeling made them feel happy and have positive attitude.

Be encouraged: Lastly, all the users pointed out that they are highly encouraged when they are given positive feedback, compliment and reward; especially when they experience that they are really doing something good and eco-friendly to the Earth. When these values were generated, users' behaviours are not only influenced, but also reinforced.

Chart 4-6. The Consolidated A-C-V Model for the Persuasive Sustainable Design (See Appendix D.)



4.3 Summary

In this chapter we analysed the data with qualitative methodologies. With the Affinity Diagram and Mean-ends Chain methods we uncovered four categories of influential factors and thirteen critical values in the context of interacting with the persuasive sustainable design.

Chapter 5

Discussion

We have presented our investigations into five related lines of inquiry: (1) persuasive tools; (2) persuasive media; (3) persuasive social actors; (4) social proof phenomenon; and (5) reinforcement effect. Our overall aim has been to explore the influential factors within the targeted users through their contextual experiences and to further examine what values persuasive technology in sustainable design might incorporate. The deliverables deriving from our study could yield a deeper understanding of the relationships between persuasive sustainable designs and the persuaded. In our empirical work, we found participants developed particular ways of seeing and handling the persuasive information.

5.1 Similarity comparison with the Behavioural Chain

According to previous studies, a pattern of behavioural chain was proposed on the use and engagement of online platforms (Figure 5-1, Fogg & Eckles, 2007). In this framework, they explained that users might undergo three phases from the day they first encounter a platform to the day they become familiarised with it.

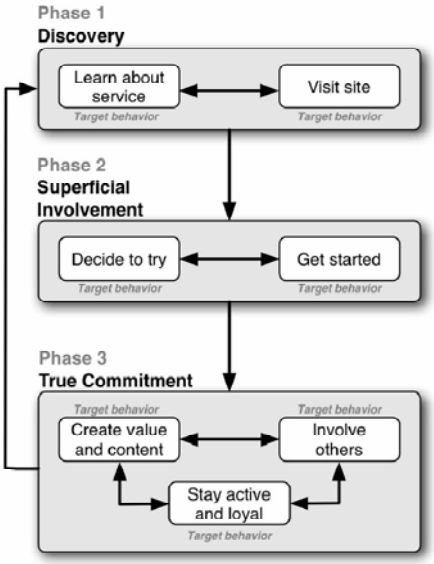


Figure 5-1. The Behaviour Chain for Online Participation

As can be seen from the Affinity Diagram, there is a similarity between the influential levels of the user responses to persuasive sustainable design and Fogg & Eckles' behavioural chain for online participation (See Table 4-5). In this paragraph the influential capabilities of persuasive methodologies in sustainable design will be addressed and mapped to the behavioural chain. In the first phase ***"Discovery"***, users get to know the services and visit the platform, which maps to our studies that users' ***"Intentions"*** were persuaded by generating curiosity, interests and reducing effort (See Quote 01, Quote 02).

[Quote 01] User#1: ***"...Yeah I thought that that area (low food mile zone) on the dynamic map is convenient and yes I will be curious and will want to take a look cuz it's pretty clear, right? I could just pass by... it's quite a new thing for me too... and it looks like I can just get everything I need there..."***

[Quote 02] User#2: ***"Um... trying out is important, and it's interesting that I can get various combinations of new cooking ways, it's kinda cool! And I like that idea of cooking foreign dishes easily with local food, I thought it would be fun for me to try it at home..."***

In the second phase ***"Superficial Involvement"***, when users' ***"Behaviours"*** were triggered under the climate of the activity; once their requirements can be satisfied, they may be comfortable to try it and decide to get involved in the platform. However, examination is simultaneously happening to confirm whether the activity they are participating in is worth continuing. More importantly, through transparent information and providing new knowledge (sustainability) to raise users' trust and reliability are the underlying key factor to effectively orient them to the next phase (See Quote 03, Quote 04, Quote 05). Aside from this, in order to achieve the best outcome, the persuasive tools embedded in the external environment must provide appropriate but not disturbing persuasive-suggestions at the right time and in the right place (Fogg, 2003; Intille, 2004; Mathew, 2005).

[Quote 03] User#1: ***"...the instant discount I get when I bought some low-food-mile stuffs shows that the supermarket considers the concept very important! Otherwise they would promote it this way, right? Well for me it means that they care a lot..."***

[Quote 04] User#2: ***"...for me, that eco-avatar thing IS exactly the sustainable spirit of the supermarket..."***

[Quote 05] User#3: ***"...that low-food-mile eco-tag shows that the supermarket is responsible for it, I will totally go for it cuz it not only attracts my attention but also shows this product is reliable, and has credit..."***

In the third phase ***"True Commitment"***, in which users' ***"Attitudes"*** were influenced and changed. Users may not only use the platform, but also create its value and content, becoming engaging and even recommending it to other users. To reach this level of intensity, as we found out that in this context, design with "credibility" is one of the most important factors to influence users' attitude towards sustainability. Users' attitude will be reinforced as they gain reliable, trustworthy and responsible experience, as well as being encouraged by incentives and positive feedback. (See Quote 06, Quote 07).

