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**A STUDY OF INTERFACE
REQUIREMENTS OF CHINESE
SOCIAL NETWORK SITES**

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**M.Phil
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2015**

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A Study of Interface Requirements of Chinese Social Network Sites

Lijin Su

A thesis submitted in partial fulfillment of
the requirements for the degree
of Master of Philosophy

January 2014

Certificate of Originality

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Abstract

The increasing popularity of social network sites (SNSs) indicates the willingness of people in China to perform social activities online. Understanding the interface requirements of local people is important in designing SNSs. Technical surveys related to Chinese SNSs have regularly been conducted in recent years. However, most of these studies have stressed the development, cultural differences and profile models of Chinese SNSs over their interface status. To meet increasing online demand, SNS systems must provide more multifunctional tools and simplify their interactive processes. An appropriate interface design may contribute to the improvement of SNSs. It is necessary to study what kind of SNS interface designs are enjoyed by the people in China, and why.

This study aims at identifying the interface requirements of SNSs in China. Its main research targets are **Renren**, **Kaixin001**, **Pengyou** and **Qzone** as the representative SNSs. A theoretical framework of interfaces is proposed as a basis for investigations. In this framework, a website interface can be considered as the point of interaction between a user and a system, in terms of two main factors, usability and visual aesthetics. The issue of usability is related to the effectiveness, efficiency, satisfaction, error tolerance and operational learnability, and visual aesthetics enhances the experiences by using design elements and visual arrangements. Based on this theoretical framework, this study tested the interface requirements relating to the usability and visual aesthetics of the SNS sites mentioned above.

I begin this thesis by discussing the visual aesthetic preferences of SNS users. I administered surveys to the users of SNS to determine what kind of design styles the Chinese users like, in terms of overall presentation and individual design

elements. I then conducted a usability evaluation to determine the operational problems and usability of the chosen Chinese SNSs. I also performed a case study to further understand the relationship between website usability and visual aesthetics, and to ascertain the design elements affecting website usage. Finally, I built a website to evaluate the effectiveness of this framework.

The results of my study indicated that a solid style line design with 1 px in size was largely suited to Chinese SNSs users, who preferred easy to use icons and a simple style of interface design. In terms of general aesthetics, the users largely preferred browsing the content from top to bottom rather than from left to right. They liked simplicity in the interface design for browsing photos, and showed a relatively low need for examining the text pages. The participants thought that the Chinese SNSs were generally straightforward to use. My study also revealed that most of the usability problems were related to website learnability. The users wanted the operations to be more consistent with their experiences. Navigation, links, buttons and layout designs were found to be directly related to website learnability.

This study contributed to enriching interface design knowledge with Chinese SNSs, with a basis research framework that can be further extended. The empirical results of this study clarified the interface requirements within this framework, and communicated the idea of importance of interface design among Chinese SNSs.

List of Publications

Su, L. J., & Tang, M. X. (2012). Evaluating the Similarities of Web Aesthetics in Chinese Social Networking Sites. The 7th International Conference on Design Principles and Practices.

Su, L. J., & Tang, M. X. (2013). Interface Design Effects on Webpage: A Theoretical Study and Website Evaluation. The 6th International Conference on Computer and Electrical Engineering.

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Chapter1 Introduction

This chapter begins with the discussion on the existing problems of Social Network Sites (SNSs) in China. Then the necessity and significance of identifying the interface requirements of Chinese SNSs are described. The research aims and the organization of the thesis are then stated, with an introduction to the proposed investigations to be carried out in this thesis.

1. Problem descriptions

1.1.1 Gaps between Chinese SNSs and others

As represented by **Facebook**, SNSs are spreading around the world in rapid speed. In SNS websites, users can easily upload their messages, images, music and videos to the systems. Others can quickly get the latest messages and images through feeds. These activities allow the users of SNSs to engage in online social and cultural activities, and to maintain contacts with friends and family members. Shortly, the term of SNSs (Haythornthwaite, 2005) is deemed as online platforms, which focuses on establishing social connections among people. To date, the most popular SNS in American and Europe is **Facebook**, whilst in China, **Renren** and **Qzone** are the representatives of SNSs. However, there is a significant gap between Chinese SNSs and those in the US and Europe. The following part will describe a comparison among **Facebook**, **Renren** and **Qzone**.

According to the ranking by Alexa (<http://www.alexa.cn>, 2013), **Facebook** ranked the second in the US, while **Renren** ranked the 30th in China. The daily average time when people stayed with the **Facebook** in the US was triple of the people who stayed in **Renren** in China. With regard to the supporting languages, the Facebook supports 16 languages, while **Renren** and **Qzone** only support Chinese. From the **Facebook**'s status, the popularity and recognition of SNSs in American and Europe are high whilst the mentioned Chinese SNSs are relatively low. It is obvious that SNSs in China still have lots for improvement in order to attract more users.

1.1.2 Design problems in Chinese SNSs

The interface designs of many SNSs in China do not strong characters. Lacking the vivid design features or simply coping from the **Facebook** have become primary problems among Chinese SNSs. During the process of my investigation, over half of the participants commented that they did not consider the layouts of the interface of Chinese SNSs attractive. In many cases, the contents of the SNS sites are simply divided into two parts on the left and the right hand side of a page. This kind of page layout is not easy to browse, according to many users that I talked to during my study. Actually, **Facebook** also employed this style but it doesn't seem to work well with the Chinese SNS users. Besides, there are other problems of interface design in many present SNSs in China. The general problems with Chinese SNS interfaces can be summarized below:

- (1) The interface design and operations lacked attractive features and styles. Although some web makers realized this issue and then they tried hard to design vivid features, such as using the skin conversion, the framework and basic aesthetic considerations are not changed. Among the popular SNSs in China, including **Renren**, **Kaixin001**, **Pengyou** and **Qzone**, the interface designs are more or less similar to each other because they all seemed to have mimicked the style of the **Facebook**;
- (2) There are many overlapping and redundant links in many websites, especially in **Qzone**. In a homepage, for example, people can easily find that a note has three links, one is at the top of the banner, and the other two are displayed in the right hand side list and the middle list. These overlapping links are seldom useful for the users. During my survey, many users pointed out that too many links actually disturbed their choices;

(3) In many cases, the layouts of the interfaces are not unified on the same page.

Taking the photo page of **Renren** as an example, the interface of the album page and the latest list page are totally different. However, they actually are the same page, displaying the same photo. This disaccord is even more apparent when the skins are changed. The skin does not only change the appearance of website (such as the color, button, icon and so on), but also the operations. This problem can make the users confused. Here the skin means a style of background, such as a picture or a banner or a decoration of a website

1.1.3 Limited knowledge of interface design

In previous studies, many researchers focused on the history, development, profit model and cultural differences of Chinese SNSs. The knowledge about interface design of Chinese SNS is limited. The interface design is deemed as a factor contributing to the development of Chinese SNSs, as concluded in Zheng's (2012) study. Liu (2009) explored the problems of interface design in Chinese SNSs and his research was one of the early researches and explorations on the issue of interface design for SNSs. However, there is limited knowledge in this area of interface design for Chinese SNSs. Users of Chinese SNSs seemed to be used to the designs that are similar to each other. The preferences and expectations of Chinese users on SNS interfaces are seldom known.

Based on the issues mentioned in above sections, it can be stated that Chinese SNSs still have a lot for improvement. Promoting better interface design in Chinese SNSs is a right way to move forward because it is important to care for both usability and aesthetic standards. This research focuses on the analysis of interface requirements for Chinese SNSs. The motivation is for making direct

contributions to the development of Chinese SNSs, meanwhile enriching the sense of interface design by providing knowledge about the user requirements.

1.2 Research aims and objectives

This research aims at identifying the interface requirements of Social Network Sites in China in order to sum up the design principles suitable for the design of interfaces for websites. Referring to the definition from Liao (2000), a website interface may be deemed as the connection between a user and an application running on a web server. The “connection” does not only display the information on a computer for its users, but also include the subjective operations. My research questions can be defined as:

- What is the status of people’s usages on the SNSs in China?
- What interface design of SNSs is desirable for the people in China?
- Which style of website interface is largely appealing to them?

In order to provide concrete answers to these questions, in this study, my objectives are defined as follows:

- (1) To identify and understand the popular preferences for the appearance of SNSs. For an interface, its appearance can be described as the design features such as icon, color, texture. Similarly, the design on buttons, lines, layouts, space and texts are also the concerns for the visual appearances of a website interface. These features and their aesthetic attributes will be explored in this study in the context of user requirements for web design;

- (2) To evaluate the usage and operation of the existing SNSs in China. During the browsing process of a website, the pages always contain some interactions between computers and users. Without training, how well and how easy a website can be operated by its user? This question needs an answer in order to give some guidance for website interface designers. It is believed by many that the success rate of enrollment of a webpage is affected by its interaction design. If the interface of a website is appealing for users, but at the same time the operation is difficult, then the popularity of this website will be undermined. In this research, the operations of website interface will be explored together with the aesthetic appearance of the interface;
- (3) To examine the correlation between the appearance and operation of the web interface. That is, to identify the constraints on these two issues. In particular, the issue of how design features will affect the usage of a website will be explored through implementation and evaluation. The study will make clear of what design features are more important for Chinese users of SNS.

1.3 The scopes and hypotheses

With the above mentioned research aims and objectives, the scope of this research can be clarified. In China, the types of SNSs are diverse. While **Weibo** provides mainly the news, **Zhenai** is largely used for match making for young people. Among different types of SNSs, their interface designs can be quite different. In this research, only the kinds of campus and entertainment sites are selected. In comparing with the **Facebook**, there can be many kinds of SNSs in China, which include **Renren**, **Kaixin001**, **51**, **Qzone**, **Pengyou**, **Bai**, etc.

This research only focuses on the interfaces that are displayed on computers. Other electronic devices (such as mobile device) are not considered. Comparing

the computer with mobile device, it is a fact that the mobile devices are becoming the dominated media. The development of SNSs also follows the same trend. However, computers are still playing a significant role for both work and leisure which could not be totally replaced by mobile devices. Some functions are more suited to be performed in computers. Taking the photo as an example, it is true that most people upload their photos online through smart phones. But for high quality photos, such as those taken by professional cameras, people still prefer to upload and view them through computers with bigger screens. The smart phone is not a good device to edit and browse high quality photos. In future work, however, the mobile devices can be considered as a platform for the analysis of user requirements on SNSs, mainly because it is easy to carry.

About the demographics, only Chinese users are considered and included. People whose ages are from 14 to 45 are the main research subjects. **Figure1-1** displays the research scope of this study.

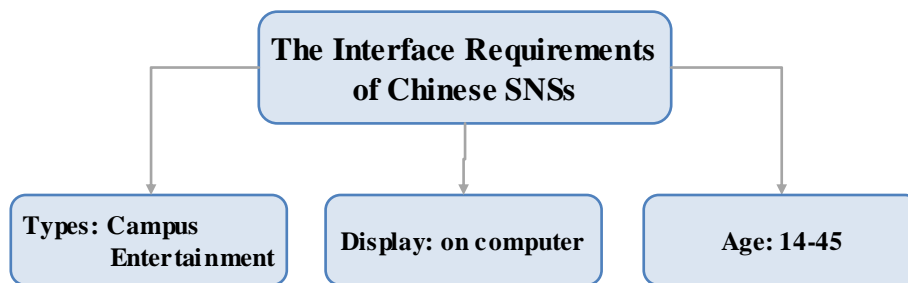


Figure1-1. The research scope including website type, display platform and age group

Often, if the contents of a website are not helpful for users, then the users will rarely revisit that website. In this study, it examines the interface design only,

while the issue of how the content affects the effectiveness of interface is not the focus of the study.

1.4 Outline of this thesis

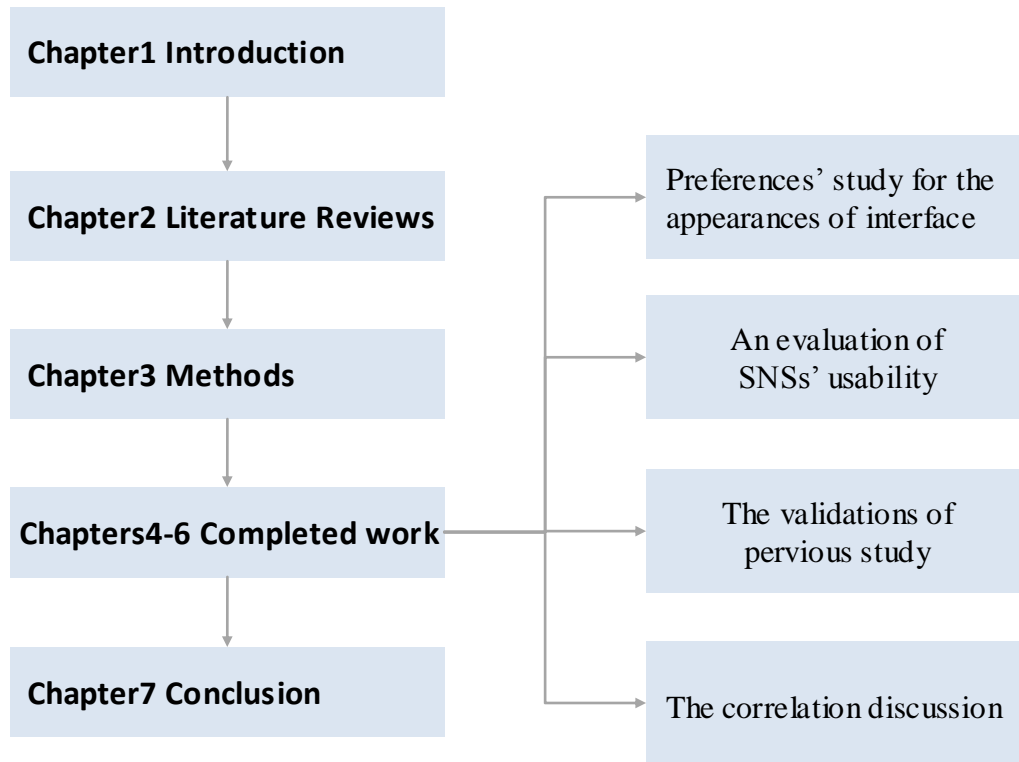
The remaining part of the thesis is summarized as follows. Chapter2 is an overview of Social Network Sites in China. Firstly, the definitions of SNSs, website interface usability and visual aesthetics are respectively explained. An introduction to the history and status of Chinese SNSs are then presented. The literature on website interface research is reviewed.

In Chapter3, research methods are introduced in details. A theoretical framework is proposed to conduct my investigations. This framework is related to the composition of website interface. Then, the testing objects including Chinese SNSs and cultural websites are listed. The experimental designs and the methods of data analysis are summarized in this chapter.

From Chapter4 to Chapter6, the whole completed works are respectively described. Chapter4 explores the people's preferences for the aesthetics of SNSs in China, and then an evaluation of operation of Chinese SNSs is presented in Chapter5. Chapter6 presents two case studies. The design experiences and principles summarized in the research findings are validated in Chapter6.1 and the understanding of the relationships between the appearances and operations of website interface is presented in Chapter6.2.

Finally, Chapter7 presents the conclusions of the analysis of interface requirements of Chinese SNSs, and suggests the directions for future studies.

Figure1-2 displays the outline of this thesis.



Figre1-2. The outline of this thesis

Chapter2 Literature Review

This chapter defines the terminologies used in this study, including Social Network Sites (SNSs), web interface, usability, visual aesthetics and user requirements. An historical review of early and current Chinese SNSs is then provided. The final section presents some additional information about Chinese SNSs and website interfaces.

2.1 Term definitions

2.1.1 Social network sites

In the field of information technology, “SNS” serves as an abbreviation for Social Networking Service, Social Networking Site in reference to communication platforms such as **Facebook**. However, in this study, “SNS” is defined exclusively as Social Network Site.

The differences between these two terms need to be stated. Richter et al (2009) define a social networking service as an online system that provides users with identity management functionality and enabled them to keep in touch with other users online. According to a description by Ahn et al (2007), a social networking service is an online service, platform or site that facilitates the construction of social networks or social relations among people. These social relations come from real-life connections such as classmates, friends and families. Although this definition indicates that such a “site” is a kind of “service”, the range of services is more extensive. The general goal of a social network service is to provide real-life activities for people online, which is also the main purpose of social network sites. A “site” is a kind of “services”. This study focuses on social network sites instead of social network services, since a site is easily connected with an interface whilst a service may have others forms. In technical terms, there is a distinction to be made between a “network” and “networking”. Boyd and Ellison (2007) suggest that “networking” stresses an original relationship, usually between strangers. People who use websites like **Facebook** are rarely looking to find new people. Rather, they are mainly interacting with friends and family members who belong to their real social networks. Hence, in this thesis, the term “social network site” is more suitably applied to environments such as **Facebook**.

Boyd and Ellison (2007) also suggest that SNSs enable people to “(1) create a public or semi-public profile within a bounded system; (2) articulate a list of other people with whom they share a connection; and (3) view and traverse their list of connections and those made by others within the system”. This definition summarizes well the basic features of SNSs. An SNS should initially provide a public or semi-public profile to each user, after which real-life connections can be built online. At this stage, users are prompted to find their friends, who are also members of the website and commonly referred to as “friends” or “fans”. By clicking a connections list, users may view the latest messages on their friends’ profiles. Other than building up social relationships online, carrying out social activities is the main purpose of SNSs.

The Types of Chinese SNSs

SNSs have diverse types. Zhong (2012) classifies the SNSs into four types according to their themes. The first one is related to the online communications and interactions with friends and family members, such as **Facebook** and **Renren**. The second type is a kind of social media which mainly offer news online, such as **Twitter**. The third type is for business users, and the fourth type is mainly for photos browsing and processing. In this research, the Chinese SNSs can also be classified by the themes. **Renren**, **Kaixin001**, **Baichinaren**, **51** etc. are similar in type to **Facebook**. **Weibo** is an example of type for news. For business type, there are **Tianji** and **Wealink**. In addition, **Douban** and **Guokr** are a type of SNS that provide knowledge such as books, videos, photos, music.

As the mentioned above, the type of Chinese SNSs are diverse, and their interface designs are also quite different. In this study, SNSs similar to **Facebook** are my focuses. In this type of SNS, users mainly take parts in activities such as finding the personal pages of their classmates, family members and friends; sharing

photos; recording notes, statuses and videos; viewing friends' latest feeds; making comments; and playing games. In contemporary SNSs, "feeds" serve the vital function of displaying the latest news and articulating a friend list.

2.1.2 Website interfaces

Website interface design has received a great deal of scholarly attention. Interface research has stretched across disciplines such as art, computer science, psychology and sociology. Vicente (2009) identifies the interface as a computer-based medium that provides sociotechnical system information to operators, with displays and controls comprising its major elements. An interface is a communication medium (Marcus, 2002) that facilitates the sending and receiving of data. It allows human beings to interact with computer devices (such as software, hardware and touch screens) and computer devices to interact with each other.

According to Liao (2000), a website interface connects the users to an application running on a web server. It represents both the information displayed for users on the computer and the physical connection. Sherson (2002) lists three basic elements of website interface as a design platform: navigation, usability and semiotics. A website's interface design should account for how the website helps users move from place to place (navigation), how well it assists users in achieving their targets (usability) and the effectiveness of its visual communication (semiotics).

In this study, the term "web interface" refers to how a website is displayed to users and the interaction between the website and its users, rather than the port and web connections. A web interface can be classified in many ways according to the amount of elements it includes. In a review of previous studies, Wang

(2005) observes that an interface design comprises a framework, an information architecture and web usability. Sherson (2002) states that navigation, usability, semiotics and layout should be considered in an interface design. Furthermore, Morville et al (2006) divide the interface design phases into audience-based, function-based and organization-chart-based phases.

Based on these classifications, web usability and visual aesthetics are considered in this study as the most relevant aspects of interface design. The appearance of a website can be judged by its visual aesthetics, and the website's operation and usage can be measured by the usability of its interface. These two elements dictate the focus of this study. Both usability and visual aesthetics should be considered when evaluating whether users are satisfied with an interface design. **Figure2-1** represents two components of a website interface. The definitions of these two elements are discussed in the following subsections.

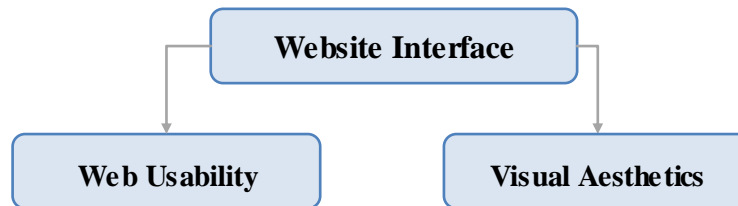


Figure2-1. Components of a website interface considered in this study

2.1.3 Usability

The term “usability” was initially proposed to displace the term “user friendly” (Bevan et al, 1991). When a user operates on a machine, a comprehensive interface design can be considered “user friendly”. In the early stage of research on HCI, the emergence of engineering usability enables developers to focus on measuring progress, and a usability project has the advantage of being easy to

measure (Whiteside et al, 1988). However, the concept used at this stage was not clearly defined.

