

**Expanding the Scope of Localization:
A Cultural Usability Perspective on
Mobile Text Messaging Use in American and Chinese Contexts**

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Contents

LIST OF TABLES	VI
LIST OF FIGURES	VII
ACKNOWLEDGEMENTS.....	VIII
ABSTRACT	X
INTRODUCTION.....	1
Structure of the Dissertation	6
CHAPTER 1	
CHALLENGES OF MOBILE TEXT MESSAGING IN LOCALIZATION CONTEXT.....	7
The Dilemma of Culture in Localization Practices	7
A Working Definition of Culture.....	8
Culture and Definitions of Localization	9
Approaches to Cultural Issues in Localization Practices.....	12
Challenges of Mobile Text Messaging	20
A Short History of Mobile Text Messaging.....	20
Gap between Design and Use.....	21
Use in Everyday Life.....	25
A Contrasting Phenomenon of Local Uses	30
CHAPTER 2	
UNDERSTANDING TECHNOLOGY USE WITH CULTURAL USABILITY.....	35
Cultural Considerations in Usability Studies.....	35
Engineering Perspective.....	36
Humanist Perspective.....	37
Cultural Usability Research.....	40
Three Approaches to Contextual Issues in Technology Use.....	42
Activity Theory: Situating Contextual Factors in Activities	42
Genre Theory: Structuring Contextual Factors with Rules.....	46
British Cultural Studies: Articulating Contextual Factors in Discursive Practices.....	47
Comparison of Three Approaches.....	50
Affordances: Realizing Practices through Interactions	51
Origin of Affordances.....	52
Affordances for Social Interactions.....	53
Activity-Based Affordances	55
Instrumental Affordances and Social Affordances	57
Intended Use and Possible Uses	58
Cultural Usability: Bringing Meanings into Activities.....	59
CHAPTER 3	
RESEARCH DESIGN	62
Research Sites	62
Site Selection.....	62
Site Description and Comparison.....	63
Case Study Approach.....	75
Pilot Studies	76
Participants.....	78
Data Collection	84
Stage One: Studying Use Patterns.....	84
Stage Two: Investigating Mediation Practices.....	88
Data Analysis	92

Research Questions	92
Pattern Comparison	94
Explanation-Building	101
Validity Issues.....	103
CHAPTER 4	
GENERAL PATTERNS OF USE: TEXTING IN CONTEXT	104
Use Scenario Overview	104
Participant Profile.....	104
General Use of Mobile Telephony.....	105
Use of Text Messaging	108
Uses of Other IT	114
Affordances and Expectations.....	116
Instrumental Affordances	116
Social Affordances	119
Media Choices.....	122
Expectations	126
Site Comparison	127
Texting in Action	129
How many? Where? Who? When?.....	129
What about?	133
Discussion.....	143
Affordances and Various Personal Uses	143
Gender Differences.....	147
Emerging Genres: Generic Patterns of Mobile Text Messages	149
Interactions between Uses and Contexts	152
Case Preview	164
CHAPTER 5	
EMMA’S STORY: NICE GESTURE IN A TECHNOLOGY-MEDIATED LIFE.....	166
Profile	166
Patterns of Daily Use.....	168
Text Messaging in a Technology-Mediated Life.....	174
Discussion.....	182
Technology Affordances and Rhetorical Arrangement.....	182
Identities Mediated By Phone	185
Usability Breakdown	187
Reflection Notes	188
CHAPTER 6	
SOPHIE’S STORY: NEW CHOCOLATE AT WORK	190
Profile	190
Patterns of Daily Use.....	191
Texting at Work	197
Discussion.....	201
Texting as Chocolate: Affordance a in Business Setting	201
Enhancing Work and Personal Life with Text Messaging	203
Usability Breakdown	206
Reflection Notes	206
CHAPTER 7	
LILY’S STORY: PURE WATER IN SOCIAL NETWORK.....	208
Profile	208
Patterns of Daily Use.....	210
Discussion.....	218
Indispensable Means of Communication in a Social Network.....	218

Indifferent but Pure Like Water.....	220
Usability Breakdown.....	222
Reflection Notes	222
CHAPTER 8	
EXPANDING THE SCOPE OF LOCALIZATION	224
Theorizing Local Uses with Cultural Usability.....	224
A Cultural Usability Perspective on Local Uses	224
Localization on the Circuit.....	228
Reconsidering Localization Practices	234
An Expanded Vision of Localization Process	234
Insights for Localization Practices	237
Designing for Life Styles	240
REFERENCES	245
APPENDIX A	
MOBILE MESSAGING USER SURVEY	266
APPENDIX B	
WORKBOOK OF “EXPERIENCES WITH MOBILE MESSAGING”	269
APPENDIX C	
INTERVIEW PROTOCOLS	277
APPENDIX D	
CODING SCHEME: MOBILE TEXT MESSAGING USE IN CONTEXT	280

List of Tables

Table 2.1 Levels of Activity	45
Table 2.2 Comparison of Three Approaches to Contextual Factors	51
Table 3.1 IT Use Profiles in Year 2002	64
Table 3.2 Most Recent Data of IT Usage	66
Table 3.3 Digital Wireless Technologies in US	67
Table 3.4 Comparisons of Calling Plan Features between Two Sites	70
Table 3.5 Comparisons of Cultural Dimensions between Two Sites	74
Table 3.6 Participant Description	83
Table 3.7 Overview of Text Messages	98
Table 4.1 Phone Information	106
Table 4.2 Comparison of Messaging Purposes	113
Table 4.3 Comparison of Daily IT Use	115
Table 4.4 Comparison of User Level	116
Table 4.5 Overview of Logged Messages	129
Table 4.6 Comparison of Life Spheres across Sites	136
Table 4.7 Comparison of Rhetorical Purposes across Sites	137

List of Figures

Figure 1.1 Cell Phone Keypad	23
Figure 1.2 Predictive Typing Technology	24
Figure 2.1 Usability as a Product Quality	36
Figure 2.2 Activity Triangle	44
Figure 2.3 Circuit of Culture	49
Figure 2.4 the Framework of Cultural Usability	59
Figure 3.1 Cell Phone Keypads for Chinese Market	72
Figure 3.2 Text Message Log Form	87
Figure 3.3 PDA-based Field Note Database	92
Figure 4.1 Features of Mobile Phones	106
Figure 4.2 Comparison of Daily IT Use	115
Figure 4.3 Typical Temporal Pattern	132
Figure 4.4 Temporal Pattern: Texting at a specific time period	133
Figure 4.5 What About: Life Spheres	137
Figure 4.6 What About: Rhetorical Purposes	138
Figure 4.7 Gender Difference of Messaging Purposes	148
Figure 5.1 Emma's Phone Wallpaper	167
Figure 5.2 Emma: Where did mobile message occur?	169
Figure 5.3 What about: Rhetorical Purposes of Mobile Texts (Emma)	170
Figure 5.4 What about: Life Spheres of Mobile Texts (Emma)	170
Figure 5.5 Emma: Who did she text to?	171
Figure 5.6 Emma: When did she text?	174
Figure 5.7 Technology-Mediated Conversations	175
Figure 6.1 Sophie: Where did mobile messaging occur?	192
Figure 6.2 Sophie: Who did she text to?	192
Figure 6.3 What about: Life Spheres of Mobile Texts (Sophie)	193
Figure 6.4 What about: Rhetorical Purposes of Mobile Texts (Sophie)	194
Figure 6.5 Sophie: When did she text?	197
Figure 6.6 Texting at Work	201
Figure 6.7 Cultural Usability	206
Figure 7.1 Lily's "Dancing Queen"	210
Figure 7.2 Lily: Where did mobile message occur?	211
Figure 7.3 Lily: Who did she text to?	211
Figure 7.4 What about: Life Spheres of Mobile Texts (Lily)	216
Figure 7.5 What about: Rhetorical Purposes of Mobile Texts (Lily)	217
Figure 7.6 Temporal Pattern	218
Figure 8.1 Localization on a Cultural Circuit	232

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Abstract

Current localization practices suffer from a narrow and static vision of culture resulting in usability problems for IT product and design. Such a narrow focus of an artifact and its functionalities creates a situation in which such IT is unable to support complex activities in a concrete context. The recent success of mobile text messaging challenges our prior assumptions of technology use and pushes us to think of issues of culture, usability, and localization in a broader spectrum.

To improve current localization practices and better understand cultural issues in usability studies, my dissertation examines and compares multiple cases of local uses of mobile messaging technology in American and Chinese contexts. This study employs a framework of cultural usability, bringing social-cultural contexts into user activities and integrating key concepts and methods from activity theory, genre theory, and British cultural studies. This framework regards usability as a mediation process consisting of an instrumental aspect (mediation of practices) and a social aspect (mediation of meanings). More than 40 frequent users of mobile messaging in the US and China participated in the study. An expanded view of localization is surfacing from various use histories collected by questionnaire survey, diary study, qualitative interview, and observation, which urges us to look at the localization work occurring at the user's site. This study illustrates how each specific local use develops in a concrete activity situated at the intersection of the immediate context and social context and how this local use echoes with both the subjectivity of the user and the ethos of the surrounding culture. It calls for a change in localization practices from localizing for operational affordances by simply applying

cultural conventions in localization work to localizing for social affordances with rich understandings of use activities in context.

From a broader perspective, this study has implications for information design and technical communication pedagogy by urging us to move from a functional perspective to a broad socio-cultural perspective to develop information products that resonate with users' lifestyles.

Introduction

Localization of IT products is gaining more attention in the age of globalization, especially because the profits of the IT industry in the American domestic market remain stagnant (Fujinuma & Ridsen, 2002). Besides manufacturing products in cheap labor-cost areas and selling products to the overseas market, the newest trend for big companies is towards moving their development division offshore to reduce costs (Forrester Research, Nov. 2002). Since computing technology entered the commercial market, we accepted the fact that the product designer was not the end user any more and that the user's context (including social and cultural factors) was distinctively different from the designer's. The current situation suggests it is now normal to design IT products for users in other cultural contexts, and the cultural gap between designers and users is growing larger. In this dissertation, I use the term "developer localization" to refer to the localization work occurring at the developer's site.

The design challenges for localization have become more demanding because a large amount of today's IT products are consumer-oriented information appliances (Bergman, 2000). Compared to enterprise information systems that are designed to improve work practices in the organizational context, information appliances are expected to fit into the fabric of individual user's everyday life, having "the capability of becoming attached to their users socially and emotionally" (Norman, 2000). While the local uses of IT enterprise products in organizational contexts might share similarities in work flows and

organizational structures across cultures, the local uses of IT consumer products take on various cultural and social meanings in individual life spheres located in different cultural contexts. In this dissertation, the localization work at the user's site is referred to as "user localization."

All these demanding challenges from both the developer's site and the user's site urge us to develop an effective way to address cultural issues in IT localization and design well-localized products to support complex activities in a concrete context. However, current localization practices have not been very successful yet. The lack of a broad and dynamic understanding of culture is one of the major problems hurting localization practices. From the development side, localization work is usually carried out with a narrow scope and only on a surface level (Sun, 2002). Localization specialists focus their attention on delivery aspects. They are interested in techniques of localizing interface features, such as what colors will not work for an audience in a specific country and what page layout would be preferred by some ethnic cultures. Their enthusiasm for the forms of information products—the tip of the iceberg—usually results in their ignorance of the huge underwater iceberg—the broader cultural context where information products are situated, and where products are designed, produced, distributed, and consumed. This shortsightedness finally results in the lack of an overall vision of localization strategies in product design, leading to poor usability in actual use at the user's site.

The problems discussed above cannot be blamed only on localization professionals. These issues are actually common in current IT product design and development environments. The popular concept of usability originates from the field of cognitive science and computer engineering, which causes two major problems for usability research. First, researchers tend to regard usability as an isolated quality and ignore the social-cultural context surrounding the product (Adler & Winograd, 1992; Brown & Duguid, 1994; Spinuzzi, 1999b). Second, researchers typically focus on half of the mediation process, i.e., the mediation of activities, and discount the mediation of meanings in a socio-cultural context. As Hales observed, design approaches are usually strong on the “tool” perspective — the instrumental aspect of design, but weak on “text” aspect — the social aspect that interprets the product from its social-cultural context of use (1994).

To address these problems, I studied mobile messaging technology that is poorly localized at the developer’s site but then rescued by users with their localization efforts in this dissertation. By examining and comparing the *user localization* of mobile text messaging in both American and Chinese contexts, I search for ways of improving the *developer localization* in the design process and helping localization professionals better meet the demanding challenges in cross-cultural IT product design.

Mobile text messaging is a technology that challenges our prior assumptions of technology use and pushes us to think of issues of culture, usability, and localization in a

broader context. It is a hard-to-use technology with inherent limitations but great market success. It is a technology originally designed as a business application and marketed accordingly, but people primarily use it in their personal life sphere. It is a technology people adopted for its instrumental convenience, but now a completely new social world is being built because of it. It is a technology people not only use but integrate into their daily lives to fit their lifestyles as well. It is a technology that is becoming a popular communication mode in East Asia, Europe, Australia, and other parts of the world no matter if the cultures in those regions are described as high-context, low-context, collectivist, or individualist¹.

The use of mobile text messaging keeps increasing. In the United States (US), 1.7 billion text messages were sent during the third quarter of 2003, up from 1.2 billion during the first quarter, and up from 1.2 billion of the yearly volume in 2002 (Forrester Research, October 2002; Richtel, 2004). In China, 220 billion text messages were sent in year 2003, up from 90 billion in 2002 (Kahn, 2004; SINA, Dec.30, 2002). What happened and is happening behind these huge numbers of text messages exchanged on wireless phones? Why is mobile text messaging so popular even though mobile phones are not a good tool for writing? How do users “localize” a hard-to-use technology into their everyday life to augment work and life?

¹ The terms “high-context” and “low-context” are used by E. Hall (1976) to describe how the meaning is conveyed by the amount of information or implied in the context in different cultures. “Collectivist” and “individualist” are used by Hofstede (1991) to measure the ties among individuals in a society.

A new framework of cultural usability is developed and employed for studying this intriguing technology use phenomenon. This framework brings social-cultural contexts into user activities and integrates key concepts and methods from activity theory, genre theory, and British cultural studies. It regards usability as a mediation process consisting of an instrumental aspect (mediation of practices) and a social aspect (mediation of meanings). More than 40 frequent users of mobile messaging in the US and China participated in the study. An expanded view of localization is surfacing from various use histories collected by questionnaire survey, diary study, qualitative interview, and observation, which urges us to look at the localization work occurring at the user's site. It argues that every situated use is a local use with specific "localization strategies" developed by users. This study illustrates how each specific local use develops in a concrete activity situated at the intersection of the immediate context and social context and how this local use echoes with both the subjectivity of the user and the ethos of the surrounding culture. It calls for a change in localization practices from localizing for operational affordances by simply applying cultural conventions in localization work to localizing for social affordances with rich understandings of use activities in context.

From a broader perspective, this study suggests that IT product design and use is a complex and dynamic interaction between designers and users and between various processes such as production, consumption, representation, and regulation, asking us to study it in rich social and technological contexts. At the same time, this study has

implications for information design and technical communication pedagogy by urging us to move from a functional perspective to a broad socio-cultural perspective to develop information products that resonate with users' lifestyles.

Structure of the Dissertation

Chapters 1 and 2 are literature review chapters. Chapter 1 introduces the technology of mobile text messaging in the localization context with a review of the dilemma of culture in localization practices. Chapter 2 reviews different approaches to cultural and contextual issues in HCI research and describes the framework of cultural usability employed in this study.

Chapter 3 describes the research design with detailed discussions of research sites and methods of data collection and analysis.

Chapters 4-7 report the findings from the fieldwork with an in-depth analysis informed by the framework of cultural usability. Chapter 4 summarizes the general patterns of use across cases. Chapter 5-7 presents three individual cases by examining the dynamic interactions between situated uses and the surrounding cultural contexts.

Chapter 8 explores the implications of this study by theorizing local uses within the cultural usability framework and proposing an expanded view of the localization process.

Chapter 1

Challenges of Mobile Text Messaging In Localization Context

“The first signs of the next shift began to reveal themselves to me on a spring afternoon in the year 2000. That was when I began to notice people on the streets of Tokyo staring at their mobile phones instead of talking to them.... I’ve learned that ‘texting,’ as it has come to be called, is only a small harbinger of more profound changes to come over the next ten years.”

— Howard Rheingold: *Smart Mobs: The Next Social Revolution* (2002, xi)

This chapter situates the phenomenon of mobile text messaging within the research context of localization practices. It reviews the current problems with localization practices and discusses why a localization study of mobile text messaging will be significant for future localization practices.

The Dilemma of Culture in Localization Practices

The concept of culture is a dilemma in localization practices. It is such a pervasive term that one can expect to encounter the word “culture” in almost every piece of localization literature, and usually more than once. However, a review of literature in this field indicates that culture is either narrowly defined or operationalized into practices, or situated nowhere in the localization process. In this section I will first define the term

“culture” used in this dissertation project and then review how cultural issues are approached in localization practices.

A Working Definition of Culture

The term “culture” has different meanings in the fields of communication, psychology, sociology, anthropology, and information studies. In this study, the working definition of culture is primarily informed by research in anthropology and ethnomethodology. This definition regards *culture* as the meanings and behaviors that groups of people develop and share over time as well as the tangible manifestations of a way of life such as artifacts and values (Geertz, 1973).

More specifically, culture is an open set of practices and a dynamic process in which cultural meanings, objects, and identities flow across institutions, nations and generations in diffuse time-space (Marcus, 1995; Sassen, 1998). It is concerned with the production and the exchange of meanings between the members of a society or a group. Meanings are produced and circulated through several different key processes including representation, identity, production, consumption, and regulation of the cultural circuit within a technological society (S. Hall, 1997). In the field of IT design, culture refers to “the ongoing, mutually recursive networks of processes, and resulting products that form our collective subjectivities” (Kerne, 1998). Thus, the culture of a technology should be investigated in a context where the collective and the individual meet and where the implementation (instrumental aspect) and interpretation (social aspect) interact.

In addition, two types of cultures are also used to describe issues in localization and intercultural communication throughout this dissertation:

- *National/Ethnic culture:* The ethnic group in which one was born into and grows up. Cultural factors from this type of culture are usually referred as dimensional cultural factors or ethnic cultural factors. They include contexting, speed of message, information flow, action chains, time, nonverbal behavior, uncertainty avoidance, power distance, collectivism vs. individualism, specific vs. diffuse, and universalism vs. particularism, as discussed in the section on “Models of Cultural Dimensions” below. It should be noted that this type of culture is what is represented in most of localization literature.
- *Subgroup culture:* The cultural group people have been socialized into. Cultural factors from this type of culture are referred as general cultural factors or subcultural factors include demographic features (e.g., age group and gender), personal background (e.g., professional knowledge and IT knowledge), and values and beliefs shared in subculture groups (e.g., an online community and a local club).

Culture and Definitions of Localization

Culture has a central role in the localization process, as claimed, proven, and validated in localization literature and real-world cases of market failures where companies did not thoroughly consider local culture issues (DeVoss et al, 2002; Dray et al, 1996; Faiola,

2002; Hoft, 1995; Marcus & Gould, 2000; Thatcher 2001; Zahedi et al, 2001). From the beginning, culture is highlighted in the definitions of localization in industry and academia.

According to the Localization Industry Standards Association (LISA), an international association founded in 1990, localization is “the process of modifying products or services to account for differences in distinct markets,” which covers three main categories:

linguistic issues (the translation of the text for the user interface, documentation, and any linguistic functionality embedded in an IT product), content and cultural issues (the content of information and the presentation of information such as icons, graphics, and colors), and technical issues (redesigning and re-engineering an IT product to accommodate issues such as double byte characters) (2003, p.13). To put it plainly: “Localization is the process of adapting and manufacturing a product so that it has the look and feel of a nationally-manufactured piece of goods” (p.3). Here, we see the industry emphasis on the “look and feel” of the product. In this view of localization, culture seems to be a magic wand that will make a product have the “look and feel” for a local market.

Researchers in academia approach the concept of localization with more of an emphasis on culture. Gribbons (1997) defines localization in a similar way as LISA does, but he gives prominent status to culture by putting cultural issues above technical issues. In his two-level localization process, localization includes adjusting the features of the product (e.g., translation, punctuation, dates, etc.) to mirror the needs and conventions of the target

audience on the surface level and adjusting the aesthetic appeal, images, colors, logic, functionality, and communication patterns on the cultural level.

In some ways, the concept of culture actually gives more opportunities for the field of localization studies. At a recent online conference on localization and translation training (2003), researchers suggest that localization does not have to be limited to the adapting process when translation is involved. It can be “a process of adapting anything to a target locale” (Clark et al, 2003), or “an interdisciplinary process of adapting an IT product to the needs or expectations of a specific target audience” (Drouin, 2003) as long as there is a distinctive culture and locale there.

To illustrate the importance of culture and its complexity in localization practices, almost ten years ago Hoft (1995) presented an interesting Iceberg metaphor (p.59). She suggests that issues of translation, punctuation, and aesthetic appeal are just the tip of the iceberg (the visible section above the water that is only 10 percent of the whole). The iceberg’s huge body is invisible to designers and manufacturers. Ninety percent of the iceberg consists of unspoken and unconscious rules (e.g. common knowledge and values shared within a culture).

Approaches to Cultural Issues in Localization Practices

To address cultural concerns in localization practices and accomplish the goals of localizing IT products on the cultural level, professionals usually adopt the following three approaches.

Ad-Hoc Localization Guides

The quick and easy way is to rely on ad-hoc localization guides. There is a large array of guides about translation, layouts, fonts, graphics, etc. based on personal anecdotes and empirical studies of local cultural conventions. Those guides usually include lengthy lists of do's and don'ts for different ethnic cultures and elaborate thoroughly on coding conventions, interfaces, formats, and other international variables (Esselink, 2000; Kano, 1995; Lingo & LISA, 2000; LISA, 2003). However, this approach is built on a static model of culture and an engineering approach favoring efficiency over context-sensitivity (Sun, 2002). Culture is regarded as something unchanging and congruent without considering the user's gender, age, or ethnic group, and only the dominant cultural values in a national culture are represented in cultural conventions. Through this problematic process of representation, rich contextual data is stripped away to present a "mechanistic and materialistic reality" (Miller, 1979). The whole process of localization is simplified as part of the engineering cycle from the planning stage to the testing stage detached from its use context.

In the pursuit of engineering and automating this process, localization professionals only need to attend to delivery and style such as translating the user interface and resizing a dialog box, as shown in a localization primer for mobile devices (Musale, 2001). Two problems surface from the transmission model (Slack et al, 1993) of localization: First, localized products and services are not fit for use contexts. Professionals are only working on the forms of information products—the tip of the iceberg, and they are ignoring the huge underwater iceberg—the broader cultural context where information products are situated, where they are designed, produced, distributed, and consumed. For example, as this study shows, mobile text messaging is used frequently for exchanging emotional messages; however, not every phone model supports this task by supplying easy-to-input emoticons and smiley, which makes entering an emotional message difficult for some users. Second, the product-oriented localization process separates product design from product use. For many manufacturers, localization only occurs at the developer's site, and it ends when the product ships. They are not aware of the interactions between use and design or user localization. In the case of mobile messaging, though many enthusiastic users localize this technology in their own contexts either to support fun communication or to maintain long-time relationship, these use trends have not been recognized by most manufacturers to improve their text messaging applications. It is shocking to see that the interface design for the mobile text messaging application on most phone models remains the same throughout these years. Overall, these two problems cause poor usability, culturally.