[Quote 06] User#3: ***"...Yeah I will be very comfortable buying the stuffs with the traceability information! For me it is pretty reliable to know where it comes from, , I trust it..."***

[Quote 07] User#5: ***"...Yes I will support this idea, cuz it gives me a sense of trust and guarantee..."***

[Quote 07] User#6: ***"...oh discount is nice, of course... and it's quite encouraging though, also makes me feel that I'm doing the right thing! I will visit next time..."***

Table 4-5. The Comparison of Behavioural Chain & A/D of Influenced Levels

Fogg & Eckles' Behavioural Chain	Discovery	Superficial Involvement	True Commitment
	Learn about service	Decide to try	Create value & content
	Visit site	Get started	
			Involve others
			Stay active & loyal
How persuasive design influences in sustainability	Influence the Intentions	Influence the Behaviours	Influence the Attitudes
	Have the initial ideas	Recognise the concept and follow	Create deep value
	Have interests and curiosity		Suggest to others
		Be educated and follow	Stay active & loyal
	Have acquaintance with the concept		

5.2 The Persuasive approaches and the corresponding responses

5.2.1 Users who like spark of freshness but dislike trouble

"Lower the burden; simplify environment setting" is one of the most critical approaches among persuasive tools, and in our research, this principle also works on people effectively in sustainable design. Before the users started to accept the ideas (attitude not rooted), an instant attraction to the other participants could be formed. The interviews revealed that they similarly responded that they are curious towards interesting things; they want to try new things; and they notice eye-catching things at the first glance, etc. Those responses showed that presenting "**spark of freshness"** is appealing. However, it is notable that this kind of approach would only trigger their "idea" while what really induces them to participate is the convenience and ease to approach (See Quote 8, Quote 9).

[Quote 08] User#3: ***"...yeah I would definitely just pass by and take a look, cuz it looks easy to find, and I'm interested in what's going on there, so definitely I would drop by..."***

[Quote 09] User#6: ***"...The setting of the low mile food zone is very attractive, I saw it on the dynamic map at the first glance, and I thought I can just pass by, instead of searching for the stuffs I want everywhere... you know, we don't really have too much time..."***

5.2.2 Cultivate trusts through learning

During the new experience for the user, by transfusing a new idea, new knowledge can be learned effectively. Under the nurture of the context for sustainable development, "Learning" itself is no longer a means of the information transmission, but a way to enable users to dig in deep into an issue. On the other hand, the persuasive media plays a rational and objective role during the construction of attitude, therefore, on the contrary, the users are likely to receive information comfortably and be willing to get involved in the context. (Quote 10, Quote 11)

[Quote 10] User#2: ***"yes I would definitely go for this thing with traceability information because it's got credit! And I found it the most persuasive to me, and I thought it's a***

guarantee to me and also totally good for the environment, so, why not? I will keep coming back next time..."

[Quote 11] User#6: ***"well, the traceability information on that board is the most acceptable way cuz it provides information so clearly and complete, it's transparent. So that saying eco-friendly is not only a slogan, it's something true! I thought, by this way is can tell me how they did it (growing and transporting from where), the process is very important, yeah..."***

In addition, a specific phenomenon is uncovered by educating the user- they will be aware of their space for improvement. These information, which were built on their existing attitudes are readily matched and effected to their existing attitudes. What made things interesting is that if we compare the insight in this paragraph with the content of 5.1.1, the users – who were seeking simplicity, were more willing to study and be less distracted by inconveniences under this context. This is because the different depth of effect upon the different stages that makes the persuasive methods and the application of the influential goals complementary to each other. (See Quote 12, Quote 13, Quote 14)

[Quote 12] User#6: ***"...ah! This is what I need! (Video displaying the transporting process of the food) I got to stop by and check it. Yeah it's very easy for me to accept this idea... It's always nice to know new knowledge..."***

[Quote 13] User#7: ***"...yes I am interested in watching this video. But I think it would be even better if it can show how the environment is like where they grow these things, and how they are doing it... then it'd be more attractive cuz we can understand it more, and feel more secure. The video is so much useful in learning this concept than the slogan..."***