Different researchers have subsequently defined usability and its testing standards in different ways. According to Nielsen's definition (1993), usability is related to whether an interface design satisfies a user's demands on the system. The test criteria consist of learnability, efficiency, memorability, errors and satisfaction. Bevan (1995) defines usability as "the quality of use", with quality including effectiveness, efficiency and satisfaction, which are also affected by the particular assignments, users and environments involved. Bevan's description provided the factors in addition to the test criterion. Lin et al (1997) define usability as the capability of an interface, or how easily and effectively a user can complete an arranged task after receiving specified training. According to this description, usability relates mainly to the operational effectiveness of the interface. In addition, the ISO2411-11 (Jokela et al, 2003) defines usability as the extent of an interface's efficiency, effectiveness and user satisfaction when inviting specific users to complete specific targets. In general, the term "usability" is conceptualized more concretely at this stage, and the test criteria are differentiated by their emphases.

The preceding definitions focus mainly on the system and usage. Quesenbery (2003) expands the scope of these definitions by claiming that usability is also "(1) a result that shows the quality of the product; (2) a process which refers to the quality of the method adopted for creating the product; (3) a technique involving characteristic methods; and (4) a philosophy that refers to a belief in design to improve users' satisfactions". In the context of my study, usability is defined as a result and a philosophy. The result refers to the outcome of an SNS interface assessment, and the philosophy refers to the design principles.

Benbunan-Fich (2001) defines website usability as “how lightly and well the people may operate a website or the information system without previous learning”. Quesenbery (2003) suggests that the extents of effectiveness, efficiency, error tolerance, engagement and ease of learning disclose the usability of a website. In my study, Quesenbery’s description is adopted as the theoretical foundation for building appropriate interface instruments. It divides website usability into five dimensions: effectiveness, efficiency, satisfaction, error tolerance and learnability. **Figure2-2** displays these five dimensions.

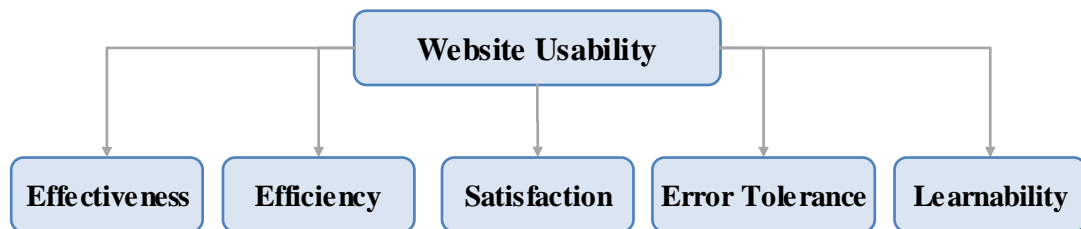


Figure2-2. Website usability dimensions

(1) Effectiveness.

For a website, effectiveness is measured by the completeness and accuracy resulting from the user’s operations. Sometimes it is measured in terms of whether all of the work is finished successfully and correctly.

(2) Efficiency

Efficiency is measured by the speed at which the work is completed. When a task costs too much time, it means the efficiency of system is low. Quesenbery (2003) notes that efficiency is mainly affected by navigation, links and buttons.

(3) Satisfaction

Satisfaction refers to how pleasant and satisfying the user is during the process of using a website. It reflects the user's mood and sense of the interface. If the interface design makes the user happy, then the satisfaction level is high.

(4) Error tolerance

When an operational error occurs, error tolerance represents how well the interface design helps the user retreat. For example, if a user clicks a link that is not located in the database, a 404 page that directs the user to return to the initial page represents an error tolerance effort.

(5) Learnability

Learnability is measured by how easily the system can be operated by the inexperienced users. It is the most fundamental usability attribute in the sense that the most websites are required to be comprehensive, and the first experience the most users have with a new system is about how to use it.

2.1.4 Visual aesthetics of website

Berlyne (1971) was the first to interpret aesthetics in psychological terms by relating them to collative factors including novelty, complexity and wholeness. When the term "aesthetics" is applied to industrial products, it is traditionally considered as the research and theory of beauty and psychological responses to beauty (Guralnik et al, 1998). This description establishes a strong link between aesthetics and beauty. Lavie et al (2004) expand on the definition by stating that aesthetics are also related to the importance of beauty, and that beauty is revealed

by order and symmetry. Merriam-Webster Online Dictionary (2004) defines aesthetics as “a branch of philosophy; a theory or conception; and a pleasing appearance of art or that of taste”. The focus of aesthetics extends beyond beauty to both art and taste.

Despite the abundance of visual aesthetics materials, knowledge about website aesthetics remains limited. Many researchers have studied website quality and specifically usability while neglecting the importance of aesthetics. This gap does not infer the unimportance of aesthetics. In fact, aesthetics can be considered a key factor for helping to improve a website. Jordan (1998) suggests that a practicable product does not represent a pleasurable product, as usability and visual aesthetics are not the same. In fact, visual aesthetics affects people’s knowledge of a website by operating people’s perceptions and amplifying events (Zettl, 1999). Hoffmann and Krauss (2004) critically evaluate visual aesthetic materials for websites, and observe that gaps must be filled when identifying important aesthetic elements and the effect of visual aesthetics on viewers’ perceptions. Aesthetic elements and dimensions are quite important in website research.

Although researchers generally neglected website aesthetics, a few studies have identified a framework for these aesthetics. Lavie and Tractinsky (2004) identify two dimensions of website aesthetics: “classical” and “expressive” aesthetics. Classical aesthetics is associated with the terms of sequence, symmetry and clear design. Expressive aesthetics refers to creativity and originality. According to McCarthy et al (2005), interface aesthetics consist of compositional, sensual, emotional and spatiotemporal elements. These two studies define the visual aesthetics of websites and offer descriptive classifications without including specific design elements such as colors, fonts and margins. In terms of these

design elements, Kim et al (2003) observe that textures, menu layouts and colors of interface are mainly associated with aesthetics. Alsudani et al (2009) propose a concrete framework for composition. They divide the visual aesthetics of the interface into two parts. The first considers the interface as a composition of pure individual elements such as colors, fonts, photos, styles, videos, sounds and Flash animations. The second considers it as a composition of the relationships between the individual elements that form the website as a whole.

Based on Alsudani and Casey's theory, the visual aesthetics of websites may be divided into two dimensions: design elements and visual arrangements (**Figure2-3**). Design elements represent the objective factors of visual aesthetics, and visual arrangements represent the subjective factors.

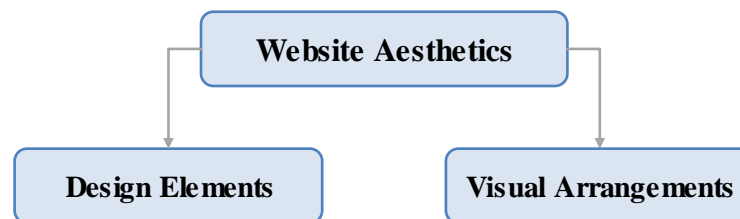


Figure2-3. The dimensions of visual aesthetics on website

(1) Design elements

Design elements comprise the entire interface features presented on a website. These include paragraphs/text, images/icons, menus/lists, links, multimedia audio/video clips/Flash animations, buttons, lines, forms, styles, spaces/blanks and frames/layouts. Each element has several attributes.

(2) Visual arrangements

Visual arrangements reflect the compositional relationships among the individual elements on a website, and are generally tested by visual attributes and measures. Park, Choi et al (2005) find 11 important attributes of aesthetically pleasing objects, including cohesion, symmetry, rhythm, movement, contrast, unity, simplicity, proportion, regularity, density and balance.

2.1.5 Requirements

Requirements represent a careful assessment of the needs a system must fulfil. Ross et al (1977) suggest that a requirement must contain three subjects: context analysis, design constraints and functional specification. In building a system, context analysis constitutes the reason for its construction, design constraints constitute the conditions of the construction and functional specifications constitute the “requirements” of the system’s introduction or what actions can be taken in the system. Applying this definition to the website interface, usability constitutes the tasks and functions a user must accomplish, and visual aesthetics constitute the visual contexts of the interface. In addition, Weigers(2009) claims that a requirement is “anything that drives design selections”. Many kinds of information fit into this category. The IEEE Standard Glossary of Software Engineering Terminology (Radatz et al, 1990) defines a requirement as “a circumstance or capability needed by people and systems, respectively, and a documented description of this circumstance or capability”. The IEEE’s description emphasises that requirements must be documented, which is a key concept in the analysis. In this study, requirements refer to the user’s need for an

interface in an SNS, including the reasons, functions and design constraints related to the interface design.

2.2 History and status of SNSs in China

2.2.1 Early Chinese SNSs

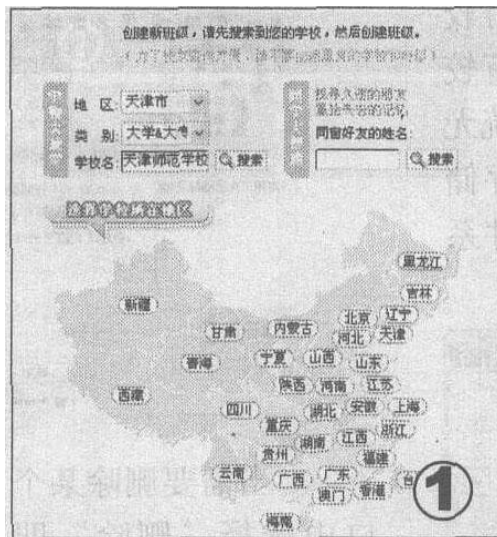
The world's first SNS, **Sixdegree**, was built in 1997 (Boyd and Ellison, 2007). In China, there is some argument about the country's first SNS. Zhou (2010) believed that the first local SNS, Chinese Classmates Album, went online in 1998. Huang (2010) suggested that it was **UUzone**, and Wang Bing (2009) argued that it was **Renren**. All of these websites are SNSs. However, from a chronological standpoint, **Chinese Classmates Album** (<http://www.5460.net>, 2013) was the earliest one that went online. It can therefore be appropriately deemed the first SNS in China. In the US, the development of SNSs may be divided into three phases, including the early years, the growth phase and the stable phase. Zhou (2010) believed that Chinese SNSs also experienced three phases. In the first phase the local Chinese SNSs' gained popularity due to lack of competition from foreign SNSs; In the second phase some Chinese SNSs experienced failures; In the third phase, some foreign lessons have been learnt by the developers in China so they began to follow their trends and strategies.

Chinese Classmates Album went online in 1998, becoming the first SNS in China. Within a short period of time, it was popular among many youngsters. During this initial period, it mainly provided simple communication services to students, who used it to look for their classes and classmates. Other similar SNSs such as **Chinearen** and **Zhanzuo** soon began appearing in China. As Wu (2005) noted, these kinds of SNSs usually provided users with a class page on which they

may leave messages. Compared with those of the current SNSs, the communication services of the initial SNSs were singular. **Figure2-4** provides a general impression of the early Chinese SNSs.



Chinese Classmates Album (1998)



Chinearen (1999)

Figure2-4. The pages of login and searching classmates in early Chinese SNSs

The early SNSs in China did not last long. When **Facebook** became popular in 2008, SNSs such as **Renren**, **Qzone**, **Kaixin001** and many others emerged and attained popularity. **Figure2-5** displays the interfaces of homepages of **Qzone** and **Renren** during their initial development periods. The interface design of **Qzone** was different from that of Facebook, while that of Renren appeared to be similar to **Facebook**.



Qzone (version 3.1)



Renren (2005, the first name is Xiaonei)

Figure2-5. The initial home pages of Qzone and Renren

The development of Chinese SNS websites has stabilised since 2008. Some youngsters are still using SNSs to communicate with friends, family members and other people, but not at a high frequency any more. New features have been added to Chinese SNSs, including communities and web games (Wang Liang, 2009). Web games are now included in most of the SNSs in China, and people are using SNSs to engage in many social activities online.

2.2.2 Current status of Chinese SNSs

Up to 2013, **Renren**, **Qzone**, **Chinaren**, **Kaixin001**, **51** and **Pengyou** were the mainstream of campus and entertainment SNSs in China. **Table2-1** lists the Alexa ([http://www.alexa.cn, 2013) ranks of these sites. **Qzone** is not an independent entity in the Alexa ranking, but rather it belongs to the domain name of **QQ**. Given the notability and rank of **QQ** (the second in China), the popularity of **Qzone** can be considered similar to that of **Renren**. However, without concrete

data, it is difficult to distinguish **Qzone** from **Renren**. This study has no scope to compare these two sites in terms of their interface designs.

Table2-1. The Alexa ([http://]www.alexa.cn, 2013) ranks of Chinese SNSs

Rank	SNSs	Alexa rank in China	Daily page views by 1 visitor (page)	Daily time on site (min)
1	Renren.com	56	7.16	12:06
2	Pengyou.com	76	2.56	3:53
3	Kaixin001.com	191	5.51	6:31
4	51.com	208	2.26	2:34
5	Chinaren.com	655	2.20	2:49

According to **Table2-1**, **Renren** is relatively popular among Chinese SNS users. However, comparing it with other kinds of websites in China, its rank (56th) is not high. The average visitor spends 12:06 minutes on the site daily and views 7.16 pages. Looking at these five in ranks, it seems that Chinese SNSs do not attract as much usage as those in other countries such as USA. First of all their ranks are not high. Furthermore some of their ranks decreased over the years. The only outstanding site is **Renren**. Despite being more popular among Chinese SNSs, it ranked only 22nd in 2012 and declined to 56th the following year. According to the China Internet Network Information Centre (CNNIC, 2012), the number of Chinese SNS users did not change much between 2012 and 2013. This observation is detailed in **Figure2-6**.

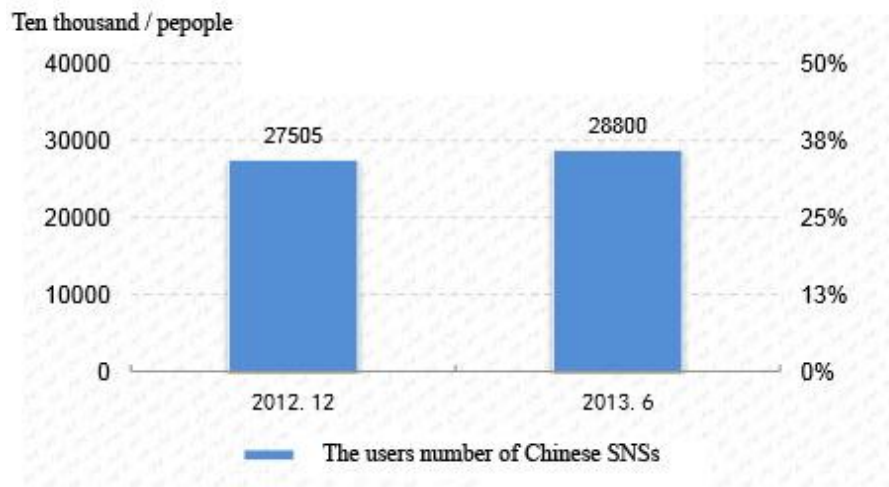


Figure2-6. The number of Chinese SNSs users between 2012 and 2013

Figure2-7 shows the interface designs of the four SNSs used in China. It can be seen that their layouts are quite similar to each other. All of the main navigations are arranged at the top of the webpage, and the secondary navigations are arranged on the left-hand side. All of the feeds are listed in the middle of the page. These websites obviously differ in terms of their design styles, including their colours, backgrounds, icons, buttons, and so on.



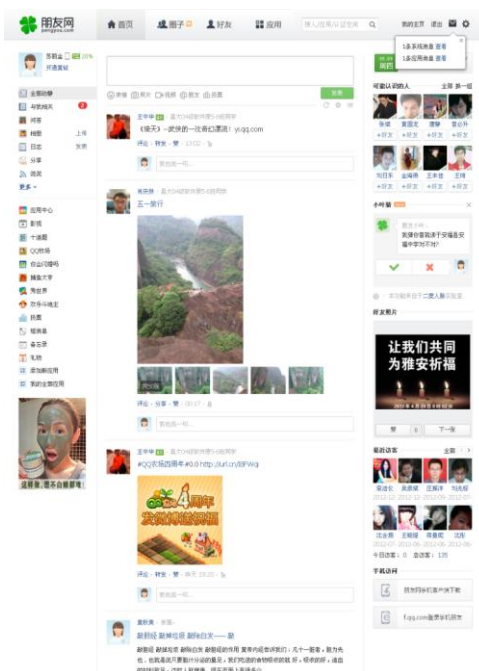
Renren



Qzone



Kaixin



Pengyou

Figure2-7. Homepages of Chinese SNSs (2012)

In summary, Chinese SNSs are currently still in a growth phase. However, according to the Alex ranks and usage numbers, their developments are showing a decreasing trend. The styles of their interface design remain singular, with the lacking of vivid features that attract users. Therefore, their interface designs need improvements.

2.3 Previous studies of Chinese SNSs

As described in the first chapter, most studies of Chinese SNSs have focused on their history, development, profit model and cultural differences.

In the early phase of development, Chinese users rapidly came to prefer SNSs such as **Renren** and **Kaixin001**. Some scholars began to explore the reasons for this popularity. Liao (2009) suggested that these SNSs provided platforms for online social activities that met the Chinese requirements of sociality. Their functions included building personal pages, sharing notes and photos, and browsing the latest statuses of friends, among others. Although they lacked vivid features in the interface design, they nevertheless attracted the users. From a psychology perspective, SNSs help users release pressures and gain self-identity, and make them happy in a comfortable environment (Cui et al, 2009). Li (2010) noted that the superiority of SNSs is based on the user-centeredness. Content such as notes, photos and video displayed in the SNSs is posted by the users themselves. The “feeds” provide an efficient way for browsing friends’ latest news, and they largely meet users’ online communication needs. Furthermore, the real-name system is a feature of Chinese SNSs, as it eliminates any concerns of people who may worry about that they are talking to strangers.

After a short period of popularity, some Chinese SNSs began to lose users. Many scholars have attributed this loss in popularity to cultural differences. Zheng (2011) pointed out that the cultural differences restricted the popularity of SNSs in China. Americans are more interested in individualistic values than the Chinese, who favour collectivism. In terms of SNS usage, Americans are more willing to display their information online than the Chinese who in many aspects prefer to keep their views private. Although relationships among people are relatively complex, they uniformly promote one's sense of worth. Yang (2010) explored group culture in China, and revealed that the Chinese preferred to attain their goals by working with their acquaintances. For example, a Chinese user may be attracted to a website if his or her friends are already doing so. Relationships among Chinese users on the SNSs are also easily broken if they enter into conflicts with one another. In short, Chinese users tend to think of online social activities as a "group" manner. Many researchers of Chinese SNSs have observed that cultural differences resulted in a loss of popularity for some SNSs. However, it is my view that lack of good interfaces is also a factor for the loss of popularity of some SNSs in China.

Some have proposed profit models for SNSs in China. Huang (2010) proposed two profit models: advertisements and social games. Unlike traditional advertisements, SNS users are encouraged to participate in these advertisements, enhancing the interactions among manufacturers and users. Selling space for social games to be displayed in SNSs also benefits the website administrators. Ye (2012) suggested that Chinese SNSs may profit by cooperating with banks. For instance, students may pay tuition fees through SNSs, and the website administrators may charge auxiliary expenses.

Finally, some scholars have expressed their future expectations of Chinese SNSs. Gu et al (2008) advise that SNSs will mainly establish a clear framework, open up sources and expand the public space. Chen (2011) advises that Chinese SNSs should become multimedia, and will be widely used on mobile devices and become open platforms in the future. In terms of a business model, he also agrees that SNSs will profit from advertisements and social games.

2.4 Previous studies of website interface

Since 1991, many website interface studies have focused on users' emotions, cultural dimensions, usability, prototype design and visual aesthetics. In terms of usability, Chadwick et al (2002) identified how a website's performance was affected by interface changes (such as text size), with the result providing a guideline for website usability studies. Bevan (1997) stated that management and maintenance were important for maintaining usability. However, the priority of work in maintaining usability is not discussed in Bevan's results. In terms of usability evaluations, Palmer (2002) believed that navigability, down delays, the response speed, information architecture and interactivity affected website usability. Although these measures are referenced in this study, they do not necessarily provide a complete guidance on how to evaluate website usability.

The diverse requirements of interfaces used in different countries and cultures have been analysed. There are researches on websites which have concluded that there are the cultural dimensions to consider, as proposed by Hofstede et al (2010). Four pairs of words have typically been used to describe these cultural dimensions: "small power distance versus large power distance, collectivism versus individualism, femininity versus masculinity, and weak uncertainty avoidance versus strong uncertainty avoidance". Marcus et al (2000) analysed the

requirements, preferences, desires and expectations of users from the countries with different cultures. They pointed out the obvious differences in the requirements of navigation schemes and content credibility. Although my current study references Marcus and Gould's researches, it focuses on SNSs rather than on all kinds of websites. In terms of the cultural influences on SNSs, Song et al. (2003) compared user behaviour between America and China. Their results summarised the individual requirements of personal reputation, privacy and trust, and website validity and usage. They differentiated user behaviour but they did not focus on analysing interface design requirements.