Models of Cultural Dimensions

To address these problems, researchers suggest bringing cultural contexts into practices and research (Bosley, 2001; Dray et al, 1996; Faiola, 2002; Hoft, 1995; Marcus & Gould, 2000; Thatcher 2001; Yli-Jokipii, 2001; Zahedi et al, 2001) by applying popular cultural models developed by E. Hall (1983), Victor (1992), Hofstede (1991), and Trompernaars (1993). According to Hoft (p.78), these four scholars developed four distinct models with different emphases. E. Hall's model focuses on the right response of the message within the cultural dimensions of contexting, time, space, information flow, and action chains. Victor's model focuses on business communication with factors including language, environment and technology, social organization, contexting, authority conception, nonverbal behavior, and temporal conception (LESCANT). Hofstede's model regards culture as "mental programming." His cultural dimensions such as power-distance, collectivism vs. individualism, femininity vs. masculinity, and uncertainty avoidance are well-accepted in the field. Trompernaars' model approaches culture from the problem-solving angle with dimensions similar to Hofstede's.

Models of cultural dimensions are more structured and more research-based than ad-hoc localization guides. For example, Hofstede's model is developed based on his intensive questionnaire research among thousands of IBM employees in 72 national subsidiaries, 38 occupations, and 20 languages from 1968-1972 (Hoft, p.85). Thus, Hofstede's model is the most popular in both industry and academia. A recent review (Meyers & Tan, 2003) of

cross-cultural information systems research finds that 24 of 36 pieces of literature reviewed used some or all of Hofstede's cultural dimensions. In the design arena, Barber & Bader (1998) proposed "cultural markers" to map different dimensions of culture such as power distance onto interface features in cross-cultural website design based on Hofstede's model.

These models provide vocabularies and structured frameworks to compare cultural patterns across nation, which is helpful for localization design. However, we should still be aware of their limitations. First, these models were advanced to study cross-cultural communication rather than for cross-cultural design, and thus they cannot be simply converted in localization heuristics. For example, a closer look at the application of cultural dimensions on cultural markers show that they only deal with features at the delivery level and fall into the trap of the transmission model again: The design approach of cultural markers still interprets culture as ethnic culture in one dimensional view, in a similar way as ad-hoc localization guides do. To solve this problem, we need to have better ways to incorporate cultural dimensions into localization practices.

Second, these cultural dimensions also have their own methodological limitations. As Meyers and Tan noted, Hofstede's method of data collection is problematic. He conducted his survey in an organizational context (IBM), rather than in a broader social-cultural context. The people he studied shared many cultural values and interests concerning their careers and working context. As Hofstede's student, Trompenaars collected his data in a

similar way, and he developed his model based on an extensive survey of only 16 questions among managers and administrative staff (Hofstede, p.88). In addition, E. Hall's model came from personal observation, and Victor's primarily came from secondary sources.

Third, those cultural dimensions are mostly based on the concept of a national culture, and the nation-state is actually a relatively recent phenomenon occurring in the later part of human history. In localization practices, we often see local cultures that are related to a subculture group (e.g., instant messaging is more popular in groups of teenagers than in other age groups) in a country, but these cultural models cannot help our design and localization if they are obscured by a set of national culture dimensions.

Furthermore, these views of culture place concrete cultural realities into static dimensions, which contrast with contemporary anthropological findings. Some researchers who employed cultural dimensions in research work found that those dimensions could not fully explain the complex phenomena found in the field. For example, Harvey (1997) concluded his research on a comparative study of geographic information systems between German and American users this way: "Hofstede's dimensions of national culture are a good basis for understanding the influence of national culture on organizations' self-representation, but miss the actual practice of social activities" (p.145).

In fact, missing the actual practice of social activities is a common problem in localization literature. As an example, Hofstede's book *International Technical Communication* (1996) covers many aspects of internationalization and localization with "international variables," but none of them come from field studies of use activities in context. Additionally, she does not mention the term "activity." In her mapping of international variables (p.114), all of the variables are static and abstract. For example, when they follow her suggestions of cultural editing (p.123), designers can only beautify buttons with local translations, though the real goal here is to support user activities in their local context. When culture is operationalized into abstract dimensions separated from concrete user activities in localization process, culture is not situated in practices. Moreover, this shortsightedness misses the use moment when certain kinds of local uses are engendered by particular socio-cultural settings and when certain technologies are adopted in a locale to reinforce or transform the social-structural configurations. For example, some Asian users think mobile text messaging is more suitable for Asian people to express implicit feelings and emotions.

Fieldwork Methods

To remedy these problems, fieldwork methods are also used in the localization process to gather more concrete and complete understanding of local uses (Jokinen et al., 2003; Yu & Tng, 2003). This approach interprets culture as a set of things, a process, and a set of practices that are concerned with the production and the exchange of meanings between the members of a society or group in an ethnomethodological sense. The standard

ethnographic fieldwork asks researchers to study how users use a product in their natural context as anthropologists observe aboriginal people. This method provides thick descriptions of use histories; however, it does not have formal models for data analysis and knowledge reuse related to IT product design. As Sullivan (1989) pointed out, successful adaptations are needed before the fieldwork method can really contribute to usability research.

Contextual design (Beyer & Holtzblatt, 1998) is one possible adaptation. The idea of contextual design is to enter the user's world as an "apprentice" to learn, and to make observations and inquiries related to the selected focus areas. Compared to ethnographic fieldwork, contextual design has its own set of structured methods. Thus it has been accepted by some companies including Nokia as a participatory method to gather design requirements (Vaananen-Vainio-Mattila & Ruuska, 2000). However, contextual design is more suited to explore individual user needs at the conceptual stage. It does not say much about how to evaluate product usability. Furthermore, its work models focus on design for work practices in the organizational context, which is not very informative for design in the individual context. And it also lacks a way to address cross-cultural issues in localization practices.

User and task analysis (Hackos & Radish, 1998) is another adaptation. Its user research methods draw from varied disciplines including anthropology, cognitive psychology, technical communication, instructional design, market research, scientific management

and so on. It studies users by “observing them in action” (p.7) with a long list of analysis methods on different levels and in different scopes. However, the focus of user and task analysis is still on the action level. Guidelines about cultural issues are very limited and superficial. For example, as a tool to study contextual factors, environment lists and profiles can only help collect observable data while ignoring factors that cannot be watched but sensed or felt.

A common limitation for current fieldwork methods is that they just focus on the aspect of tool-mediated production of an IT artifact in context, but rarely explore its sign-mediated communication. Other limitations include studying product use only at certain stages or in a short period. Long-term research with a focus on a developmental aspect is also very hard to find in the HCI field. To study localization practices in context and improve localization performance, we need an approach to address cultural issues more effectively. It should have a structured and flexible framework to investigate concrete uses via the fieldwork with a robust structure to address issues of dimensional culture and subcultures.

Actually, problems of cultural contexts that undermine localization practices are similar to problems that haunt usability studies. Current usability research suffers from a narrow focus on artifacts and their functionality, and thus fails to consider the complex contextual factors surrounding the artifacts (Brown & Duguid, 1994; Spinuzzi, 1999). Next I will

discuss how mobile text messaging use challenges some of our prior assumptions about technology use, and what this case study will suggest to the field of localization studies.

Challenges of Mobile Text Messaging

In some ways, mobile text messaging is such a spectacular phenomenon that it challenges our old assumptions of technology use and pushes us to think of usability in a broader context. It is a hard-to-use technology with inherent limitations, but it enjoys a huge market success. It is a technology originally designed as a business application and marketed accordingly, but people primarily use it for their personal life. It is a technology people adopted for its instrumental convenience, but now a completely new social world is being built because of it. It is a technology people not only use but integrate into their daily lives to fit their lifestyles as well.

A Short History of Mobile Text Messaging

Mobile text messaging refers to the short message service (SMS) available on most digital wireless phones that allows sending and receiving short text messages (or more colloquially “texts” or “txts”) between wireless phones and other handheld devices. It was originally designed as part of the GSM (Global Systems for Mobile Communication) mobile phone standard and is supported also on digital wireless networks such as CDMA (Code Division Multiple Access) and iDEN (Integrated Digital Enhanced Network). The message can contain alphanumeric characters with a maximum length of 160 characters for

Latin alphabets, including English, and 70 characters for non-Latin alphabets, such as Chinese (Mallick 2003; “SMS Definition,” 2004).

Text messaging was originally used as a voice mail alerting service — a simple mechanism to inform subscribers that they have a voice mail ready for retrieval (Hill, 2004). The first text message was sent by British engineer Neil Papworth to colleagues at Vodafone, a UK mobile phone giant, on December 3, 1992 (“Texting,” 2004). The message was “MERRY CHRISTMAS,” which was similar to many greetings messages sent today. Due to poor radio coverage, interoperability problems between networks, the limitations of one-way messaging, the potential for mobile text messaging was not realized until a few years later. Now mobile text messaging is one of the most popular forms of personal communication worldwide.

With the phenomenal success of mobile text messaging, we now have a generation named by this technology, “Generation Txt” (Rheingold, p.20). Now, the word “text” is not just used as a noun any more but also as a verb¹.

Gap between Design and Use

From the design perspective, mobile text messaging was “an accidental success that took nearly everyone in the mobile industry by surprise” (MobileSMS, 2004). It succeeds even with its inherent usability weaknesses.

¹ “Text” is used as both a noun and a verb in this dissertation.

Hard-To-Use Technology

For many people, it is a hard-to-use technology. There is a big gap between novice users and expert users. While novice users think it is a technology difficult to use with the barrier of text entry, expert users can send a text within seconds even while multitasking. Yet even with its current popularity, many people, including some frequent users, still think it is a pain to enter text into a phone.

From the beginning, it is obvious that wireless phones were designed with little expectation that people would use them for composing and reading text messages. This is evident in the phone's small display and keypad, poor input methods, and limits on message length.

A typical phone screen only displays three to eight lines of text unless the phone is a PDA-based smart phone. Though the message length limit is 160 characters for Latin alphabets and 70 characters for non-Latin alphabets, it is not feasible to input a long message or read it on such a small display.

The data input mechanism is a significant factor in the usability of messaging technology on mobile phones. Currently, there are four options available (Mallick, 2003):

- Keypad input: A 12-digit phone keypad is used to enter numbers and letters. All the cell phones have this option.
- Pen-based input: PDA-based smart phones typically utilize graffiti or handwriting recognition technology to allow users to enter text using a stylus.
- Keyboard input: BlackBerry devices and some cell phones (e.g., T-mobile

Sidekick) incorporate small thumb-based keyboards to make text inputting easier and more efficient.

- Voice input: Also known as “voice commands.” A lot of phones allow users to initiate a call or look up a contact using voice commands, but this technology has not yet been applied to text messaging.

Among these options, keypad input is the most prevalent, partially because phones with keypad inputting are much cheaper than phones with other input technology and because most users prefer a small phone rather than a palm-sized PDA.

The 12-digit keypad makes it easy to enter phone numbers but cumbersome to enter text messages. As shown in Figure 1.1, each button on a keypad represents three letters. To get to the desired letter, a user needs to press the associated key multiple times. For example, if a user wants to get “b,” she must press the “2” key twice, pausing between each key press to get “b.” This method is referred to as “multi-tap.”

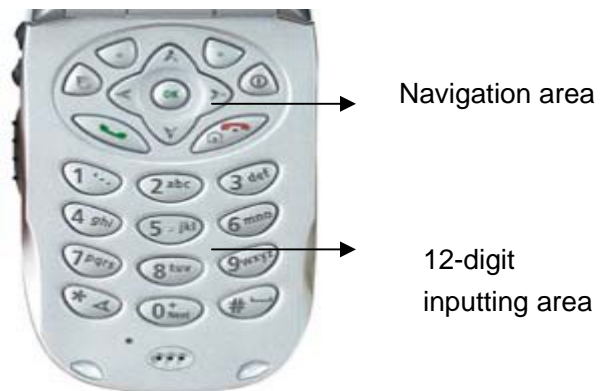


Figure 1.1 Cell Phone Keypad

To make entering text messages easier, some companies developed predictive typing technologies (see Figure 1.2). This technology preloads the cell phone with a database of thousands of words, emoticons, and punctuation, and can then automatically scan possible variations to determine the correct word. This allows the user to simply press each key once for the letter she wants and then advance to the next letter without pausing—just as people would on a computer keyboard—watching as the screen displays what the cell phone assumes that the user wanted to type. Some smart predictive typing can even do word completion. In this case, after the user types “lu,” the technology will automatically complete the word with whatever word the user has typed most often (e.g., “lunch”), and thus the user does not need to type out the full word each time. Currently there are three popular predictive typing technologies worldwide: T9, eZi, and iTap. All three technologies support multiple languages including English and Chinese (SJInfo, 2003; Yesky.com, 2003).



Figure 1.2 Predictive Typing Technology²

² The picture downloaded from: <http://www.t9.com/showcase.html>

Business Application vs. Personal Use

Mobile text messaging was originally designed as a voicemail alerting service. After it became popular, it had been marketed for business use until recently: An ad on the Nextel website (accessed on Oct.20, 2003) still touted the business use of text messaging by showing how text messaging could help two employees secretly exchange work-related messages during a business meeting so that they can tell the boss the information he needs. Nevertheless, text messaging became phenomenally popular despite the fact that the design did not effectively support the use of exchanging messages in personal life spheres. It is estimated that close to 80 percent of SMS messages sent are consumer-oriented (Mallick).

The MobileSMS website reviewed the consumer success of mobile messaging in this way:

SMS advertising went from showing business people in suits entering text messages to bright pink and yellow advertisements aimed at the youth markets that adopted SMS.... SMS was the triumph of the consumer- a grassroots revolution that the mobile industry had next to nothing to do with and repeatedly reacted to.

In all, it was users' efforts that turned a hard-to-use technology into a use success.

Use in Everyday Life

The use phenomenon of mobile text messaging is peculiar as it challenges our prior assumptions about usability, technology adoption, and the affordances of technologies.

Usability in Context

The popularity of wireless phones and mobile text messaging pushes us to revisit our previous artifact-based view of usability and urges us to switch from product-oriented design to process-oriented design.

Traditional usability studies tend to focus on an artifact and its functionalities, ignoring its surrounding contexts, a view which is critiqued by many people (Brown & Duguid, 1994; Spinuzzi, 1999). In some ways, it is understandable that usability is thought of as merely being located in an open Microsoft Word window when a user is attentively interacting with the Word program: There are no other agents in this interacting system.

However, the use mode of wireless phones and mobile text messaging makes the single-agent model of usability obsolete. It calls for a system-wide view of usability.

Technologies of wireless phones and mobile text messaging can never be in use only with the handsets. Instead, to get the technology to work, the hardware, software, and service technologies must work together. Thus Palen and Salzman suggest the usability of wireless phones lies beyond the handset (2002a). They indicate that the technological system of a wireless phone should have four socio-technical components: the hardware, software, network (the network technology for mobile telephony including phone services, calling plan features, and calling coverage), and bizware (policy from wireless carriers). Ketola and Roykkee (2002) describe three types of interfaces for mobile phones: User interfaces (including “input and output devices,” “industrial and mechanical design and software

factors”), external interfaces (including “user support elements,” “accessories and supporting software”), and service interfaces (including availability, utility, and interoperability of the carrier’s service). They point out that there is a hierarchy between these three interfaces. For example, the user interface is dependent on the service interface, and the external interface is dependent on the user interface.

Use after Adoption: Integrating Technology into Daily Life

Compared to other technologies, the use trend of mobile text messaging shows a strong tendency for integrating this technology into the user’s everyday life. This emerging use trend surrounding mobile text messaging suggests how users work to make the technology more usable and meaningful. They usually develop ranges of local uses for this technology and integrate the technology into their daily lives. From the localization perspective, these integration processes are also forms of localization, i.e., user localization, as users are actually localizing a technology to fit into their lives and their local cultures. This use trend asks to consider localization within a broader vision.

Some researchers regard this process as “technology integration” rather than mere use (Mante & Heres, 2003)³. They point out there are three aspects of technology integration in the case of wireless technology: The *adoption* of technology by the individual and the *diffusion* of the innovation on the societal level; the *integration* of technology to make it fit

³ Here is a side note. I was not aware of this set of literature when I was designing my project, and most of these were not published by early last year, either. It is exciting to see that this use trend of lifestyle is recognized by other researchers.

into one's daily life; and the *positioning* of technology among other daily technologies by considering life values, moral economy, and so on.

Carroll and her colleagues use the term “appropriation” to describe “the way in which technology or technological artifacts are adopted, shaped and then used” by users with their “technology appropriation model” (2002). Presenting a case study of mobile phone use among Australian young people ranging from 16 to 22 years old, they argue that these users are not just adopting a technology, but adopting a lifestyle. During the appropriation process, the “technology-as-designed” is transformed into the “technology-in-use.” They conclude, to design for appropriation, we need to study technology use over longer periods of time rather than conducting standard use tests and evaluations within short time frames. They also want researchers to focus on the psychosocial dimensions and sociotechnical interactions in use.

Haddon describes this process as “domestication” (2003). Proposed by Silverstone and Haddon (1996), “domestication” studies the taming of innovation by the individual, the process that integrates personal technology into everyday domestic life, leading to the real adoption of a technology. Derived originally from British studies on consumption, the concept of domestication emphasizes consumption rather than mere use. The three distinct dimensions of consumption—commodification, appropriation, and conversion—are also three moments of domestication and of the construction of the domestic itself. They propose to use the notion of double articulation to understand the domestication of

communication and information technologies. The first articulation occurs as “the meanings of all objects and technologies are articulated through the practices and discourses of their production, marketing, and use” (p.62). Then communication technologies provide the basis for a second articulation in culture with “their programmes, narratives, rhetorics, genres, and the software” (ibid). The second articulation and the meanings produced are results of the first articulation. Based on “double articulation”, they claim:

Media and information and communication technologies are central because they are themselves both objects to be consumed and the facilitators, through their status as media, of consumption. Through our involvement with them we learn how to consume and what to consume. And through our involvement in consumption, we learn to display who and what we are. In this lies media and information and communication technologies’ distinctively reflexive role in everyday life (ibid, p.65).

Instrumental and Social Aspects

The phenomenon of text messaging is intriguing because it is a technology affording both meaning creation (text) and task functioning (tool). People adopted this technology for instrumental convenience at first, but users are building a new communication mode and a new form of social relationships through use. This transformation from a tool perspective (instrumental) to the text (social) attracts many researchers from fields such as HCI, mass communication, and science and technology studies to engage in this fascinating research

conversation. Two major trends have emerged. One trend focuses on the “*social* aspect” of this technology: Some researchers are exploring how messaging technologies affect people (especially teenagers) in the Western world by studying the process of social shaping and its implications for future design. Topics include representation, identity, privacy, emotion and social networking (Brown et al, 2001; Eldridge & Grinter, 2001; Taylor & Harper, 2001, 2002; Weilenmann & Larsson, 2001; Lenhart et al., 2001; Grinter & Palen, 2002; Schiano et al, 2002). Another group of researchers are interested in how ad-hoc chats could support collaborative projects and work conversations as a business *instrumental* aspect (Nardi et al, 2000; Issacs et al, 2002; Herbsleb et al, 2002; Hansen & Damm, 2002).

However, in light of the challenges posed by this technology and related use phenomenon, we see little research combining a focus on both the instrumental aspect and the social aspect of the technology, as most research on this topic only studies the use by teenagers. Few researchers approach these localization issues by comparing SMS use in Eastern and Western cultures. In addition, exigency and affordances of mobile texts, topics in which technical communicators are interested, have not yet been investigated. These issues are addressed and examined in this dissertation project.

A Contrasting Phenomenon of Local Uses

From the localization perspective, the phenomenon of mobile text messaging is more striking.

This technology has become a popular communication mode in East Asia, Europe, Australia, and other parts of the world no matter if the cultures in those regions are described as high-context, low-context, collectivist, or individualist. It is interesting that though text messaging is a popular mode in other places of the world, it is not widely used in the US.

Here are some data from the two fieldwork sites explored in this study: Text messaging was introduced in China by China Mobile in the second half of 2000. Before the year 2000, most cell phones in China did not have the ability to send text messages in Chinese. Soon text messaging took off as both a huge business and cultural phenomenon. 18.9 billion text messages were sent in the year 2001 (Chen, 2002). The volume reached 90 billion in 2002, and then 220 billion in 2003 (Kahn, 2004; SINA, Dec.30, 2002). Starting from May 1, 2002, text messages could be exchanged across the networks of China Mobile and China Unicom⁴ (Xinhua News, 2002). At the US site, I am unable to find the exact time when text messaging was introduced to the US, but the earliest time of adopting text messaging reported by my participants was September 2000. All the American wireless carriers were interconnected by the end of 2002 (3GAmericas, 2004). The yearly volume of text messages was 1.2 billion in 2002. 1.7 billion text messages were sent during the third quarter of 2003, up from 1.2 billion during the first quarter (Forrester Research, October 2002; Richtel, 2004).

⁴ Two major wireless carriers in China.

These use differences between the two sites can not be simply explained with dimensional cultural factors. For example, if we make a claim that Asian people are more inclined to the implicit communication mode of text messaging, how could we explain the popularity of text messaging in the UK which shares similar cultural dimensions as the US does?

Another suggested answer is the low cost of the text messaging services in China.

However, users do not have to choose mobile text messaging if they just consider the cost factor, and they might choose email instead or choose nothing as they did before, for example. In fact, users tend to send more text messages than needed and send text messages on occasions they would not have taken any communicative actions before, ending up spending more money. Neither can the cost factor explain the popularity of mobile messaging among a group of people in American contexts. There must be some social exigency behind the emergence and circulation of so many mobile text nuggets.

When an artifact with inherent usability weaknesses still enjoys a great use success, this suggests other factors in the network— social and cultural factors—play a more important role on its usability issue than the technology itself. What are these factors? How do they influence the use of mobile text messaging? These questions are investigated in the fieldwork and discussed in later chapters.

Furthermore, it is obvious that the technology of text messaging at these two sites involves only minimal localization work from the engineering side—phone manufacturers mainly translate the interface and menu into local languages. And as discussed in the previous

section, on a general level, the design of a wireless phone itself is not sufficient (actually poor in some situations) to support the messaging task; however, some groups of users still love it. Comparing different use rates of mobile text messages in the US and in China, we can see that the similar phone design leads to different use scenarios. All these suggest that use plays a more significant role than design for the adoption and use of mobile messaging technology.

Clearly users are actively working on the technology to make it fit into their lifestyles through “user localization.” And even with minimal localization work by developers, two distinctive types of uses which echo with local cultures have been developed on the technology as reported and discussed in this dissertation. Text messaging is primarily used as a form of fun communication and small talk among American participants to express emotions and feelings, and among Chinese participants, it is used as a way of staying in contact with friends to exchange information. The variety of local uses found from the fieldwork also shows how complex uses are developed around situated activities rather than abstract cultural dimensions as reported in Ch.4.