[Quote 14] User#8: ***"...I find these products very fresh and low cost by the video. You know, for someone like me, who has no knowledge of this kind, this way is very effective to educate me and cultivate my sustainable idea..."***

5.2.3 I have done something good! Reinforcement vs. Incentives

According to the affinity diagram (page 49), rewarding positive feedback is capable of influence people's attitudes and it enhances users' satisfaction and involvement. The positive information,

experience points, compliments, and the discounts are all effective in terms of generating their engagement. From the interviews, we can realise that these persuasive methods (through providing incentives) play the rule as "unexpected presents". The user will receive the reward because of the participation in sustainable activities, i.e. they already approve of this method to some degree. With these methods, the user can receive the positive message of encouragement. Just like clapping hands, it enables their sense of agreement to be reinforced and deep-rooted. (See Quote 15, Quote 16, Quote 17)

[Quote 15] User#3: ***"...the incentives are attractive, I like that. I will try to participate more next time I come here. Because the food is good, and even eco-friendly. Why not?"***

[Quote 16] User#4: ***"...heh, I'm happy to get that discount and I'm encouraged! It's such a surprise, haha... I like those positive feedback, I can be eco-friendly and I support local food... making me feel very optimistic! ..."***

[Quote 17] User#8: ***"...the experience point is kinda a surprise! Haha...didn't expect to get it though. But it's good, and that makes me feel like participating more. And I think I would pay more attention on what I choose... to see if it's low-food-mile or not..."***

The effect of "doing good deeds" is an aspect worthy of lots of attention. It is clear to us that after the users received positive feedback from various fields owing to the realization of sustainable ideas, the fact that their thoughts have been straightened is not out of the feeling of achievement, but because they are touched by the idea of protecting the earth on their own, the happiness of protecting the environment without sweat, the feeling of conducting meaningful actions, and other sorts of satisfaction after doing good deeds. (See Quote 18, Quote 19)

[Quote 18] User#1: ***"...getting the experience points makes me feel happy, like mental satisfaction kind of feeling, you know what I mean?... it's more like, everyone is doing the good thing, I'm going to keep it up too!"***

[Quote 19] User#2: ***"...the compliment from the eco-avatar makes me feel comfortable, feel good... but you know, not something sense of accomplishment, it's more like I am actually doing something good to our environment, to our Earth..."***

[Quote 20] User#6: ***"...I like the have the experience points, it's like I also made effort on this activity, felt meaningful..."***

[Quote 21] User#5: ***"...I thought those rewarding kind of feedback can influence my attitude gradually, because it just blends in my life so naturally. It's fairly persuasive and motivated to do such easy but good things in daily life, you know, like I could just being eco-friendly by grocery shopping? That's something touching and nice, isn't it?"***

This explains that to these kinds of people, the purpose of attending green activities is for the sake of our environment rather than personal achievements. Hence, when the users are praised and awarded because of their actions, they will receive a positive value that I have done the right and good things. It will support their following actions and will even lead them to suggest the idea to others. (See Quote 22, Quote 23)

[Quote 22] User#2: ***"...yeah I will want to take my boy to this supermarket to teach him this concept and what I have done, I'd also recommend to my friends..."***

[Quote 23] User#4: ***"...of course we need to do something eco-friendly no matter how troublesome it is... well most of the eco-friendly things are troublesome haha... but it would be the best if you can just do it naturally like this. And of course I'd recommend to my friends this concept, especially the trying out area..."***

5.3 The Influential Factors among the Community

5.3.1 Ambience is inspiring

The influence of surroundings plays a role as a stimulant rather than initiation in this study. All users indicated clearly that even though ambient information[4] will not directly affect the behaviour for a newbie, it can successfully elicit their curiosity and guide them to experience the vibrant ambient of theme activities from the arena. (See Quote 24)

[Quote 24] User#4, 6: ***"...yeah I will be attracted to check it out, because I'm new to this idea, never heard about it... so this event/activity kind of thing looks interesting to me, not the numbers of the people..."***

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[4] Ambient information means that messages received in the arena are transmitted from matters in the surroundings.

Aside from the interviews, we can see that purchasing food ingredients is more likely to be a goal-oriented[5] activity, and it has more to do with personal preference. Thus, if the exterior environment at the time and other people's behaviour has no direct relation to each other, they will be inclined to make their own decisions and concern about their own needs. (See Quote 26, Quote 27)

[Quote 26] User#1, 2, 3, 5: ***"...I'd be pretty curious about people carrying eco-shopping bags with different colours, would be wondering why and what that is? I might find it is something to do with eco-friendly, but no... don't think I would be driven to want to own one..."***

[Quote 27] User#2, 8: ***"...the recommending purchasing information will be my good reference to choose from, if the stuffs that the person buy is related to what I have in mind, I would specifically check it as my reference... it's not really something influential or persuasive, just a reference. What I need is more important..."***

As a result, we define this sort of pattern as "the influence of inspiration." It can not only straighten the users' impression regarding this concept, but also indirectly becomes information for the users' reference or a premium option for need in the future.