Users' emotion is another research area that is related to website interfaces. Zhang et al (1991) provided a conceptual framework and foundation for the relationships between user satisfaction and interface design. They found that most of the factors affecting user satisfaction were related to interface operations. Zhang et al (2000) discussed two design parts that are related to user satisfaction, including hygiene and motivators. They observed that the former factor was related to "dissatisfaction" and that the latter referred to the elements that "directly contributed to satisfaction". Based on the aforementioned researches, I consider that certain interface design elements are connected to the satisfaction of users and others to dissatisfaction. A website user's emotional needs can sometimes directly reflect the requirements and expectations of the interface design. However, the emotion of users towards website interface is out of scope of my study. It is nevertheless an important factor to consider in the future research.

Chapter3 Research Methods

This chapter mainly introduces the methodologies used in this study. It begins by providing a brief overview of the research methods. A design framework is then proposed. Finally, the research process and methods used, including cluster analysis, surveys, user testing, case study and standard deviation, are described in details.

3.1 Research approaches

The visual aesthetics and usability of Chinese SNSs are the main directions in the framework. This chapter seeks to accomplish the following objectives:

- (1) To propose a design framework;
- (2) To explore the requirements of the visual aesthetics and usability of Chinese SNSs;
- (3) To test the findings of that exploration; and
- (4) To achieve an understanding of the interface designs of Chinese SNSs.

A diverse range of research methods have been used in the research on website designs by many. Although this study adopted a mixed-method approach, including quantitative and qualitative methods, the quantitative methods represent the core approach. Quantitative methods are mainly used to analyse a situation by calculating numerical data. In contrast, qualitative research methods rely more on textual descriptions. The methods adopted in this study include cluster analysis, surveys, user testing, implementation and case studies. The first three of these methods are quantitative methods, and the fifth is a qualitative method. The implementation of a website for evaluation is used as an experiment method and this implementation involves both design, programming and content organization, with which several design elements for interface are used. **Table3-1** lists the research methods adopted in this study.

Table3-1. Research methods adopted in this study

Chapter	Research	Research Methods
4.1	Aesthetic similarities between Chinese SNS websites	Cluster analysis
4.2	The subjective preferences for visual arrangements of interfaces	Surveys
5	A usability assessment about Chinese SNSs	User testing
6.3	Implementation for testing my framework	Developing a website and Case study
6.4	The Exploration of relationships between visual aesthetics and usability	Developing a website and Case study

First, I explored visual aesthetics including design elements and visual arrangements. Users tend to perceive visual aesthetics as a whole rather than as individual design elements. Hence, I adopted cluster analysis and the survey method to analyse the design elements and visual arrangements according to my study objective and subjective viewpoints from the literature.

Second, I performed a usability evaluation. Numerous usability evaluation methods have been adopted in previous studies. User testing, the think-aloud method, focus groups and interviews are common methods of usability evaluation. The think-aloud method requires participants to voice their behaviour when performing planned tasks (Vansomeren et al, 1994). Although the think-aloud method is advantageous in that it allows users directly describe their behaviour, it affects usage speeds and ultimately give biases to the efficiency tests. Focus groups and interviews both involve participants directly expressing their thoughts about a research topic, and are advantageous in that they quickly identify usability

problems. Other than these common methods, A/B testing and utility measures have also been used as assessment methods. A/B testing (Kohavi et al, 2007) involves designing a page with two styles issued at random to participants. The better style is determined according to the page turnover rate. However, the high expense involved in this method makes it problematic to use. In terms of the utility measure, Toomim et al (2011) tested participants' preferences by posting tasks on Amazon's Mechanical Turk. However, this method is not appropriate for evaluating SNSs, which are online communities. Pages are divided into many parts and uploaded to Amazon's Mechanical Turk as individual pages, in which users ultimately lose interest. In this study, I selected the user testing approach for the usability evaluation. Users were required to complete planned tasks, and their operational processes were recorded. This approach is advantageous in that the system is directly and effectively operated by people, and factors such as effectiveness, efficiency, satisfaction, error tolerance and website learnability are represented during the process.

In addition, I developed a website and conducted case studies to test the findings of previous explorations and clarify the relationship between visual aesthetics and usability. According to Lazar et al (2010), case studies can be conducted to explore a specific issue, or a group of people can help gather requirements and evaluate interfaces. Implementation of this website is an important methodology for me since I get the chance to know the process of developing a website, and design the interface with my proposed framework for evaluation. This understanding of the design and implementation process gives me a clear picture how design elements can be used to achieve both usability and aesthetic quality for a website.

Finally, I adopted standard deviation involving cluster analysis and case studies to analyse the data. The standard deviation served as the main factor and reference tool in the visual aesthetics cluster analysis and case studies, respectively.

3.2 A design framework

Frameworks play an important role in research methods. According to Margaret (2005), a framework is commonly a conceptual or true configuration that serves as guidance and includes expansions of the research object. From Clifton's (2003) viewpoint, a framework simplifies complicated science and associates with disconnect targets for making them more helpful. A framework allows research to be tested and verified, even when the researcher did not perform it. Combined with these descriptions, the effect of a framework is apparent; applying a framework to research can improve the clarity and efficiency of explored process. Hence, I proposed a design framework related to website interface composition to guide this study. The development of this framework draws the lessons and the inspirations from literature reviews during which two main problems and their connections are identified, i.e., usability and visual aesthetics.

Speaking generally, my design framework was created based on two dimensions: one dimension came from the definition of "website interface" in previous literatures, while the characteristics of SNSs' interface formed the other dimension. In literature review (Chapter2.1.2), Marcus (2002) defines that the interface is a communication medium and allows human beings to interact with computer devices. According to this definition, when the computer device is a website, its interface can be described as how a website is displayed for and interacted with users. So, what constitute the website interface? Many scholars made the discussions and reported their findings. On the one hand, from the

literature review, it is obvious that the usability is mentioned most frequently. On the other hand, the functions of SNSs are abundant, and its operational ways are diverse. Hence, the usability as a vital role of interface design was considered in my design framework first. Excepting usability, the information architecture, semiotics, visual aesthetics et al. are discussed in former literatures. Comparing the existing SNSs, their information architectures and navigation designs are generally similar. Moreover, there is a strong relationship between information architecture and function design. In this research, the explored subject focused on “interface”, not the “function” and “content”. So, the information architecture was not considered in the design framework. About the semiotics, its scope is wider than that of visual aesthetics. Moreover visual aesthetics can represent the display and appearance of a website (Merriam- Webster Online Dictionary, 2004). Based on the above reasons, the visual aesthetics was considered in this research. In brief, the first level of the framework was completed. When the study explores whether users are satisfied with an interface design, both usability and visual aesthetics should be considered.

Next, the further exploration between usability and visual aesthetics were respectively performed. Reviewing the literatures, the former studies on usability are abundant and mature. In my research, the framework of usability was designed based on Quesenbery (2003)’s theory. The usability is deemed as the quality of a product; this quality is divided into five dimensions: effectiveness, effectiveness, efficiency, satisfaction, error tolerance and learnability (Quesenbery, 2003). In the context of SNSs, the effectiveness means the users’ the completion rate of operation while the operational speed displays the efficiency. The satisfaction refers to users’ psychological reactions to the site in general. What’s more, when a user makes a wrong operation, error tolerance represents the degree

of recover design. About learnability, it refers to how easily it is to be used to the degree of fluency, especially for the inexperienced users.

With regard to visual aesthetics, my purpose was to identify the practical design principles which should be directly applicable to the SNS's interface. This means the "concrete elements" consisted of visual aesthetics should be considered, such as the button, font, colour, line, icon and so on. The practical principles among these concrete design elements were my explored intention. Based on this premise, I adopted the theory from Alsudani et al (2009) to guide this research. Alsudani et al (2009) divide the visual aesthetics of interface into two parts: the first considers the interface as a composition of pure individual factors such as colors, fonts, photos, styles, videos, sounds and Flash animations; the second considers it as a composition of the relationships between individual elements. In this theory, both design elements and visual arrangements are considered, which coincide with my research purpose as mentioned above. Through comparing the SNSs, the common design elements were determined as links, paragraphs/text, images/icons, menus/lists, multimedia audio/video clips/Flash animations, buttons, lines, forms, styles, spaces/blanks and frames/layouts. With regard to visual arrangement, Park, Choi et al (2005) identify 11 important attributes of visual arrangement: cohesion, symmetry, rhythm, movement, contrast, unity, simplicity, proportion, regularity, density and balance. But the simplicity, proportion, movement and rhythm were relative obvious issues in the design of web interface.

To sum up, **Figure3-1** represents the completed framework. In this framework, the website interface is divided hierarchically, with each part including different factors. In my framework, website interface design consists primarily of usability and visual aesthetics. Usability may be divided into five factors (effectiveness, efficiency, satisfaction, error tolerance and learnability). Visual aesthetics

comprises design elements and visual arrangements. I explored the usability and visual aesthetics of Chinese SNSs according to this framework.

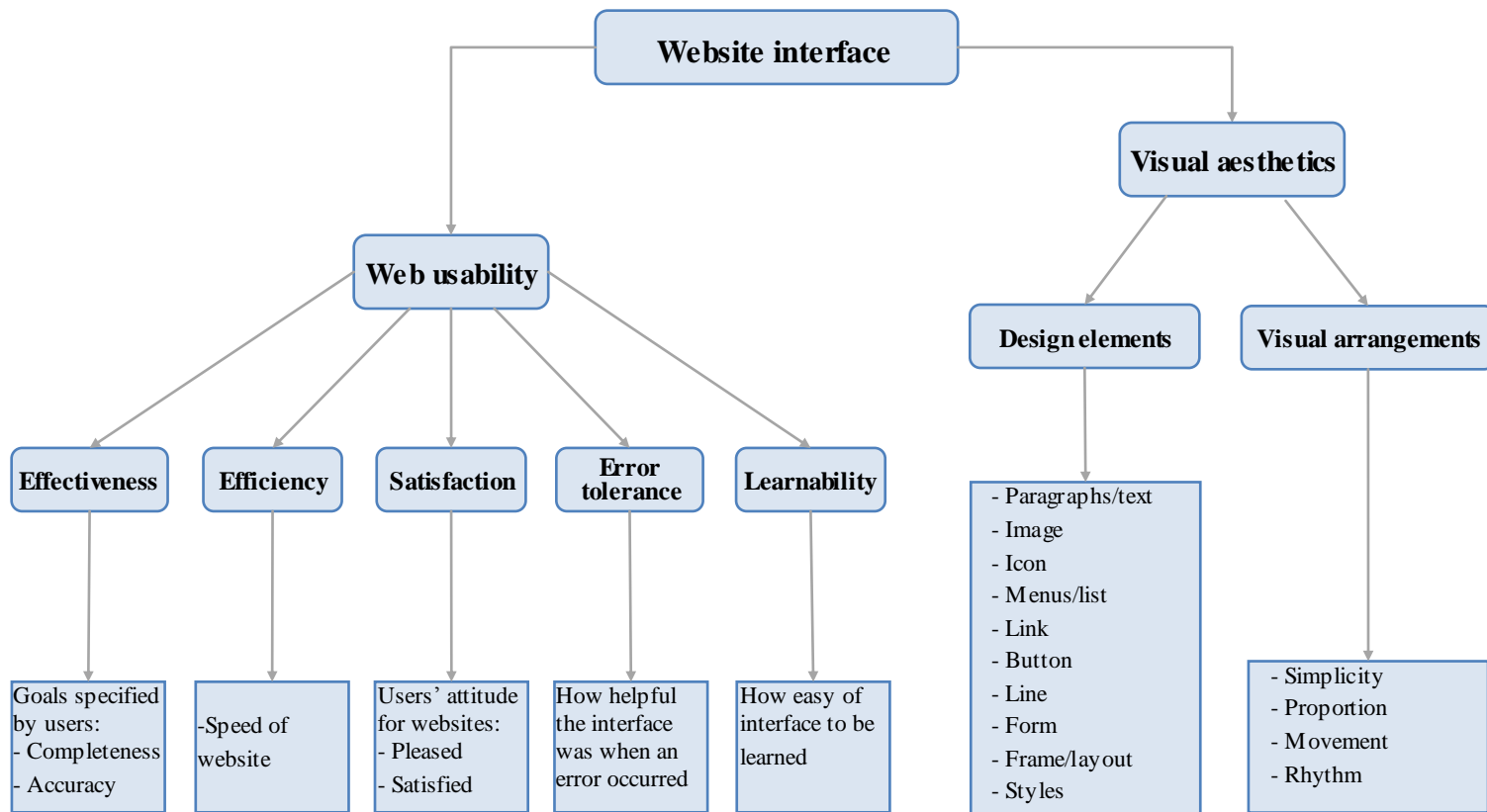


Figure3-1. The design frame work

3.3 The selected methods

3.3.1 Cluster analysis

Cluster analysis is a major technique and data induction tool used to classify a “mountain” of information into small subgroups. As Romesburg (2004) suggests, a cluster is the mathematical method that may be adopted to identify the similar objects in groups. Cluster analysis reveals a strong relationship between classification and similarity. Classification is required for the development of language, which consists of words that are helpful for recognising and discussing diverse types of events, objects and people. Classifying the most similar objects into groups may benefit researchers who are targeting appropriate treatments and approaches, which is also the purpose of cluster analysis. Cluster analysis may be divided into hierarchical cluster analysis, two-step cluster and k-means cluster. If the data file is large or mixes the continuous and categorical variables, then two-step cluster should be adopted. If the research has a small dataset and is expected to examine solutions with increasing numbers of clusters, then hierarchical clustering analysis would be the better choice. The k-means cluster should be selected for a moderately sized dataset.

In this study, I selected hierarchical cluster analysis to compare the Chinese SNSs. Chapter4.1 introduces the similarity comparisons. The similar design elements among the Chinese SNSs were assigned values calculated using the hierarchical cluster method. Two terms must be introduced in hierarchical cluster analysis: distance and similarity. Distance refers to the degree of distance between two objects, and similarity refers to the degree of similarity between two objects. A principle should be established to describe the relationship between distance and

similarity. The similarity of two objects depends on the variable distances. The distance may be equal to a value such as the deviation, range, mean and maximum. The steps involved in the type of hierarchical analysis conducted in this study are described as follows (Romesburg, 2004).

- (1) Select the variables that the researcher is required to group, and then build a data matrix. The columns that refer to the objects to be clustered must be determined, along with the rows that list the attributes that describe the objects. In Chapter4.1, the design elements (menus/lists, frames/layouts, links, images, buttons, paragraphs/text, forms, icons, styles and lines) represent the rows, and four Chinese SNSs (**Renren**, **Qzone**, **Kaixin001** and **Pengyou**) are listed in the columns. The design elements are classified according to their similarities.
- (2) Standardise the data matrix. This step is optional if the variables are tested according to different scales. There are no other measurement scales applied in Chapter4.1. Hence, the design element variables are represented by the means of the object values.
- (3) Calculate the scores of a resemblance coefficient to assess the similarities between the entire pairs of factors. This step refers to the data computation process. Most modern software can compute data according to a math criterion. In this study, I implemented IBM SPSS Statistics, a software package used for statistical analysis (Green et al, 2010). SPSS is capable of handling large amounts of data, conducting textual analyses and much more. Furthermore, it can be used to calculate data for hierarchical cluster analysis.
- (4) Display the outcomes via a tree or a dendrogram that represents the hierarchy of similarities between the objects. The classification should be easy to

determine according to the similarities presented in the dendrogram. SPSS can also represent the results in trees.

Although hierarchical cluster analysis has a logical structure and is easy to interpret, two limitations persist. First, hierarchical clustering is relatively unstable and unreliable. If the criteria used to standardise the data are different, then the results will differ. Hence, the criteria play an important role. Second, the sample should be split into at least two groups. Because there are more than two groups of design elements in Chinese SNSs, this second limitation should present no concern.

3.3.2 Surveys

Among the many types of quantitative research, survey research is very popular and has many types. According to Fowler (2013), the survey methodology involves sampling and statistical analysis of the data from a target population. Sukamolson (2007) suggests that survey research comprises the systematic gathering of information from a sample for the purposes of learning and predicting the behaviour of the population of interest. In addition to these two definitions, survey research involves sampling, questionnaire design, questionnaire administration and data analysis. Surveys ask the same question in the same way to every respondent. This data collection method can be used to make inferences that explain certain circumstances. Surveys are a more direct and convenient way to collect data, and can be performed in a number of different ways, including face to face, via telephone, online or via email. In a face-to-face survey, a personal interviewer asks a respondent question directly. In a telephone survey, the interviewer asks the respondent questions via telephone. The latter two modes are Internet related. Investigators may upload a survey online or send

it to the interviewers via email, after which it may be classified further. Respondents may be required to write answers on papers or online. During interviews, a respondent's words may be recorded and transcribed.

I adopted the survey method in this study. As detailed in Chapter4.2, I administered a survey to determine the set of visual arrangements of SNS interface largely preferred by Chinese users. A survey that featured webpages with diverse layout styles was issued to a group of respondents, whose responses indicated their visual arrangement preferences. Students from Shenzhen University were chosen as the respondents. College students aged between 18 and 28 were among the major users of Chinese SNSs, and most had abundant experience and minds for SNS design that could provide reliable source of information for the purpose of my research. Based on a theory advanced by MacCallum et al (1999), I invited forty-five students to participate in the study. For a high community, a sample size below 100 was considered to be effective. The students' majors had to be diverse to improve the accuracy of their responses. Hence, the respondents were interviewed at random locations on campus. Chapter4.2 details the data collection process and the outcomes.

3.3.3 User testing

User testing is a method frequently implemented in a usability evaluation. According to Tan et al (2009), user testing chiefly depends on the users' experiences and comments, and is commonly performed in a scenario-based surrounding. A user is invited to carry out real tasks in a realistic and complete system. Lindgaard (2006) observes that user testing should be the main methodology in usability evaluation compared with other usability evaluation methods, and that it may implement the principle and solve the errors of whole

usability. Nielsen et al (1993) find that five users on average may identify 85% of a website's operational problems. The preceding conclusions indicate that user testing is an effective method for discovering the usage problems that confuse or mislead users. User testing can also identify users' behaviour and preferences. In observing people's activities, investigators can record some habits that may benefit designers' future work.

Chapter5 introduces my usability evaluation of Chinese SNSs. I invited seven participants to test **Renren**. The participants were issued planned tasks for them to complete. If the participants found a task too difficult, then they were given the option to pass it. During the process, HyperCam (2013) software was used to record the participants' operational behaviour in the computer. The completed rates and speeds were both analysed in the findings. Through the user testing, 22 usability problems were found during the operations. These behavioural problems provide ways to directly improve websites.

3.3.4 Implementation

Developing a testing platform or a prototype is a common method in interface research. In this research, a website as a testing platform was built after the other study tasks. This method belongs to experimental method. In the field of software engineering, the experimental method refers to the systematic procedure designed with the purpose of proving the hypothesis and theory. It provides an exploration between "cause" and "effect" (Wohlin et al, 2012). What's more, the strengths are obvious. After completing an exploration, adopting the experiments method in the validation of findings can enhance the completeness of exploration. In this research, a design framework was firstly proposed; the exploration was carried out based on the framework; after that the former findings and experiences were

adopted to implement a website and gain the validation through this website. This way was a “circle” which raised the completeness of research. The second strength refers to practice experience. After building the website, I gained the practice experience of interface design and a better understanding of users’ requirements.

The website developed in this research was the Phoenix website. The Chinese preferences of usability and visual aesthetics were summed up in the former explorations; and then the Phoenix website was designed based on the former findings. The concrete design process is introduced in Chapter6.2. After the completion of Phoenix website, an evaluation of interface and the further exploration of relationship between visual aesthetics and usability as two case studies were respectively implemented in the website, which were introduced in the next part.

3.3.5 Case study

The case study method is the most common qualitative method and has been used in many disciplines. Yin (2014) defines the scope of a case study as follows: “discusses a contemporary issue within its real-life surrounding; enquires the boundaries between issue and environment are not clearly obvious; the main study problems refer to interpret the issues”. Based on this description, the “case” should be a contemporary functioning unit and investigated in a natural context. A case study represents problems, reasons and solutions that must be identified to solve a specific and small issue. Such a case study may also serve as a reference to similar issues. The strengths of a case study are its depth and highly conceptual validity. It clarifies contexts and processes, and reveals the causes of a certain

circumstance. Furthermore, it links causes and outcomes to develop new hypotheses and research questions.