To study how cultural issues work in the localization process of mobile text messaging at two fieldwork sites and understand text messaging use in context, a methodology that meets the following criteria is needed:

- It studies how users use the technology in context.

- It has constructs allowing probing into social and cultural factors surrounding technology use.
- Its unit of analysis should be appropriate for the scope and dynamics of usability research. Thus the unit should incorporate contextual factors while tracing the developmental aspect of the artifact.
- It not only studies how a technology is used as tool in an immediate context but also explores its signifying practices in the socio-cultural context.

In the next chapter I will review usability research from the cultural aspect and introduce a framework of cultural usability to understand technology use in context.

Chapter 2

Understanding Technology Use with Cultural Usability

In the previous chapter I reviewed the dilemma of culture in localization practices and looked at the decontextualized practices that resulted. Those problems cannot be blamed only on localization professionals. They are actually common issues in current IT product design and development. The popular concept of usability originates from the field of cognitive science and computer engineering. These fields tend to regard usability as an isolated property and ignore the social-cultural contexts surrounding the product (Adler & Winograd, 1992; Brown & Duguid, 1994; Spinuzzi, 1999b). To address these problems, I have brought together ideas and methods from localization/usability studies, activity theory, genre theory, and British cultural studies to develop a framework of cultural usability to study technology use in context.

This chapter reviews contextual problems in current usability studies, compares three approaches of studying contexts in technology use, discusses affordances emerging through use, and outlines the framework of cultural usability employed in this project.

Cultural Considerations in Usability Studies

Usability studies usually take one of two approaches: An engineering perspective or a humanist one. They differ in the way these approaches define the concept of usability and the way they conceive of contextual and cultural factors in design and use.

Engineering Perspective

The engineering approach is the most accepted viewpoint in this field. It regards usability as the quality of an individual artifact and a component within a larger system. The well-accepted definition of usability comes from Jakob Nielsen (1993). From the beginning, usability is mapped as “a *narrow* concern compared to the larger issue of system acceptability” (p.24, emphasis added). Usefulness is divided into two components, utility and usability. The former deals with functionality while the latter examines “how well users can *use that functionality*” (p.25, emphasis added). Usability is usually associated with five metrics: learnability, efficiency, memorability, errors, and satisfaction. Furthermore, usefulness is also a subcomponent of system acceptability (see Figure 2.1) that examines “whether the system is good enough to satisfy all the needs and requirements of the users and other potential stakeholders” and is “a combination of its social acceptability and its practical acceptability” (p.24).

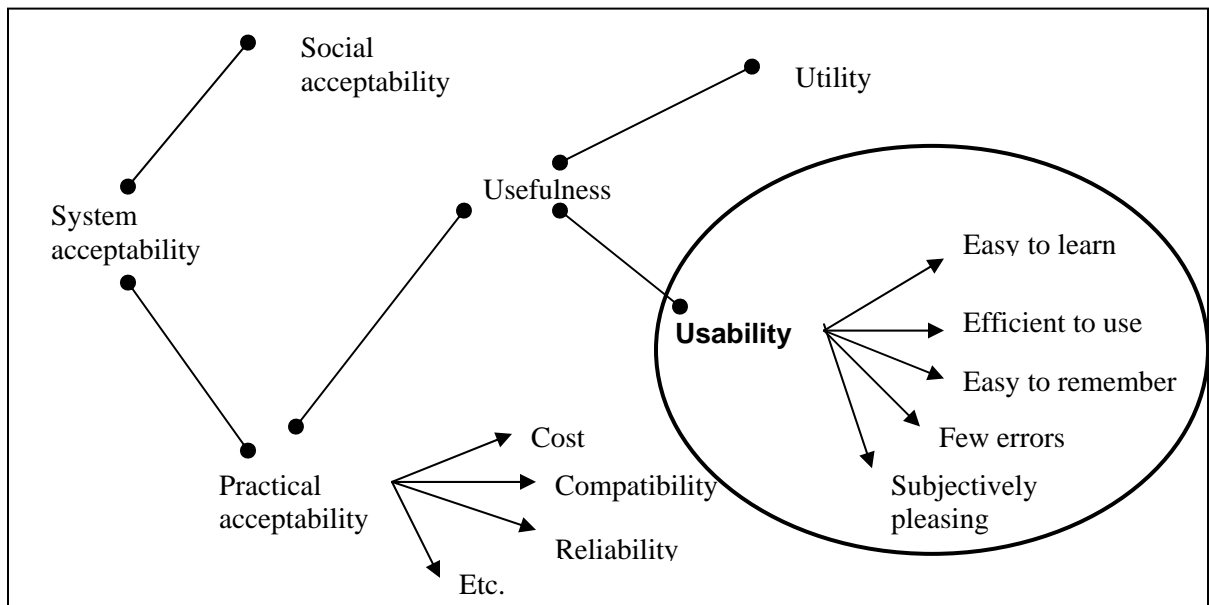


Figure 2.1 Usability as a Product Quality (Nielsen, 1993, p.24)

Figure 2.1 shows that Nielsen's view of usability attends to issues within a narrow scope: Contextual factors such as social and cultural aspects are detached from the use of product functionality. This view favors the system and defines usability as attributes measured by quantitative methods. Though he notices that usability is "measured relative to certain users and certain tasks" (p.27), Nielsen stresses that we should follow a "precise and measurable" way to guarantee that usability will be "systematically approached, improved, and evaluated (possibly measured)." Thus those that cannot be measured in a precise way are ignored in this approach. Even though Nielsen advances ten heuristics to evaluate the product, his heuristics still focus on tangible and quantifiable factors of products.

People who share this perspective include Dumas & Redish (1993), Rubin (1994), Weiss (1991), Shneiderman (1998), and Norman (1988). Dumas and Redish claim that "usability is an attribute of every product" (p.4). Rubin maintains that "the design of usability [testing] must be structured and systematic" (p. 18). Weiss adapts five usability metrics into four criteria for documentation: Readability, accessibility, suitability, and availability (p.18). Shneiderman's eight golden rules (p.74-75) are similar to Nielsen's ten heuristics in the way they both focus on similar factors. Norman suggests seven stages of action model from his psychological background and tells us more about users; however, these goal-oriented actions at the mesoscopic level cannot provide us with an overall picture of the cultural-historical activity at the macroscopic level.

Humanist Perspective

Researchers from the humanist side suggest that a broader scope of usability should be employed to interact with more than the measurable qualities of a product. Furthermore, usability research should include the contexts and culture, and give more leverage to users.

Sullivan argues that usability testing should be broadened to usability research that “includes the work of people who design systems, test them, develop educational materials, and study users” (p.256). The subjects should consist of users who learn to use products and would actually use these products in various contexts. Instead of usability testing, usability evaluations should be introduced into usability research, and it should be inserted at an earlier phase of product development. Cultural factors are addressed here with a cultural model. This model approaches usability from the sociological angle and studies how people use products in the context of common use with the fieldwork method.

Based on Sullivan’s work, Johnson (1998) describes a three-level structure of “a user’s way of knowing” to investigate the interactions among users, social contexts, cultures, and the design process: Users are regarded not only as practitioners who use tools. They are also producers involved in the design process, citizens serving as active participants in the larger technological order, and equally-responsible members of the technology enterprises of our culture (p.46). His user-centered technology model indicates that the engineering perspective of usability cannot really locate users in the center of the design process.

Salvo (2001) moves further by suggesting a focus shift in usability studies “from evaluation of user actions to engagement with users” (p.273). As usability is more widely realized as an integral part of the design process in the collaborative model, a dialogic relationship between technology producers and users has become more critical. He proposes to develop a dialogic ethic for usability to counteract the ethic of expediency associated with the engineering model and to incorporate different local interests in the design process.

Spinuzzi (1999a, b) argues for a distributed model to investigate user activities based on activity theory and genre theory. He maintains that usability is a quality of the entire activity network and is distributed across the network (p.77, 1999a). According to his distributed model, usability is not located in a single artifact but distributed across various actors, tools, and goals. People use an ecology, for example, an interrelated group of tools, to jointly mediate their activities.

As a core concept in human-computer interaction research, usability should represent the interdisciplinary feature of this field. However, current usability studies favor the engineering perspective rather than the humanist one, and the social-cultural context surrounding the product is often ignored in research and practice. This causes problems in practice (Adler & Winograd, 1992; Johnson-Eilola, 1996): Users are treated as test subjects from a mechanical view; only low-level actions are attended to; usability is not introduced to the design process until the last stage; usability studies are reduced to usability testing and only the decontextualized uses of technology are studied; the whole design process is regarded as a means instead of an end.

Virkkunen and Engeström (2001) points out that the real problem here is due to the problematic concept of usability itself: “[I]t projects the qualities of an activity system into one of its components, a tool” during a transformation process. Accordingly, usability explorations usually stop at operation levels (Engeström & Escalante, 1996). The activity level of the interactions and the broader social contexts behind the micro-level interactions are often ignored. Hales (1994) further suggests that current design approaches highlight the “tool” aspect (similar to the “instrumental” aspect in this dissertation) of human action

while discounting the “text” aspect (similar to the “social” aspect) — the interpretation of the product from its social-cultural context of use.

Cultural Usability Research

The growing competition in global markets has resulted in the growing need for cultural usability studies, or in some cases, cross-cultural usability studies. The term “cultural usability” has begun to appear in usability literature. A closer look shows that there is not an official definition; different people refer to it in different ways.

Cultural usability is usually approached in two ways since researchers interpret culture differently. One way is to interpret culture as ethnic culture, and thus cultural usability is a study of cultural effects on product design. This line of thought seems to be more popular than the second one, and it is also what people usually refer to when talking about cultural usability. The issue of cross-cultural usability was brought up by researchers (Barber & Bader, 1998) working on website localization. They state that “usability issues must take on in a cultural context” and coined the term “culturability” as “the merging of culture and usability.” They define culture as “a means of distinguishing among the different countries and their respective web-sites” and regard culturability as a quality that can be added at some stage of the design process. This line of research is discussed in the “Models of Cultural Dimensions” section in Chapter 1.

Another way is to interpret culture as a set of things, a process, and a set of practices that are concerned with the production and the exchange of meanings between the members of a society or group, involving issues of representation, identity, and power. This interpretation comes from cultural studies. The Media Lab at the University of Art and

Design in Helsinki, Finland has done some research in this area. They (Tarkka & Tikka, 2001) define cultural usability as a search for a design approach that “situates the practices of technology within its cultural and social contexts” — a critical design sensibility. It is a combination of culture and technology with interpretation and implementation. The research work at this center focuses on the design practices from the discursive angle and the influences of consumer culture in HCI design.

Similarities surface when comparing these two approaches to two strands of usability studies: The engineering perspective and the humanist perspective. The first approach arises from the engineering approach. This approach is more interested in how to conduct cross-cultural usability research in an instrumental way. Pushed by industry need, more empirical research findings with this approach have been gathered about cross-cultural interface design elements (Marcus et al, 2001; Badre, 1998, 2001; Yli-Jokipii, 2001), cross-cultural user profiles (Faiola, 2002), and usability methods (Dray et al, 1996). The limitations of this approach are due to the engineering mindset: Culture is approached statically and researchers seek universal patterns for different cultures. The dynamic and ever-changing cultural contexts have not been paid enough attention. The second approach studies general cultural factors with a critical perspective in the same vein of the humanist approach. It does not seem interested in workable models in practice. Empirical findings from this angle are limited at this time.

The two approaches study the cultural dimension of usability complementarily, but they do not provide a complete picture of cultural usability. For example, some studies of cross-cultural interface design elements usually stop at the level of ethnic cultural preferences and fail to explore the dynamic relationship between the cultural preference

and structuring forces; those who study cultural usability with a critical perspective did not realize that the ideology frameworks vary in different cultures.

Three Approaches to Contextual Issues in Technology Use

The key issue here is how we should approach cultural and contextual factors in understanding technology use. This approach should help us study both the instrumental aspect and the social aspect of human action and address the dynamic interaction between design and use. Kuuti (1999, p.360) comments on this issue this way:

We are living in a period of transition— a search for a new paradigm for information systems (IS) is going on.... At the core of the debate lies the question of how to handle contextuality in IS design and therefore in IS research. It now seems to be generally accepted that designing the technical “core system” alone is insufficient, and that in order to design and implement a successful IS some kind of “context” has to be taken into account — a context that includes people and their relations.

We need new research methodologies that help explore contextual factors. Next, I will review and compare three theoretical constructs that are well-accepted in the field to study contextual factors.

Activity Theory: Situating Contextual Factors in Activities

Activity theory is advanced as a potential framework for HCI research (Kuutti, 1997). As a cultural-historical approach, it claims that people’s activities are an object-oriented and tool-mediated process in which actions are mediated through the use of artifacts (including tools and languages) to achieve a transformative objective.

Activity theory is significant for the field of HCI to explore contextual issues by bringing the following valuable concepts and principles to practice and research.

First, a focus on the tool (or artifact) on the basis of activities from activity theory helps us see how a technology is interpreted as an object used by people to perform activities in context. A tool becomes a tool only through use. Therefore, a tool needs to be studied in its use setting; it is not meaningful to study a tool in isolation. As Bannon and Bødker point out, “a human activity approach to analysis of artifacts must include the actual praxis of use, as well as the specific material, social, and historical setting of that use” (1991).

Second, all human activities involve the use of tools, and activities are mediated by tools. The concept of mediation is valuable here as it shows the ways that people use artifacts are socially, culturally, and historically determined. And the emphasis of activity theory on the mediation process, the transformational objective, and the activity system suggests a process-oriented view of the design process rather than a product-oriented view.

Third, activity theory uses an activity as the unit of analysis to study human activity and tool mediation, which brings the vision of contexts into the object of inquiry. The activity system includes “a minimal meaningful context.” In this “minimal meaningful context,” history, development, meanings, community, rules, and even culture are articulated into a unified framework (see Figure 2.2), which makes the context consideration an inherent feature of activity-theory-based HCI research. As Nardi (1996) describes:

Activity theory... proposes a very specific notion of context: the activity itself is the context.... Context is constituted through the enactment of an activity involving people

and artifacts.... [T]he specific transformative relationship between people and artifacts...is at the heart of any definition of context, or activity. (p.76)

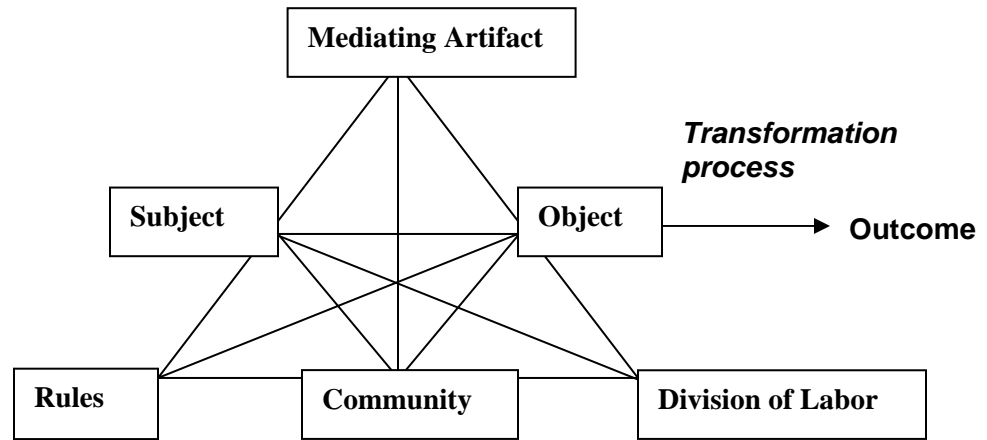


Figure 2.2 Activity Triangle

Fourth, the three-level structure of activity (see Table 2.1) makes it possible to distinguish and describe contextual factors as associated with the instrumental aspect or the social aspect of an activity. According to Leont'ev (1978), the unit of activity is hierarchically structured on three functional levels. A concrete activity is always motivated by general objectives acknowledged and recognized in the local community and in the socio-cultural context. The concrete activity is realized by actions which are goal-directed in an immediate context (e.g., at the workplace or at home). Actions are usually conscious, and they are similar to the “tasks” we often talk about. An action is realized by conditions in a use situation (i.e., a material setting). Operations are usually non-conscious and automatically performed. For example, a concrete *activity* involves a user who wants to maintain regular contact with an old college friend by sending messages of greetings occasionally. As she does not want to disturb her friend who might be busy at that moment, she chooses text messaging for communication. The act of sending a text

message to the friend is *action* here. *Operation* refers to the mundane details when the user interacts with cell phone keypad and text messaging application. In all, the three-level structure is not static but fluid depending on the use situation.

Levels of Activity	Governed By	About
Activity	Motive	Why
Action	Goal	What
Operation	Conditions	How

Table 2.1 Levels of Activity

Activity theory presents a robust framework to study contextual factors on an activity-basis, and it shows us the complexities and fluidity of activities in context. But it does not tell us how activities are structured by contextual factors. The vision of context and culture here is still limited: Activity theory is good at the interpretation of tool-mediated production but weak at sign-mediated communication (Engeström, 1999; Spinuzzi, 1999). Contextual factors in the activity system are primarily immediate contextual factors based on individual consciousness, without considering broader cultural patterns. In the case of mobile text messaging, activity theory can illustrate why a user chooses text messaging based on instrumental convenience, but it lacks vocabularies to investigate how this use act helps that user maintains her multiple identities in her daily communication.

As Kaptelinin says, as a developing approach, activity theory has an advantage in its “potential for integration with other conceptual frameworks” (Kaptelinin, 1996, p. 64). To overcome these limitations, I am combining concepts from genre theory and British cultural studies. This will allow me to investigate use situations in a broader cultural arena.

Genre Theory: Structuring Contextual Factors with Rules

Genre theory attends to textual and contextual regularities, repeated actions, and technological influences, both across texts and across practices by examining social exigencies of genres (Dias et al, 1999).

Below is a concise summary from Erickson (1999):

A genre is a patterning of communication created by a combination of the individual (cognitive), social, and technical forces implicit in a recurring communicative situation.

A genre structures communication by creating shared expectations about the form and content of the interaction, thus easing the burden of production and interpretation.

A genre is “a collection of practices that finds its nexus in the recurrent, dynamic activities in which users engage” (Spinuzzi, p.37, 1999). It should be noted that genre theory has been used together with activity theory quite often in empirical studies in the fields of HCI and technical communication (i.e., Dias and Spinuzzi).

Genre theory brings the following insights to the exploration of contextual factors during use. First, genre theory provides a foundation for interpreting actions from a social angle. According to Miller (1984), genres are social actions in response to recurrent situations with social motives. Dias and his colleagues interpret a social motive as “a motive that is socially recognized and allowed for” and “that the culture acknowledges you may have and allows you to have” (p. 20). As “the culture’s arrangements,” genres are “means of legitimately acting on these motives.” In a local setting, social motives take the form of “local purposes” (p. 22). Linking genre theory to activity theory, they suggest that genres are “enactments of recognized social motives” and “activities in Letont’ev’s sense” (p.25).

Second, the notion of genre can help us better understand the artifact in a social and historical context. By providing socially constructed interpretive conventions, genres serve as “border resources” (Brown & Duguid, 1994), which are also “affordances” here, to help interpret the artifact’s use in context. In HCI research, artifacts are broadly interpreted as genres to investigate how the connection of design and use is dynamically settled in different interface features by inquiring about rules and habits related to genres. In this project, I interpret IT artifacts (e.g., wireless phones and messaging programs) in broad generic terms in which IT artifacts function as non-textual genres providing clues (e.g., interface features) for use. Textual genres such as mobile text messages are studied as ITtexts — the blend of IT and texts (Geisler et al., 2001). Non-textual genres work together with textual genres to mediate practices in situated use.

Third, the rule-tool relationship embodied by genres is insightful to illustrate how uses of technologies are structured in social contexts. Influenced by Giddens’ structuration theory, Miller suggests genres are capable of reproducing social structures with their recurrent nature in situated communication (1994). Yates and Orlikowski (1992) argue that genres are produced, reproduced, and modified by individuals through a process of structuring in organizational contexts. Regarding a technology as a genre can help us reveal the reciprocal relationship between a technology and the social context in which it is produced and used.

British Cultural Studies: Articulating Contextual Factors in Discursive Practices

According to Fiske (1987), the term *culture* used in British cultural studies is neither aesthetic nor humanist in emphasis but instead political. Culture here is “a way of living

within an industrial society that encompasses all the meanings of that social experience” (p.284). Thus British cultural studies is concerned with “the generation and circulation of meanings in industrial societies,” or more accurately, in technological societies. It studies popular culture and the interactions of culture and technology in the postmodern period. Its emphasis on popular culture and daily life practices helps us to understand technology use in everyday life and the influence of consumer culture on IT product design and use.

The articulation model (Slack, 1993) from British cultural studies explores contextual factors from a discursive angle, highlighting the mediation of meanings on the social aspect of human action which activity theory does not. According to Slack, articulation as a methodology maps the context, but “not in the sense of situating a phenomenon *in a context*, but in mapping a context, mapping the very identity that brings the context into focus” (1996, p.125). Thus “identities, practices, effects generally *constitute* the very context within which they are practices, identities or effects.” It is a process of creating connections between various contextual factors on the level of practices and the level of meanings. Grossberg (1992, p.54) describes the process as follows:

Articulation is the production of identity on top of differences, of unities out of fragments, of structures across practices. Articulation links this practice to that effect, this text to that meaning, this meaning to that reality, this experience to those politics. And these links are themselves articulated into larger structures, etc.

As an example of such mapping, the circuit of culture (S. Hall, 1997; du Gay, 1997, see Figure 2.3) examines five key processes in a development cycle of an artifact: How the artifact is represented, what social identities are associated with it, how it is produced, how

it is consumed, and what mechanisms regulate its distribution and use (du Gay, 1997, p.3). In the real world, these five elements continually overlap and intertwine in complex and contingent ways. In addition, the cultural circuit illustrates how meanings are mediated by an artifact and suggests a study of the whole circuit of culture is needed to examine a cultural artifact completely.

Applying this model to usability studies can show how other elements (representation, identity, production, and regulation) interact with and contribute to the “consumption” element in the whole lifecycle. It tells us that the consumption process is not the only significant and stand-alone process we need to consider when we design new products. Moreover, in addition to the investigation of subjective experiences with terms such as identity and representation, the construct of this circuit also explores broad cultural patterns in a use context, which serves as a good counterbalance to the individual user-focused perspective of activity theory.

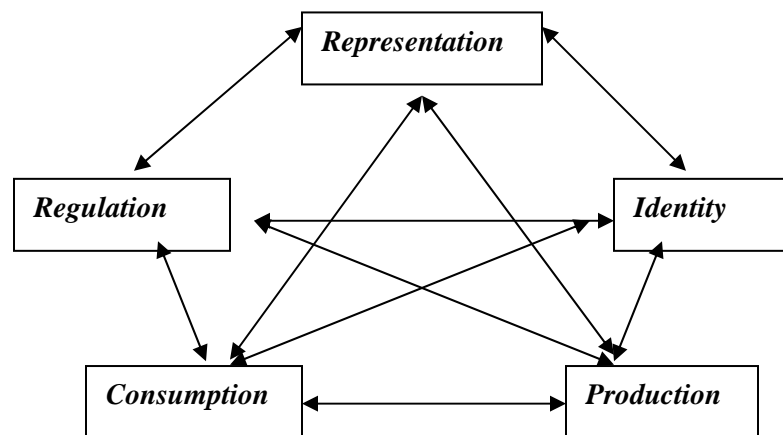


Figure 2.3 Circuit of Culture (S. Hall, 1997)

In the case study of the Sony Walkman (du Gay et al., 1997) with the circuit of culture, researchers find that nowadays text and technology, hardware and software, and product

and use are dependent upon one another and are interrelated; technology companies like Sony are not simply hardware or software companies but part of a culture industry (p.81). Practices in many IT companies support this statement. Cell phone companies not only manufacture phones but also provide free games and cartoons; software companies compete for the technology and the technical support, as well as training services. Since IT companies are defined as part of a culture industry, the high-tech products they produce are also defined as cultural artifacts. The localized product is an actor and an agent of the culture industry in the age of globalization.