5.3.2 The sense of joint participation is necessary

Similar to the environmental factor, the commonality between sense of mutual participation[6] and ambient information is that they can elicit the users' curiosity and are willing to see what activities others are participating in. It is not only interesting to the users, but it will additionally arouse a feeling for them that other people understand what is happening currently, and elicit them to get to know it themselves. In terms of doing something eco-friendly, they also tend to hope others will join in with them together. (See Quote 28, Quote 29)

[5] I am here today not just randomly visiting, but for a certain activity.

[6] It means the feeling of participation from others in the arena.

[Quote 28] User#1, 2, 3, 5: ***"...well it looks there are a lot of people doing something together, and I'll be curious to know what's going on..."***

[Quote 29] User#1: ***"Whether others in the supermarket are participating or not matters to me, I don't want to be the only one doing it, haha... I want to be with others. At least it shows that there is credibility for people to join in..."***

As users were introduced this concept in the beginning, designs that show others participating can also make positive impact on users' intentions. That is to say, it matters if everyone is participating or not. If so, it means that everyone beholds certain fidelity towards it and is such trust-worthy that will lead others to believe in it without any doubt. (See Quote 30, Quote 31)

[Quote 30] User#2: ***"The more people are joining, the more I will identify with it..."***

[Quote 31] User#3: ***"...of course it shows if a lot of people are buying stuffs from that area (low-food-mile zone) means the products are really good. For me, it's my sort of judging criterion when I first encounter a new thing..."***

In addition, the accuracy in determining the sense of mutual participation is a very important key. In the begging stage of knowing these concepts, the highly accurate number of participants is merely an obscure idea for them, while the introduction of a broader concept means more for them. Thus, we can conclude that the influential of sense of mutual participation on sustainable concept will vary according to the users' understanding and experience. That is to say, to start in a broader manner can help transmit messages and arouse users' concern, e.g. other people have also bought this item. After the users have such an idea, the influence of a concrete number and message[7] will be far more important. (See Quote 32, Quote 33)

[Quote 32] User#8: ***"...Yeah, showing how many people are participating in numbers expresses the positive information and I will notice that local/in season food means it's fresh! But I thought in the beginning, a brief introduction of the concept is enough, numbers don't really mean a lot to me..."***

[Quote 33] User#4: ***"...numbers are trustable, and it has some sort of reliability. I thought that in the beginning when I'm still not in this concept, it will be more interesting to introduce and spread out the idea with a broad way, instead, showing***

[7] For example, how many people have bought this today?

numbers/participants is just ok. But you know, after I understood and accepted the idea, I will refer to the numbers to make decision!..."

5.4 Sustainable Design Implications

Drawing from human computer interaction theory and user study, we propose the following 10 guidelines (3 don'ts and 7 do's) for persuasive sustainable design:

5.4.1 Avoid things which are not directly related to sustainability (Don'ts -1)

Persuasive tools which are not directly pointed to sustainable concept (e.g. shopping bags in different colours) should be applied less. Users pay less attention and care less when they find it not related to them, or not expressing the sustainable ideas.

5.4.2 Avoid using social actors as "recommender" (Don'ts -2)

Social actor could be a good way to mediate people. However in terms of influencing sustainable concept, "teammate/partner" characteristic looks far more important than "familiarities/mirror". To be a spokesmodel for sustainability, users need a helper or a partner to work with. Someone who represents eco-friendly will associate with users better than someone who seems to be like them, that is likely to minus the effect on persuading when users find it more like an advertisement.

5.4.3 Focusing on "who is the participant" is less necessary (Don'ts -3)

Social influence is a critical aspect on mediate people as stated in 5.4.8. Though users do care about the joint participation, they do not seem to pay much attention to the distance of the relationship between them and others. In other words, presenting "who exactly" is participating[8] does not seem to be influential.

[8] For example, your neighbour has also bought this item

5.4.4 Designing for instant motivation (Do's -1)

As shown in the previous study, aside from LOHAS (Lifestyles of Health and Sustainability) advocates, most people are passive to the idea of sustainability and environmental protection, especially the targeted users from the following study, who have to take care of both work and family. Under such circumstance, what can anticipate them to participate in green activities is the main concern for the sustainable design. Therefore, in making a sustainable design, it should minimize requirements, simplify actions, make it eye-catching and easy to accomplish and the like that will successfully elicit participation from people. Moreover, it should also include interesting and fun elements in the design in order to satisfy the users' desire to try new things, and to further formulate a motivation for trying it out.