In the current instance, the Phoenix website serves as the case study object. Some of the principles proposed in my initial studies required verification. I built the Phoenix website while applying these principles practically, and conducted two case studies. The first case study tested my previous explorations, and the second considered the relationships between visual aesthetics and usability. In the first case study, I invited 20 Chinese participants who were familiar with the Internet to evaluate the website. In the second case study, eight designers from **Zhenai** were interviewed and they expressed their experiences in terms of the Phoenix website. Chapters 6.3 and 6.4 discuss the two case studies in more details. Some interface design experiences were disclosed in the Phoenix case studies that could be applied to SNSs in future work.

With regard to the participants of case studies, people who come from the former research in Chapter4 and Chapter5 are better, because the Phoenix website was developed based on the theories in these two chapters. Adopting the same sample could enhance the consistency of research methods, especially in social sciences. However, the questionnaires, surveys and interviews of this research were not used for a social science area, but rather for a technical point of view. Hence, the different group of people were adopted in the case studies.

3.4 Methods of data analysis

3.4.1 Standard deviation

Standard deviation measures the fluctuation of an average. Enke first developed the concept in 1832, and Walker formally coined the term “standard deviation” in 1999. Many studies have used standard deviation to measure variability, dataset spreads and the relationships between means and other data. A standard deviation value captures uniform levels of responses, and a mean value captures the average of several responses. The following formula is used to calculate a standard deviation. When the values are near the mean, it represents the outcomes are quite unified and the standard deviation is small. Likewise, when the values are away from the mean, it represents the outcomes are widely different.

$$S^2 = \frac{\sum(X-M)^2}{(n-1)};$$

Σ = Sum of;

X = Individual score;

M = Mean of all scores;

N = Sample size (number of scores);

Most of the data analyses conducted in this study captured mean and standard deviation values and considered their minimum and maximum values. The similarity comparisons detailed in Chapter4.1 captured the means, minimums, maximums and standard deviations of four Chinese SNSs. I also adopted them in my usability evaluation of the Phoenix website, which is detailed in Chapter 6.3.

3.5 Other methods in future work

Except for the methods mentioned above, other methods which were applicable in interface exploration but were not considered in this research may be adopted in future work.

The first one was the in-depth interview. It mainly invites a small number of people to investigate their viewpoints of the concrete issue, think or program, which is a semi-structured method. (Boyce & Neale, 2006). When the information about a person's thoughts and behaviors are necessary detailed, or the new issues need to be explored in depth, in-depth interview are useful. Although the strengths are apparent, there are also a few limitations for in-depth interviews. The interview data may be prone to bias by personal opinions; interviews can be a time-intensive evaluation activity. If the group of participants is renewed, the outcome may be inconsistent. For reducing the effect of personal bias, the larger numbers of interviews are required to be performed. These limitations were the reasons why the in-depth interview was not adopted in this research. In future, when the experimental environment is mature (there is the plenty of time; large number of sample could be collected), the in-depth interviews can be carried out.

What's more, the second one was correlational research. In Gravetter and Forzano's book (2011), "correlational research is defined as two or more variables; the variables are calculated to obtain a group of values (usually two values) for each individual". In brief, the correlational method is quite suitable for the relationship discussion. However in this study, I have not selected the correlational method to explore the relationship between visual aesthetics and usability. There is also the limitation of correlational research. While the relationship between two variables may be identified in correlation studies, it not

means that one leads to a change of other one. In future work, the correlation analysis can be used for the validation of the existed relationship.

Chapter4 Requirements of Visual Aesthetics of Chinese SNSs

As described in Chapter2.1, the visual aesthetics of a web interface comprise two factors: design elements and visual arrangements. This chapter explores the specific and general aesthetic preferences of Chinese SNS users by testing the design elements and visual arrangements, respectively. First, it compares the design element similarities among the Chinese SNSs. This similarity study disclosed that a solid style line design of 1 px in size was largely suited to Chinese SNS users, followed by effective icons and a brief design style. It investigates the implementation of a set of visual arrangements. In the investigation, the participants were asked to select their favourite visual arrangements. The participants preferred to browse content up down rather than from left to right. They required a simple interface design when browsing photos, and exhibited a relatively low need for text.

4.1 The specific preferences: design elements

4.1.1 Questions regarding design elements

Users do not find it easy to comment on the separate design elements of a website. Instead, they can judge whether a design is aesthetically pleasing or not based on the overall impression they have of a website. Users' favourite elements are also subject to change. For instance, although users largely accept text in a list style, they may change their mind when this style is applied to a certain website. Despite the changeability of subjective impressions, this study attempted to understand users' preferences for design elements by making objective comparisons among some of the existing SNSs. The visual aesthetics of Chinese SNSs are somewhat similar based on their common functions. Designers use unified elements to display interfaces in a way that makes a website more learnable for the users. Web designers may design similar pages for different SNSs in terms of font sizes, list styles and icon locations. Identifying the similarities among interface designs is an objective way to explore user preferences for visual aesthetics.

Chinese SNSs exhibit more than a few similarities in terms of their interface designs. For example, the design elements of **Renren** and **Qzone**, such as their layouts, form styles, icon designs and font sizes, have a great deal in common. As mentioned previously, this study aims to discuss the aesthetic similarities among some of the Chinese SNSs and classify their design elements based on these similarities. In particular, it answers the three following questions.

(1) What Chinese SNSs are designed with high degrees of similarity?

- (2) What design elements are mostly commonly used across the Chinese SNSs?
- (3) How these design elements can be sorted based on their degrees of similarity?

I selected **Renren**, **Pengyou**, **Kaixin001** and **Qzone** as my testing subjects, as they represented some of the popular SNSs in China. I calculated the data using the aforementioned descriptive methods and cluster analysis.

4.1.2 Similarity comparisons among Chinese SNSs

This subsection introduces the similarity comparison process. The experimental subjects included **Renren**, **Qzone**, **Pengyou** and **Kaixin001**. As mentioned in Chapter2, the Alexa ranks (2013) of these four websites are relatively high among Chinese SNSs. **Renren** ranks 56th, **Pengyou** ranks 76th and **Kaixin001** ranks 191st. The rank of **Qzone** is included in that of **QQ**, which ranks the 2nd. Of its visitors, 65% come from **Qzone**, indicating the popularity of **Qzone** in China.

I retrieved the design elements and attributes of **Renren**, **Qzone**, **Pengyou** and **Kaixin001**. I divided the design elements into 10 parts (paragraphs/text, images, icons, menus/lists, links, lines, frames/layouts, forms, buttons and styles). Each element had specific attributes. For instance, the attributes of a button included its size, design style, click style and border. **Table4-1** displays the design elements and corresponding attributes of the four Chinese SNSs. The next step involved comparing the design elements. Each website element had a value calculated according to its attributes. One element might have been displayed on many objects across the four SNSs. When one attribute matched another, the object was given a value of 1. The value of each element was the mean of the total values of the included objects. I used the following formulas to calculate the values:

Element value=Sum of object value/Number of objects, and Object value=Sum of attribute value/Number of attributes.

For instance, if the size attributes of the comment forms were the same across **Kaixin001** and **Renren**, then the comment forms included in the forms category were given a value of 2. The comparisons traversed all of the design elements. The term “same” was uniformly defined across the different attributes. **Table4-2** shows the standards for defining the "same" levels of element attributes. Taking the number measure as an example, if the font size for **Pengyou** was equal to that for **Kaixin001**, then the font size design was deemed to have the same attributes across the two websites.

Table4-1 Design elements and corresponding attributes in SNSs

Design Elements	Included Objects	Attributes
Paragraphs/text	Feeds, message boards, note lists, sharing, personal information, comments in feeds, comments in notes	Font-size, font-colour, alignment, text spacing, length
Images	Feeds, profile avatars, avatars, album covers, album lists, album photos, album friend lists	Size, border, maximum size, display style, design style
Icons	Colourful icons, concolourous icons	Size, border, design style
Menus/lists	Note lists, sharing lists, top navigation, left navigation	Font, font-size, font-colour, height, width, design style, spacing

		style
Links	Left navigation, common links	Font-colour, click style, selected style
Lines	Lines	Size, border, colour
Frames/layouts	Homepages, profile pages, note lists, message pages, album pages, personal information, friend pages, search pages, sharing pages (homepages), application pages	Width proportion, design style, column
Forms	Message boards, search forms, input forms, comment forms	Size, small size, border, colour, design style, location, icon location, button location, avatar location
Buttons	Feed buttons, album buttons, reply buttons, grey buttons	Size, border, colour, design style
Styles	Styles	Design style

Table4-2 Measures for defining the “same” attributes

Attributes	Measures
Font	“宋体”, “微软雅黑”
Font-size, font-colour, size, colour, text-spacing, length, width, columns, height	number
Font-weight	Bold, normal
Alignment	Left, right, centre
Border	Rounded corner, square corner, solid line, dashed line
Width- proportion	Small-big-small, big-small, small-big, big-small-small, small-small-big
Location	Outside, inside, left, right, top, centre, bottom,
Display	Layer, none
Design style, selected style, click style, content style, spacing style.	Descriptive words and no unified measures

The most similar websites

I adopted descriptive methods (minimum value, maximum value, mean and standard deviation) to calculate the data. To determine which website was mostly similar to other SNSs, I summed the design elements of the four SNSs, and calculated their minimum values, maximum values, means and standard deviations. The highest mean indicated the most similar websites.

The most similar design elements

I conducted hierarchical cluster analysis to determine the most similar design elements, and categorised the elements according to their similarities. Hierarchical cluster analysis is a generic name for a variety of mathematical methods. Numbering in the hundreds can help to identify analogous objects in a set. In this experiment, I standardised the design element values as a data matrix, and drew a similarity tree using the SPSS (2010) software.

4.1.3 Outcomes of similarity comparisons

This subsection lists the final similarity outcomes. **Tables 4-3** and **4-4** display the values of the included objects and design elements, respectively, and **Table4-5** presents the descriptive values of the four SNSs. The former tables indicate that the design elements varied widely in terms of similarity. The most different element was “images”, which had the lowest sum. Its value (0.21) for **Renren** ranked the last. The second inconsistency occurred in the “buttons” element, which had a total value of 2.57 across the four SNSs. In contrary to the elements of “images” and “buttons”, the element of “line designs” showed the highest similarity across the four SNSs, with values reaching the maximum of 2.30 for both **Renren** and **Kaxin001**. The element of “line designs” also reached the second maximum value. The sums of “images” and “styles” reached 6.33 and 6.00, respectively. However, the element of “styles” represented the most inconsistent outcome for **Qzone**. The design style of **Qzone** was considered less sparse than those of the other three SNSs.

The elements’ value statistics revealed the degrees of similarity among the four SNSs selected for the study. According to **Table4-5**, the mean of 1.2920 for **Renren** was significantly higher than the other means, and the mean of 1.0730 for

Qzone was the lowest. The standard deviation values for the two SNSs were 0.69083 and 0.53568, respectively. **Renren** had the highest degree of aesthetic similarity to the other SNSs. Although its visual aesthetics were more unified with those of the other SNSs, its design elements were largely distinguished. Some of its design elements were quite similar to those of the other three SNSs, and some were quite different. From a general viewpoint, **Renren** had the most common aesthetic design. On the contrary, the visual aesthetics for **Qzone** offered more flexibility than those of the other SNSs, and its elements exhibited only a small fluctuation. In **Qzone**, the paragraph/text, image, icon, menu/list, link, line, frame/layout, form, button and style designs were relatively different from the designs of the other three SNSs. However, the 10 elements did not exhibit huge differences overall. **Pengyou** offered the second highest flexibility in its visual aesthetics after **Qzone**.

Table4-3. Values of the included objects

Design Elements	Website	Included Objects	Values	Total Value
Paragraphs/text	Renren	Feeds	0.8	6.25
		Note lists	1.2	
		Message boards	1.2	
		Sharing	1.4	
		Personal information	0.25	
		Feed comments	1	
		Note comments	0.4	
	Qzone	Feeds	0.6	7.45
		Note lists	1.6	
		Message boards	1.2	
		Sharing	1.6	
		Personal information	0.25	
		Feed comments	1.4	
		Note comments	0.8	

	Pengyou	Feeds Note lists Message boards Sharing Personal information Feed comments Note comments	0.4 1.6 0.6 1.6 0.25 1.4 0.8	6.65
	Kaixin001	Feeds Note lists Message boards Sharing Personal information Feed comments Note comments	0.6 1.2 1 0.6 0.25 1 0.8	5.45
Images	Renren	Profile avatars Avatars Feeds Album (cover) Album (list) Album (photo) Album (friend)	0.5 0 0 0 0 0.67 0.33	1.5
	Qzone	Profile avatars Avatars Feeds Album (cover) Album (list) Album (photo) Album (friend)	0 0 1.5 1 1.5 0.67 0.33	5
	Pengyou	Profile avatars Avatars Feeds Album (cover) Album (list) Album (photo) Album (friend)	0.5 0 1.5 1 1.5 1 0	5.5
	Kaixin001	Profile avatars Avatars Feeds Album (cover) Album (list) Album (photo) Album (friend)	0 0 1 0 1 0.33 0	2.33

Icons	Renren	Colourful Concolourous	2.33 1	3.33
	Qzone	Colourful Concolourous	1 1	2
	Pengyou	Colourful Concolourous	2.33 1.33	3.66
	Kaixin001	Colourful Concolourous	2.33 1.33	3.66
Menus/Lists	Renren	Top navigation Left navigation Note lists Sharing lists	1.33 2 1.2 1.2	5.73
	Qzone	Top navigation Left navigation Note lists Sharing lists	1.17 1.67 1.4 1.4	5.64
	Pengyou	Top navigation Left navigation Note lists Sharing lists	0.17 1.83 1.4 1.4	4.8
	Kaixin001	Top navigation Left navigation Note lists Sharing lists	1.33 1.83 1.2 0	4.36
Links	Renren	Common links Left navigation	2 1.3	3.33
	Qzone	Common links Left navigation	1.7 1	2.67
	Pengyou	Common links Left navigation	1.7 1	2.67
	Kaixin001	Common links Left navigation	1.3 0	1.33
Lines	Renren	Lines	2.33	2.33
	Qzone	Lines	2	2
	Pengyou	Lines	2	2
	Kaixin001	Lines	2.33	2.33
Frames/layouts	Renren	Home pages Profile pages Note lists Message pages Album list pages Personal information Friend pages	2.67 2.33 1.67 1.67 0.33 2.33 0.67 2	15.01

		Search pages	0.67		
		Sharing pages	0.67		
		Application pages			
	Qzone	Home pages	2	14.67	
		Profile pages	2.33		
		Note lists	1.67		
		Message pages	1.67		
		Album list pages	1.33		
		Personal information	2.33		
		Friend pages	0		
		Search pages	2		
		Sharing pages	0.67		
		Application pages	0.67		
	Pengyou	Home pages	2.67		11.66
		Profile pages	2.33		
		Note lists	1.33		
		Message pages	0		
		Album list pages	1		
		Personal information	2		
		Friend pages	0.33		
		Search pages	1.33		
		Sharing pages	0		
		Application pages	0.67		
	Kaixin001	Home pages	2.67	12	
		Profile pages	2.33		
		Note lists	0		
		Message pages	1.33		
		Album list pages	0.67		
		Personal information	2		
		Friend pages	0.33		
		Search pages	2		
		Sharing pages	0		
		Application pages	0.67		
Forms	Renren	Message boards	0.67		3.34
		Search forms	0.5		
		Input forms	1		
		Comments	1.17		
		Qzone	Message boards	0.67	3.2
		Search forms	0.5		
		Input forms	1.2		
		Comments	0.83		
		Pengyou	Message boards	0.5	3.13
	Search forms	1			
	Input forms	0.8			
	Comments	0.83			

	Kaixin001	Message boards Search forms Input forms Comments	0.83 1 1 1.17	4
Buttons	Renren	Feed buttons Album buttons Reply buttons Grey buttons	0 0.75 0.25 0.5	1.5
	Qzone	Feed buttons Album buttons Reply buttons Grey buttons	0.75 1.25 0.75 1	3.75
	Pengyou	Feed buttons Album buttons Reply buttons Grey buttons	0.75 0.5 0.75 1	3
	Kaixin001	Feed buttons Album buttons Reply buttons Grey buttons	0.5 0.75 0.75 0	2
Styles	Renren	Styles	2	2
	Qzone	Styles	0	0
	Pengyou	Styles	2	2
	Kaixin001	Styles	2	2

Table4-4. Values of design elements

Num	Design Elements	Renren	Qzone	Pengyou	Kaxin001
1	Paragraphs/text	0.89	1.06	0.95	0.78
2	Images	0.21	0.71	0.79	0.33
3	Icons	1.67	1.00	1.83	1.83
4	Menus/lists	1.43	1.41	1.20	1.09
5	Links	1.67	1.34	1.34	0.67
6	Buttons	0.38	0.94	0.75	0.50
7	Lines	2.33	2.00	2.00	2.33
8	Forms	0.84	0.80	0.78	1.00
9	Frames/layouts	1.50	1.47	1.17	1.20
10	Styles	2.00	0.00	2.00	2.00

Table4-5. The similarity measures of four SNSs

SNSs	N	Minimum	Maximum	Mean	SD
Renren	10	0.21	2.30	1.2920	0.69083
Qzone	10	0.00	2.00	1.0730	0.53568
Pengyou	10	0.00	2.00	1.0730	0.53568
Kaixin001	10	0.75	2.00	1.2810	0.49903

After comparing the similarities, I sorted the design elements in order. Concretely, the entire values in **Table4-4** were calculated through cluster analysis, then the classifications of design elements emerged which are displayed in **Figure4-1**. The data of Y axis represents the serial number of design elements from **Table4-4**; the elements' values are individually displayed in X axis. The elements are grouped

in pairs. Viewing the lines in X directions, it was suitable to categorise the elements into four groups. The first group comprised the lines element. Icons and styles were included in the second group. Menus/lists, links and frames/layouts comprised the third group. The final group included paragraphs/text, forms, images and buttons. The lines element had the highest value, indicating that line design was the most uniform element across the 4 Chinese SNSs. The icon and style designs were less unified. However, the paragraph/text, form, image and button designs presented the largest differences, indicating a greater flexibility in design.

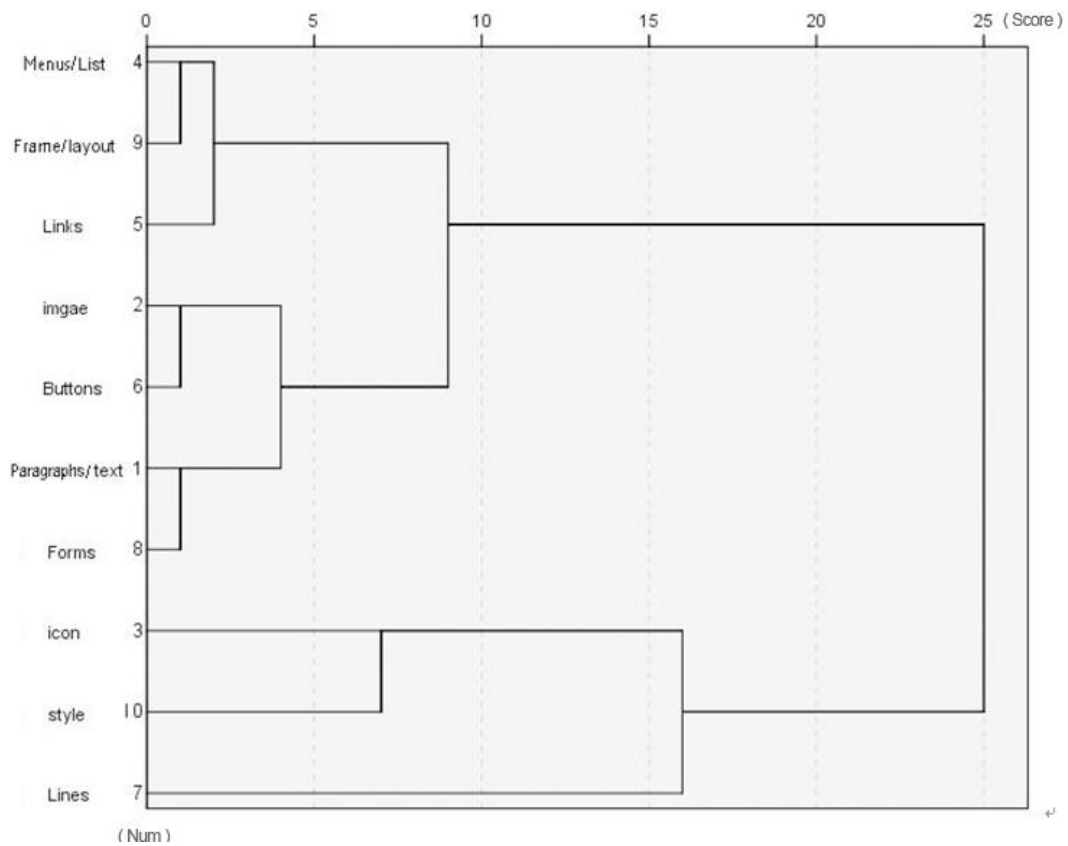


Figure4-1. Tree of similarities for design elements

4.1.4 Summary

This investigation summarises the interface designs of Chinese SNSs. This summary clearly indicates the current state of Chinese SNS website design. Furthermore, the outcomes indicate the similar design elements shared by the 4 Chinese SNSs studied. These elements, which were uniformly applied in the SNSs by designers, may objectively represent Chinese users' preferences for the visual aesthetics of SNSs.