Comparison of Three Approaches

All three theoretical constructs are well-accepted approaches to investigate contextual issues in the field of HCI¹. To illustrate how the three approaches could work together to explore contextual issues in technology use, I compare and contrast their different focuses and strengths in Table 2.2.

¹ For examples of the application of activity theory in HCI, please see Nardi (1996). For the application of genre theory, please see Brown & Duguid (1994) and Spinuzzi (1999). For the application of British cultural studies with the cultural circuit, please see Churchill & Wakeford (2001).

Theories	Methodology of Studying Contexts	Methodological Strength on Different Mediations	Ways of Situating Artifacts in Context
Activity Theory	activity as a unit of analysis	mediation of activities (tool-mediated production) on the individual level	an artifact-practice dyad
Genre theory	genre as social action in the sense of both a cultural artifact and a structuring force	mediation of activities (tool-mediated production) via mediation of meanings (sign-mediated communication) on the social level	an artifact-rule dyad
British Cultural Studies	articulation model	mediation of meanings (sign-mediated communication) on the social and individual level	artifact on a cultural circuit

Table 2.2 Comparison of Three Approaches to Understanding Contextual Factors

Affordances: Realizing Practices through Interactions

Affordances describe the action possibilities posed by the artifact in use and associate the artifact with practices. Affordances are the linking points where factors from socio-cultural contexts come into play during the use process. In this section, I review the development of the term “affordance.” We will look at how this term has been expanded by incorporating a consideration of socio-cultural factors; we will also see how activity-based affordances will help us better address use issues.

Origin of Affordances

Coined by Gibson, the term “affordance” is “something that refers to both the environment and the animal in a way that no existing term does. It implies the complementarity of the animal and the environment...” (1979, p.127). He asserts that an affordance is “equally a fact of the environment and a fact of behavior. It is both physical and psychical, yet neither. An affordance points both ways, to the environment, and to the observer” (p.129).

Gibson’s explanation clearly shows that, in the beginning, affordances were considered only as emerging from the context of material encounters between actors and objects.

Baerentsen and Trettvik interpret the term in this way: “affordance being a *relationship* (or the possibility of a relationship) between organism and features of the environment, perception of affordances is perception of relations between features of the environment and features of the organism itself” (2002, p.53).

Norman adopts this term from Gibson and introduces it in his famous book *The Design of Everyday Things* (1988). He defines affordances as “the perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used” (p. 9). Since then “affordance” has become a popular concept in the HCI field. This term helps designers describe the features and functionalities of the artifact they are working on and examine the implicit and explicit interaction cues their designs provide to users with artifacts. However, to Norman, affordances cannot be used to describe every HCI design. He states affordances should be physical affordances only, for example, the computer screen only affords viewing but not pointing and clicking. Pointing and clicking are only “perceived affordances,” not real “physical affordances” (1999). For Gaver, Norman’s student, pointing and clicking are affordances, but are “perceptible

affordances.” He distinguishes perceptible affordances from hidden and false affordances, and asserts, “when affordances are perceptible, they offer a link between perception and action; hidden and false affordances lead to mistakes” (1991, p.79). Today, when practitioners refer to “affordances” it is generally by this definition.

Norman’s understanding of affordance implies a focus on artifacts as tools mediating between users and the context of use. However, from the perspective of activity theory, Albrechtsen and his colleagues (2001) critique Norman’s vision of affordance based on a matching of two models (user’s model and system’s model) in that it lacks cultural considerations and places socio-cultural contexts outside the confines of the system’s domain, relegating affordances to a kind of “no-man’s land.” They conclude that both Norman’s and Gaver’s visions are short-term affordances that do not take the developmental aspect of an artifact into account and thus are “more or less static surface phenomena” (p.10). Because of that, HCI design has thus mostly been focused on “low level interaction modalities” (p.6).

To solve these design problems, Baerentsen and Trettvik assert that the field of HCI must throw away their belief that affordances are “magical qualities of objects in isolation.” Instead, “artifacts, technologies, and their knowledgeable users are seen in their actual interdependency and co-existence in processes of activity, ultimately as abstract moments in societal forms of praxis” (p.59).

Affordances for Social Interactions

The trend of incorporating social dimensions into affordances started from the mid-90s, when the community of Computer-Supported Collaborative Work (CSCW) began to

loosely use the term “social affordance” to describe properties of technology that afford social behaviors. However, it remained undefined until Bradner.

In her dissertation, Bradner defines social affordance as “the relationship between the properties of an object and the social characteristics of a given group that enable particular kinds of interaction among members of that group” (2001, p.132). For example, a wireless phone affords to stay in touch with friends anytime and anywhere. She argues that social affordances indicate how members of a social group might interact with one another when interaction is mediated by technology. Accordingly, a study of social affordances of a given technology must study both the social context of human-human interaction and the features of technology used during the mediation. As to the relationship of social affordances with physical affordances, she suggests that “social affordances arise out of the physical properties of an object when considered in the context of the social interaction that the object mediates” (p.133).

In addition, Bradner compares the verbs *afford*, *support*, and *enable*, suggesting that the distinction comes from the German root *aufforderungscharakter* for *afford*, meaning demand or invitation. “Both these words connote something compelling, i.e. an object is present that is compelling human action” (p.135). Therefore, the social affordance of a technology comes from the fact that there is something inherent in that technology that *compels* certain social interactions among other similar technologies. For example, in a comparison of calling people and texting people, both technologies *support* and *enable* communication, but texting might *afford* “keeping in touch” better than calling by not disturbing the other party because it is an unobtrusive communication mode.

Bradner's contribution helps distinguish social affordances from physical affordances (the affordances we typically talk about in HCI design). However, her view of social affordances fails to explain how these physical affordances and social affordances are interconnected and interact during a user activity. Other than claiming that social affordances arise out of physical affordances, she does not tell us where the social affordance is located and precisely what relationship exists between these two types of affordances. Her scope of social affordance is also limited. As she herself claims, she only looks at social interactions on the level of dyads and small groups and does not consider interactions at the level of society and culture (p.134).

From the stance of social constructivism, Hutchby (2001) explores "communicative affordances" in technology-mediated conversations with the methodology of conversation analysis. In his view, communicative affordances provide both "constraints and unique possibilities" in social interactions. The concept of "affordance" here is significant in that it can help us "avoid the arbitrariness of the radical constructivist position" and "evade the equally unilateral epistemology associated with technological determinism" (p.33).

However, the term "communicative affordance" is not well defined or structured in his book.

Activity-Based Affordances

The activity theory approach makes it possible to develop a structured construct of affordances (Albrechtsen et al, 2001). An informative theorizing of affordances within the framework of activity theory comes from Baerentsen and Trettvik (2002). They approach affordances from a cultural-historical angle and develop a three-level structure of affordances. In their description, they distinguish two types of affordances: Natural

affordance for animals and cultural-historical affordances that “originate from adaptation of (objects in) the environment to suit the satisfaction of human needs, and are nested in cultural-historical *forms of societal praxis*” (p.57). The latter are “produced intentionally and are specifically designed for inclusion in cultural-historical forms of practice. The cultural-historical artifacts and forms of practice are artificial habitats.” In simpler terms, affordances emerge “as activity-relationship between actors and objects” (p.59). Their theorizing of affordances introduces the socio-cultural context from the beginning.

Baerentsen and Trettvik place the concept of affordances in an activity-based framework by asserting that “[a]ffordances are not properties of objects in isolation, but of objects related to subjects in (possible) activities” (p.59). As affordances are realized in interactions as activity-relationships between actors and objects, they propose that the concept of affordance should be treated as a generic concept which distinguishes affordance on the operational level with “operational affordance,” “instrumental affordance” on the action level, and “need related affordance” on the activity level. As we can see, the need related affordance on the activity level includes the social affordance Bradner discusses at the group and community level and other affordances on a higher level.

The robust three-level framework allows the study of affordances in context by showing connections between different levels of affordances. With this structure, it is clear to see what levels of affordances have been designed and realized in practice. Current HCI design is not good at higher levels of affordances, because it spends too much time developing operational affordances. Baerentsen and Trettvik’s structure also makes it possible to distinguish social affordances from other types of affordances in a meaningful way.

Instrumental Affordances and Social Affordances

In this project, I approach issues of affordances based on the three-level structure and distinguish technology affordances into two types: instrumental affordances and social affordances. Instrumental affordances will refer to affordances on both the levels of operation and action by combining operational affordance and instrumental affordance from Baerentsen and Trettvik's work. These are affordances emerging from use interactions in the material context. Social affordances are the affordances on the activity level emerging from use interactions in the socio-cultural and historical context. For example, the instrumental affordances of mobile text messaging include silent communication, convenient use, discrete action and so on. Its social affordances include staying in contact, having fun, and others (for details, please go to Ch.4).

I made this choice as I am focusing on examining the higher-level interactions of situated use and cultural contexts in this project without probing into interactions on the micro-action level. It is not meaningful to describe operational affordances without an in-depth understanding of operations and conditions. Therefore I treat these two levels of affordances in a general manner; however, I recognize instrumental affordances that I am discussing in this dissertation come from both levels of actions and operations, and I do not want to suggest that operational affordance can be ignored in research.

Second, I recycle the term "social affordance" from Bradner to refer to "need related affordance", but use it in a slightly different manner. Here, "social" refers to social interactions on both the community-based level and the society and cultural level, which is broader than in Bradner's interpretation. "Social affordance" here is a more

straightforward and accurate way to describe the relationship between social practices and technology properties than Baerentsen and Trettvik's "need related affordance."

Third, the distinction between instrumental and social affordances corresponds to the two aspects of human actions — instrumental aspect and social aspect — that I am studying in this project, which helps me better address how affordances are designed and realized to support the two aspects of actions.

In addition, I argue both types of affordances are realized not only by the artifact in use, but by other parts in a technological system as well. In the case of mobile text messaging, the whole system consists of the artifact (including its software and hardware), the services received from carriers, and the network technology. We are unable to simply locate the usability issue in the handset or in one component.

Intended Use and Possible Uses

Another issue is how affordances are realized in use. Here there is a gap between intended and possible uses, and between design and use. As people often find in IT product designs, though certain types of affordances are designed into an artifact, they might not be recognized or appreciated by users as what designers expect. Quite often, other uses have been developed through use beyond the designers' intentions. These uses are also the local uses discussed in Chapter 1.

This phenomenon of unintended use appears due to the fact that affordances actually cannot be designed in advance. As I discuss above, affordances only emerge during interactions through use, and they are "but abstract moments of the concrete users [sic] concrete user activity" (Baerentsen & Trettvik, p.60). Thus, "[t]he task of design is in many

cases not to eliminate the possible uses, but rather make sure that the intended use is visible for the user” (p.59).

Cultural Usability: Bringing Meanings into Activities

Based on the discussion above, I propose a framework of cultural usability integrating key concepts from activity theory, genre theory, and British cultural studies to explore contextual issues in usability studies and approach cultural issues in the design process.

With a focus on the mediation of *meanings* and of *activities* in context, the framework of cultural usability regards usability as a diffusing feature across the activity system, incorporates cultural factors from both the *immediate context* and *socio-cultural context* into the object of inquiry, and situates culture in the dynamic interactions of the *instrumental* and *social* affordances of the technological artifact (see Figure 2.4).

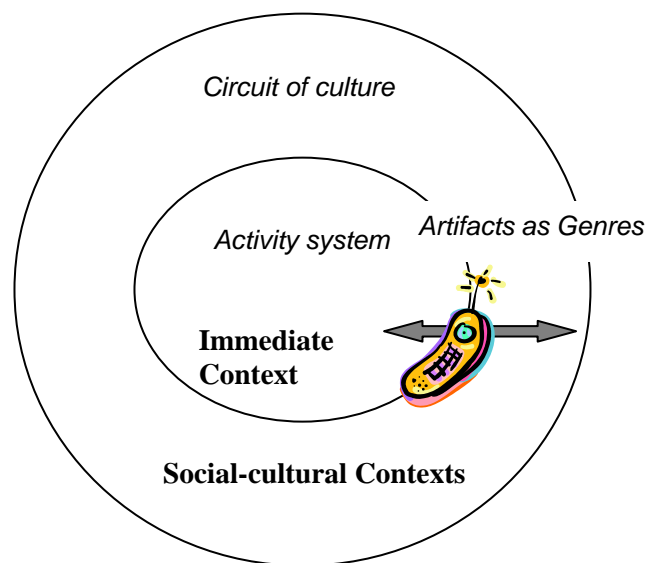


Figure 2.4 The Framework of Cultural Usability

I argue that usability is a diffusing feature that embodies interactions in the network. It is founded on and originates from the process of mediation. In simpler terms, usability is a

mediation process that consists of tool-mediated production and sign-mediated communication. It is both (a) a material interaction with the artifact and its context and (b) an interpretation process of this activity. As Suchman and her colleagues (1999) point out, the integration of technologies with our social and material worlds are actually interactions among agents, actors, and artifacts in the network.

The framework of cultural usability is used as a research methodology in this project. My stance of research here is “praxis.” I agree with Sullivan and Porter (1993) that technical communication research is “a design activity involving the construction of a method worked out from the intersection of theory and situation, which leads not to knowledge (in the sense of total truth), but toward understanding, the basis for future rhetorical judgment” (p.237). As Salvo (2001) suggests, usability studies can be both a design mechanism and a critical research practice.

The framework shaped my methods of data gathering and analysis and guided through the fieldwork of this project as described below:

- To explore a concrete use activity situated at the intersection of the immediate and the socio-cultural context, I used the hierarchical structure of activities to examine patterns of uses such as where and when the text messaging practice occurs, who people text to, and what they text about. The activity-based instrumental affordances and social affordances were brought in to understand the dynamic interaction process between the user and the technological artifact and between practice and context.

- To investigate recurrent use situations of mobile text messaging in context and search for structuring forces of this technology in a broad socio-cultural context, I drew from genre theory, linked textual patterns of mobile messages to routinized use behaviors, and analyzed accordingly. In addition, the technology of mobile text messaging was interpreted as a genre which mediates between social motives and local goals with instrumental and social affordances.
- By looking at the circuit of culture through which text messaging technology circulates, I analyzed how the mediation of meanings and the social motives originating from broad cultural contexts affect the adoption and use of this technology in daily life practices and in various life spheres. Furthermore, the circuit view provides a timeline and a developmental aspect to look at the local use process.

The framework of cultural usability makes it possible to transform descriptive accounts of use into prescriptive suggestions for design. It delves into the mediation process of activities and meanings with a developmental aspect and studies general and ethnic cultural factors constituting the process. It uses heuristics such as the activity structure and the circuit of culture for data collection and analysis. With this framework, theory-informed scenarios can be developed to intervene in the design process. In addition, this intervention is part of the circuit of culture.

The following chapter describes how this framework of cultural usability guided me to design and conduct research for this project.

Chapter 3

Research Design

The research goal of this study is to uncover the complex interactions between situated uses and the surrounding cultural contexts via multiple case studies of frequent users of text messaging technology. To explore how different cultural factors are interwoven in situated uses of a technology, I chose to conduct comparative case studies in two distinctively different cultural contexts: the US and China. Qualitative research methods were employed to learn about the subjective understandings of mobile messaging and obtain local explanations. This chapter describes the research design, pilot study work, methods of data collection and analysis, and validity issues.

Research Sites

The fieldwork was primarily conducted in two sites: the capital region (Albany) of New York State in the US and the capital area (Hangzhou) of Zhejiang province in China.

Site Selection

I chose these two research sites for comparison based on three major considerations that I will describe in the following section.

First, these specific areas are representative of the typical user-base for mobile telephony in the two countries. As middle-sized cities in the well-developed regions of these countries, Albany and Hangzhou both boast the average or above average penetration

rates of cell phones and text messaging. All major national wireless carriers can be found in these two cities. These factors are helpful for a study of frequent users of mobile messaging and make the fieldwork easier for operation.

Second, these two areas are comparable for case study research. Albany is 150 miles away from the biggest city in the US, New York City, while Hangzhou is 113 miles away from the biggest city in China, Shanghai. Both capital cities are similar in city size and have similar statuses in economical, technological, and cultural institutions of their home countries. The use patterns found from these two sites not only represent the current trends in metropolitan areas but also are meaningful for the future study of the adoption and use of mobile technology on a wider scale.

Third, as a researcher, I am familiar with both areas and local cultures, which is important for a study on contexts of use. I have been living in the Albany area for almost four years. I lived in Hangzhou for eight years, and I still have close contacts there.

Site Description and Comparison

IT Infrastructure

The following table describes demographics and technology usage in the US and China primarily according to a recent report from Morgan Stanley (Meeker, Choi, & Motoyama, 2004).

Categories	USA	China
2002 Population (000's)	280,562	1,284,303
2002 GDP per Capita (US\$)	37,231	963
2002 Installed PCs (000's)	198,469	29,159
PC Penetration	71%	2%
2002 Internet Users (000's)	162,100	59,000
Internet User Penetration	58%	5%
2002 Telephone Lines (000's)	177,000	214,000
Telephone Line Penetration	63%	17%
2002 Mobile Phones (000's)	140,767	206,616
Mobile Phone Penetration	50%	16%
Mobile Phone to Internet User ratio	0.9:1	3.5:1
Monthly Volume of Mobile Messages in 2002 (000's)	100,000*	7,500,000**

Notes:

All data come from *China Internet Report* (Meeker, Choi, & Motoyama, 2004) except noted.

* Source: Forrester Research (Oct.2002)

* Source: SINA (Dec.30, 2002)

Table 3.1 IT Use Profiles in Year 2002

As shown in Table 3.1, US and China use profiles contrast with each other interestingly. With 162 million Internet users and 198.5 million PCs in 2002, the US is the top market for personal computing and e-business (ibid); however, American users seem to be very reluctant to use mobile content services such as mobile text messaging. Compared to the US, China boasts the second largest Internet and PC user base; however, the penetration rates of PC and Internet users are still very low due to the country's large population. Among other available ITs, mobile phones stand out as a "revolutionizing force." The penetration rate of mobile phones in China in 2002 was eight times larger than PCs, and more than three times the number of Internet users. In the US the rate of mobile phones was 71% more than PCs, and 86% of that of Internet users. Morgan Stanley states that "[n]o major market comes close to China's 2003 ratio of 3.5 mobile users for every one Internet user...Simply based on volume, interest and momentum, it is likely that China will possess increasing scale advantages in mobile phone and Internet connectivity/messaging" (p.27).

The most recent data from China shows that earlier this year mobile phone users exceeded landline phone users for the first time. And in 2003 the volume of text messages reached the record-high number of 220 billion (Chinabyte.com, 2004).

Categories	USA	China
2003 Internet Users (000's)	185, 000*	8, 0000*
Mobile Phone Users (000's)	154,000 (by Dec.2003)**	296,000 (by Apr.2004)***
Telephone Line Users (000's)	...	285,000 (by Apr.2004)***
Volumes of Mobile Messages in 2003 (000's)	...	220,000,000 ****

Notes:

* Source: *China Internet Report* (Apr.2004, Morgan Stanley, p.6)

** Source: IDC (<http://www.idcresearch.com/getdoc.jsp?containerId=31272>)

*** Source: *Monthly Report of Telecommunication Industry* from the Ministry of Information Industry of China (<http://www.mii.gov.cn/mii/hyzw/tongji/yb/tongjiyuebao200404.htm>)

**** Source:

(<http://www.chinabyte.com/busnews/216485043416072192/20040202/1764690.shtml>)

Table 3.2 Most Recent Data of IT Usage

Digital Telephony and Text Messaging

In the Albany area, there are currently six national wireless carriers: Verizon Wireless, Cingular Wireless, Sprint PCS, Nextel, T-Mobile USA, and AT&T Wireless¹. These

¹ AT&T Wireless introduced their service to the Albany area in the middle of my fieldwork. Therefore I do not have participants who use this service.

carriers offer voice service on digital wireless technologies such as CDMA (Code Division Multiple Access), GSM (Global System for Mobile), and iDEN (Integrated Digital Enhanced Network). Data services are offered on corresponding network technologies such as 1XRTT (Single Carrier (1x) Radio Transmission Technology) and GPRS (General Packet Radio Service), and iDEN (see Table 3.3).

Carriers	Wireless Technology Standards	Wireless Network Technology for Data Service and Internet
Verizon Wireless	CDMA	1XRTT
Cingular Wireless	GSM	GPRS
Sprint PCS	CDMA	1XRTT
Nextel	iDEN	iDEN
T-Mobile USA	GSM	GPRS
AT&T Wireless	GSM	GPRS

Source: Forrester Research (Oct.2002)

Table 3.3 Digital Wireless Technologies in US

In the Hangzhou area, as in other Chinese cities, there is tight competition between two national carriers: China Mobile and China Unicom. The former offers service based on GSM technology, and the latter offers service on both GSM and CDMA technologies.

American carriers offer two ways for customers to pay: monthly plan packages and prepaid phone cards. Most customers select the former. Wireless plan packages often

include monthly airtime minutes ranging from two hundred to thousands of minutes, unlimited nighttime and/or weekend minutes, free long distance, and other features such as voicemail, caller ID, call forwarding, call waiting, etc. A typical calling plan ranges from \$30-40 with 200-300 monthly airtime minutes with free night and weekend minutes. Additional minutes beyond monthly airtime allowance are usually \$0.40~50 each.

Text messaging is typically a separate feature American customers need to pay extra money to get. Different carriers offer different choices. For example, customers can opt in a bundled text messaging plan such as \$2.99 for 100 text messages (e.g., Verizon Wireless), pay \$10 for a “vision package” for text messaging and unlimited wireless Web access (e.g., Sprint PCS), or choose a bundled text and talk plan in which text messaging is included (e.g., T-Mobile). Occasionally text messages are free in some bundled text and talk plans. If customers do not choose a separate text messaging plan, they will pay \$0.10 for a message sent and \$0.02 for a message received.

Like their American counterparts, Chinese customers also have two choices: monthly plans and prepaid cards. Individual customers often chose prepaid phone cards, as there were usually no discounted service packages available before 2002. As wireless competition became more intense and the wireless carriers introduced discounted monthly packages, more and more customers opted for monthly plans. A common Chinese calling package includes these features: in-network local minutes, out-of-network local minutes, and a couple hundred text messages. Compared to

American calling plans, Chinese calling plans do not include features such as free long distance, voicemail, caller ID, and call forwarding. The monthly fee ranges from 20-50 Yuan with free incoming calls including a few hundred local minutes and a few hundred text messages. Additional minutes outside the network will cost 0.55-0.60 Yuan each, and those inside the network will cost 0.35-0.40 Yuan each. In most cases, text messages are bundled with phone calling plans. Customers pay 0.10 Yuan for additional text message sent, and incoming messages are free.