5.4.5 Designing new experience – what they are going to do (Do's -2)

In addition to anticipating motivation, the users may also be interested in understanding how sustainability in this platform works, and therefore, the transparency of information should be considered as well, and should also avoid any under the table procedures. Designing new experience is bound to open up to what the users are about to be involved with and what aspects they will influence, and allows them to understand the whys and what for's of this concept, current situation and what changes they can bring by their own practice. Furthermore, new experiences should be integrated with the needs of the users' activities. For instance, the activity for purchasing food ingredients involves freshness of the food ingredients, health information, such as calorie, dish combination, the way of preparing food and so on. Hence, when designing a whole experience and process of interaction, it should take this into consideration.

5.4.6 Designing trustworthiness (Do's -3)

Taking the activity of environmental protection as an example, what the users care the most about is reliability. They determine if the activity is authentic by observing while they are involved. Therefore, besides the authenticity of the activity itself, it should adopt some adequate approaches

to reveal its reliability, for examples, logos that can represent environmental friendliness, descriptions that delineate the product's resume, and even a record about the number of purchasers, etc., all of which can emphasize and represent that the activity or the service platform is reliable and trustworthy, and it will enhance the users' sense of identification.

5.4.7 Designing to educate (Do's -4)

Offering chances for education is also an important part that requires attention in the platform of sustainable design. Within design, there should be clear explanations that apply neutral and objective viewpoints to the users regarding new ideas. The rights and wrongs[9] should also be identified clearly, so that the users could receive correct information rapidly and properly.

5.4.8 Designing mutual influence (Do's -5)

In addition, behaviour of other participants in this field can be influential as well. Through the usage of the information from the outside, the design of the service platforms can show to the users that there are many people participating and they shall feel safe to give it a try. The participation of people from other fields can, on the one hand, let newbie users feel they are part of them, and change their will imperceptibly. On the other hand, the number of participants or any other eloquent and valuable information for reference can be adopted to convince more effectively the users who have been familiar with it.

5.4.9 Design to encourage their behaviour – Incentives (Do's -6)

Almost everyone is fond of encouragement. Apart from promoting and introducing, after the users participate in an activity, an adequate encouragement is necessary to be given. Therefore, the content of design should consider practical feedback, such as awards, upgrades, and praises, or virtual feedback, such as value of experience or scores. This sort of positive feedback will enhance

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[9] For example, the expression form of high food mile and low food mile

the users' experience, and make them feel that they are doing the right things and are able to keep doing the same.

5.4.10 Designing to make changes without changing lifestyle (Do's -7)

Last but not the least, even though the goal is to make environmental protection an activity for the whole civilians, it should start with the current life of people, and change people's behaviour and attitudes on the premise not to change largely the living style. It is owing to the fact that to most people, the activity of environmental protection is not as easy as a leisure activity or an easy task. From getting to understand the concept, actively participating in the activity, and eventually turning into a follower, the whole process could not be done without lots of effort. The designers ought to take this principle as a fundamental reference. They also have to consider the extent that different users can accept, and let such behaviour naturally fit into a daily routine, in that the users will establish good behaviour and correct values.

Chapter 6

Conclusion

6.1 Achievements

The basic research question is that exploring how persuasive technology and social influence phenomenon mediate users in the genre of sustainable service design. The studies were successful in exposing some of the individual values, influential factors as well as uncovering aspects of the physical, emotional experiences we were interested in.

As stated in chapter 1, the primary goal of this research has been the elaboration of the current situation regarding environmental issues, the brief introduction of the food mileage concept and the recent development of the sustainable design. A review of these theories in chapter 2 reveals that persuasive technology, psychology of persuasion and social cognitive theory have been applied to exploring social phenomenon and developing platform to influence behaviour for the better. Using the mixed-fidelity prototype designed based on the approaches from the theoretical framework the user testing result presented in chapter 4 helped us to extract seven key challenges when designing for persuasive sustainable design.

Through this study, we applied design approaches based on persuasive technology and the psychology of persuasion regarding behaviour change as a research tool to investigate the users' responses and how they are affected in the iterative user testing. Through the human-centred design process, the involvement of the users enables us to obtain the real context of the influencing factors and their preliminary ideas toward sustainable design. Yet this study is only the primary discussion, and provides basic suggestions to design projects that focus on changing people's attitudes. In the future, there can be further studies on the practical fields or implement of the activities that closer to the real use scenarios.