Renren exhibited the most frequently used and common features overall. Its visual aesthetics were the most similar among the selected 4 Chinese SNSs. Although its interface design lacked the vivid features of the other three SNSs, it was moderated well and provided a base framework for future reformation opportunities.

The main pages of the Chinese SNSs were composed of 10 elements. These elements were divided into four groups based on their similarities: (1) lines; (2) icons and styles; (3) menus/lists, frames/layouts and links; and (4) images, buttons, paragraphs/text and forms. The elements with the most uniform attributes were given higher rankings. Chinese users were accustomed to these attributes. Lines comprised the most unified element across the Chinese SNSs, followed by icons and styles. The common element attributes are summarised as follows.

- Line: 1 px, solid line;
- Colourful icon: 16×16 px, compact style;
- Concolourous icon: blue colour;

- Style: brief;
- Menus/lists in top navigation: 宋体, 14 pt font;
- Menus/lists in left-hand navigation: 宋体, 12 pt font;
- Menus/lists in note list: 14 pt font;
- Frames/layout on homepage: 3 columns;
- Frames/layout on personal page: 3 columns.

These common attributes provided principles for the website designers, and represented the design styles to which users were largely accustomed. For example, when a designer builds a new SNS, the design may include colourful icons (16×16 px and compact style). However, it may not include all of the related elements, which should share common attributes.

One limitation of this investigation is that some element attributes such as font colour are objective and changing. There are two ways to describe a font colour: as an RGB value (e.g., #000000) and as the colour name (e.g., black). The researcher must choose a descriptive way, which may produce different results. In this study, objective attributes comprised only a small part of a design element and had little influence on the results. Hence, the similarities may be described as general.

Finally, this investigation opens a door for future studies, which may consider other elements which are not considered herein (such as video). However, a designer's response can be used to verify similarities. This study summarises the

objective preferences of design elements, and encourages future studies to explore the visual aesthetics of Chinese SNSs.

4.2 General preferences: visual arrangements

4.2.1 General preferences for visual arrangements

According to Arnheim (1954), although a website is composed of many individual elements, users tend to perceive it as a whole. This indicates that one's personal impressions are easily affected by the changes in the arrangement of visual elements. This arrangement includes layout characteristics, with which design elements are arranged on an interface according to a style. Taking navigation as an example, a navigation list can be placed at the top or along the right-hand side of a webpage. These two locations constitute different visual arrangements, and may cause users to have different reactions.

According to Arheim's theory, visual arrangement analysis is conducted to perceive users' interface design preferences. However, little research has examined the visual arrangements of Chinese SNS interfaces, and little is known about whether the arrangements considered have been acceptable by users. To address this issue, I subjectively explored the interface designs of Chinese SNSs to discover a set of visual arrangements largely preferred by Chinese users. I compared 10 groups of webpages extracted from the selected SNSs, and measured the different arrangements in each group according to their visual attributes. As Park et al (2010) suggested, visual attributes can be used to describe the compositional relationships between 11 individual elements (balance, symmetry, movement, rhythm, contrast, proportion, unity, simplicity, density, regularity and cohesion). Because not all webpages include all of these elements, only some

visual attributes are discussed in this study. Based on visual attributes, people's subjective requirements can be quantitatively expressed in the final results.

This study aims to understand the general preferences of Chinese users and to improve interface designs, which would benefit the development of SNSs in China. The visual arrangement of an interface design plays an important role, as first impressions that directly affect users' revisiting rates. This study ultimately aims at answering the following two questions.

- Which visual arrangements of SNSs do Chinese users largely prefer?
- Which principles implemented by the websites under examination can be followed by designers?

4.2.2 Theories related to the visual arrangements of websites

Website arrangement is not a new concept. It can be described in terms of visual composition and design formation, which arises from the concept of the page layout. According to O'Connor (2014), a page layout mainly refers to the arrangement and style design of the elements displayed on the page. The visual arrangement of a website reflects the compositional relationships between its individual elements. These individual elements may include text, pictures, lines, spaces, buttons, and so on. The visual arrangement is related to how these individual elements are placed. According to Lawrence et al (2007), visual arrangement aims at making a page visually pleasing and its contents easy to find via user interaction. Some studies have proposed specific principles for the arrangement design of visual elements. Tondreau (2009) documents 100 principles for onscreen layout design. Taylor, McWilliam, Forsyth and Wade

(2002) propose layout standards suitable for UK organisation websites such as hospital, government and shopping websites.

Few studies have considered the visual arrangements of Chinese SNSs. Zhou (2010) points out that the SNSs in China commonly lack interface designs. Chen (2010) proposes that Chinese SNS interfaces are entirely composed of the head, left-hand, main and footer locations. Liu (2009) conducts an exploration of Chinese SNS interface design based on cultural comparisons. His study specifically analyses the individual elements and information architecture of Chinese SNSs. However, he avoided exploring overall webpage composition. When people perceive something, they always perceive it as a whole. This study focuses on the design of a webpage as a whole. Although research related to the visual arrangement of Chinese SNSs has been rare, some studies have considered website layouts.

In some cases, website arrangements have been tested according to their visual attributes and measures. These cases have focused on the overall visual composition of webpages with various design elements. As mentioned in the previous section, the aesthetics of a webpage can be evaluated according to 11 visual attributes, including balance, symmetry, movement, rhythm, contrast, proportion, unity, simplicity, density, regularity and cohesion. In this study, four visual attributes (rhythm, proportion, movement and simplicity) were easily identifiable in the webpages selected from the Chinese SNSs. Rhythm is connected to the regular patterns of changes among individual elements. Proportion refers to the ratio of an object's height to its width. Movement describes the tendency of the user's eyes to move while viewing a webpage. Finally, simplicity refers to the clarity of the visual arrangement.

4.2.3 Design of arrangements' investigation

Participants

I invited forty-five college students to select their favourite visual arrangements from 10 groups of Chinese SNS webpages, with each participant selecting one webpage from each group. These forty-five students came from Shenzhen University and were aged between 18 and 28, which is the age group comprising the major users of SNSs in China. Of the participants, sixteen were male and twenty-nine were female. Their study backgrounds were mixed, and included the material, building, humanities, science, management, economics, engineering and law disciplines.

Process

The 10 groups of webpages were distributed to the participants during face-to-face interviews. These 10 groups included the webpages that represented the main functions of Chinese SNSs. A review of the major Chinese SNSs revealed their main functional elements to include albums, personal profiles, notes, friend lists, sharing, games and personal comments. Although the elements might have shared certain contents, their visual arrangements were diverse. Taking the friend lists as an example, **Figure4-2** displays two common arrangements. The information related to one game was represented in the lists on these two pages, with the different widths and heights of the lists forming different visual arrangements. Although each group of webpages displayed similar contents, they were designed with different arrangements. In other words, each group displayed some features of the currently existing SNS layout designs. The webpages also had the same backgrounds and colour styles to lessen any visual distortion. **Renren** is one of the popular SNSs in China, and its design style is quite familiar to Chinese users.

Hence, based on the design style of **Renren**, the 45 student participants compared the 10 groups of webpages with different visual arrangements.



Figure4-2. Two visual arrangements of a games list

After receiving the responses, the webpages were simplified as prototypes and measured according to their visual attributes. Although the contents of the webpages in each group were similar to each other, the individual elements in their arrangements had different compositional relationships. The prototypes

allowed these different relationships to be quantitatively compared. The webpage considered in this study exhibited four visual attributes, including rhythm, proportion, movement and simplicity. Different requirements were placed on more diverse functions, and they were identified by the responses received.

4.2.4 Outcomes of arrangements' investigations

As mentioned previously, the 10 groups of webpages included photo, photo list, personal profile, note, note list, friend list, personal introduction, sharing list, game list and comment list pages. The visual arrangements in each group were compared according to the pages' visual attributes. The friend, sharing, game and comment list pages were compared based on rhythm. The personal profile and introduction pages were compared based on movement. The photo, note and note list pages were compared based on simplicity and proportion. Each participant was permitted to select one webpage from each group. The final responses are discussed individually in the following section.

The first group comprised photo pages. **Figure4-3** shows the possible arrangements of SNS photo pages according to prototypes. The “photo” rectangle represents the display space of one photo. The webpage backgrounds in the first four figures are black, and those in the other two figures are white. **Figure4-3(a)** received the most votes with 17 participants selecting it, followed by **Figure4-3(c)**. Among the 45 participants, **Figure4-3(e)** received the lowest number of votes. This indicates that they highly desired interface simplicity while browsing the photos. In **Figures 4-3(a)** and **4-3(c)**, the backgrounds are both black, strongly highlighting the photo object and improving the browsing simplicity. The arrangements in these two figures are also relatively simple, as

they include only two columns each. In summary, the users preferred a simple arrangement for the photo pages.

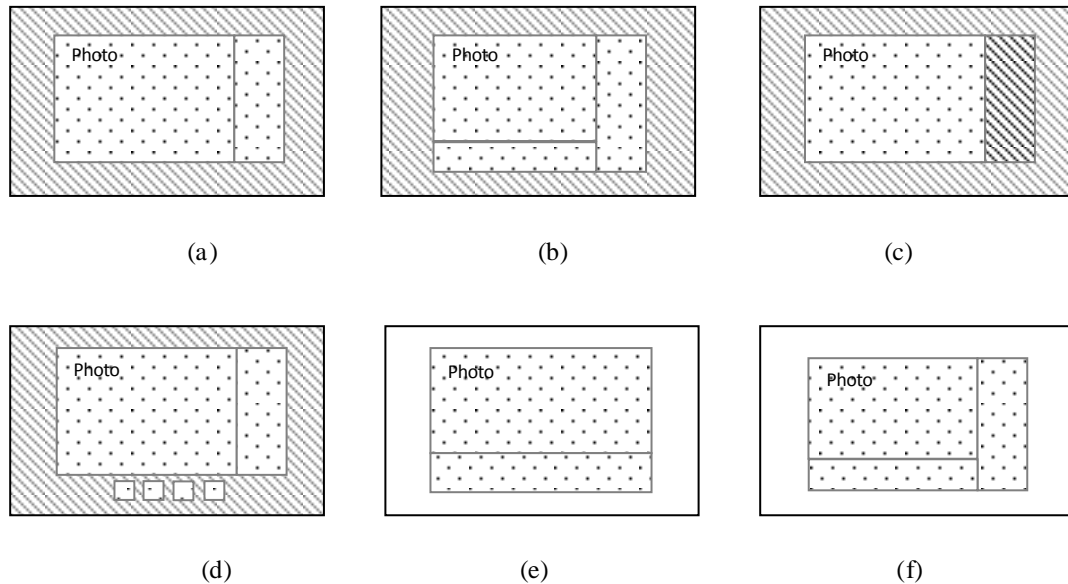


Figure4-3. The first webpage group

The second group comprised the photo list pages. The zoomed-out photos in **Figures 4-4(a)** and **4-4(b)** are shaped as squares and rectangles, respectively. In **Figure4-4(c)**, the zoomed-out photos are shown in their original sizes. Most of the participants preferred the arrangement in **Figure4-4(a)**, which received 28 votes. However, 18 participants preferred the style in **Figure4-4(c)**. In summary, the users found that square shapes offer a more visually appealing proportion while browsing the photo list page.

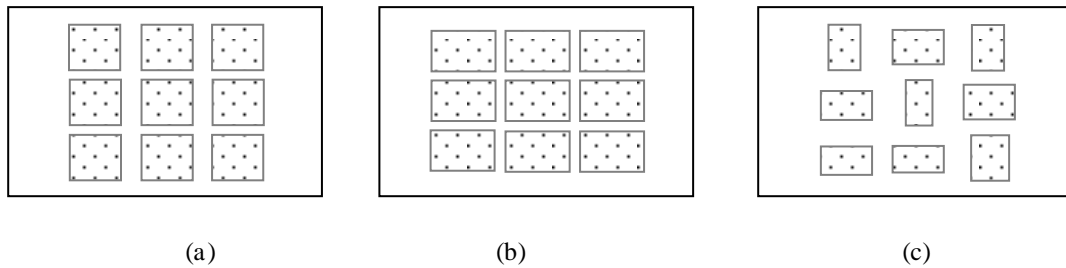


Figure4-4. The second webpage group

On an SNS, a user's personal profile page is usually browsed by his or her friends. There were two kinds of arrangements in the SNSs examined in this study. **Figure4-5** shows the third group, which comprises prototypes of personal profile pages. These pages were compared based on how their arrangements affected the users' eye movements. The users focused on the middle rectangle when presented with the content as shown in **Figure4-5(a)**. However, their focus was divided along two sides when they were presented with that in **Figure4-5(b)**. Most of the participants selected **Figure4-5(a)** as their favourite. This suggests that they preferred personal profile page content to be positioned centrally for easy reading. When presented with **Figure4-5(b)**, the users' eyes had to move from left to right, which the users found less acceptable.

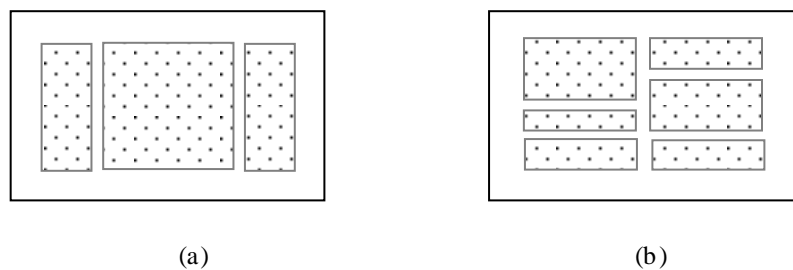


Figure4-5. The third webpage group

The fourth group comprised note pages. These pages were mainly used to display note contents. The pages also occasionally displayed additional content along the left hand and right hand sides, including links to other notes and user information. SNS note pages can have three kinds of visual arrangement, including one, two and three columns. **Figure4-6** presents their specific prototypes. According to the responses, 27 of the participants preferred the three-column arrangement (**Figure4-6(c)**), and 17 preferred the one-column arrangement (**Figure4-6(a)**). This result indicates that they were happy to read information in addition to the note content when visiting a note page. In other words, they did not significantly require the visual arrangement to be simple. **Figure4-6(b)** represents the highest level of simplicity applied to help users focus on the note content.

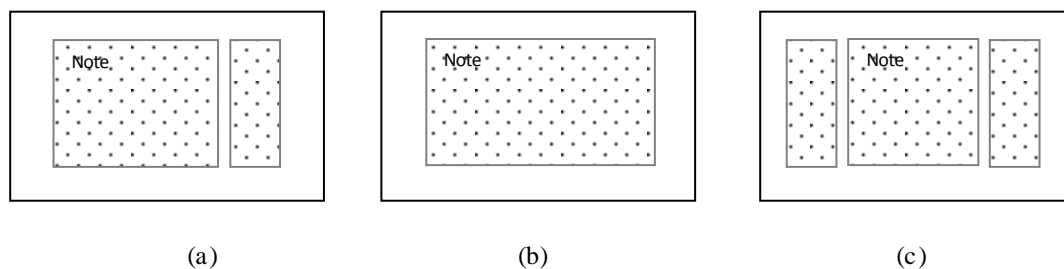


Figure4-6. The fourth webpage group

The note list page did not adhere to many kinds of visual arrangements. The fifth group comprised two common styles as represented in **Figure4-7**. In this group, the visual attributes were compared based on the proportion of the list content. In these two arrangements, one rectangle represents the content of one note. **Figures 4-7(a)** and **4-7(b)** display the proportional differences of each list. In the first figure, the title, picture and some parts of the article are displayed in the list. In the second figure, only the title is displayed. Thirty-three of the participants selected **Figure4-7(a)**, indicating that they wanted to see more information

about an article while browsing a note list page. In other words, the users found the larger proportion of space provided by the note list page suitable for reading.

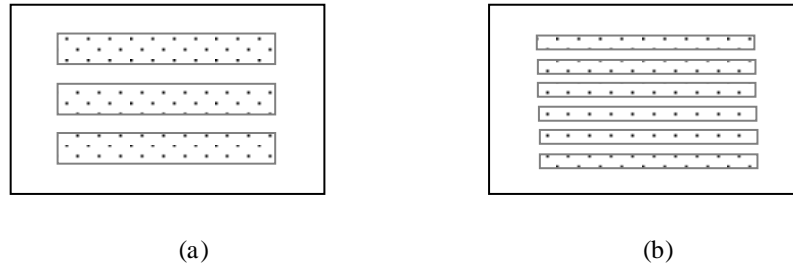


Figure4-7. The fifth webpage group

The sixth group comprised friend list pages that adhered to three visual arrangements. **Figure4-8** describes the prototypes of the three arrangements, with each patterned rectangle representing the introduction of one friend. Twenty-five of the participants preferred the arrangement presented in **Figure4-8(b)**. Twelve of the participants preferred the arrangement presented in **Figure4-8(a)**. These results indicate that the users found the rhythm of many lines more acceptable for a friend list page. They wanted to see more friends on the screen instead of mere descriptions, and considered the arrangement shown in **Figure4-8(c)** to be a waste of space.

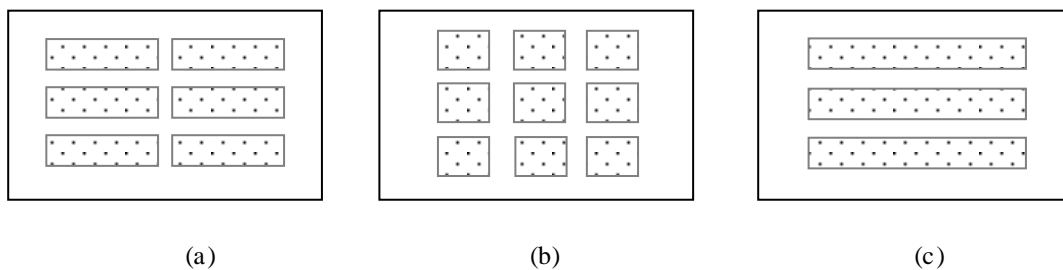


Figure4-8. The sixth webpage group

When users browse a stranger's profile, they arrive at a quick understanding of the stranger based on the personal introduction presented. The seventh group included two personal introduction pages, which were compared on the basis of their layouts. **Figure4-9** shows the simplified prototypes of these pages. The visual attributes of these two arrangements differed in terms of their influence on the users' eye movement. When presented with **Figure4-9(a)**, the users' eyes moved from either left to right or up down among the four panels. When presented with **Figure4-9(b)**, the users' eyes moved only from left to right. Most of the participants (38) preferred **Figure4-9(b)**, indicating that they did not like making complex sight movements when reading personal introduction pages. Hence, the visual arrangement designed for personal introduction pages must be kept simple and centralised.

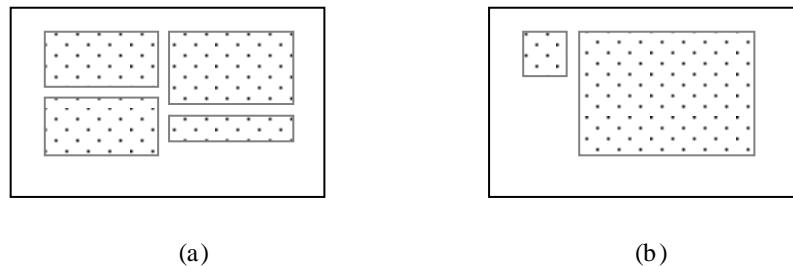


Figure4-9. The seventh webpage group

The eighth group included sharing list pages. These pages are quite popular on Chinese SNSs. Users often visit them to view popular notes, photos and videos. **Figure4-10** displays the two prototypes of the sharing list pages, with one patterned rectangle representing the content of one sharing list. Thirty of the participants preferred the arrangement shown in **Figure4-10(b)**, indicating that they preferred the line-by-line rhythm of display on the sharing list pages.

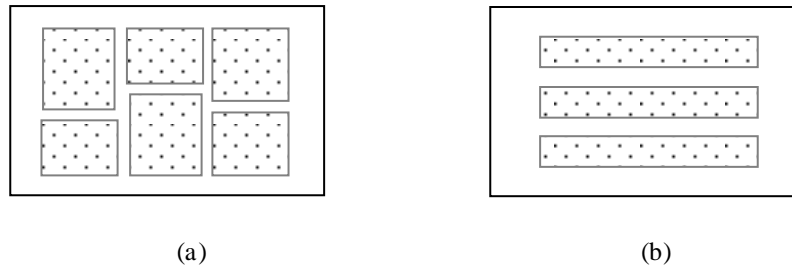


Figure4-10. The eighth webpage group

The ninth group included game list pages, which are popular pages on Chinese SNSs. **Figure4-11** displays the prototypes of the game list pages, with one patterned rectangle representing information related to one game. In terms of the participants' selections, **Figures 4-11(a)** and **4-11(b)** did not differ significantly. Twenty-eight participants preferred the arrangement in **Figure4-11(a)**, indicating that the users preferred a line-by-line rhythm rather than many patterns on a single line. The users wanted to be presented with more game introductions on the game list pages before playing a game.