Table 3.4 compares different features of typical calling plans at these two sites based on information found on carriers' websites.

<i>Features</i>	<i>American Site</i>	<i>Chinese Site</i>
Monthly airtime minutes	Included	Usually not included. If included, only for local in-network calls
Free night and/or weekend minutes	Usually included	Not included
Free long distance	Included	Not included
Voicemail	Included	Not included, an extra feature to order
Caller ID	Included	Included
Text messages	Not included, an extra feature to order	Included
Additional minutes	\$0.40~50 each (same price for both inside and outside	0.55-0.60 Yuan each for calls outside the network,

	the network)	0.35-0.40 Yuan each for calls inside the network
Additional text messages	\$0.10 for a message sent and \$0.02 for a message received	0.10 Yuan each a message sent, free for messages received

Table 3.4 Comparisons of Calling Plan Features between Two Sites

Text Entry Methods

Currently there are three popular predictive typing technologies worldwide, T9, eZi, and iTap. All three technologies support multiple languages including English and Chinese (SJInfo, 2003; Yesky.com, 2003).

T9, which stands for “text on 9 keys,” was introduced by a U.S. company Tegic Communications (now owned by AOL) in 1998. This method is the most accepted predictive typing technology which has been installed on more than 100 phone models throughout the world². Phone manufacturers such as Nokia, Siemens, Samsung, Sanyo, Sony, Kyocera, and Philips use this technology. Its Chinese dictionary has 9,000 words (ibid).

eZi was developed by a Canadian company Zi corporation. This technology is loaded on the phones made by Ericsson, Alcatel, and Amoi. Its dictionary for Chinese has 20,902 words (ibid).

² <http://www.tegic.com/licensees.html>

iTap was developed by Motorola and loaded on phones made by Motorola. Its dictionary for Chinese has 6,727 words (ibid).

For Chinese inputting, each of these three methods is divided into two input modes:

Sound-based input (e.g., Pinyin mode or BoPoMoFo mode) and shape-based input (e.g., stroke mode). The sound-based input mode is built on Pinyin, the standard notation for the Romanization of the Chinese simplified character set. In the Pinyin or BoPoMoFo mode, a user spells the character phonetically using Pinyin. In the Stroke mode, the technology divides the Chinese character into a few basic strokes with each key

representing one stroke such as dot (·), dash (—), perpendicular downstroke (↓), downstroke to the left (↙), wavelike stroke (ㄨ), hook (㇇), upstroke to the right (↗) and bend (㇏). T9 is the most popular inputting method which uses five strokes, eZi uses eight strokes, and iTap uses nine strokes. In Figure 3.1, a is a phone keypad with T9 using keys of 1-5 to represent five basic strokes; b is a phone keypad with eZi that uses eight numeric keys to represent eight strokes and Key 8 as a wild card key to represent the stroke the user is not sure of how to classify into one of the eight basic strokes; c is a phone keypad utilizing iTap method with nine numeric keys for nine basic strokes.



a. A Nokia Keypad with T9 Input Method



b. A LG Keypad with eZi Input Method



c. A Motorola Keypad with iTap Input Method

Figure 3.1 Cell Phone Keypads for Chinese Market

The most recent versions of sound-based and shaped-based methods all incorporate time-saving functions such as associated phrases. For example, a phrase (word) in Chinese is usually made up of two characters. With the function of associated phrases, users can get the second character right away after inputting the first character. For example, the word “zhong fan” means “lunch” in Chinese which consists of two characters. When a user chooses “zhong” for the first character, other characters that can be combined with “zhong” for meaningful words would appear at the bottom such as

“fan” (for “lunch”), “wu” (for “noon”), and “jian” (for “middle”). The user could just choose the character “fan” without further entering anything. Some models even allow users to develop their own dictionaries. But old phone models lack this functionality.

If just comparing text entry speeds of English and Chinese with predictive typing methods, entering Chinese text messages is not as hard as one might assume. In my own experiments, I found that entering Chinese texts was not more difficult than entering English texts on a phone keypad, and in fact Chinese messaging sometimes might be faster using the five-stroke input³. However, compared to entering texts on a computer keyboard, no matter how easier entering Chinese it is than on a phone keypad, it is still slower than doing it on the keyboard.

Chinese inputting also has its challenges. For sound-based input, since Pinyin wasn't introduced until the 70s by the Chinese government, most people of older generations are not good at Pinyin at all. Thus text entry is a big barrier for users over 45 who want to adopt text messaging technology. Second, sound-based input requires a user to pronounce each character correctly. There are many dialects in China that differ greatly, but Mandarin (the official spoken language of China) is based only on one type of dialect: The Northern dialect. Many southern Chinese have strong accents, causing them to have problems pronouncing Mandarin properly. Third, sound-based input usually requires more keystrokes per character than shape-based input. However, in shape-based input

³ Shape-based input usually locates the same character quicker than sound-based input locates it.

(Figure 3.1) various phone models map basic strokes differently on phone keypads.

Furthermore, shape-based input requires a user to enter each character stroke by stroke in a specific stroke order strictly as it is taught in elementary schools; however, many people often deviate from the correct stroke order in daily writing. In the end, it takes time to be a proficient typist on a particular phone model. So, sometimes, switching to a new phone means not only adjusting to a new interface and special functions but also learning a new input method.

Dimensions of Culture

From the perspective of international communication (Honald, 1999), American culture and Chinese culture differs in the cultural dimensions illustrated in Table 3.5.

<i>Features</i>	<i>American Culture</i>	<i>Chinese Culture</i>
Communication Style	Low-context communication	High-context communication
Power Distance	Low	High
Collectivism vs. Individualism	Individualist	Collectivist
Long-term vs. Short-term Orientation	Short-term orientation	Long-term orientation
Objective of Learning	Idealism	Pragmatism
Traditions of Learning	Understanding	Rote learning

Table 3.5 Comparisons of Cultural Dimensions between Two Sites

Case Study Approach

In this study, I use a case study approach to examine mobile text messaging use in context. As Yin (1994) suggests, a case study methodology helps to investigate a contemporary phenomenon within its real-life context especially when “the boundaries between phenomenon and context are not clearly evident” (p.13). In this project, each individual participant poses an interesting and meaningful case. Clearly, the case study approach is useful here to catch “the particularity and complexity of a single case” and to “understand its activity within important circumstances” (Stake, 1995) as it can disclose how a particular participant localizes the messaging technology to fit within his/her particular life spheres to make his/her life easier and more meaningful.

There are two features to this project’s case study approach. First, this approach is an “instrumental case study” (Stake, p.3). This project began with an intriguing issue rather than with a particular case. I sought to investigate how frequent users localize a hard-to-use technology to fit their lifestyles and how localization work occurs at the user’s site within the framework of cultural usability.

Second, it is a “collective case study” (Stake, p.4). To study this intriguing issue, I selected multiple cases to describe ways of localization. I chose cases based on the criteria of variety and diversity, which can help me understand localization practices from different angles and maximize my learning. More specifically, I use measures to compare across cases and to interpret information in depth for some of the cases. The comparison I

use here is to see what kinds of patterns are common across cases and across sites. Thus I chose a broad group which is stratified as varied as possible by age, gender, profession, and wireless carrier for the first stage of study (questionnaire and text messaging diary). The collected data about patterns of use include cell phone information, SMS use history, other IT use, and detailed SMS use patterns such as when and where participants texted, who they texted to, and what they texted about. At the second stage, cases with interesting patterns of use were selected to bear further exploration using methods of qualitative interviewing and/or shadowing observation to see how the users use text messaging technology in context and to hear how they interpret this use.

I employed the theoretical framework of cultural usability to guide my case study research. At the same time, I was open to other theories that might help me better understand cases. For example, theoretical constructs such as structuration theory and innovation diffusion were brought to help examine cases at the later stage.

Pilot Studies

To better design this study, I conducted two types of pilot studies: Surveys to get a preliminary understanding of the fieldwork sites and a full set of pilot fieldwork studies to test and refine research methods.

A preliminary survey was carried out at each of the two sites. I conducted a computer-based survey at the American site in November 2002. That survey consisted of

25 questions about demographic characteristics, phone features, phone plans, IT literacy, and messaging use. A total of 65 freshmen that were participating in the Communication and Information Technology course at Rensselaer Polytechnic Institute participated in that survey. This group was comprised of 55 males and 10 females, ranging in age from 18-20 years-old. Among this group, 37 had wireless phones and 33 of these phones were text messaging-enabled, but only 14 participants used their text messaging service (38%). The average user received 7 messages and sent 7.9 messages weekly, while the high-end user received 50 messages and sent 50 messages per week. The median values were eight messages received and three messages sent weekly. The survey participants appreciated SMS because it is fast, convenient, short, direct, and reliable. They were not satisfied with SMS due to cost, typing difficulty, message length, and the non-interoperability problem between the networks. They used the messaging service mostly for staying connected with friends (79%), sending a stealth message (71%), and arranging appointments (50%).

A paper-based survey was conducted at the Chinese site in April 2003. That version of the survey was a revised one based on the feedback obtained from the previous survey study, and the same one as that was employed in the pilot fieldwork (described as below). It consisted of 29 questions. Fourteen students from Zhejiang University participated, consisting of 10 females and four males ranging from 21-24 years-old. The median number of daily text messages exchanged was 10 messages.

A full set of pilot fieldwork was conducted from March to April of 2003. A 30-year old female retail manager (V20⁴) at the American site was selected as the participant. I employed a case study methodology with data collection methods including a survey, a text message diary, a shadowing observation, and a qualitative interview. The pilot case study shows that the participant sent 40 and received 27 messages during the four-day period of diary study and half-day of shadowing observation. Most of the text messages were exchanged in her workplace, but only a small percentage of messages were work-related. I found that the participant was using mobile text messaging to mediate between work and life, between business tasks and emotional needs. Technologically, the pilot case study helped me refine my research instruments through real fieldwork. Methodologically, it helped me see a new use case: Text messaging use of young professionals. Based on this, I expanded the fieldwork participant pool from college students to young professionals.

Participants

Criterion-based sampling is employed in this project. Participants were selected based on the following criteria:

- Participants must be frequent users of text messaging who send and receive at least five text messages per day (the more, the better). The number five came from pilot surveys and previous research (Q. Zhou, 2003; Y. Zhou, 2003). A large

⁴ A participant ID.

number of participants exchanged more than 10 messages each day, and some even reached 20 to 30 a day. The highest daily volume from the Chinese site was 68 while that from the American site was 47. By choosing frequent users as participants, I am able to study successful adoption cases of mobile messaging technology, which can help me understand what factors would improve and sustain localization practices.

- Participants are young adults ranging from 18 to 30 years-old. They are either college students or young professionals. They are likely to be more technology savvy compared to other groups of people, and they are more likely to purchase trendy gadgets as they can afford them. Most of them live by themselves or maintain a living arrangement independent of their parents. Some of them support themselves. A few of the participants are married, but none of them have kids. Furthermore, work, leisure, entertainment, and fashion are all important life issues for them at this age. The balanced interests in different life arenas offer me a good chance to explore what mobile messaging means to the users' whole life rather than just the leisure sector. This distinction distinguishes this study from previous research of mobile messaging, which primarily focused on the entertainment use of the teenager group. Meanwhile, this user group has its own distinctive culture, which makes it convenient to study both general cultural factors and ethnic cultural factors at the same time.

- Participants have various use patterns. I regard this project as an exploratory study of mobile text messaging in contexts, and I want to use multiple cases to describe ways of localization with a collective case study approach. Therefore, I chose a broad group of people from different ages and from two cultures, trying to stratify the participant pool as much as possible by profession, age, gender, and wireless carrier. For example, since each wireless carrier has its own service packages and special plans, I made sure that research participants were comprised of users from all the wireless carriers available in the fieldwork sites. I do not claim that all of my cases are representative ones, though some of them are.

I recruited American participants via two channels. For college students, I recruited at local colleges by posting flyers on campus, posting temporary job request messages through the career center email list or departmental lists, or posting the ad in college newspapers. For young professionals, I contracted the job to a local recruitment agency, Manpower. They posted the job ad on job information websites such as Monster.com, the job section of a local newspaper (Times Union) and their own website. It was easier to recruit college students than young professionals. The number of usable students who responded to my ad was two times the number of student participants. I contacted the respondents by phone first to know about their general use patterns before inviting them to participate. All young professionals who matched with the selection criteria and agreed

to participate were chosen for the study. In all, among the 26⁵ people who agreed to participate, seven of them dropped out in the middle of the first stage of the study after six of them returned the completed survey questionnaires⁶. The final number of American participants was 19.

Chinese participants were recruited primarily by referrals from friends. In this method, friends, colleagues, and classmates who matched with selection criteria were located and invited to participate. As was the case at the American site, college students were easier to recruit. Twenty-four people participated in the study. Two participants' data were removed during the stage of data analysis because their text messages were not logged properly. The final number of Chinese participants was 22.

Participants were offered payment for their work based on the local hourly rate. A few participants declined payment.

At both sites, a few participants contributed to the study together. Here group participants refer to people who are close friends, roommates, or lovers. The messages they sent to each other counted for most of the messages they logged in their diaries. There were two groups of participants at the American site: One group was a couple and another group was comprised of four close girlfriends. There were three groups of participants at the Chinese site, and they were all couples.

⁵ This number includes the participant of the pilot fieldwork, V20.

⁶ Their questionnaires were not included in the survey data.

Table 3.6 describes participants' demographic characteristics and their wireless carriers. Seven of 19 American participants and 10 of 22 Chinese participants were selected for an in-depth study and participated in two stages of the study. Their information is listed in bold in the table.

Three patterns deserve our attention. First, two thirds of the participants are female. I did not arrange gender constraints for participant recruitment. As long as people met criteria and showed distinctive use patterns, they were accepted for research. Second, two thirds of the participants are college students. I was trying to find more young professionals who use mobile messaging frequently, but this group of people were either difficult to locate or unwilling to participate in research. Third, the number of participants from some wireless carriers (e.g., Sprint PCS, Nextel) is much smaller than the number of those from other carriers (e.g., Verizon Wireless, T-Mobile) at the American site. This situation was either caused by the size of the customer base in the Albany area or by their not-so-easy-to-use texting service. In all, these participant patterns illustrate a general user scenario of mobile messaging use at the two fieldwork sites.

American site					Chinese site				
<i>ID</i>	<i>Age</i>	<i>Gender</i>	<i>Occupation</i>	<i>Wireless Carrier</i>	<i>ID</i>	<i>Age</i>	<i>Gender</i>	<i>Occupation</i>	<i>Wireless Carrier</i>
V20	30	F	retail manager	Verizon	Y27	19	F	sophomore	Mobile
C15	22	M	graduate student	Cingular	Y41	21	F	translator	Mobile
N44	20	F	college junior	Nextel	L43	26	F	college teacher	Unicom

C42	19	F	college junior	Cingular	Y44	23	F	graduate student	Mobile
V27	18	F	freshman	Verizon	L45	20	F	sophomore	Unicom
S28	18	F	freshman	Sprint	Y46	21	F	sophomore	Mobile
V29	18	F	freshman	Verizon	L14	22	M	sophomore	Unicom
T21	23	F	admin assistant	T-Mobile	Y47	20	F	sophomore	Mobile
V11	22	M	audio engineer	Verizon	L17	23	M	sales and planning staff	Unicom
T22	20	F	college junior	T-Mobile	L48	29	F	copywriter	Unicom
T23	19	F	freshman	T-Mobile	Y11	23	M	college senior	Mobile
V25	23	F	admin assistant	Verizon	L12	21	M	college junior	Unicom
V13	19	M	freshman	Verizon	L21	21	F	college junior	Unicom
T12	20	M	college senior	T-Mobile	Y22	23	F	college senior	Mobile
V26	18	F	freshman	Verizon	Y25	21	F	college junior	Mobile
T41	18	F	college junior	T-Mobile	L13	22	M	college junior	Unicom
V43	20	F	sophomore	Verizon	L26	21	F	college junior	Unicom
V46	28	F	legislative coordinator	Verizon	Y42	20	F	sophomore	Mobile
V48	21	F	college senior	Verizon	Y28	19	F	sophomore	Mobile
					L29	19	F	sophomore	Unicom
					L15	20	M	sophomore	Unicom
					Y16	21	M	sophomore	Mobile

Table 3.6 Participant Description

Data Collection

My exploration focuses on two areas: Use patterns and mediation practices. I think these two areas provide us a way to illustrate a more complete story of the complexity and dynamics of usability in context from different angles. Use patterns present a snapshot view to us by indicating how a technology is actually used in real life, while mediation practices illustrate the dynamic process of how users interact with a specific technology in their lives and how usability diffuses across the network.

I designed this study into two stages. In the first stage, I focused on use patterns across cases and across sites to gather a general overview of how mobile text messaging is used at these two sites. In the second stage, I selected interesting cases emerging from the first stage and examined their mediation practices in depth.

Stage One: Studying Use Patterns

I conducted the first stage of this study at the American site from late August to early November in 2003. The same set of Chinese data was collected from October through November in 2003. At this stage, I employed questionnaire surveys and text message diaries to study patterns of mobile messaging use at these two sites.

Questionnaire Survey

Surveys gather demographic information, use details, as well as views and feedback from a large number of users. They are a popular method to investigate the use trends of a specific

technology in usability studies. One of the famous examples is GVU's WWW online user survey. Even for a small sample of participants, surveys help to collect measures that are independent of the system, users, or tasks to which questionnaires are applied and can serve as a reliable basis for comparison across sites (Kirakowski, 2001).

Two forms of questionnaire-based surveys were implemented at the first stage. The first questionnaire is a stand-alone study entitled "Mobile Messaging User Survey" (see Appendix A). It was developed based on Geisler's PDA user survey (personal communication, December 5, 2002) and pilot study. Participants were asked to fill out this survey on the spot when they were given their workbooks for the diary study at our first meeting. The survey has a total of 25 questions which are divided into four sections: background, phone information, SMS use, and use of other IT. Most of the questions are multiple-choice, and a few open-ended questions are informational questions. The Chinese version of the survey differs slightly from the American version to accommodate the local technological context.

The second questionnaire is embedded in the last two pages of the diary study workbook (see Appendix B). I asked participants to complete this survey during their diary study. A total of eight open-ended questions asked participants how they feel about and their expectations for mobile messaging.

Text Message Diary

Diary studies are often used in HCI and CSCW research as “a middle-ground solution to the opposing limitations of laboratory studies and field studies” to capture “activities that occur in real environments vis-à-vis some kind of technology currently under investigation” (Palen & Salzman, 2002b). Furthermore, in this project, mobile text messaging is an ad-hoc activity occurring in any context, sometimes in very private contexts, where the researcher is unable to study directly. A text message diary logged by the participant is used to record the mediation practices and sample the participant’s typical messaging use patterns within a window of four consecutive days, including workdays and non-work days. In this case, a personal schedule is prioritized above the calendar weekday and weekend schedule. This setup is also based on the phone plans at the American site where phone minutes are charged differently on weekdays and weekends⁷.

I developed 16 pages of the “Experiences with Mobile Messaging” workbook (see Appendix B) for participants to log their text messages based on existing field research (Conifer Research, 2002; Grinter & Eldrige, 2001). The workbook is divided into three sections. The first section asks participants to map their social network and daily IT use in charts. The second section allows the participants to log the time, locations, situations, message recipients, and message content (see Figure 3.2). The third section is an

⁷ Due to some implementation issues, message logs from eight Chinese participants only have the workday patterns.

open-ended questionnaire. For private messages, participants do not need to log the message content, but they are asked to log the place, time and situation for that message. At the American site, I sent a mobile text message to each participant's cell phone to remind him/her to log messages every day during the diary study. In addition to the standard log form allowing participants to log 22 messages a day, I also gave some participants extra pages to log additional messages (these users claimed that they were high-volume message senders during our initial meeting). However, by reviewing the collected text messages it is clear that the participants did not log all of their text messages during that period. The reasons are complex. In some situations, participants ran out of extra log forms and did not ask for more. In others, some cell phones can only hold dozens of text messages and the oldest text messages were automatically purged before the participants had a chance to log them at night on the same day.

Day 1		Shorthand: R —Message Received, SP —Message Sent By Phone, SE —Message Sent By Email, SW —Message Sent Via Websites										
Today's date: _____		Q*: Would you still send the same message with other communication tools if you didn't have a mobile messaging service available?										
#	Time	Type				From / To Whom	Reply to Message #	Message Content	Place	Situation	Q*	
		R	SP	SE	SW						Y	N
3	7:00 a	x				Jane	2	City kitty	driving	She went to NYC	x	
1												
2												

Figure 3.2 Text Message Log Form

A total of 2474 text messages were collected from the fieldwork, including 813 messages from the American site and 1661 from the Chinese site. Data obtained from the text

message diary study provide a vivid picture of how participants used messaging technology in context by illustrating patterns of when and where text messaging occurred, who participants texted, and what they texted about. These use patterns helped me understand the on-going messaging practices from both the perspective of genre and the angle of activity theory.

Stage Two: Investigating Mediation Practices

I conducted the second stage of fieldwork from October 2003 to May 2004. This stage was a rather long period, as I worked on transcribing paper-based workbooks into computer databases and conducting analyses of messaging patterns across the sites to select participants for the second round. Also, it took time to retrieve all of the surveys and workbooks from the Chinese site.

Forty percent of the participants were selected for the second stage. They were not randomly chosen. Special attention was taken to keep a balanced variety of subjects, based on their messaging patterns from the first stage. For the sake of variety, I chose people who came from different wireless carriers, age groups, and genders. I then selected people who had distinctive patterns. They were chosen either because they exchanged the highest volumes of messages at their sites, because they texted at a specific time period (e.g., after work), because they texted to specific people (e.g., to a sister), because they texted for specific purposes (e.g., texting to exchange reviews about

sports games late at night), or because they had interesting interpretations (e.g., regarding text messaging as “a beautiful form of implicit communication”).

At this stage, I used methods of qualitative interviewing and/or shadowing observation to conduct an in-depth study the mediation practices of selected cases.

Qualitative Interview

Rooted in the philosophy of qualitative research, the qualitative interview is a field interviewing method to find out what participants feel and think about their worlds (Rubin & Rubin, 1995) by allowing the researcher to avoid imposing their worldview on the participants. A qualitative interview is usually built up from three types of questions: main questions, probes, and follow-up questions.

In my fieldwork, I used different forms of qualitative interviews to collect life stories about cell phone use and SMS use from selected participants to understand how they think of and interpret their messaging life. I usually started a semi-structured interview with questions emerging from the previous stage of fieldwork. For example, I showed the participant a chart of her messaging activity based on her text message log for one day (for sample, please see Figure 5.6) and asked her what she thought of her messaging pattern. Sometimes I asked a participant why he sent text messages at a specific time period or in a certain place. After the participant’s memory was refreshed, I asked him questions about his phone’s features, his personal adoption process, any usability

problems and solutions he encountered, learning artifacts, and his personal interpretations (for a sample of the interview protocols, see Appendix C).