Moreover, adopting human-centred design in the research/design process can assure that the outcome may be suitable for its intended purpose in the context in which it will take place. The involvement of the users also assists in managing users' expectations and can make the overall process more efficient and effective.

6.2 Research Deficiencies

In the study we intended to explore users' capacity to be affected by persuasive and social influence approaches via qualitative research and in-situ prototype methodologies. However, there are still restrictions in the process that caused certain research deficiencies, as described in the following:

1. Attitude change takes time; it may require long-term observation and record. However, under the restriction of our research scope, we were only able to conduct the small-scale user study, which may affect the precision of the user response because users' statements regarding long-range influences might vary over time.
2. In the user study, a mixed fidelity prototype was adopted for the scenario test and we collected participants' responses from their interaction with the platform. Although it was efficient and effective to display the ideas, it is still lacking in the physical feeling of the real system.

6.3 Outlook & Future Direction

Human behaviours may vary with social and technological development, but the concerns about the environmental issues is worth attending to, and a non-stop campaign in the making, on either industrial products or service platforms. Thus, it is worth exploring how users obtain and digest a large amount of information that promotes an eco-friendly concept. The following are some future directions of the studies regarding persuasion in sustainable design:

1. A deeper research can be conducted to investigate the responses from a diversity of others, to understand the differences of their motivation and context of attitudes and behaviour changes between different user types.
2. The testing platforms can be altered to working prototypes and be collaborated with the physical environment so as to have participants involved in the real settings.

Since people's minds are influenced and cultivated by social surroundings, there can be more rigorous, extensive or focused research with respect to the social phenomenon on top of our presented studies.

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Appendix

Appendix A. Interview script

訪談進行流程與提問重點

研究主題：Persuasion in Sustainable Design

一、破冰、說明與介紹

- 開場、寒暄、自我介紹（訪談者姓名、單位、研究主題概述）
- 受訪者基本資料紀錄（年齡、性別、職業、家族成員、生活型態側寫）
- 詢問受訪者之超市購物行為活動、對永續環保的觀念、是否聽過食物里程

二、保密協定與酬勞說明

- 確認同意可錄音並簽署同意書
- 確認其他需要配合的事項
- 說明訪談內容僅供學術使用，資料絕不外流
- 告知訪談結束後將給予新台幣兩百圓整作為酬勞

三、User Testing 準備

- 進入場域（超市），取一購物推車，將 12 吋筆記型電腦架於扶手附近
- 閒聊、並準備錄音

四、User Testing 進行

- 給予一段情境故事做開頭，引導受訪者進入情況

「今天你下班了，像往常一樣你準備前往家附近的超市購買晚餐要用的食材。走在路上你經過了一家最近開的超市，上面寫「低食物里程超市」，於是你打算到這間超市來買東西。店員給了你一張購物卡，你拿了推車，上面有一個小螢幕。」

- 告訴受訪者可以依照平時購物的路線逛超市，並在途中一邊展示 prototype 螢幕上的畫面

五、訪談內容大綱（針對每一項設計手法）40 min

- 這樣的手法帶給您什麼樣的感受、看法與觀點？
- 這樣的手法會影響您嗎？若是，影響什麼？為什麼？（負面亦問）
- 這樣的手法是否有效傳遞永續觀念給您？您有什麼感受？
- 這樣的手法您容易接受嗎？為什麼？（負面亦問）
- 這樣的手法您喜歡嗎？為什麼？（負面亦問）
- 這些手法中哪一個您印象最深刻？為什麼？
- 這些手法中哪一個您最容易接受？為什麼？

六、收尾

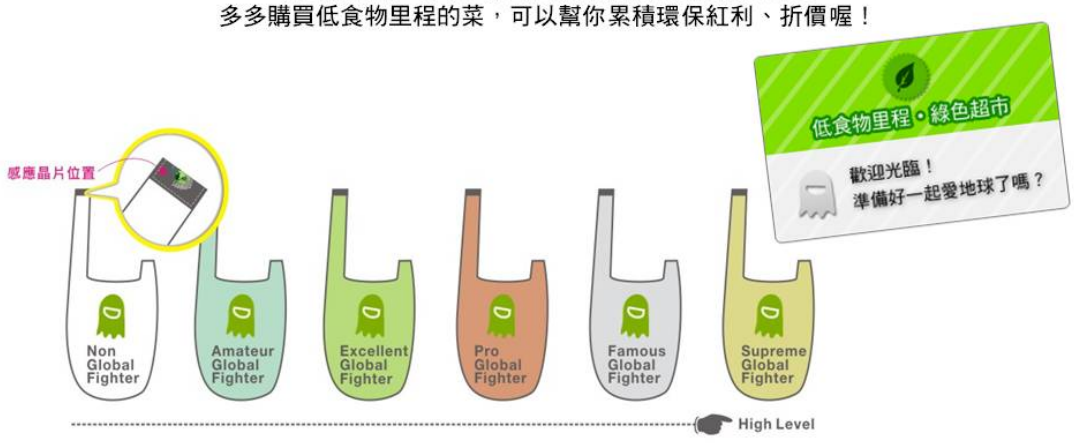
- 詢問是否有要補充的想法或訪談內遺漏的事項
- 詢問訪談中是否有需要改進之處
- 致贈新台幣兩百圓整酬勞
- 感謝受訪者並結束訪談