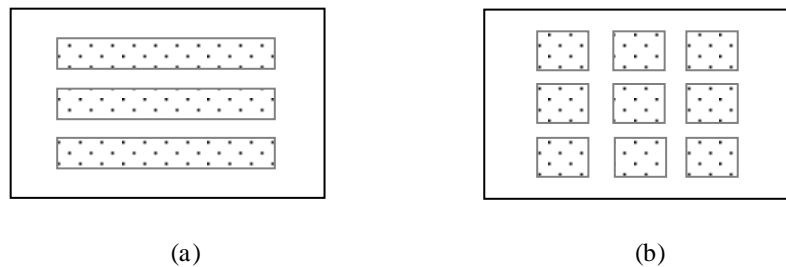


Figure4-11. The ninth webpage group

The 10th group included comment list pages, which presented two arrangement styles. **Figure4-12** displays their prototypes, with each patterned rectangle representing one comment. In **Figure4-12(a)**, all of the user comments are listed on the same line. In **Figure4-12(b)**, the comments have a hierarchical relationship;

Thirty-nine (or 87%) of the participants preferred **Figure4-12(b)**, indicating that they found the hierarchical rhythm of the comment list more acceptable and easier to read.

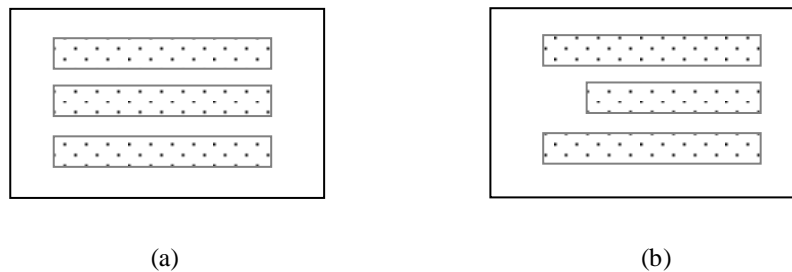


Figure4-12. The 10th webpage group

4.2.5 Summary

A set of SNS visual arrangements largely accepted by Chinese users were identified via comparisons among 10 groups of webpages. Their prototypes are displayed in the previous subsection. Furthermore, preferences for selected arrangements were determined and can be summed up according to the following principles.

- On the list pages, differences in interface arrangements were usually related to proportion and rhythm. The responses indicated that most of the participants preferred viewing square pictures while browsing many photos. For the note and game list pages, the participants wanted to read more introductions about each item. However, the friend list pages produced contrary results, as the detailed introductions seemed to be less required by the users, and the presentation of a friend's avatar and name was sufficient. For the sharing pages, the participants mostly accepted content listed line by line. This principle is also held for the comment list

pages. The participants were happier to read comments presented in a hierarchical arrangement.

- The participants had different page simplicity requirements for the photo and note pages. They largely preferred a clear arrangement for the photo pages. However, they found a clear arrangement less important when reading articles.
- Finally, the responses reflected that the participants preferred arrangements on personal introduction and profile pages that could be browsed from up down. They did not prefer layouts that were divided equally into two parts.

This study has identified some Chinese users' visual arrangement preferences. Most of the visual arrangements applied to SNSs in China, including **Renren**, **Kaixin001**, **Qzone** and **Pengyou**, did not match the participants' preferences. Designers may revise these arrangements based on the above findings. Poter (2001) indicates that once people feel bad about an interface, they switch to another website immediately. Therefore, it is important to design an interface that is largely liked by people. In addition, this investigation provides a quantitative method of analysing subjective requirements that can be applied to other studies of websites such as news sites and blogs.

Future research will explore the visual arrangement of SNSs on smart phones. Many Chinese users visit websites and applications via their phones. A study that compares the visual arrangements of computers and smart phones should help broaden the discussion of Chinese users' preferences for the interfaces of SNSs.

Chapter5 Requirements of Usability of Chinese SNSs

This chapter explores the issue of usability of web interface. A usability assessment of the selected Chinese SNSs was conducted. This chapter introduces the background of the assessment, and lists the previous studies on the usability problems of Chinese SNSs. **Renren** was selected as the testing platform to represent Chinese SNSs for usability study. Finally, the testing process and outcomes are presented.

5.1 Introduction

From the perspective of functionality, SNSs provide public spaces for people to maintain social activities online. Users often upload their photos, videos and notes to SNSs, making them available to their friends and families. SNSs also include different interactive tools such as “Comment”, “Like” and “Delete” actions among others. Given this multi-functionality, SNS operations are relatively diverse, and give rise to the question of whether they can be easily judged. These interactive operations may be measured according to interface usability. A high usability indicates a website with a straightforward interface that is easy to interact with. In addition to aesthetic design, straightforward operation maintains the revisiting rates of users and attracts additional users. Given these issues, usability cannot be ignored when considering the SNS interface design. The existing reviews on Chinese SNSs have largely avoided the problems with usability. How satisfied are Chinese users with SNS usage? Can some of the systems be improved? This study explores the usability of Chinese SNS interfaces in order to gain the knowledge about user requirements.

I explored the possible problems in usability that might occur during the operational process of using a SNS. According to previous studies, the methods for testing usability as a part of interface design are relatively mature and diverse. In this study, I implemented testing to investigate actual user behaviour, and the records of users’ operations on a website are then used to identify usability problems. I invited seven representative participants to complete some tasks on **Renren** which is selected from four Chinese SNSs after an initial investigation. These tasks were planned in advance. They were recorded via HyperCam, are presented in the final results along with the operational problems encountered.

In brief, this investigation was motivated by two questions. First, what is the current state of Chinese SNS in terms of usability, regardless of whether the SNSs are straightforward? Second, how can SNS interface designs be improved, and which interactive systems must be amended? The answers to these questions are revealed in the findings.

5.2 The theoretic bases of usability studies for SNS

Chapter2.1 presented a review of the previous usability studies. Website usability is associated with the level of difficulty involved in using the system without much learning in advance. Although an abundance of studies have considered usability knowledge, related studies on Chinese SNSs have been rare and scattered. Shen et al (2012) tested the usability of Chinese SNS privacy systems, and their results indicated that navigation and blacklists must be improved. However, their study focused on the privacy system interface, and the privacy system is not representative for other commonly used SNS functions. Liu (2009) summarised the design principles for Chinese SNSs. They included usability, and he stated that icons should largely be designed with general patterns. However this suggestion is abstract and lacks specific analysis. My investigation focused on evaluating the issue of usability as an integral part of overall design of interface.

In terms of composition, this investigation was conducted based on Quesenbery's description of usability, which the author divides into five factors: effectiveness, efficiency, satisfaction, error tolerance and learnability. These five factors were considered also in my investigation.

5.3 The testing platform

The testing platform was confirmed before the investigation. The mainstream SNSs in China selected for the investigation are **Renren**, **Qzone**, **Kaixin001** and **Pengyou**. These well-known websites have similar functions and contents, and users regularly browse them to find personal statuses, photos, notes and friends' comments. However, their aesthetic designs are somewhat distinguishable. The design of interface affects the usability of a website in terms of functions and interactions. In my testing platform for usability, the aesthetic aspects are minimized in order to focus on usability and not to confuse the participants with the two issues at the same time. I conducted an initial investigation involving twenty people from China. Screenshots of the well-known SNSs were issued to the participants, who were required to identify their favourites and express their suggestions. The process involved is detailed as follows.

5.3.1 Confirming the testing platform

Participants

Twenty students (six males and fourteen females) from Hong Kong Polytechnic University and Shenzhen University were invited to participate in this research. All of the students were from China, including the provinces of Guangdong, Jiangxi, Shandong, Hangzhou, Beijing, Shanghai, Hunan and Henan. They were familiar with the selected four SNSs, and had an average of three years of experience using them. In my research, I considered this experience important since with their experiences, they could express their views on the issues more accurately.

Process

The participants were required to select their favourite designs from four SNS webpages. The homepage and login page of each SNS represented the most frequently used pages and the sites' vivid aesthetic features. These pages constituted the options for the participants. **Figure5-1** shows the login pages of **Renren**, **Kaixin001**, **Qzone** and **Pengyou**. The design styles of these four SNSs were generally similar. The interface designs of Renren and **Kaixin001** were particularly similar except for their main colour schemes, which were blue and red, respectively. **Pengyou** exhibited the most compact style, and **Qzone** exhibited the most colourful design. **Pengyou** largely made use of transparent icons and light lines. The background of the **Qzone** was the only one designed with a pattern. The backgrounds of the other three SNS homepages were all in white.

The most popular SNS (**Renren**) after comparing four selected SNSs was selected as the testing platform for the usability evaluation. Although this website gained the highest vote, it was not without criticism.



Renren



Kai xin001



Pengyou



Qzone

Figure5-1. The login pages of the four SNSs (2012)

Results

The aforementioned SNS descriptions received the approval of 20 participants. One of the participants strongly disliked the design of **Pengyou**, who asked the questions like “The lines and icons were too light for me. Sometimes this confused me. Where are the column boundaries?” Furthermore, the designs of **Qzone** and **Kaixin001** each received one vote of disagreement. According to one user, “I dislike the design style of **Qzone**. My personal status is quite private, and I cannot display myself on such an informal website”. In terms of the final statistics, ten people selected the design of **Renren** as their favourite. **Kaixin001**, **Qzone** and **Pengyou** received six, two and two votes, respectively. This indicated that the users mostly accepted the interface design of **Renren**. Hence, **Renren**, which was operated by Oak Pacific Interactive Company, was confirmed as the testing platform for the investigation.

5.4 Usability evaluation of the current Chinese SNSs

During the evaluation, the skilled operator demographic had to be excluded when recording the initial user behaviour. Hence, neither frequent visitors nor experts were included in the study. Seven people from China were invited to carry out the usability testing. Three of these users were the students at Hong Kong Polytechnic University, and four were from Nanhang Company in Shenzhen. Two of the participants had browsed **Renren** before but lacked ample experience with the site, and five of the participants had never used it before. Three of the participants were female and four were male. Their average age was 28.

Evaluation process

After the testing platform and samples were confirmed, several tasks were issued to the participants. These tasks were related to the main systems of **Renren**. The CNNIC’s report in 2012 observed that browsing feeds, making comments, updating statuses and writing notes were the main SNS system functions frequently used by Chinese users. Based on the CNNIC data, **Figure5-2** summarises the main systems of **Renren** (registration, personal information, personal feeds, friends, photos, notes and applications). These systems referred to the most interactive operations that occurred on the website. The tasks planned in each system were different, and the common operation was selected. **Table5-1** lists the specific tasks designed in this study.

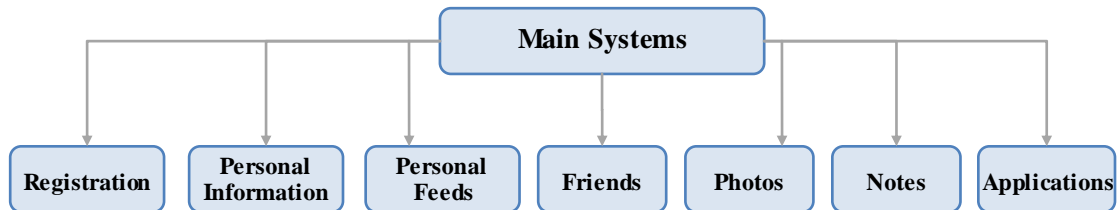


Figure5-2. The main systems of Renren

Table5-1. Tasks implemented by the participants

Task	Content	System
1	Register an account with an arranged mailing address and password.	Registration
2	Update a profile picture.	Personal information
3	Input university or work information.	

4	Input personal interests such as music, hobbies, books, films, games and/or sports.	
5	Browse a friend's feeds.	Personal feeds
6	Click "Like" on a feed.	
7	Comment on a feed.	
8	Update a status with fonts and pictures.	
9	Delete a status.	
10	Search a classmate and add him/her as a friend.	Friends
11	Invite a friend to join the website.	
12	Set the blacklist.	
13	Upload two photos.	Photos
14	Create a new album and set its cover.	
15	Tag a friend in a photo.	
16	Left-rotate a photo.	
17	Click "Like" on a photo.	
18	Comment on a photo.	
19	Share an album.	
20	Write a note with fonts and letter paper.	Notes
21	Share a note.	
22	Delete a note.	
23	Add the "Happy Farm" application.	Applications
24	Send a gift to a friend.	

During the testing process, the participants were required to finish as many of the planned tasks as possible. However, not all of the tasks had been completed. If the participants felt unsure about a task, they were free to give up on it. The

participants were notified in advance that they could stop a task when the operational tool took too long to find. This condition helped increasing the participants' patience. The HyperCam (2013) software was used to record the participants' operational behaviour as they completed the tasks. These recordings were transferred to video.

I analysed the video data from the user tests. The problems the participants encountered while performing the arranged tasks were recorded. All of these problems are related to the users' confusion, mistakes and emotions while performing the tasks. Which experiences led to mistakes? Which interfaces confused the users? If the participants clicked a button several times, but the desired target was not behind the button, then the design involved was considered to be confusing for the participants. These usability problems are summarised in the results, and are classified according to effectiveness, efficiency, satisfaction, error tolerance and learnability.

5.5 Outcomes of usability evaluation

5.5.1 Usability status

Seven participants successfully finished most of the tasks, with a completion rate reaching 90.68%. **Figure5-3** displays the completion rate in details. The remaining unfinished tasks belonged to the notes and friends systems (with the completion rates of 3.73% and 5.59%, respectively). Five users were unable to successfully share notes or set a blacklist. One user was unable to delete a note, and four users were unable to figure out how to invite friends to the site.

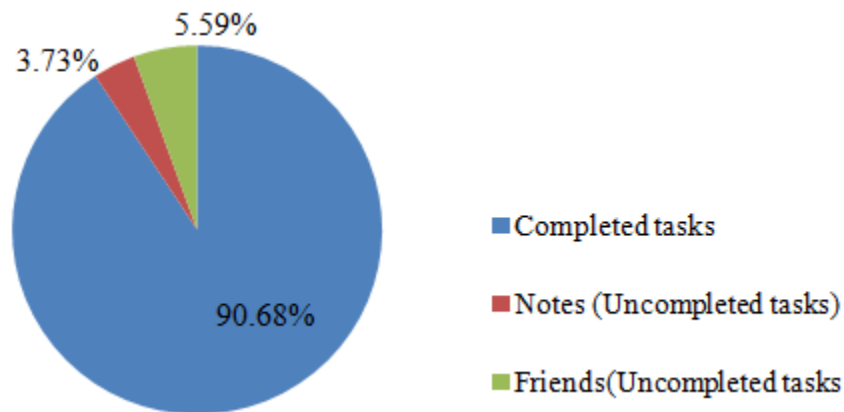


Figure5-3. Planned task completion rates

The participants found some tasks difficult, such as those related to personal status, personal information, photos and friends. However, they were able to achieve these targets slowly. This represented a website efficiency problem. **Figure5-4** displays the specific situation. Only 9.32% of the tasks took an extended amount of time for users to complete. Most of these tasks were related to personal information, including inputting their personal interests, updating their profile pictures and inputting their university or work information. Three of the participants were unable to update their profile pictures quickly. In the photo system, the tasks of sharing an album, setting the album cover, tagging a friend in a photo and left-rotating a photo were somewhat hidden from the participants. Finally, three of the participants were unable to invite their friends to join the SNS in a rapid manner.

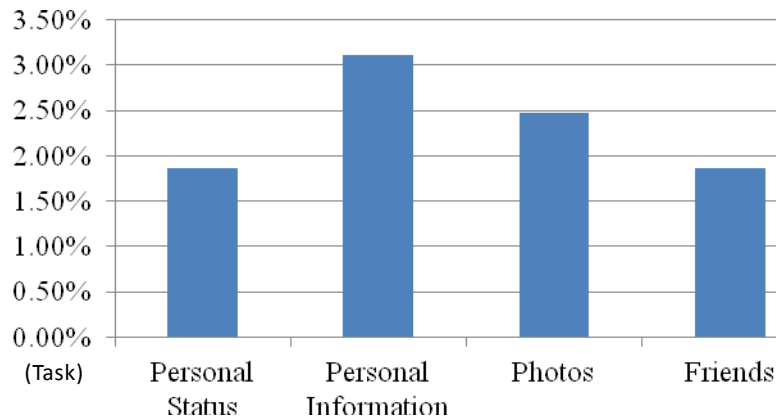


Figure5-4. Graph indicating the relatively slow system operation

5.5.2 Usability problems

I watched the testing process videos and recorded 22 usability problems, as shown in **Table5-2**. Four users misunderstood the deletions of personal status. They thought that their personal status could be deleted in the feeds, but it could only be done in the personal status list. Most of the participants made this mistake. Three participants complained that too much information was required for the “learning experience” task. According to one participant, “Writing out my learning experiences is boring. I have forgotten some of my school years”. Several problems were also found in relation to the inconsistency between designers and common users. The users who visited the site did not use the targeted tools created by the designer. Problem Nos. 8, 10, 12, 13, 14, 15, 18, 19 and 20 all reflected this inconsistency. Furthermore, problems such as “I thought my personal information would be displayed in a private account”, “I thought my personal status could be updated on the message board” and “I confused the chat list with my friend list” were encountered by at least two people.

Table5-2. Usability problems that emerged during the process

No	Usability Problems	No. of People	Systems
1	The requirement of using my real name is too strict.	1	Registration
2	I frequently need to switch between English and Chinese on one page.	1	
3	The pop-up windows displaying university information slow down the system response.	1	
4	I am required to fill out too much information related to my learning experience.	3	
5	I received no confirmation e-mail.	1	
6	The “Next step” button on the registration page is too small.	1	
7	I was asked to enter my password only once, rather than having to confirm it a second time.	1	
8	I did not know which button to click to upload my profile picture.	1	Personal information
9	I was unsure whether my profile picture had already been updated.	1	
10	I made a mistake entering personal information in my “user account”.	2	
11	I was unsure whether some of the tags provided in my personal interests were better than other.	1	
12	I thought I could comment on the message board by updating my personal status.	1	Personal status

13	I thought my personal status could be deleted on my feed list.	4	
14	I thought my personal status could be updated on the message board.	2	
15	I confused the chat list with my friend list.	2	Friends
16	The photo tagging option was not flexible.	2	Photos
17	I mistook the personalised album for the album cover.	1	
18	I confused the album comments with photo comments.	1	
19	I mistook sharing an album with sharing a photo.	1	
20	Other users may mistake a photo's introduction with a comment on the photo.	1	
21	No sharing button was available.	1	Notes
22	I confused the definition of "game" with that of "application".	1	Applications

After the usability problems were listed, the corresponding relationships between the usability problems and compositions were discussed. It was determined that the problems could be classified according to the compositions. As described previously, website usability is composed of effectiveness, efficiency, satisfaction, error tolerance and learnability. **Table5-3** displays the problems with their relation to these five usability attributes. The problems that occurred in the operations are analysed in the subsequent sections.

Table5-3. The corresponding relationship between usability problems and its compositions

Usability	Description	No. of Problems
Effectiveness	Problems that affect the user's correctness in completing tasks.	3
Efficiency	Problems that affect the users' operational speeds.	3
Satisfaction	Problems related to the users' feelings towards the website.	2
Error tolerance	Problems related to seeking assistance when an error occurs.	3
Learnability	Problems related to operational predictability.	11

Effectiveness

The complaints such as “The ‘Next step’ button on the registration page is too small”, “I was unsure whether my profile picture had already been updated” and “The photo tagging option was not flexible” were related in the “effectiveness” attribute. These three problems were related to task completeness. During registration, the “Next step” button was arranged in the list of recommended friends and it cannot be easily found by the participants. **Figure5-5** presents a screenshot of the registration page. The green button (“Add friends”) was more problematic than the “Next step” button. When a user continued clicking the green button without adding friends, the page did not jump forward, and registration remained incomplete. Furthermore, photo tagging was not flexible, and drove some participants to give up on the operation.



Figure5-5. Registration page screenshot

Efficiency

The “efficiency” attribute is related to user’s operational speed. Problems that affected the speed at which tasks were completed were classified under the efficiency attribute. Some issues could have been improved for the registration system. The real-name requirement was considered strict. As shown in **Figure5-6**, a participant who input her real name (苏二) was not accepted by the system. Furthermore, the participants were always required to switch between English and Chinese inputs. As shown in **Figure5-6**, the email address and name fields required different input methods.



Figure5-6. Screenshot showing personal information fields during registration

In terms of learning experience, three participants complained that too much information was demanded. It took one of these participants a long time to find his university in the options. **Figure5-7** exhibits a pop-up window containing university information. Reviewing the video footage, it was found that one participant repeatedly slid the scroll bar to find his university, which was not famous in China, and located it in the middle of the form. Solving these issues would help to improve the efficiency of the registration system.