An interview usually lasted 45 to 75 minutes, all of which was audio-recorded. At the American site, most of the interviews were conducted with the individual on campus, in their dorm, or at home. For a group of three girls who are close friends and classmates, I chose the format of a focus group. A total of seven American participants participated in the interview. The interviews at the Chinese site were individual interviews conducted on the phone. Ten Chinese participants were interviewed in this manner.

As the second stage lasted for a period of time, most participants were interviewed five or six months after they first participated in the diary study. The people interviewed had clear memories of what happened during the initial study. With this timeframe, I was able to see how their messaging patterns evolved throughout that period. After the first stage, most people did change their use patterns. To make the data comparable across cases, I interviewed two participants who were interviewed earlier than most of the other people (one in April 2003 and one in December 2003) again about their new patterns in May 2004.

Interviews allow me to access the rich data of individual user experiences that are not exposed in questionnaire surveys or text message diaries. These detailed accounts

provided me with a solid foundation to build explanations for the mediation practices of mobile messaging.

Shadowing Observation

Shadowing observation is a way of observing users by walking in their shoes. The benefits of shadowing in this project are obvious: I will be able to gain deep insights into a participant's messaging activity and his/her use contexts. However, text messaging can be personal and not many participants are willing to be shadowed. Another problem is time. To obtain participants' consent for observing, I had to propose to follow them for only half a day at a time convenient for them. This timing arrangement works best for participants who have a peak messaging time in the daytime but not for odd hours. For example, one of the participants told me her peak time was right before bedtime when she usually had leisure time to chat with friends in bed and then fell in sleep. And some of the other participants claimed that they did not have a peak time for messaging, and thus it was not feasible for me to capture a couple of message-sending moments spanning across the whole day. Neither was it feasible for me to have an overseas trip to observe Chinese participants with the current difficult situation of visa application.

Among the seven American participants in the second stage, I found three people who were willing to be shadowed. For each of the participants, I followed them for one or two half-days as they went about their tasks in their cars, offices, stores, classrooms, gyms, and dorms — popular places for messaging from their diary studies — and saw how

they texted in context. I found some eye-opening discoveries during some observation sessions, although I did not find anything exciting in one of the cases.

During the shadowing session, I used field note forms to guide my observation and make notes. To save time for transcribing, I developed a field note database on my PDA for the last two cases (for screenshots, see Figure 3.3)

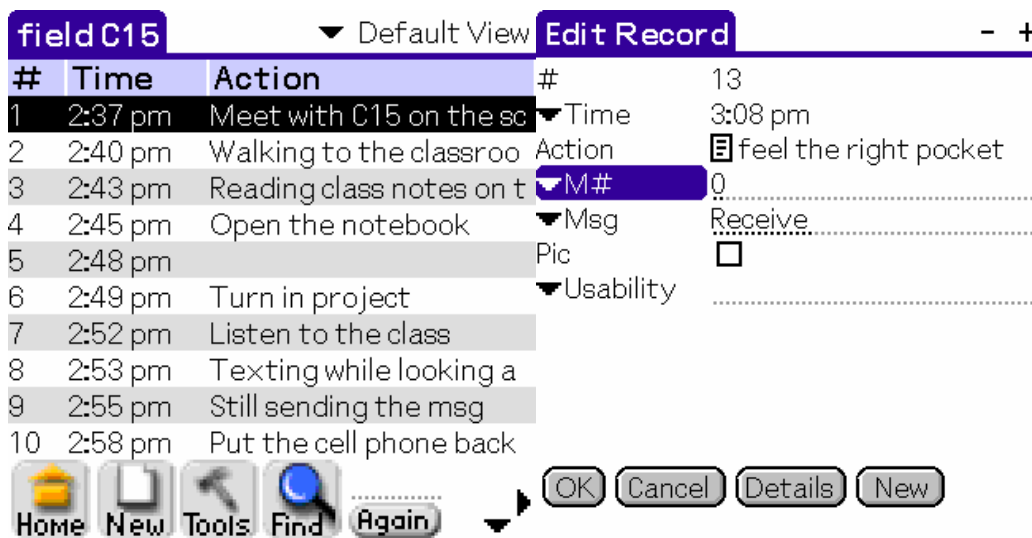


Figure 3.3 PDA-based Field Note Database

Data Analysis

Research Questions

The primary goal of this project is to study the localization process at the user's site by exploring the dynamic interactions between cultural contexts and situated uses surrounding mobile messaging technology. The framework of cultural usability is employed to probe the articulation moment when different levels of contexts interact with each other and when activities and meanings are interwoven.

Other goals include:

- Fully develop the model of cultural usability in fieldwork
- Search for workable localization heuristics to improve current localization practices

Questions that explore the phenomenon of mobile text messaging are developed within the framework of cultural usability by pulling together perspectives from localization and usability studies, activity theory, genre theory, and British cultural studies.

Two driving questions for this project were formed through fieldwork. One is about the phenomenon of mobile text messaging; another is about the localization process at the user's site:

- Why is mobile text messaging so popular even though mobile phones are not a good tool for writing?
- How are cultural factors articulated through use to localize a technology?

In addition, the following particularizing questions were posed during the fieldwork:

- Are there different use patterns and mediation practices between Chinese users and American users? If so, what are they?
- How do different levels of affordances work during use?
- In the case of mobile text messaging, how did frequent users (successfully)

localize a hard-to-use technology to fit their lifestyles?

- What do these localization practices at the user's sites suggest for future localization work?

To answer these questions, I analyzed the data through two stages, pattern-comparison and explanation-building, to understand how contextual and cultural factors are articulated during the localization process to help achieve usability goals in users' contexts.

Pattern Comparison

At this stage, data concerning use patterns and mediation practices were coded into different pattern categories by following the theoretical framework of cultural usability. I am interested in locating factors from the immediate context and the broad cultural context and exploring how these factors shaped and informed the messaging activity. Also, in this collective case study, I am looking for both individual patterns and general trends across cases.

Pattern Coding

To study the complexity of individual messaging activity embedded in context, I coded the individual case data collected from the diaries into patterns of use activity with a simple 5W structure: *When* and *where* did text messaging occur? *Who* did participants text to? *How* were messages exchanged? *What* did participants text about? Coding for the first four questions is pretty straightforward from diary logs. To better see patterns, I

typically convert the coding results into pie charts and activity charts (see the charts in Chapter 5-7). To code for the *What* question, I employed the verbal data analysis method (Geisler, 2004) to analyze text messages into two dimensions: Rhetorical purposes and life spheres. Details of the verbal data analysis method are discussed in the next section.

The 5W structure was also applied to study the general use trends across cases. For example, the average number of people a participant texted to in a four-day period. For a detailed discussion on this topic, please see Chapter 4.

Data collected from questionnaires, interviews, and observations were coded for two purposes. One is to explore mediation practices of individual cases included in the following categories:

- *Immediate contextual factors* originating from the immediate context that motivated a participant to adopt mobile text messaging or change their use of text messaging, e.g., friend's suggestions, unable to access email at work, the cost, and so on.
- *Broad cultural factors* originating from the broad cultural context that motivated a participant to adopt mobile text messaging or change the use of text messaging, e.g., advertisement impact, peer pressure, and the desire to stay connected.
- *Affordances* including instrumental affordances and social affordances of the mobile messaging technology found during fieldwork.

- *Uses for instrumental needs and social needs* including uses for instrumental (task-related) purposes and social purposes.
- *Usability problems* consist of two parts: instrumental aspect and social aspect. The instrumental aspects of usability problems include any issues related to the design of the phone, service plan, and the network. The social aspect refers to any problems related to the user's interpretations of the task and the service.

The second purpose is to examine the general trends across the sites. This category includes measures of use histories such as cell phone use history and SMS use history, measures of phone cost, monthly bill, learning methods of SMS, text entry methods, and so on.

Verbal Data Analysis

The development of the coding scheme for rhetorical purposes was informed by activity theory, genre theory, and my observations through fieldwork.

On the individual level as in the immediate context, I argue that users are not just texting for the experience of texting but texting to accomplish higher-level tasks. Texting is the action embedded in an upper-level use activity which originates from a goal. To better support user activity with a well-designed IT product, we need to understand what use actions users are engaged in and what kinds of goals users are developing through this use.

At the same time, the examination of use goals should inform UI design. Thus the categories of use goals should be able to be translated into design functionality.

On the social level, as in the broader cultural context, these use goals are related to a new writing practice for mobile devices. A closer look at the text messages shows that those exchanges are different from exchanges via email, letters, faxes, and instant messaging programs. For example, my fieldwork found that participants primarily used mobile messaging to communicate to close friends in the same age group (see Chapter 4). The emergence and popularity of this writing practice signals the birth of a new genre. As Miller (1984) suggests, genres are social actions as they are typified rhetorical responses to situations that are socially interpreted or constructed as recurrent or similar. Swales (1990) also characterizes a genre as “a class of communicative events” having “a shared set of communicative purposes” and similar structures, stylistic features, content and intended audiences. So what are those “shared communicative purposes” that find various representations via millions of messages exchanged on cell phones? What social motives contribute to this writing practice and bring to the birth of this new genre? Twelve years ago the genre of text messaging did not exist, but in the interviews some heavy users claimed they could not live without text messaging.

Based on these rationales, text messages were segmented by a single rhetorical purpose. There are a total of 2866 message segments with 942 from the American site and 1924 from the Chinese site. As we can see from the table below, most messages are

single-purpose ones. It should be noted that a single-purpose message might have two or more sentences sharing the same purpose.

	# of segments	# of messages	ratio of segments/ messages
US	942	813	1.16
CN	1924	1661	1.16
Total	2866	2474	1.16

Table 3.7 Overview of Text Messages

I developed coding categories based on speech act theory (Cutting, 2002), conversation analysis (McLaughlin, 1984), and previous research on instant and mobile text messaging use (Issacs et al, 2002). The rhetorical goals of text messages (see Appendix D for the coding schemes) were coded into seven categories:

- **Informing:** Code any message or reply that is sent to inform about something going on and to share information that one or both of the parties might be interested in.
- **Co-experiencing:** Code any message or reply that is sent to share the current status or experience with the other party.
- **Instructing:** Code any message or reply where the recipient is asked to help or propose something in order to accomplish a task.
- **Coordinating:** Code any message or reply that is sent to coordinate tasks, events, and schedules.

- **Expressing:** Code any message or reply that is used to express feelings or views.
- **Switching:** Code any message or reply that suggests having a follow-up phone or text conversation shortly.
- **Other:** Code any message or reply that does not fit one of the above categories.

Within the dimension of life spheres, I want to understand how participants used mobile text messaging to augment their work and life. For example, I wanted to explore in which life spheres they used mobile text messaging the most, which types of activities and relationships mobile text messaging supported best, and in what types of cultural contexts mobile text messaging fit best.

The coding scheme of life spheres was also informed by previous literature and other findings from fieldwork. Wheeler (1999) describes life spheres as “psychosocial settings within which a person functions” and which are “held together by common interests, purposes, visions, or goals” (p.45). It has three components: relationships, activities, and cultural context. Here, “[t]he relationships build the interpersonal and social network in which a person acts and interacts with other people [in a specific life sphere]... The activities are initiated and done within the confine of the life sphere... The cultural context provides the rules, regulations, and supporting framework for the life sphere” (ibid). This structure fits nicely with the framework of cultural usability that examines user activities by considering various factors in different levels of contexts: Different life

spheres maintain different relationships and initiate assorted activities within different types of cultural contexts.

Wheeler developed seven life spheres: work, family, personal leisure other than with family, professional affiliations, community activities, spiritual participation, and education. I adapted her categories to accommodate the feature of this study and coded the life spheres of mobile text messages into the following five categories:

- **Work:** Code any message or reply that is about the life sphere of work related to the sender or the recipient.
- **School:** Code any message or reply that is about the life sphere of the school or the educational institution related to the sender or the recipient.
- **Family:** Code any message or reply that is about the life sphere of the family related to the sender or the recipient.
- **Personal leisure other than with family:** Code any message or reply that is about the life sphere of personal leisure other than with family related to the sender or the recipient.
- **Other:** Code any message or reply that doesn't fit into any other categories or is a system message from phone carriers or advertisers.

In this dimension, I also used a single purpose message segment as the coding unit. In this regard, a purpose is an embodiment of an activity that is a component in a specific life sphere.

After two rounds of second coding, the simple agreement for the dimension of rhetorical purposes is .90 or .87 corrected by Cohen's Kappa, and the simple agreement for the dimension of life spheres is .98 or .96 corrected by Cohen's Kappa. The second coder tested 12.7% of message segments, including both American and Chinese.

Explanation-Building

At the second stage, coded patterns along with collected textual artifacts, text messages, interview transcripts, and observation notes were contextualized within the framework of cultural usability. This interpretive framework employs the activity system and the circuit of culture to map contextual factors. Previous research suggests that the usability of wireless phones lies beyond the handset (Palen & Salzman, 2002a). When a user is sending a text message, he is not just interacting with the interface of the wireless phone but with the service and the network. The physical touch of the phone, the interactivity of the phone interface, the service provided by the carrier, the speed of the network, his own interpretation of text messaging based on friends use and advertisements, will all affect his perception of usability.

The activity system and the circuit of culture map contextual factors to two perspectives:

Immediate contextual factors and broad contextual factors.

- On the lower level, with the analysis of immediate contextual factors, the activity system examines individual user experiences with a focus on the *instrumental* aspect. It explores the situated mediation process of mobile text messaging influenced by immediate contextual factors such as workplace rules and network service.
- On the upper level, broad user patterns and social shaping are explored on the cultural circuit with a focus on the *social* aspect. To provide a rich description of cultural factors influencing user experiences, I supplemented the interactional view of culture—the circuit of culture—with the dimensional view of culture that includes general cultural factors describing the culture of this user group and ethnic cultural factors describing two local cultures.

Moreover, I believe that these two perspectives are overlapped. Genres are used here mainly to investigate how the genre of mobile messages provides affordances that other existing genres lack and how the genre of wireless phones mediates and remediates use goals in context.

Validity Issues

A variety of procedures were followed to validate findings through fieldwork. At the data collection stage, the plan of data collection is shaped by theoretical propositions. Pilot studies were conducted to test the sites, examine research methodologies, and refine the research plan. Multiple sources of data were used to achieve triangulation of data sources.

At the data analysis stage, three theoretical frameworks were brought in to triangulate analysis. At the same, since my study is a combination of qualitative and quantitative methods, the analysis is triangulated by different methods. I checked for alternative explanations and negative evidences emerging from the study by discussing these findings with participants, my advisor, my committee members, and colleagues at school and at academic conferences.

Chapter 4

General Patterns of Use: Texting in Context

This chapter reports findings from the fieldwork and describes general patterns of use across cases. Narratives of selected cases will be given in the next three chapters.

Use Scenario Overview

Participant Profile

Table 3.6 in Chapter 3 describes a general demographic pattern among participants. They are frequent users who claimed to exchange more than five text messages daily.

To recap, the average age of the American participants is 20.8 years-old, while the average for Chinese participants is 21.6 years-old. Most of them were either pursuing or have earned their college degrees. Two thirds of participants were female. Twenty-two percent of the participants were working professionals in various industries. Most of them lived in rented apartments by themselves, with friends, or their partner, or in a dorm. A small number of participants lived with their parents. The usual place of work (including school work) for most of the participants was either in a location away from home or a mixture of home and away from home. By all standards, they were not mobile professionals, as none of the participants selected the “on the road” in the survey.

General Use of Mobile Telephony

Table 4.1 describes the participant's phone information between two sites on phone features, adoption history, and the cost.

Categories	US Participants	CN Participants
Average Phone Cost	\$ 75.00	1498.15 yuan ¹
Popular Phone Functions	Text messaging (100%) Web browsing (83%) Downloadable ringtones (58%) Downloadable games (54%)	Text messaging (100%) Downloadable ringtones (77%) Web browsing (55%) Downloadable games (55%)
Popular Phone Brands	Motorola (5) LG (4) Kyocera (2)	Nokia (11) Motorola (3) Samsung (2)
Average Use History of Phone (Months)	30.89	19.50
Average Use History of SMS (Months)	14.42	18.09
Average Monthly Phone Cost	\$ 66.94	56.14 yuan
Average Monthly	\$ 6.63	32.05 yuan

¹ The current currency exchange rate is 8.3 yuan per US dollar. The average wages, costs of the baskets for food, and price for domestically made products in China are similar to the US on the values of numbers.

Text Cost		
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Table 4.1 Phone Information

Phone Features: Participants at both sites used phone models which had similar phone functions such as text messaging, Web browsing, downloadable ringtones, and games (see Figure 4.1). However, Chinese participants paid more to purchase their phones, as Chinese wireless carriers seldom offer discounted cell phones with yearly contracts. The fieldwork did not find dominant phone brands among American participants. The most popular brand was Motorola, owned by five of the users. At the Chinese site, 11 out of 22 participants owned Nokia phones.

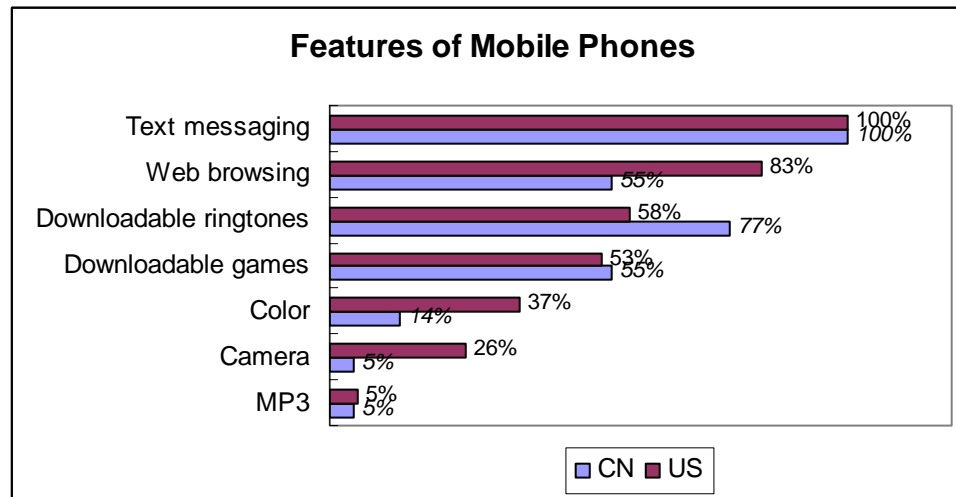


Figure 4.1 Features of Mobile Phones

Adoption History: American participants had a longer adoption history of cell phones than their Chinese counterparts. The average American participant had been using a cell phone for more than 2.5 years, and the average Chinese participant used a cell phone for

1.5 years before this study was conducted. It is interesting to note that the average Chinese participant had been using text messaging for 4-months longer than the average American participant. Moreover, for most Chinese participants, they started using text messaging at the same time they adopted their cell phones, while American participants usually adopted text messaging 16 months after they purchased their cell phones.

This trend can be explained by the local development of mobile telephony and IT infrastructure in the two countries. This was also validated by findings from participant interviews during the second stage. Most American participants stated that they experienced an adoption moment triggered either by a television commercial, a friend's suggestion, or a change in their life. The Chinese participants who were interviewed were not aware of such a moment of adoption: For most of them, texting is taken for granted. One participant said, "When I got my new phone, I texted to all my friends announcing that I got a phone and here is my phone number, blah blah...."

Wireless Cost: It is hard to compare the monthly costs of mobile telephony between two countries. However, the average ratio of call cost vs. text cost for American participants was 10:1, while the average ratio for Chinese participants was 1.75:1. Chinese participants were willing to pay more for text messaging than American ones.

Use of Text Messaging

Learning SMS: The most popular method to learn text messaging at both sites was “figuring it out by myself with trial and error,” selected by 94.7% of American participants and all Chinese. The second most popular method differed for the two sites. American participants tended to ask friends to show them (55.6%) or watch how other people do it (52.9%). Chinese participants preferred to consult manuals or tutorials (81.8%), while only 23.5% American participants did.

This finding suggests that we might need to revisit the findings from a previous comparative study of German and Chinese cell phone users (Honold, 1999). In that study the researcher claims that Chinese users from a high-context culture preferred to learn by imitation and relied more on informal and oral information, while German users from a low-context culture like to consult manuals. Similar to the German culture, American culture leans towards the low-context communication end (Hoft, 1995). Further research should be done to explore this area.

The survey also found that it took a much longer time for American participants to learn how to use text messaging, which might be due to the fact that they were not as motivated as Chinese users. All Chinese participants stated that it took less than one day to learn this task, among which 54.6% of them took less than 5 minutes and another 36.4% took half an hour. Only 15.8% of American participants reported using less than 5 minutes to learn this task, 21.1% spent half an hour, 15.8% a few hours, 15.8% one day, 26.3% one week,

and one participant needed a month. Of course, that participant did not spend the entire month learning this simple task. She tried it off and on, and she finally could use it after a month. The difference in time suggests that Chinese participants were motivated to learn text messaging, and thus they liked to consult manuals or tutorials to accomplish this task in a short amount of time.

Text Entry Methods: To most people's surprise, the survey found that participants, as frequent users of text messaging, did not use faster-inputting methods as we thought. At the American site, 68.4% of participants typically used multi-tap and only 44.4% used predictive typing². Various factors contributed to this phenomenon. Some participants had an older phone model that did not support predictive typing. Some people just did not like it. One participant said in her interview that she was so used to the rhythm of multi-tap that she could type without looking at the phone, but if she used T9, she had to keep checking the screen to see whether she typed the correct word came up. Another participant also thought that T9 messed up words occasionally, and she preferred to type words out.

At the Chinese site, 90.9% of participants usually used Pinyin input, and 10% did stroke input even though stroke input is faster than Pinyin input. Fifteen percent of participants sometimes used predictive English input to enter English³. Participants preferred Pinyin

² Some people consistently use both methods.

³ A few English messages were logged during the diary study at the Chinese site.

inputting to stroke inputting because the Pinyin method is easier to learn and more intuitive to use. People need practice to become good at stroke inputting. One user of five-stroke inputting stated that she adopted stroke inputting because she also used the Wubizixing (“five-stroke character-shape”) method to enter Chinese into the computer. Therefore, she was good at dividing characters into character roots because of her daily practice.

Ways of Sending Messages: Participants usually sent text messages by phone. Fifty percent of American participants and 18.4% of Chinese participants had sent text messages via websites, and only 6.2% of American participants and 13.6% of Chinese participants said that they used websites to send text messages very often. American users can also send text messages via email. Of these users, 37.5% of them had used this service and 6.2% used it occasionally.

In the diary study only a small percentage of text messages had been sent via websites or email, and most of these messages had been sent by people who either did not have cell phones or did not have a text messaging feature on their phones. This might have been due to the current design of the diary log. Messages sent via websites by participants were not saved in the participants’ phones. It is very possible that a participant forgot a text message he sent via a website when he was logging the messages late at night.

Types of Messaging Services: Two-way, basic text messaging was the most used service for participants at both sites. The second most popular service was Instant Messaging (IM) services on mobile phones such as American Online's Instant Messenger (AIM) at the American site and QQ⁴ at the Chinese site. More than half of the participants (55.6% in the US and 54.5% in China) had used this service, and 22.2% of American participants and 13.6% Chinese participants used this service very often. The third service was multimedia / picture messaging: 27.8% of American participants had tried it and 16.7% used it from time to time; 9.1% of Chinese participants had tried this service but none of them used it more than that.