Appendix B. Prototype images displayed in the user testing

社區周圍不遠處，有一間超級市場上週新開幕
今天，你一如往長的要去做例行的食材採購，於是你決定去這間看看

這間超級市場似乎和一般的有一點不同
他標榜著「低食物里程・綠色超市」

你進入門口，店員親切的招呼你，並且遞上一個白色的購物袋、一張環保卡
她告訴你說，這是本超市專屬的購物袋跟電子錢包
多多購買低食物里程的菜，可以幫你累積環保紅利、折價喔！



低食物里程？

你好像聽過這個名詞，但卻又不是很熟悉。

於是，你推了購物車，照著剛剛店員的指示
將卡片插入推車上的螢幕，並將背袋掛在推車上的掛勾上，開始了購物

在進門時，你看見大螢幕的宣傳廣告

你發現這個超市裡的人，都使用跟你一樣的購物袋
只是大家的顏色都不一樣

你把卡片插入螢幕時，螢幕上出現了動態地圖
並且也讀取到你今天的購物清單

你看到有些食材包裝上，有葉子圖樣的標籤

當你拿起某樣食材放入購物車時

走過蔬果貨架旁，有一個直立的螢幕播放著影片介紹

你想要買一些水果，然後在貨架上看到產銷履歷的牌子

你想要買一些水果，看到水果架上有一個立牌

你經過了試吃專區

你在試吃專區停留，螢幕顯示菜餚食譜，詢問要不要收藏

你想要買一些肉，看到架上有一個電子告示牌

你想要買一些肉，看到架上有一個電子告示牌

你想要買一些蔬菜，看到架上有一個電子告示牌

結帳時，你螢幕顯示今天購買的物品，以及回饋的環保金
你將超市卡遞給店員，以核對並結帳

結帳人員將卡片遞還給你，卡片上的資訊變化了！

Appendix C. Affinity Diagram

4th Level Super Headers	3rd Level Headers	2nd Level Headers	1st Level Statements
Influencing the INTENTION (Getting to Have the Intention)	1 Others' participating behaviour and attitude would make positive impact on my idea	Other people's participating will raise my interest after I have the attitude in mind	[How many bought] After I have the low food mile idea, it matters to me how many people are buying eco-products
			[How many bought] More people buying it, more likely I will buy
		The sense of people's joint participation will arise my idea of participating	[How many bought] I feel it will raise my interest
			[Who else also buy] It is fun and interesting to know what's in others'
			[How many join] I can see many people are participating with me
			[Tag] What other purchase (in their shopping cart) can be my reference
			[How many join] I am curious to know what they are participating
		Other's participating is noticeable and I will identify with it	[Tag] I admire people who are buying products with eco-tags
			[Bag] Seeing people with the eco-bags makes me feel that others know
			[Bag] The eco-bag expresses customers' loyalty
			Knowing the info that how many people have bought this item makes me feel that people identify with this idea
			[How many bought] It seems many people are participating when I see the info that how many people have bought this item
			[How many bought] Seeing the info that how many people have bought this item will not trigger me to buy it
			[Who else also buy] It seems like everyone is participating
	2 Fun, eye-catching and uncomplicated new things may attract my interests	My curiosity makes me want to take a look	[Map] My curiosity makes me want to take a look
			[Map] Make me wonder what "low food mile" is
			[Bag] I will be curious
			[Video] It will attract me to go watch it
			[Bag colour +] At first I'm curious about it
		The creative way of giving feedback is very interesting and necessary	[Compliment] It is creative and makes me feel positive
			[Character] The character is necessary and fun
		Eye-catching and clear present is very easy to ecognise in a glance	[Map] Looks clear and obvious so that I can recognise
			[Tag] I can clearly recognise because it stands out from others
	3 The action is simple and convenient that doesn't need a lot of time to do it, which makes it easier for me to accept		[Map] Looks easy to get what I want to buy
			[Map] Convenient to drop by
			[Map] Looks very easy to find
			[Tryout] Will consider buying the product if it's easy to cook the meal
			[Video] I don't have much time here, so it'd better be short and easy
			[Video] It will make me easier to accept this idea
	Being influenced unknowingly	The complete information transmitting can help me accept the idea	[Source] It tells me how the food is transported, but not only a slogan
			[Source] This way is the most acceptable because it's very complete
			[Source] I can see the procedure (of how we have the products here)
			[Video] It educates me and helps me to understand and the idea
		Be influenced gradually under the atmosphere in the environment	[Bag colour +] Seeing people's bags in different colour, under this atmosphere for a while, I will want to upgrade
			[Colour +] I might be influenced under this atmosphere gradually
		Other's choice can be my reference	[Also buy] It can be my assorted reference
			[Also buy] It can be my recommendation if I'm new to cooking
		Trying out new dishes provides me various choices	[Tryout] It provides different/variety of cooking ways
			[Tryout] "Trying out" can make me buy things out of the shopping list