Figure5-7. Screenshot of a pop-up window containing university information

Satisfaction

Although all of the participants updated their profile pictures successfully, one participant was confused by the profile picture page. He complained that the interface design looked “strange”. Furthermore, as one participant observed, “I don’t like typing non-important information. If some tags were provided for my personal interests, I would feel better about it”. Both of these problems reflected the users’ emotions, and were classified under the ‘satisfaction’ attribute.

Error tolerance

Errors were unavoidable, and when they occurred, the system design attempted to help the users recover. **Renren** caused three errors without issuing a restoration response. Although one participant registered successfully, the confirmation letter was not sent, and the participant was not provided with a link to obtain it. The other two errors were the slow system response caused by the university information pop-up windows and the lack of a note-sharing button. In the case of the latter, the problem occurred in the list of notes. When a user wanted to share a note, he tried to click the sharing button in the list of notes, as shown in **Figure5-8**. However, clicking this button transferred the user to the note page without successfully sharing the note?



Figure5-8. Screenshot of a user's note list page

Learnability

Most of the problems (11) were related to learnability. A learnability issue arose when an operation was not designed to match the user's experiences. Several of the participants mistook and confused the locations of some of the tools, including the personal information, personal status, friends, photos and applications systems.

Two participants thought their personal information was listed on the account pages of other users, when it was in fact listed only on their own profile pages. Participants also had misconceptions of the comments on and deletion/updating of a status (“I thought I could comment on the message board by updating my personal status”, “I thought my personal status could be deleted on my feed list”, “I thought my personal status could be updated on the message board”). In the photo system, the separate concepts of the album and personalised album confused certain users. This issue also arose for album and note sharing. When presented with the task of sharing an album, one participant shared a photo instead. In the applications, one participant mistook the definitions of “game” and “application”. Although he planned to find “Happy Farm” on the game page, it was in fact classified as an application on **Renren**. The participants were similarly confused by the introduction of a photo with the comments made on that photo.

The participants were also confused by some terms and interface designs. One participant was confused by the page design while uploading an avatar. **Figure5-9** displays a screenshot of the avatar page. The user successfully uploaded an avatar, but did not know whether to click the first or the last button. Reviewing the video, it was obvious that the user moved the mouse along the photo to the yellow area and then tried the first and the last buttons. The yellow area represented the signal of a successful uploading, but it was designed too small and easily ignored by the the participants. The two blue buttons represented the actions of uploading and saving the small avatar, respectively. Neither of these buttons helped the users to jump to a new page. Two participants were similarly confused by the chat list with their friend list. During the testing process, one participant clicked a link in the chat list twice. The same mix-up occurred for the album and photo comments.



Figure5-9 Screenshot of an avatar page during upload

Finally, there was a pointed difference in common user habits during the registration process. Users inputted their passwords only once without a second confirmation request. **Figure5-10** shows the registration page. In the area outlined in red, it is obvious that a participant directly input a password as their names, and that his or her habit was to enter the password twice during registration.



Figure5-10. Screenshot of the basic information fields on the registration page

5.6 Summary

This study disclosed the status of the usability of some of the Chinese SNSs. As a representative Chinese SNS, the participants in the investigation found **Renren** generally straightforward to use. For tasks including major operations, the users were able to finish most of their work, attaining an effectiveness rate of 90.68%. Most users seemed to find it relatively easy to operate. However, certain tasks were not completed in the notes and friends systems. Furthermore, reviewing the users' operational speeds, the level of efficiency was generally satisfactory. Only 9.32% of the tasks took an extended amount of time for the participants to complete. Updating profile photos required the most efforts by the participants.

This investigation identified 22 usability problems. Learnability problems accounted for the largest percentage of these problems (50%). If designers could change an interface design based on user experience, then these learnability problems may be solved. Furthermore, effectiveness, efficiency and error tolerance comprised three additional problems, and the remaining two problems were related to user satisfaction. Effectiveness and error tolerance problems should be avoided urgently, as they directly affect usage accuracy. Designers should flexibly provide more options to users to address satisfaction problems.

This investigation successfully identified the usability requirements of some of the Chinese SNSs. Designers could amend the present SNSs to avoid the usability problems identified herein. The registration, personal information, personal status, friend, photo, note and application systems of other websites in China may also be designed based on these experiences. This investigation should enrich the general knowledge of interface design in Chinese SNSs. Future studies could conduct usability tests on other types of SNS, such as **QQ** and **Pengyou**. A comparison

study involving these websites would be useful for exploring the usability problems of Chinese SNSs in more details.

Chapter6 Two Case Studies and Implementations

This chapter tries to further clarify interface designs by building a website. I begin it by detailing the research background and describing the website-building process. Two case studies were conducted. The first study tested my previous explorations, and the second focused on the relationships between visual aesthetics and usability. Finally, the research processes and findings of the two studies are presented in detail.

6.1 Introduction

The previous two chapters explored some of Chinese SNS interfaces in terms of their visual aesthetics and usability, and the knowledge that might be used to derive design principles based on the findings has been generated. The applicability of this knowledge as the basis of possible design principles should be tested and verified. This is related to the answers to the research questions including: Are a website's visual aesthetics and usability related? How does a website's aesthetics design affect its operations?

Two case studies are presented in this chapter. The first was conducted to test my previous explorations, and the second focused on the relationships between visual aesthetics and usability. Their overall goals were to further clarify the Chinese SNS interface design process. Building a new website was the first step, and this website served as the same testing object across the two studies.

I proposed design principles in the implementation of a website before inviting people into the evaluation. Building a website is a direct way of exploring interface design, as many experiences arise in the design process. This implemented new website is not an SNS, but rather a tourism website that chiefly introduces a cultural location in China (Phoenix town of Shaanxi province) and provides travel information. I detail my reasons for building such a website as follows.

- An SNS is a large-scale website. Due to time and resource limitations, I could not build an entire SNS by myself within this study;

- The main function of an SNS is to provide social activities online. Users can also communicate online via a tourism website, such as via a message board;
- A tourism website features relatively simple interactions and rare content that facilitate the adoption of design principles;
- Cultural influence should be reduced. Culture is an important factor that has changed the designs of SNSs in different countries. To decrease the cultural influence, the website built in this study was characterised by traditional Chinese features that most Chinese users would find generally acceptable;
- Phoenix, which originated in 5500 BC, has a long history and many cultural characteristics, and presented an appropriate design object. I have visited the town before, and my experiences there helped me make the website's design consistent with the local style.

In summary, simple interactions and Chinese cultural features were the chief reasons for my choice of a tourism site. After setting up the Phoenix website, the first study was conducted, in which users were invited to comment on it. The second study was then conducted, during which the relationships between visual aesthetics and usability were further examined. This chapter seeks to further clarify Chinese users' web interface preferences through these two studies involving implementation and evaluation.

6.2 Design of Phoenix website

6.2.1 Design requirements

Designers use a diverse array of methods to develop websites. The Phoenix website design process was divided into three steps. The first step involved analysing the content requirements. What would be useful for tourists? What benefit could the site have for the location? What should the designers expect? These questions were answered by organising the website content.

- Tourists were expected to learn from content including a simple introduction of Phoenix; specific descriptions of its local history, culture, craft and architecture; local news; activities; traffic information; contact information; travel logs noted by other tourists; accommodation; and food;
- The government and citizens of Phoenix were expected to know tourists' preferences for foods, crafts, attractions and accommodations, among other items;
- Although I could not build an SNS, the website served the main function of providing social activities online, such as participating in a comment section.

The second step involved confirming the design styles, which referenced those of other popular tourism websites. I consulted five Chinese tourism websites in China for reference, and compared their places, colours and visual features. The common features of their design styles were identified in these comparisons. As shown in **Table6-1**, the tourism websites commonly included lakes, mountains

and the sky in their design aesthetics, and their common colours included blue, green, grey and orange. I referenced these common features in my design.

Table6-1. Comparison of five tourism website homepages

Link	Place	Colours	Visual Features
http://www.gotohz.com/	Hangzhou	Blue, orange, grey, green, yellow	Lake, pagoda, sky, clouds, trees
http://www.nbh.com.cn/	Nanbei Lake	Green, blue, orange	Clouds, lake, mountain, landscape
http://page.renren.com/600938399/index	Candina	Blue, grey	Snow, mountain, sky, people
http://www.sxtour.gov.cn/	Shaoxing	Brown, red, green, black, green	Ships, town, river, people, trees
http://www.taichilake.com/	Taichi Lake	Green, orange, blue	Lake, trees, clouds, birds, temples

After confirming the general styles, I practically applied the design principles from my previous explorations during the design process. The previous outcomes revealed that Chinese users preferred browsing content from up to down. The information pages included “Introduction”, “Travel guide” and “Cooperation projects” pages, all of which were designed with a top-to-bottom style. The main contents were displayed in the middle of each webpage, and the left-hand columns included some related links. This design also complemented the clarity of the text design. When a page mainly displayed an article, other content was

rarely presented in accordance with the preferences of Chinese users. Most of the buttons were designed with a compact style (pure colour and font), and some that provided a guidance function were added to the patterns. According to the usability study, people confused the buttons used to upload profile pictures, as they were located too closely to other buttons. On the Phoenix website, similar buttons were rarely used on a single page.

6.2.2 The Phoenix website

After the initial work was completed, the Phoenix website was successfully built. This subsection describes the website in detail.

- (1) **Place:** Phoenix was the topic of the website. The site mainly introduced the town's tourism environment to strangers.
- (2) **Designs:** The website implemented colours seen in the local architecture. Brown was the primary colour, and red was the secondary colour. Although few Chinese tourism websites used brown as their main colour, the colour was typically adopted to represent ancient cities, such as on the Shao Xing website mentioned in **Table6-1**. **Figure6-1** displays the homepage of the Phoenix website, representing the overall design. In terms of the visual features, the arch, ancient building, mountain lines, Phoenix shape and classic frame were adopted to reflect the town's local characteristics. Because a tourism website should provide plenty of travel information, the homepage was given a three-column layout, and a two-column layout was applied to the other pages. In addition, two font families were mainly adopted on the website: “宋体” and “微软雅黑”.

- (3) **Content:** The website included five pages. On the homepage, the content comprised scrolling pictures of Phoenix along with a video, microblog, message board, celebrity information, travel guide, cooperation project information, a simple introduction, a traffic guide and weather information. The rest of the pages included an introduction page, a travel guide page, a cooperation projects page and a page for the message board.

In summary, the testing object (Phoenix website) was completely built and was the first website designed for Phoenix town. The next step involved examining the relationship between its usability and visual aesthetics.



Figure6-1. Phoenix website homepage

6.3 Case study one: the evaluation of Phoenix website

As mentioned in the section 6.1, the aim of this case study was to test my previous explorations. After the Phoenix website was built, 20 Chinese users were asked to perform the planned activities on the website. They were administered a survey, with questions relating to the composition of the site's visual aesthetics and usability. The experimental process is described in more details in the following subsections.

6.3.1 Assessing the usability and visual aesthetics

Participants

The participants in this test consisted of twenty Chinese website users. Ten of the participants were the students at the Hong Kong Polytechnic University. The remaining ten participants were selected from an IT company in Shenzhen. All of the participants came from different provinces in China, including Guangxi, Sichuan, Hubei, Beijing, Henan Shanghai, Heilongjiang, Jiangxi and Guangdong. It was appropriate to recruit diverse demographics to decrease the cultural influence. All of the participants were aged from 24 to 30, and included eleven males and nine females. All of the participants were familiar with the Internet, and had been using it for periods ranging from 5 to 14 years.

Testing process

The usability evaluation of the Phoenix website was related to five points (effectiveness, efficiency, satisfaction, error tolerance and learnability). Twelve statements were designed to express these five points. The users' ability to find the introduction page and users' comments about Phoenix and to assess the site's navigation reflected the site's effectiveness, and its efficiency was explored by evaluating its speed and links. The users' emotions, operational ability and mistake tips represented their satisfaction, learnability and error tolerance, respectively. Each statement was assigned a value, and the participants indicated their level of agreement with the statements on a 5-point scale from "Strongly disagree" to "Strongly agree". Finally, the mean and standard deviation were used to analyse the assessment and sequence data. The highest value represented the strongest agreement.

The 12 statements are listed as follows:

- (1) On this website, I can find the introduction, history and travel tips for Phoenix;
- (2) The information I obtain from the links meets my expectations;
- (3) I can find the users' comments about Phoenix;
- (4) The navigation and link designs help me conveniently browse the related information;
- (5) I can learn about Phoenix quickly on this website;
- (6) The website is quick;

- (7) I am satisfied with the website's content arrangement;
- (8) I feel comfortable on this website;
- (9) When I perform an incorrect operation, some tips appear to inform me;
- (10) This website presents little of a no-browsing problem;
- (11) I do not need a site map to navigate this website;
- (12) The website's navigation and menu design styles are unified.

Statements (1), (2) and (3) were related to effectiveness.

Statements (4), (5) and (6) were related to efficiency.

Statements (7) and (8) were related to satisfaction.

Statements (9) and (10) were related to error tolerance.

Statements (11) and (12) were related to learnability.

I tested the website's visual aesthetics according to its design elements, which included text, images, icons, menus/lists, links, video, buttons, lines, forms, spaces, layouts and styles. The participants were required to express their first impression of the website, and the survey was constructed specifically to capture their evaluations of 12 design elements. The participants were required to select the attractive elements and express their agreement with some of the design element statements. Each selection and agreement was given a value of 1. Consequently, the elements were graded based on the sum of the final data.

The 5 questions are listed as follows:

- (1) Does the website's design style match the characteristics of Phoenix?
- (2) Do you like the visual style?
- (3) Which design elements interest you (styles, images, icons, text, video, lines and/or buttons)?
- (4) Which of the following statements are appropriate for Phoenix website (appropriate space sizes, overly large space sizes, large forms, line designs, obvious links, and/or icon and button styles)?
- (5) Which elements of design are more important to Phoenix website (text, styles, images, icons, video, menus/lists, links, buttons and/or lines)?

Questions (1) and (2) were related to the general assessment of the website's visual attractiveness.

Questions (3), (4) and (5) were related to the website's design elements.

Appendix A includes the surveys administered to the participants.

6.3.2 Outcomes of the evaluation

First, the usability of the Phoenix website was assessed, with each usability point receiving a score from 1 to 5. As shown in **Table6-2**, learnability achieved the largest mean of 4.65. In the user testing, statements (11) and (12) reflected the learnability of the interface. Most of the participants found the Phoenix website easy to use when they first visited. The website's learnability gained the highest agreement among the participants. The next highest ranking was effectiveness,

which reached a mean of 4.4 as reflected in statements (1), (2) and (3). Most of the participants found the introduction, history, travel tips and user comments on the website, and completed the main tasks with a high level of accuracy (**Figure6-2**). The approval degrees of statements (9) and (10) were low, reaching a mean of only 3.18. Statement 9 delivered the lowest value of 1.5, indicating that few users found the mistake tips. This means that error tolerance received the lowest agreement out of the five attributes. In terms of the degree of fluctuation, the participants' comments towards learnability were more consistent than those towards the other four attributes, as its standard deviation reached the lowest score of 0.40066. Contrary to the users' comments related to learnability, those related to error tolerance were most diverse, reaching a standard deviation of 1.23837. In addition, because the interaction on Phoenix website was simpler than that on SNSs, the entire usability of Phoenix website was relatively high.

Table6-2. Scores of the five points of usability

Usability	Minimum	Maximum	Mean	SD
Effectiveness	3.33	5.00	4.40	0.47929
Efficiency	2.67	5.00	3.72	0.70207
Satisfaction	2.50	5.00	3.98	0.81878
Error tolerance	1.50	5.00	3.18	1.23837
Learn ability	4.00	5.00	4.65	0.40066



Figure6-2. The introduction page and users' comments pages

In terms of visual attractiveness, the users' first impressions were expressed based on two questions. First, does the website's design style match with the characteristics of Phoenix? Second, do you like the visual style of the website? In **Figure6-3**, "A" presents the result of the first question and "B" presents the second. Twenty participants were commonly satisfied with the aesthetic design of the Phoenix website, indicating a certain visual attractiveness. Eleven participants admitted that the website's design style was consistent with the features of Phoenix, and nine participants were interested in the design style. On the contrary, no one disagreed with the consistency, and only three participants were

disinterested in the attribute. **Figure6-4** displays the final result of the design element assessment. As in the method mentioned previously, each user selection and agreement was assigned a value of 1. According to these values, the design elements were graded into three groups. The highest-ranking group included the images, icons, links, buttons and menus/lists, with values ranging from 9.5 to 16. This indicates that most of the participants approved the website's image, icon, link, button and menu/list designs. The second selections were composed of text, layouts, spaces and forms, which the participants generally liked. The attractiveness of the lines and video attained the lowest scores of 1 and 2, respectively.

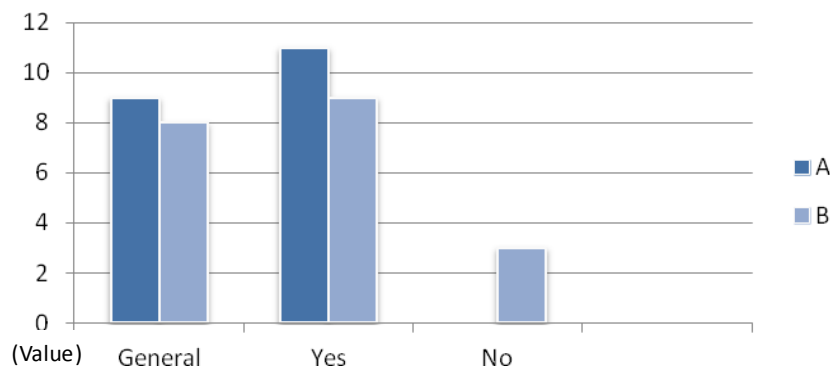


Figure6-3. The general assessment of visual aesthetics

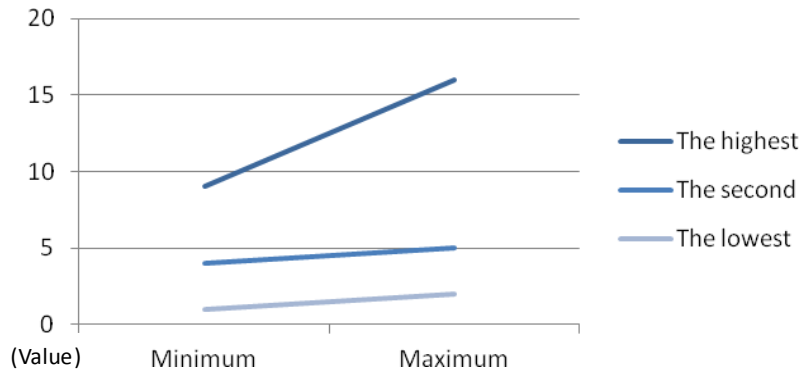


Figure6-4. The assessment of design elements

In summary, the participants were generally satisfied by the usability of the Phoenix website. Each point of usability attained a score of over half of the maximum. The aspects of learnability and effectiveness received relatively high levels of agreement. This indicates that the website's interface was easy to operate, and that the participants found its information accurate. However, the website's interface design was less helpful in permitting users to recover from errors. In terms of the visual attractiveness assessment, the participants were commonly satisfied with the aesthetic design of the website, indicating a certain visual attractiveness. Among the visual elements, the website's images, icons, links, buttons and menus/lists received the most positive comments.

6.3.3 Summary

In this study, the design principles summarised in previous explorations were practically applied to the implementation of a website. The website's effectiveness principles were tested via users' responses. Based on the outcomes, most of the users were satisfied with the website's operation and visual aesthetics,

indicating that they generally accepted its design principles. This result may validate my previous explorations and improve their accuracy.

This study was a small case study conducted to verify my previous explorations. Not all of the principles were applied to the Phoenix website. These principles should be applied to SNSs in future work. Designers with abundant experience may be invited to participate in the tests. It must be acknowledged that the implemented Phoenix website is relatively small and as a result, the test results need to be carefully used. Nevertheless, the implementation played an important role in validating my framework.

6.4 Case study two: relationships between visual aesthetics and usability

Chapter4 and Chapter5 explored the visual aesthetics and usability of interface design for websites separately. The relationships between the two were considered in this case study. This study mainly considered how aesthetic design affected a website's operation.

The Phoenix website was also considered in this study, but the participants were replaced by designers. Eight designers from China were invited to be interviewed. After they used the Phoenix website, they were issued surveys related to the visual aesthetics/usability relationships. Furthermore, certain relevant information emerged during the interface design process, some of which were related to the association between aesthetics and usability. Combining the designers' responses with my design experiences, the findings reveal the relationships between visual aesthetics and usability.

6.4.1 Designer interviews

Participants

Analysing the visual aesthetics/usability relationships required the use of certain web-specific terms. As such, web expert designers who were familiar with these terms were suitably adopted for this study. Eight designers (including three men and five women) who came from China and worked at IT company **Zhenai** were invited to participate in the investigation. Their average age was 25.5, and over half of them had 10 years of web development experiences, with the highest level reaching 13 years.