Very few participants subscribed to informational alerts via wireless carriers or Web portals. Three American participants subscribed to alerts including sports scores (three users), weather forecasts (three users), music news (one user), and world news (one user). Four Chinese participants subscribed to alerts about daily phone cost (two users), sports (one user), and daily English words (one user).

Messaging Purposes: Americans said that the top two purposes for sending messages were for fun or passing the time (see Table 4.2). The former was ranked as No.4 (86.4% agree) at the Chinese site, and the latter was as No.9 (only 40.9% agree). In comparison, Chinese participants named staying in contact with friends or loved ones their number one reason for messaging. American participants ranked this as the seventh purpose, with

⁴ QQ is a popular IM system in China.

84.2%. Aside from this major difference, participants at the two sites shared some similar reasons for using text messaging. Of the top six reasons, more than 85% of the participants from both sites agreed on five of these six purposes, with only slightly different rankings between sites.

One important finding from this research is that the top purpose for messaging at both sites falls in the social life arena: Participants either wanted to have fun with friends or stayed in contact with them. This suggests that participants, at least in their opinions, texted more for social needs than for instrumental needs such as coordinating schedules or exchanging information.

Rank	US Participants	CN Participants
1	To have fun conversations with friends (100% agree; 84.2% strongly agree; mean=1.16)	To stay in contact with friends or loved ones at every moment (100% agree; mean=1.48)
2	To kill time (100% agree; 57.9% strongly agree; mean=1.42)	To send a stealth message in the place where I can't talk (95.2% agree; mean=1.76)
3	To connect with people without disturbing them (94.7% agree; mean=1.58)	To connect with people without disturbing them (90.9% agree; mean=1.64)
4	To send a stealth message in the place where I can't talk (89.5% agree; 52.6% strongly agree; mean=1.58)	To have fun conversations with friends (86.4% agree; mean=1.86)
5	To arrange or adjust appointments (89.5% agree; 47.4% strongly agree;	To get or exchange information instantly (86.4% agree; mean=1.91)

	mean=1.68)	
6	To get or exchange information instantly (89.5% agree; 36.8% strongly agree; mean=1.74)	To arrange or adjust appointments (85% agree; mean=1.85)
7	To stay in contact with friends or loved ones at every moment (84.2% agree; 63.2% strongly agree; mean=1.58)	To save phone cost (54.5% agree; mean=2.50)
8	To avoid lengthy phone conversations (84.2% agree; 47.4% strongly agree; mean=1.74)	To avoid lengthy phone conversations (40.9% agree; 13.6% strongly agree; mean=2.59)
9	To save phone cost (57.9% agree; mean=2.53)	To kill time (40.9% agree; 9.1% strongly agree; mean=2.64)
10	To email people when computers are not around (52.6% agree; mean=2.63)	To email people when computers are not around (40.9% agree; 9.1% strongly agree; mean=2.77)
11	To show people I'm cool (22.2% agree; mean=3.56)	To show people I'm cool (4.5% agree; mean=4.05)

(Notes: Purposes in lighter shading areas are those ones that more than 85% of participants chose, and purposes in darker shading areas are ones that more than 50% but less than 85% participants chose.)

Table 4.2 Comparison of Messaging Purposes

It is interesting to note that though a common assumption about text messaging users is that they want to save phone costs, this was not the case for both of these sites. At the Chinese site, only 54.5% of participants cited phone costs, even though phone calls cost

more there, and 57.9% of American participants chose this even though they had a larger minute allowance. At both sites, this purpose was not ranked as high as it was assumed.

Uses of Other IT

Daily IT Use: Table 4.3 describes the daily communication tools available to participants at the two sites (also see Figure 4.2). It is obvious that American participants had more communication tools available to them than Chinese ones. For 89.5% of American participants, their favorite daily communication methods included wireless phone calls, mobile messaging, instant messaging, and emails. 95.5% of Chinese participants stated that they used mobile messaging “usually,” and only 68.2% of participants used cell phones “usually.” The percentages of those “usually” using instant messaging and emails were much lower, 59.1% and 54.5% respectively. This scenario matches with the current development of IT infrastructure in these two countries, which is another reason for the high volume of text messages at the Chinese site.

Percentage Using IT	US Participants	CN Participants
90.0-100%	Wireless phones (100%) Mobile messaging (94.7%)	Mobile messaging (95.5%)
80.0-89.9%	Instant Messaging (89.5% also always using) Emails (89.5%)	...
70.0-79.9%	Landline phones (73.7%)	...
60.0-69.9%	...	Wireless phones (68.2%)

50.0-59.9%	...	Instant Messaging (59.1%) Landline phones (57.1%) Emails (54.5%)
<50.0%	Letters (26.3%) Faxes (5.3%)	Letters (9.5%) Faxes (4.8%)

Table 4.3 Comparison of Daily IT Use

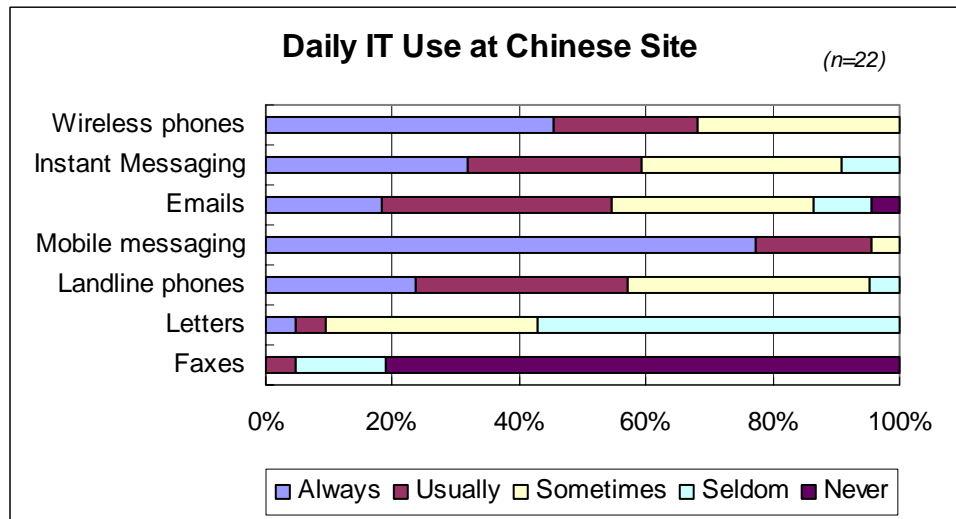
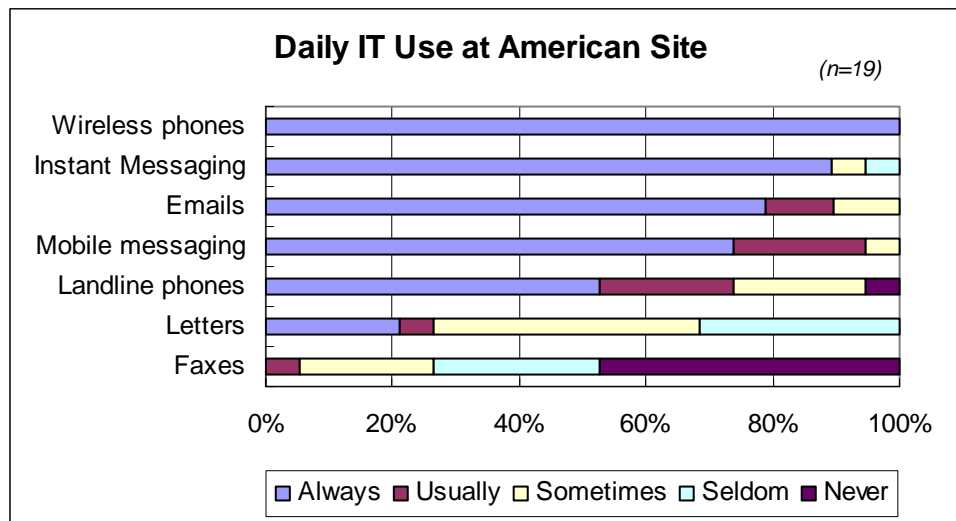


Figure 4.2 Comparison of Daily IT Use

User Level: Based on their daily use of various IT, it is understandable that the percentages of intermediate users for computer and email applications at the American site were much higher than those at the Chinese site (see Table 4.4). Chinese participants were more proficient in messaging, as such technologies were more available to them due to the development of the technical infrastructure there.

Percentage of Intermediate Users	US Participants	CN Participants
95-100%	Computer (100%) Email application (100%)	Mobile messaging (100%) Instant messaging (95.5%)
90-95%	Instant messaging (94.7%) Mobile messaging (94.7%)	...
<90%	...	Email application (77.3%) Computer (72.7%)

Table 4.4 Comparison of User Level

Affordances and Expectations

This section describes the participants' perceived affordances of text messaging and their expectations for text messaging improvements. This information is taken from data collected from the open-end question section of the diary workbook (see Appendix B).

Instrumental Affordances

Here, instrumental affordances refer to affordances on both the operation and action levels. I will not differentiate between these two levels of affordances in this section due

to two reasons: First, I describe affordances for the whole group of participants in a general fashion. Second, the structured affordances are in flux depending on the users' motives. It is arbitrary to map affordances into different levels without discussing an actual use activity.

Generally, text messaging affords the following:

Silent communication: Text messaging is a silent communication. Therefore, it works best when a user is in a setting where a conversation is not appropriate or convenient because s/he does not want to bother other people in the same room (e.g., in classes, meetings, churches, cinemas, or the dorm).

Convenient use: Phone technology is transportable, and users typically keep their phone at hand. They do not need to start up their computers and go online to text to people⁵ to do this, either. One participant thought text messaging is handier than voicemail: She preferred to text to her friends when their phones were busy. In this way, they could see text messages right away without checking their voicemail.

Quick and direct communication: Text messaging helps people exchange information instantly. This is especially true when a user wants to send a short message or needs a quick response (e.g. coordinating a lunch meeting). In addition, it is more direct than

⁵ Some mobile phone users (e.g., Sprint users) will still have to go online to send text messages.

Instant Messaging when someone does not have time to chat over IM. People can get straight to the point without wasting time with small talk.

Discrete action: The action of texting is more unnoticeable than calling, emailing, or IMing people, which allows for stealth communication (e.g., chatting on the phone with texts in the classroom or in the workplace).

Inexpensive communication⁶: With its low rates, text messaging allows users to save minutes on their phone plans. At the Chinese site, this rate afforded frequent distance communication without making phone calls or frequent local communication for people who were not in the same network.

Multi-tasking: Text messaging does not require the user's full attention. Users can text to people when they are preoccupied by something else (e.g., playing online games).

More stable communication: Text messaging technology is more stable than wireless phone calls. Users can continue to communicate via texting even when the reception in their areas is poor or when their phone battery is low. One participant said the phone signal was very poor in her house, and thus when she wanted to chat with friends on a landline phone, she often texted to her friends first to ask them to call her house phone.

⁶ This doesn't look like an affordance at first sight, but this is a feature designed into the technology system which is not built into the mobile phone but into the service network.

Seeing rather than hearing: In one case, a participant who worked in night clubs said that he could not hear well enough to talk to people on the phone in his working environment, and text messaging helped.

Delayed response: Similar to emails, text messaging did not require an immediate response.

Social Affordances

In Chapter 2, I discussed how social affordances are affordances on the activity level, related to user motives. They arise out of lower-level affordances and support social practices in context.

Staying in contact: Text messaging allows people to stay in contact in various ways: Some participants felt that they could stay in contact with their friends, relatives, and lovers in a low-key way, i.e., without interrupting the current activity of the other party. One user said that text messaging allowed her to send greetings to people who she had not contacted for a while without being abrupt. Some users commented on how it was good for maintaining relationships when the one you communicated to was not located nearby.

Having fun: A big part of texting is having fun. People exchange jokes on the phone, tease each other with slang, and kill time when they are bored. One participant said that

texting allowed her to think of new ways to use humor in her life. For other people, it was just a lot of fun to press buttons on the keypad and text!

Expressing feelings and sharing support: Text messaging is good for emotional communication such as just saying “hi” or “I love you.” Also at some unhappy (emotional) moments, a user can just text their friends “I’m sad or unhappy” without actually having to pick up the phone to talk to someone. In this way, friends can also share emotional support at a down time.

Sending holiday greetings: Similar to saying “hi” or “I love you,” text messaging is also good for sending birthday wishes and holiday greetings. On those occasions, people just want to send well wishes, and they do not need a fuller communication encounter that a voice call or e-mail would allow.

Saying something implicitly: A few Chinese participants mentioned that texting helped them convey what they would otherwise feel shy or embarrassed to say face to face or have a voice call. One participant said that texting helped her and her boyfriend move forward in their relationship. Another participant disclosed that he sent sexual explicit jokes to friends, though he would not have told the same jokes to friends face to face.

Avoiding confrontation: Text messaging allows one user to tell another user that she is mad without a face-to-face confrontation.

Avoiding lengthy phone conversation: Phone conversation always takes time, even for a quick information exchange. One has to start with “hello,” “hi,” or “how are you” and end with “have a nice day” and “bye-bye.” A few participants claimed that they would text when they just did not want to talk on the phone.

Showing considerate concerns: Text messaging is unobtrusive. It will not interrupt the other party when they might be sleeping, busy, or at work.

Protecting privacy: Texting is a good way to protect privacy in a crowded setting. People text when they do not want other people in the same room (e.g., in the dorm) to hear what they are saying on the phone.

Serving as an ice-breaker: Some participants said they felt comfortable with texting when they needed to contact people who they were not familiar with or people they were introduced to by friends. Texting helps close the communication gap.

Presenting creativity: Text messages are multi-modal. In most cases, it follows a simple text format; but a clever user can create graphics with various text-based symbols. With picture messaging and multimedia messaging, the possibilities are limitless. A few participants said that texting gave them more opportunity to communicate with people in creative ways. They began to think about tone, word choice, and even the difference of orality and literacy.

As I review affordances of text messaging emerging from the participants' diaries, I saw some site differences (e.g., Chinese participants thought text messaging affords implicit communication), but most affordances are found at the both sites.

Media Choices

Based on the above affordances, participants at both sites made their media choices by considering the communication situations, message content and size, communication styles, cost, and other considerations.

Texting over Calling

Participants selected text messaging instead of voice calling for four major reasons. First, they texted in the following communication situations:

- “when I’m in a setting (e.g., in a class, office, or church) that is inappropriate for phone conversations” (from 14 AP⁷s, and 10 CP⁸s)

- “when I don’t want to interrupt people who might be busy, sleeping, or at work” (from 3 APs and 2 CPs)

- “when I don’t want other people to hear what I am saying on the phone.” (from 1 AP and 2 CPs)

⁷ AP: American Participant.

⁸ CP: Chinese participant.

Second, message content decides the media. Participants texted when the message was a short one and when they needed a quick response (from 8 APs and 3 CPs). Some people said they would text when the topic was not important (from 3 CPs).

Third, the implicit communication style was one of the big reasons that people texted instead of calling. Participants listed the following social reasons for texting: avoiding lengthy phone conversation (from 6 APs), saying something implicitly (from 4 CPs), sharing feelings and showing care (from 2 APs), avoiding confrontation (from 2 APs), using text messages as an ice-breaker (from 2 CPs), and staying in contact without being abrupt (from 1 CP).

Fourth, people texted for cost consideration: to save minutes or save the cost of long distance phone calls (from 4 APs and 2 CPs).

Texting over Emailing

Participants chose text messaging over emailing depending on communication situations and message content.

Participants at both sites listed the following situations where they would text:

- “when I’m not around a computer” (from 11 APs and 11 CPs)
- “when I want them to get the message immediately or need an instant response”
(from 6 APs and 6 CPs)

- “when I’m mobile” (from 2 APs and 1 CP)
- “too busy to start up the computer” (from 1 AP)

The second consideration was message size and content. They texted when the message was short (from 4 APs and 4 CPs) or when the topic was about everyday life (from 1 CP).

It is interesting to note that 3 APs said that they always chose texting over emailing as long as they had the other party’s cell phone numbers. In contrast, 4 CPs said they only texted as they did not own computers, did not use email, or were not used to emailing people.

Texting over IMing

The decision of choosing texting over IMing was primarily based on communication situations. Participants went for texting in the following situations:

- “when I’m not around a computer” (from 17 APs and 6 CPs)
- “when my friends and / or I am not online” (from 4 APs and 10 CPs)
- “when I want them to get the message immediately or need an instant response”
(from 2 APs and 2 CPs)
- “when I don’t have time to go online” (from 1 AP and 1 CP)

Three Chinese participants said that they did not use instant messaging because they did not own computers or because they did not like instant messaging.

Comparing three use scenarios, communication situations seemed to be the most important factor for participants who chose text messaging over other communication means.

Considering the affordances of text messaging and daily media choices, 14 of 19 American participants and 14 of 22 Chinese participants thought mobile text messaging was important for their daily lives. To further explain the importance of this issue, some of the users stated the following:

“I use it all the time.” (from 4 APs)

“It’s my form of communication.” (from 4 APs)

“My No.2 means of communication, after AIM.” (from 1 AP)

“It is part of my life.” (from 2 CPs)

“It is an indispensable means of communication in my life.” (from 2 CPs)

“It helps me accomplish many important things in my life.” (from 1 CP)

5 American participants and 7 Chinese participants felt that mobile text messaging was ok to them. They commented as below:

“I do it just for fun.” (from 1 AP and 2 CPs)

“I have other means of communication such as QQ, MSN messenger, and email in addition to SMS.”(from 1 CP)

“Typing takes very long.” (from 1 AP)

“I can live without it.” (from 1 AP)

“Making a phone call is more convenient.” (from 1 CP)

Expectations

Participants expected to see improvements for messaging technologies in the following areas: the application, hardware, service network, and market penetration.

Most of the suggestions concerned the messaging application (53%, n=57) from the American site and 37% (n=90) from the Chinese site. People wanted easier inputting methods. Other suggestions included increasing the text size of messages, using voice-activated inputting, allowing easy access to most used punctuations and smileys, or generally improving these interfaces. They would also like to see the incorporation of email functions such as auto reply, auto save, and spell check. A final suggestion was to include functions such as scroll bars or popups to view longer messages,

Chinese participants wanted more improvements made to the service network, accounting for 58% of their total suggestions. First, participants wanted text messaging to get

cheaper. Second, they wanted smooth text communication across networks including the same pricing structure. In addition, they wanted voice messaging, better reception, and fewer spam messages. For Americans, 25% of them made suggestions regarding the service network. They also wanted a cheaper pricing structure and better reception.

A few expectations concerned the hardware. Participants wanted phones to have greater memory stores to hold more messages. Some wanted their phones' keypads to be sturdier for frequent texting tasks.

The penetration rate of text messaging was a concern for some participants (14% of suggestions from the American site). They said they wanted more people to know how to use their text messaging features on their phones, they wanted their friends to have this feature in their cell phone packages, and they wanted more people to have cell phones (as did 3% of the Chinese participants).

Site Comparison

At first glance, there is not much site difference in the participants' perceptions of text messaging technology. Participants agreed on the instrumental affordances and social affordances of the technology across sites; they made their media choices in a similar way; and they shared interpretations of what this technology meant to their lives.

A closer look shows that there are still slight site differences in regards to how participants at the two sites considered the social affordances and how they interpreted this technology.

In the case of choosing texting over calling, American participants mentioned social affordances such as avoiding lengthy phone conversations and avoiding confrontation.

They chose this technology because it afforded them *not to do* something in specific communication situations. On the contrary, a few Chinese participants stated explicitly that they just liked the implicit communication style of text messaging, and they chose texting because it afforded them *to do* something in specific communication situations.

One Chinese participant said it this way: “I feel it is more effective to convey some meanings by texting than by speaking directly.” This difference can be interpreted by the collectivist culture and high-context communication style of China, which will be discussed in detail in later sections.

When discussing the importance of text messaging in their lives, some American participants said that it was important as they used it all the time, while a few Chinese participants further claimed that text messaging was part of their lives. Clearly, we see a stronger emotional attachment to text messaging from Chinese participants, which might be related to both the wide use of texting technology and the underdevelopment situation of other communication technologies (e.g., emails and instant messaging) in China.

Texting in Action

Now the most intriguing questions are: What was happening when participants texted at the field sites? When and where did this messaging practice occur? Who did they text to? What did they text about?

How many? Where? Who? When?

Table 4.5 provides an overview of messages logged in the diary study⁹. Over a period of four days, the Chinese participants sent more text messages and texted to more people than American participants did, but the number of different texting contexts were similar across sites.

Sites	# of segments	# of messages	average daily messages per person	logged places per person	logged people per person
US	942	813	10.48	5.79	5.47
CN	1924	1661	18.79	6.59	10.05

Table 4.5 Overview of Logged Messages

How Many? American participants logged six to 110 messages in their workbooks for the whole period of the diary study. The median value was 39. The person with the highest volume of exchanged messages had 47 messages on his peak day. The participant

⁹ Not all participants logged and recorded messages for 4 days. 2 APs and 1 CP logged 5 days of messages. One AP lost the first two days of messages because they were purged before she recorded the messages due to the limited size of her phone's memory.

¹⁰ In all the chats examples, names and places are modified.

with the smallest number of messages logged only six messages, falling in two days. He explained that one of the other two days he did not text was a weekend day and thus he called people instead of texting with his plan of free weekend minutes. At the Chinese site, participants logged 34 to 199 messages. The median value was 63. The participant who sent the most messages exchanged 63 on her peak day.

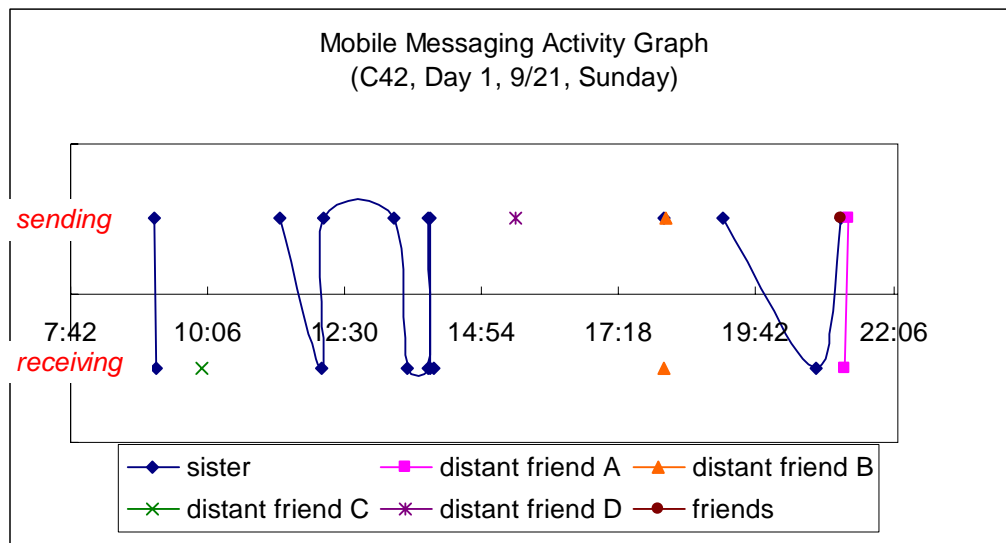
Where? Participants texted in various environments: in a class, at their home, in their dorm, in the gym, in the car, on the bus, at the bus stop, in a bar, at a restaurant, on the streets and so on. The largest percentage of text messages was sent in places like classrooms and dorms, not while the participants were on the go. So mobile text messaging is not really mobile for those participants. Participants chose text messaging more because it was available any time and anywhere, but not because it was mobile. The participants validated this when so few of them mentioned the affordance of being mobile.