4th Level Super Headers	3rd Level Headers	2nd Level Headers	1st Level Statements
Influencing the BEHAVIOUR (Give It a Try to Participate; also Confirm the Trueness)	I am attracted by the event	I want to join in the event because the atmosphere in the event is attractive not the people	[Map] Event-like atmosphere makes me want to join in [How many join] I am interested in the meaning of the event, not the number of participant
	4 My practical needs are satisfied	I will buy it because I also need it	[Who else also buy] I will buy it only if I need [Also buy] Buy it or not depends on my need [Tag] If I need it I will buy this (product with tag) Whether buying or not depends on my need not the number of people have bought
		I will buy it if these food are competitive in terms of taste and cooking	[Tryout] I will buy it if "local ingredients taste as delicious as imports" [Tryout] Feel professional of cooking exotic dishes with local food
	5 Observe and check whether it is real eco-friendly or just a commercial approach	The supermarket is actually making effort	[Discount] I feel that the supermarket itself also cares a lot [How many join] It makes me feel that this supermarket really cares [Character] It represents this supermarket's eco-friendly idea [Compliment] Seems lively that make me feel the supermarket is working on it
		I want to make sure if it is true or not	[Map] Want to check whether it is actually eco-friendly

4th Level Super Headers	3rd Level Headers	2nd Level Headers	1st Level Statements
Influencing the ATTITUDE (Getting to Believe the Concept)	6 I support and promote things which are trustworthy	The sense of comfort will make me more likely to join in	[Source] Feel comfortable to join in [How many join] It will make me more relieved to join in
		The sense of credibility and guarantee will gain my trust	[Character] It looks reliable and trustable [How many join] It has a sense of credibility [Tag] The eco-tag way is trustable [Tag] I can trust it because it expresses a sense of responsibility [Tag] I can trust it because it expresses a sense of guarantee [Tag] It shows the products' identities [Tag] Products with eco tags are certificated [Source] It makes me feel that I can trust it [Source] It shows the products' identities [Source] I will definitely buy this because it has credibility [Video] It expresses a sense of credibility
		I want to recommend to friends the "source display" and "tryout area"	[Source] I will recommend it to my friends [Tryout] Will introduce the eco-friendly concept to family [Tryout] Cooking meals with this recipe can be good role model for children
	7 Positive feedback may reinforce my behavior and attitude	The actual positive feedback will strengthen my attitude	[Discount] It will strengthen the eco-friendly idea in me [Discount] I will feel that I am doing the right thing
		The virtual positive feedback information will make me come back again	[Colour +] If I identify with this supermarket later on, I will want to upgrade [EXP point] I will continue to work harder and participate more [Source] Feel protected so that I will come again [Discount] It is pretty much an incentive for me to join again
		I feel happy about the feedback because it makes me feel that I am pmaking rogress	[Discount] I can do good thing with simple effort in daily routine [EXP point] I feel that I have devoted something to our earth [EXP point] I will have self-praise feeling from even a little thing I did once I believe in this idea
	8 All kinds of feedback would generate self-satisfaction while doing good for the Earth	Positive feedback is very encouraging	[Eco character colour change] I feel that I am encouraged [Bag colour +] I feel encouraged [Discount] It gives me very high encouragement [Character] It looks that it is encouraging you
		Both actual and virtual feedback will make me feel that I have done good things	[Eco character colour change] I feel that I am making progress [Discount] I will feel that I am doing the right thing [EXP point] I feel so happy [Discount] This feedback is very positive telling me that I love the earth [EXP point] I feel that I am making progress [EXP point] It makes me feel meaningful [Tryout] Gain a sense of accomplishment [Compliment] I feel satisfied with I have done the right thing [How many join] It expresses positive information

Appendix D. Consolidate Attribute-Consequences-Value Model