Process

During the interviews, each designer performed the arranged activities on the Phoenix website, including finding the introduction, history and attractions of Phoenix; making a comment on the message board; viewing photos; and checking the current weather. The following questions were then issued to the designers (**Appendix B**).

- (1) Which design elements are related to finding the town's accommodation information?
- (2) Which design elements help users find the comments that others have made about Phoenix?
- (3) Which design elements appear excessive and will cause antipathy for a user?
- (4) Which design elements can help users know about Phoenix the fastest?

(5) Which design elements on the 404 page can help users return to an available page?

(6) Which design elements can improve the website's operation?

All of these questions were related to the website's usability. The first two questions were both related to effectiveness, and the remaining questions successively referred to satisfaction, efficiency, error tolerance and learnability.

Questions (1) and (2) were related to the effectiveness of the website's interface;

Question (3) was related to satisfaction;

Question (4) was related to efficiency;

Question (5) was related to error tolerance;

Question (6) was related to learnability;

The options for each question were the same and included all 12 of the design elements (text, images, icons, menus/lists, links, video, buttons, lines, forms, layouts, spaces and styles). The designers were asked to select the elements related to each question. For each question, the selected element was given a value of 1. The highest value represented the strongest relationship.

6.4.2 Understanding the relationships (design experiences)

I completed the Phoenix website by myself, which helped me further understand its interface from a designer viewpoint. During the design process, I encountered the following problems in terms of the relationships between the website's usability and visual aesthetics.

- (1) The total size of the images directly affected the loading speed of a page. When the size was large, the loading speed was slow, and sometimes the page could not be downloaded successfully. This could have resulted in users leaving the page. In this case, one solution is to decrease the image sizes or cutting the large images into several parts.
- (2) It was important to consider whether the page would jump to a new page within the same window or open a new window after a user clicked a link. If all of the links adopted the first style, then the operational efficiency was greatly affected.
- (3) The website's ease of operation was directly associated with its menu and link designs. Sufficient links made the operations easier to learn. For instance, as shown in **Figure6-1**, the introduction and cooperation columns on the Phoenix website included several links, most of which repeated the same content. They did so to facilitate browsing for users, no matter what information they were looking for.
- (4) In addition to the menu and links designs, the website's layout design affected its usage. Most of the pages were designed with a two-column layout. In an unacquainted website, a consistent layout design may improve ease of usage.

6.4.3 Understanding the relationships (designer interviews)

After completing the planned tasks, the designers were required to determine the factors affecting the website's operation and to share their ideas. **Tables 6-3** and **6-4** display the respective outcomes. **Table6-3** lists six of the designers' responses. **Table6-4** lists the related degrees between the website's usability and design

elements, which were calculated based on the designers' responses. Each total element value is displayed in **Table6-4**. These values represent the degrees of influence on effectiveness, efficiency, satisfaction, error tolerance and learnability, respectively. As noted previously, the highest value indicates the strongest relationship between an element and usability. Because there were eight samples and values less than 4 represented the weakest relationships, only elements with values higher than 4 were selected. If all of the values were less than 4, the maximum value was selected.

Table6-3. The answers from designers

Designer	Q(1)	Q(2)	Q(3)	Q(4)	Q(5)	Q(6)
1	Text, images, icons, links, forms	Texts, menus/lists, buttons	Links, buttons, lines	Images, icons, links, video, layouts, styles	Links, buttons	Images, icons, menus/lists, links, video, buttons
2	Icon, menus/list, Links, buttons, styles	Text, images, videos, buttons	Lines, forms, layouts, spaces	Text, images, icons, menus/lists, video	Text, images, links	Text, images, links, buttons, layouts, styles
3	Images, icons, forms, layouts	Menus/lists, buttons, lines, forms, layouts	Text, menus/lists, links	Images, menus/lists, links, lines, layouts	Links, buttons	Menus/lists, links, buttons, layouts, styles
4	Images	Menus/lists	Links	Images	Buttons	Layouts
5	Images, links, forms	Text, images	Icons	Images, styles	Images, links	Text, links
6	Images, icons, layouts	Icons, buttons, forms,	Menus/lists, forms	Images, video	Images, icons, links	Icons, menus/lists, links,

		layouts				buttons, styles
7	Text, images	Text, styles	Text	Text, images, icons, styles	Text, icons	Layouts
8	Text, images, icons, links	Text, links	None	Text, images, icons, styles	Links	Styles, menus/list s

Table6-4. The related degrees between usability and design elements

Elements	Effectiveness	Efficiency	Satisfaction	Error tolerance	Learn ability
Text	4.0	3.0	2.0	2.0	2.0
Images	4.5	8.0	0.0	3.0	2.0
Icons	3.0	4.0	1.0	2.0	2.0
Menus/lists	2.0	2.0	2.0	0.0	4.0
Links	2.5	2.0	3.0	5.0	5.0
Video	0.5	3.0	0.0	0.0	1.0
Buttons	2.5	0.0	1.0	3.0	4.0
Lines	0.5	1.0	2.0	0.0	0.0
Forms	2.5	0.0	2.0	0.0	0.0
Layouts	2.5	1.0	1.0	0.0	5.0
Spaces	0.0	0.0	1.0	0.0	0.0
Styles	1.0	4.0	0.0	0.0	4.0

According to the preceding principle, the website’s text and image designs had greatest influence on its effectiveness. For questions (1) and (2), over half of the

designers selected text and images. They believed that there was a strong relationship between the text/images and finding information about Phoenix. Although this result coincided with my first experience, I did not notice the text element. According to one designer, “The text design is quite important, especially for the content-based sites. I have browsed a tourism website. The visual style is my favourite. However, the text, font and line spacing are too small. After a quick scan, I closed the website and searched the other websites”.

The website’s usage efficiency was mainly decided by its image, icon and design styles. The image design had the greatest influence, and all of the designers selected it for question (4). According to one designer, “The icon and image are always colourful elements. When people first visit a website, they initially glimpse at these two elements. If a designer wants users to find the information about Phoenix, conspicuous icons and clear pictures of the local landscape are quite important. Designers can put the important information near the icons. The conspicuous icons may attract users”.

Link design played an important role in satisfaction and error tolerance. In terms of error tolerance, five designers selected links for question (5). The 404 page is one form of error tolerance on a website. When users visit an invalid page, the 404 page helps them return to an available page. Link design is quite important, as users mainly depend on links to return to an available page. Buttons and images provide secondary methods for doing so.

Finally, the menus/lists, links, buttons, layouts and styles were found to influence the learnability of the website. Over half of the designers thought these elements strongly affected the usage of the Phoenix website (question (6)). These findings were similar to my design experiences. However, I neglected the buttons and styles. Most of the designers cited a common style as their reasoning. For instance,

the difficulty of operating a website increases for users when a tourism website is designed in the style of an artistic website. However, if a common style is adopted, then users may find the operation relatively familiar.

6.4.4 Summary

I conducted a case study of Chinese website interfaces based on a website with cultural characteristics. The findings successfully identified the relationships between a website's usability and visual aesthetics. The issues disclosed in the findings may be summarised here. Abundant images with small total sizes and clear text may improve the accuracy of the activities in which users participate on websites. The speed of users' activities may be increased by moderate and guiding images, icons and design styles. Furthermore, error tolerance and user satisfaction benefit from guiding links. The learnability of a website's usage is mainly determined by its menus, links, buttons, layouts and styles.

This case study had several limitations. First, the six questions issued to the designers were simple and might not have completely represented website usability. However, the questions included all five attributes of usability (effectiveness, efficiency, satisfaction, error tolerance and learnability). The abstractness of the questions might have confused the participants.

This study generally identified the relationships between a website's usability and visual aesthetics. These relationships should be further explored in future works. Other visual aesthetic factors such as balance and symmetry could also be examined. Moreover, more websites may be selected for discussions, and these discussions may be compared with the results of this study.

Chapter7 Discussions and Conclusions

The summary of my study in this thesis is the main target for this chapter. An overview of the research process is firstly introduced. The design principles arising from my investigation on the interface requirements are described. The contributions of this research and future directions for research in this area are highlighted.

7.1 Overview of the research

Reviewing the research issues mentioned in Chapter1, the main question to be answered is what interface requirements for SNSs in China are? This research focused on establishing an understanding of interface design for SNS in China through two perspectives: visual aesthetics and usability. Three objectives are established: (1) to identify and understand the popular preferences for the appearance of SNSs by the Chinese users; (2) to evaluate the usage and operation of the existing SNSs in China; (3) to examine the correlations between the appearance and operations of SNS websites.

In order to achieve these objectives, a number of Chinese SNSs were selected as the testing platforms. I mainly used the **Renren**, **Kaixin001**, **Qzone** and **Pengyou**. These platforms represent some of the popular SNSs in China. The participants in this research included college students from Shenzhen University and Hong Kong Polytechnic University, as well as designers from Shenzhen.

After the initial literature studies, the research objectives were tackled one by one. Five major studies were taken to carry out the tasks addressing these objectives. For visual aesthetics, the preferences of Chinese web users were analyzed according to the design elements and visual arrangements of SNSs selected. Comparisons were made among the selected four Chinese SNSs. Then the common styles of design elements which were frequently adopted by designers of SNSs in China were summed up in the findings. For the visual arrangements, the present visual arrangements of the selected SNSs were collected. Users were presented with these arrangements. From their responses, those characteristics of visual arrangements which are favored by the users were summarized. Based on this, a usability assessment of Chinese SNSs was carried out by recording users'

operations when they browsed the selected websites. These are analyzed in the thesis. Lastly, I conducted a case study using the website that was implemented by me during the study in order to further evaluate the design elements and usability for website interfaces. With the feedback from web designers, the relationships between visual aesthetics and usability of website were further explored and consolidated.

7.2 Conclusions

7.2.1 The visual aesthetics

Some design principles about visual aesthetics were identified in this research, and they are concluded as follows.

The outcomes of this study concluded that most Chinese users on the SNS preferred the square sized photos, when they browsed many photos online. For the list pages of notes and games, the users preferred to read more introductions about each item. On the contrary, regarding the friend list on a webpage, the detailed introduction seemed less desirable by the users, many of whom considered that an item including friends' avatar and name was enough. About the sharing, the content listed line by line was mostly accepted by the users, and this preference was also applicable for the comment list on a webpage. In addition, most users preferred to read the comments on an item in a hierarchical manner. As for the webpage with photo and note, the users have different requirements on the issue of simplicity. The high clarity of arrangement was largely admired by the users on the photo page, but the attractiveness was less affected by the design of clarity when people read articles. Furthermore, the outcomes also revealed the reading habit of users. They preferred browsing a website up down. When

visiting contents pages, they liked the personal introduction and profiles. The layouts that were divided equally into two parts were less welcome by the users.

More specifically, the following features of design elements were largely accustomed by the Chinese users of SNSs. A brief style of SNS is preferred to a complicated one. For other elements, the lines designed with 1px and solid styles are more popular. About icon, the size of 16*16px is commonly acceptable with color icons, mostly with the blue color. Then, the font families on the top navigation and the left navigation panels are preferable with “Song” (宋体), with the font size in note list of 14pt. Finally in the homepage and personal page, the layout design with 3 columns is accustomed by most Chinese users I have encountered in the research.

7.2.2 Usability

In terms of usability, the operation of present Chinese SNSs is generally straightforward for people. They can find most of the required information. An obvious issue is about easy learning. The responses I got from the users on this issue were relatively weak because they did not have much ideas of how to judge on this issue when browsing a webpage.

For further improving the usability of SNSs, the outcomes of this research also provided the specific insights. Abundant images with small sizes and clear texts may improve the accuracy of users’ accessibility and activities on a website, while the speed of users’ activities may be increased by the moderate and guiding images, icons and design styles. Then, the error tolerance and users’ satisfactions can benefit from guiding links. The issue of easy learning is mainly determined by the menus, link, button, layout and style of a website.

7.3 Contributions

7.3.1 Implications for SNSs

In Alexa ranks (2013), **Renren** is ranked relatively higher than its rank in China which is only the 56th. **Weibo**, which is another kind of online community in China, ranked the 7th. What's more, **Weibo** has been generating a great boom in China while the SNSs in China in general have been losing great numbers of users. Nowadays, people preferred to update their latest news on **Weibo** or **Weixin**. Are there no demands any more for SNSs in China? The answer is no. On the contrary, a platform which can provide social activities online is very much liked by the Chinese. In Chapter4, participants were required to make the comments on Chinese SNSs during the interviews. Over half of them expressed that the SNSs were interesting for them, and they were willing to write notes and share photos online. But the problem was that their friends were less active in renewing their SNSs updates. Besides, the lack of vivid features in interface design was considered the common problem of the present Chinese SNSs.

The issues mentioned above suggested that the improvement of Chinese SNSs should be considered in the contexts of design in which new design ideas and styles are needed in order to improve the popularity of SNSs in China. My research tried to make the improvement through exploring the interfaces of some of the Chinese SNSs. It evaluated the status of interface design of Chinese SNSs with the tasks of analysis, implementation and evaluation. In addition, users' preferences for the visual aesthetics of SNSs and their operation habits were summed up as the design principles derived from the research findings. These outcomes contribute to the development of Chinese SNSs. This study suggests

that through exploring the interface requirements, the problem of lacking the vivid feature in the existent SNSs in China can be resolved.

For designers and web makers, this research provides a direct way to revise or rebuild the interface design of SNSs in China. In the findings, I introduced the design principles individually. These design principles were not presented as abstract concepts. Instead, they provide solutions to the problems and give hints to the designers. Web designers and web makers can adopt these principles to make the improvement of their interface designs or at least they can try to compare these suggestions with any alternatives they might consider otherwise.

In addition, this research found that most previous studies about Chinese SNSs focused on the history, development, profile model and cultural differences of SNSs. About the interface design, the related study was limited. In this research, the interface of SNSs was analyzed. The design problems explored and tested in this study enriched the knowledge about the interface design of Chinese SNSs.

In the findings, the interface requirements were successfully identified. It also indicated that users' preferences for the website interface were distinguished under cultural influences. Reviewing the SNSs in other countries which have huge popularity around the world, their interface designs should also be improved in order to match the local cultures more closely if they wished to reach to Chinese users. In this regard, this research provides useful references and insights.

7.3.2 Implications for website interface

In the context of interface for websites, the design framework proposed in this research provides a reference for the explorations of website interface design. In the framework, a web interface is divided hierarchically. The visual aesthetics and

usability initially constituted the website interface. The design elements and visual arrangements are highly relevant to the visual aesthetics of websites, while the effectiveness, efficiency, satisfaction, error tolerance and easy learning are considered as an issue of usability. Through discussing the requirements hierarchically, local people's preferences for the web interface design have been identified. In future work, investigators may discuss the website interface design issues referring to this framework and the findings of this study.

Besides SNSs, this research also enriched the knowledge of visual aesthetics of website. In previous interface studies, the recognition about visual aesthetics is limited. This research discussed the relationship between visual aesthetics and usability, and then found out that how the aesthetics design would affect the operations of websites. The operations were strongly related to the design of image, text, icon, style, link menus, button and layout. The outcomes of these relationships are not only suitable for SNSs' interface design but also applicable to other kinds of websites.

7.4 Future directions

In this research, there are also some limitations. The first limitation is that the objects studied should be extended in the future. Other design elements which have not been selected for this research can also be added (like video, chatting window and notice). For the usability evaluation, this research only performed the testing in **Renren**. In future, other Chinese SNSs like **Pengyou** and **Qzone** may be considered. The outcomes' comparisons among these testing platforms will benefit further exploration of the usability problems in other Chinese SNSs.

Besides, as I mentioned before, not all the principles from my previous explorations were adopted in the Phoenix website. What's more, these principles should be practically applied to the SNS interface design. In future work, the design principles proposed in this research can be further verified and developed in practices. According to these principles, a SNS can be recreated with a new interface. After the creation, more common users and designers may be invited to make comments or to participate in the testing and evaluation.

The interface in Smartphone can also be considered in future work. In China, surfing the Internet by Smartphone has become the daily habit of many. In CNNIC report (2013) of Smartphone, 97.6% users spent 109 minutes daily playing the applications and Internet through Smartphones. In Chinese SNSs, some related applications have been created for Smartphones, but there is little knowledge about the satisfaction of users on the interfaces. In future, the interface of Chinese SNSs on Smartphone may become an important research in this area.

In addition, other social platforms can be selected for the research such as **weibo**, which is more popular than websites in China. The question of what strong points of interface design largely attracted Chinese users on these platforms is worth investigating. This question may be solved in future studies, for the improvement of Chinese SNSs in terms of interface design and aesthetic features.

Finally, the dynamic process of browsing the SNS and the features of interactions between the users and the changing websites can be considered in future work. When users turn to a new page or open a pop-up window, the consistency of the interface design is quite important. Which design elements could be helpful for increasing the familiarity feeling of webpage? How about the requirement of consistency of visual arrangements? Are there some rules which may be used for

guiding the interface design during the dynamic process? These problems can be deeply explored in future work.

Appendix A

The questionnaires about the Phoenix website

关于凤凰古镇网站界面设计的调查问卷

性别_____ 年龄_____ 网龄（大约几年即可）_____

请浏览以下网站：<http://dtrc.sd.polyu.edu.hk/phoenix.html> 并回答下列问题：

1. 给下列 1-12 个描述评分，如果你十分同意写“5”分，如果你十分不同意写“1”分，以此类推，可评分的值 1 分，2 分，3 分，4 分，5 分。

A. 能找到古镇的介绍，历史，游玩攻略等信息。

B. 点击链接和导航后，看到的信息基本和链接的描述相符合。比如:点击导航上的“古镇介绍”，页面打开后，所看到的内容符合我的期待。

C. 能找到其它用户对这个古镇的留言或评价。

D. 网页的导航和链接设计能够帮助你方便地找到网站所提供的信息。

E. 通过这个网站，能快速地了解古镇特色。

F. 网页的速度很快。

G. 很满意这个网站的内容布局。

H. 浏览这个网站感觉很轻松，无挫败感。

Y. 当操作错误时，有提示信息提醒我。比如拼写错误，或者跳转到一个错误的页面。

J. 网页很少有打不开的情况。

K. 这个网站很容易操作，不需要网站指南。

L. 导航菜单的设计风格比较一致。

2. 你觉得网站的设计风格是否能展现古镇的风格特点。（可参考古镇照片作比较）

a. 否 b.一般 c.是

3. 你觉得网站的设计风格是否能够引起你的兴趣。

a. 能 b.一般 c.不能

4. 在这个网站中，哪些元素能吸引你（可多选）

色调 图片 图标

文字 视频 线条

按钮 设计风格 Logo

5. 你觉得下列哪个表述符合这个网站（可多选）

间隔适当，阅读长篇内容时不会有压抑感

有些页面空白部分较多，感觉有些浪费空间

留言框够大，方便留言

线条的设计影响阅读。

链接设计明显，我能很容易找到链接

图标设计与网站风格一致

按钮设计与网站风格一致

6. 你觉得以下哪些设计元素在这个网站比较重要（可多选）

清晰直观的文本排版

色彩的运用

图片的多少

好看的图标

是否有多媒体元素（如视频，动画效果等）

- 清晰的导航链接
- 链接的运用
- 好看的按钮
- 分割线的设计
- 与当地相符的设计风格

Appendix B

The questionnaires about the Phoenix website (for designer)

关于凤凰古镇网站界面设计的调查问卷

性别_____ 年龄_____ 网龄（大约几年即可）_____

请浏览以下网站：<http://dtrc.sd.polyu.edu.hk/phoenix.html> 并回答下列问题：

1. 如果像要找到古镇的住宿信息，你认为和哪些设计元素有关。（可多选）

- 文本 图片 图标 菜单列表 链接
- 视频动画 按钮 分割线 表单 布局
- 空白 设计风格

2. 以下哪些元素的设计，能够帮助用户找到他人对这个古镇的留言和评价。（可多选）

- 文本 图片 图标 菜单列表 链接
- 视频动画 按钮 分割线 表单 布局
- 空白 设计风格

3. 哪些设计元素地过多出现，会引起用户的反感。（可多选）

- 文本 图片 图标 菜单列表 链接
- 视频动画 按钮 分割线 表单 布局
- 空白 设计风格

4. 如果想让用户快速地了解这个古镇的信息，你认为和哪些设计元素有关。（可多选）

- 文本 图片 图标 菜单列表 链接
- 视频动画 按钮 分割线 表单 布局
- 空白 设计风格

5. 对于 404 页面来说，哪些设计元素能帮助用户回到正确的页面上。（可多选）

- 文本 图片 图标 菜单列表 链接
- 视频动画 按钮 分割线 表单 布局
- 空白 设计风格

6. 你认为这个网站是否容易使用，是和以下哪些设计元素有关。（可多选）

- 文本 图片 图标 菜单列表 链接

- 视频动画
- 按钮
- 分割线
- 表单
- 布局
- 空白
- 设计风格

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