Both American and Chinese participants texted in a similar number of places during the four-day period. This shows that for this user group, text messaging was used in a similar way at both sites in terms of localities.

Who? Participants texted to friends, lovers, classmates, colleagues, coworkers, and relatives. Most messages were sent to friends and lovers. As the penetration rate of text messaging is very high in China, it was not surprising to see that the number of people

that Chinese participants texted to was double the number for the American site. At the same time, this result relates to the survey finding showing that Chinese participants ranked staying in contact with friends or loved ones as their top texting purpose, while this purpose was ranked only 7th at the American site.

When? Participants texted as communication needs arised. Figure 4.3 illustrates a typical temporal pattern among participants: they might text to different people throughout the day, and then they might have only two or three quick exchanges on the second day. These two charts also show that a large percentage of text messages were two-way communication, a text conversation between two people.



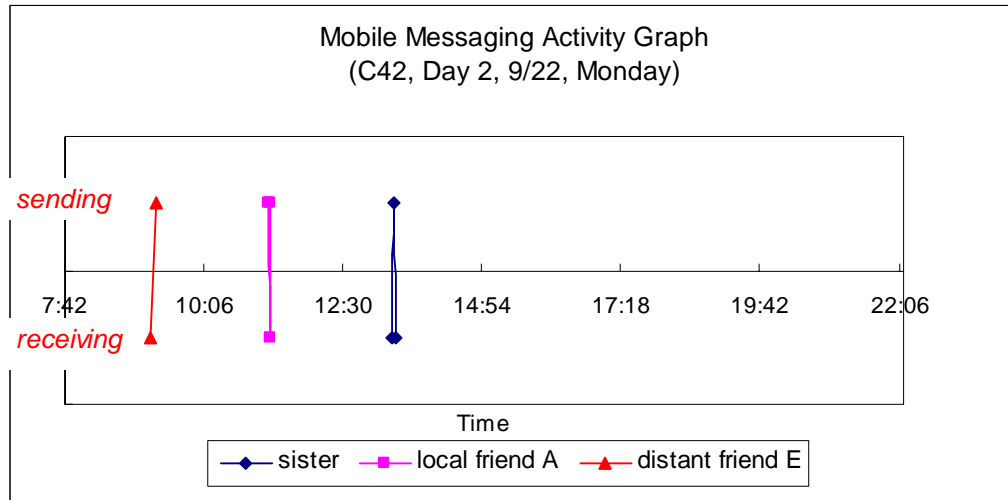


Figure 4.3 Typical Temporal Pattern

Sometimes temporal patterns of messaging activities were affected by the participants' wireless plans. Some participants had unlimited weekend minutes for phone calls. Under this condition, they might not text at all. Two American participants did not text on the weekend during the diary study.

Temporal patterns of messaging activities were also influenced by the participants' work schedules. In the case of L17, he only texted at night; he was so busy with work in the daytime that he had no time for texting (see Figure 4.4), but it looks like he was texting about his work at night on Day 3. In contrast, V20 (see Chapter 6) only texted during working hours because she felt that text messaging is a way for her to balance her work

and life.

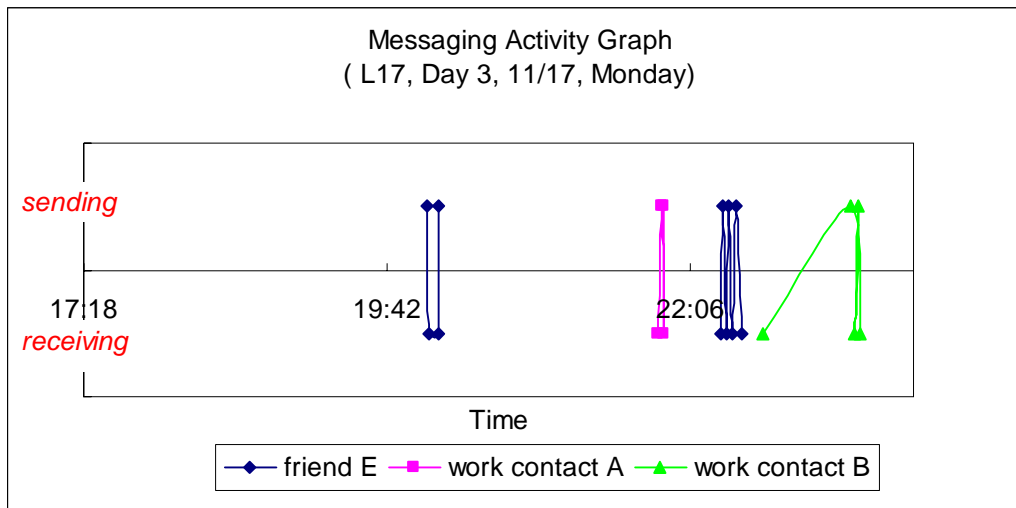


Figure 4.4 Temporal Pattern: Texting at a specific time period

What about?

To understand socially-situated digital literacy practices, the text messages were coded into two dimensions: rhetorical purposes and life spheres (see Chapter 3). I want to investigate what rhetorical purposes participants wanted to accomplish with text messaging and in what life spheres text messaging was situated.

Overall, a verbal data analysis of 2866 message segments suggested that there were different patterns of use between American and Chinese participants concerning the content areas and purposes of these messages. The data distributed at the sites over the two coding schemes (life spheres and rhetorical purposes) were significantly different from one another as measured by the Chi-square analyses. For life spheres, the sum of the

Chi-squares was 19 with 4 degrees of freedom and $p < 0.001$. For rhetorical purposes, the sum of the Chi-squares was 38.33 with 6 degrees of freedom and $p < 0.001$.

Notably, the numbers of categories for the life spheres differed in the illustrations of the overall pattern and individual case patterns. In the following description of overall patterns across sites, I aggregated the categories of work and school into a single category (work/school). Without aggregation, the overall pattern of life spheres shows that there were 2.5% more Chinese messages in the school life sphere and 2.4% more American messages in the work life sphere. However, the overall messaging patterns conflict with individual case patterns as there are actually more work-related messages in Chinese individual cases. Mainly the different proportions of students and professionals caused this contradiction. There were 26.3% professionals in the American sample and only 18.2% in the Chinese sample, and therefore there were a higher percentage of work-related messages from the American sample at the site level. To eliminate the proportion's skew, I combined those two categories, as my purpose here is mainly to distinguish work, leisure, and family relationships across groups of students and professionals. On the other hand, it is necessary to keep two separate categories at the individual case level because many student participants had distinctive life spheres of work and school. For the aggregated categories on the site level, the Chi-square analysis indicates a significance at the $p < 0.05$ level with 8.47.

The coding dimensions of life spheres and rhetorical purposes draw a big picture of messaging use from two angles:

- Text messaging was primarily used to augment the participants' activities and relationships in their personal life spheres across sites. Using messaging for business-related discussions accounted for only a very small percentage.
- American and Chinese participants employed text messaging to accomplish different rhetorical purposes. American messages were sent primarily for expressing feelings and sharing current experiences. Chinese messages were sent to exchange information and initiate actions such as instructing and coordinating.

Table 4.6 and Figure 4.5 shows that the use of messaging technology was not balanced across the different life spheres. The majority of American (76.2%) and Chinese (76.6%) messages fell into the life sphere of "personal leisure other than with family." Messages of this life sphere were about relationship work with friends or lovers, activities that occurred in circles of friends or lovers, and social rules within these circles. About one fifth of text messages from both sites occurred in the life sphere of work/school. A smaller portion of messages was devoted to the family life sphere. Overall, text messaging was used primarily for private life issues (including personal and family life spheres) rather than for business activities.

It is striking that there is a close resemblance across sites. Concerning the personal life sphere and the work/school life sphere, the percentages were very close at both sites. The major difference seems to come from the family dimension, where American participants exchanged a higher percentage of messages, in contrast to our cultural perceptions. We tend to think people in Asian cultures have closer family bonds than those in Western cultures. It is uncertain to what level this pattern is representative of the general trend at the American site, as this high percentage might be indicative of the texting practices of one American participant who primarily used text messaging as a way of maintaining contact with her sister.

	personal	work/school	family	other	Total
US	76.2%	17.9%	5.1%	0.7%	100.0%
CN	76.6%	18.1%	3.5%	1.8%	100.0%

Table 4.6 Comparison of Life Spheres across Sites

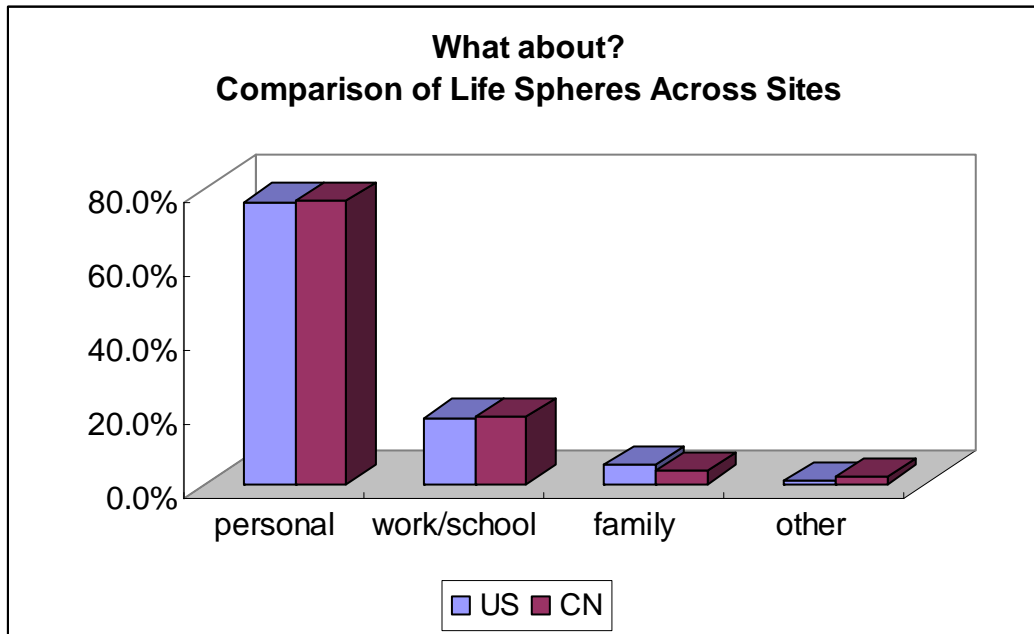


Figure 4.5 What About: Life Spheres

Though text messaging was incorporated in frequent user’s lives in a similar way with a close resemblance on the life spheres across sites, participants used the same technology to achieve different communicative goals in their local contexts (see Table 4.7 and Figure 4.6).

	expressing	informing	co-experiencing	instructing	coordinating	switching	other	Total
US	33.1%	26.2%	19.3%	11.9%	7.2%	1.8%	0.4%	100.0%
CN	25.6%	31.6%	16.8%	16.5%	8.4%	0.7%	0.4%	100.0%

Table 4.7 Comparison of Rhetorical Purposes across Sites

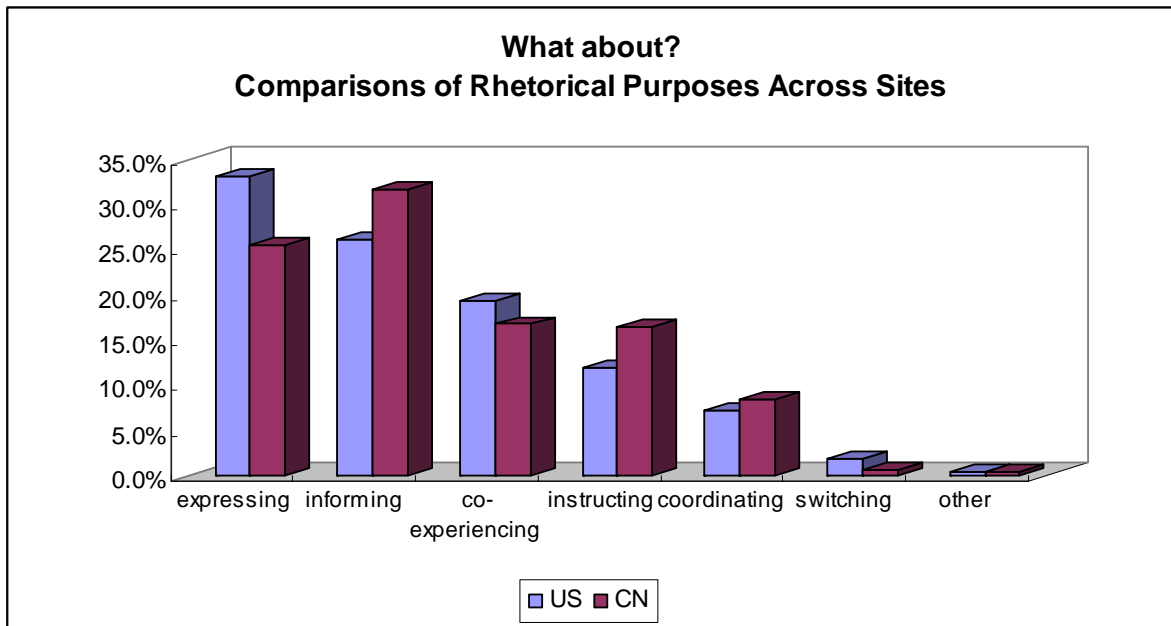


Figure 4.6 What About: Rhetorical Purposes

At the American site, a higher percentage of text messages were exchanged for emotion-related purposes such as expressing (33.1% vs. 25.6% at the Chinese site) and co-experiencing (19.3% vs. 16.8% at the Chinese site). For detail, please go to Chapter 6 for a detailed discussion of a representative case in which an American participant sent a lot of messages with emotion-related purposes. Messages for expressing purposes include greetings, compliments, love messages, wishes, encouragement, joking around, complaints, expression of neutral feelings and agreement, and onomatopoeias. For example:

- "Hey!" (Greetings)
- "THAT GRADE IS AWSOME!" (A compliment)
- "LUV YA ANNA! :O)" (Showing love and care to a close friend)

- "awesome opportunity for you..take it...i believe in you" (Encouragement.)
- "Arrrgh" (A complaint)
- "NOther (Another)?...who is the coolest m-cat in the world? :-[" (Funny chat)
- "cool good things." (Agreement)
- "mmfff." (Conveying unhappiness)

Messages concerning the co-experiencing purpose are intended to share the current status or experiences with another party. These messages describe what is happening in a real or mediated environment (e.g., TV). They can also be used to ask the other party what s/he is doing:

- "On my way home!"
- "I just bought more really cute clothes."
- "There is a guy here dressed like Reno 911, the guy w (with) the short shorts." (a short report from the Halloween party)
- "What u (you) doin (doing)"

American participants (1.8%) sent more text messages for the switching purpose than Chinese participants did (0.7%). Messages with a switching purpose include those

messages suggesting switching the current conversation to another medium, as well as messages ending the current conversation in favor of another one in the future. This is typically done when it is no longer convenient to conduct the conversation using the current medium. For example:

- “Wil (will) cal (call) u (you) in 2”
- “TTYL (Talk to you later)”

At the Chinese site, a higher percentage of text messages were exchanged for the informing purpose (31.6% vs. 26.2% at the American site) and action-related purposes (such as instructing 16.5% vs. 11.9% at the American site and coordinating 8.4% vs. 7.2% at the American site). Chapter 7 discusses a representative case in which a Chinese participant sent a lot of messages with informing purpose.

Messages in the informing purpose category are meant to inform the parties about an event and to share such information that the two parties or just the receiver would find interesting. For example, messages inquiring about a person, an object, a plan or an event that is not related to coordinating tasks, messages informing the receiver about follow-up actions, those making an announcement, those keeping the other party apprised of a current situation; and ads, subscribed-to information alerts, and system messages from carriers. For example:

- “Why he needs surgery?” (Inquiring)
- “Zhe ge xing qi wo yao hui qu, dao shi zai da dian hua gei ni. (I’m going home this week, and I will call you then.)” (Informing about follow-up actions)
- “Gao su ni wo ke neng qu bei jing shi xi. (Telling you that I might go to Beijing for an internship.)” (Announcement)
- “Lao da zai jiao shi. (The instructor is in the classroom).”
- “Mei guo IPM dian nao ji tuan gong si , wei ji nian lian he guo ri , te yi zai zhong guo da lu ju hang SIM ka chou jiang huo dong , gong xi nin zhong er deng jiang . qing yu jiang xiao jie lian xi, 131758***. (To celebrate the United Nation Day, the American IPM Corporations had a lottery for SIM cards. You won the second prize. Congratulations! Please contact Miss Jiang, 131758***.)” (Ad)
- “V. FORECAST: AUBURN SUN: 74/56 M SUNNY *MON: 73/60 PM SHOWERS *TUE 67/50 FEW SHOWERS (by TWC).” (Subscribed info alerts)
- “Nin dang qian yi chan sheng hua fei 29.90, dang qian yi you hui hua fei 24.20, dang qian ying jiao fei yong he ji 5.70, yu e 27.37. (Your current phone cost is 29.90, you have saved 24.20, and you need to pay 5.70. Your balance is 27.37.) ” (System message)

Messages with instructing purposes are used to ask the recipient to help accomplish a task as follows:

- “If i cant get to the office for my check next week, could you get it for me?”
(Asking for a favor)
- “Chu qu zou zou o? (How about having a walk outside?)” (Proposing an agenda)
- “Xi hao lian xi hao jiao, jiu yao shang chuang shui jiao le. (Wash your face and feet, and it’s time for bed.)” (Reminding the recipient to do something)
- “Yao shi huo bu xia qu, wo zhe xia ge yue ke yi jie ni qian. (If you are broke, I could lend you some money.)” (Offering help)
- “Ming tian wo nv peng you sheng ri, zui hao jiu shi zhe ge xing qi san guo lai, da jia yi qi chi fan. (It will be my girlfriend’s birthday tomorrow. You’d better come over this Wednesday. Let’s have dinner together.)” (Inviting)

Messages with coordinating purposes are used to coordinate an activity, including the time, location, and people, as well as the follow-up activities concerning the tasks and events:

- “Dinner?”
- “Where do ya wanna go?”

- “I think we are going at 715.”
- “Can my mom go with me?”
- “Xian deng wo guo lai ba. (Wait for me there first.)”

Discussion

Affordances and Various Personal Uses

Findings across the sites suggest that the current use of mobile messaging technology arose out of the structured affordances—instrumental and social—of this technology.

The fieldwork shows that text messaging was a technology used for personal communication rather than business communication across sites. Most text messages occurred in the personal and family life spheres, and only less than one fifth of all messages were in the work/school sphere. This use scenario is a result of the combined affordances of the technology perceived by participants. As users interacted with instrumental affordances (e.g., silent, quick, and direct communication; discrete action; delayed responses) built into the mobile messaging technology through design to accomplish daily communication activities situated in context, social affordances (e.g., staying in contact in an unobtrusive way and expressing feelings and sharing support any time and anywhere) emerged through use and afforded particular social-cultural practices surrounding the activities. From these patterns of use, the instrumental affordances of mobile messaging technology support personal communication tasks in particular

situations very well. The social affordances of mobile text messaging fill personal communication gaps other technologies are unable to complete. Thus, various uses of this technology in the personal life sphere were found in fieldwork. Participants used the technology to stay in touch with old friends at a distance, to connect with family members, to socialize with new acquaintances introduced to them by friends, to coordinate schedules, to exchange sports reviews late at night, to look for people in the library, to amuse and cheer up friends, and so on.

Participants adopted text messaging as it fit within their lifestyles and their local IT ecology. They constantly made media choices from a range of communication technologies selecting the one they felt fits best for a particular communication situation and their audience. Text messaging was never the only communication technology participants used to augment their life and work. The patterns of mobile messaging use should be understood and interpreted in a web of different technologies situated in local contexts. The fieldwork found that participants had developed sophisticated strategies to use different technologies for different audiences. Some participants mapped different people into an imaginary “communication matrix.” For others, they did this without being aware of. Text messaging was just a particular way for participants to communicate to a particular group of people in their lives.

The adoption of text messaging can be also understood with the approach of uses and gratification (Wei & Lo, 2003). This approach assumes that the audience actively selects

and uses its media, and that how individual audience members employ these media depends on their social and psychological needs as well as gratification-seeking motives. Here, the social and psychological needs are similar to affordances discussed in this project. However, this approach explores user motives mostly via questionnaire-based surveys, and thus the rich contextual data are often filtered out in this format of data collection.

Participants acknowledged the social affordances of mobile text messaging technology. In the survey, they ranked social-related purposes as their top reasons to participate in text messaging and mentioned how they loved the social affordance of the technology:

- *“It’s like you get a little greeting card in the mail every day. It’s nice to know you thought of someone that made you laugh.”*
- *“It’s fun to get a message. Like the movie, ‘You’ve got mail.’ It is always a surprise.”*
- *“It’s a very beautiful thing to communicate with people using text messaging.”*

The affordances of this technology not only afforded uses but also constrained uses. For example, the affordance of being convenient comes from the small size of the cell phone, which usually only has a keypad for inputting, a small screen for reading, and a limited memory for holding messages. For some participants, it was fun and challenging to

compose and input interesting texts on a small keypad. For others, the inputting process was tedious and even annoying after a while.

The participants' patterns of use evolved through time. Some participants increased their use by becoming more proficient at thumb typing. Some high-volume participants reduced their uses after the novelty wore off. Cost is another reason that participants reduced their use of this technology. In some cases, when the affordance of low cost disappeared as carriers discontinued their promotional text plans, participants changed their patterns. In other situations, when another technology was introduced into the local IT ecology, the old balance would be tipped and changes of use occurred. One Chinese participant said she sent fewer messages to her coworkers as she started to communicate with them via email. For all participants who reduced their use during the study, they said they would keep text messaging as long as they had cell phones.

The various personal uses of mobile messaging actually depart from the intended use of the original design. Chapter 1 describes how mobile text messaging was designed, introduced, and marketed as a business technology. There is a large gap between the intended use and the actual uses, as most of the actual uses fell within the private life sphere. This might be beyond the designer's thoughts, but it is a logical assumption considering the affordances of the technology. We might want to ask: What kinds of business tasks do the affordances of mobile text messaging best support in context? How do these affordances work for situated activities in context? Do people have to rely on

affordances such as quick and direct communication of mobile messaging to accomplish business tasks when they can use other available communication technologies?

Affordances emerge from these contexts and are realized within these contexts. We cannot just focus on affordances and forget the users' contexts when designing a technology.

Unfortunately, some manufacturers and wireless carriers still seem to stick to the intended use of this technology and ignore other possibilities. The gap between intended use and real use causes usability problems. For example, the input for emotional-related messages is not supported well. This caused one participant to have a hard time entering an exclamation mark to show her emotions in text messages.

Gender Differences

The social affordances of the messaging technology seemed more aligned with female communication styles and were in fact more appealing to female participants. Female participants used text messaging more than males, and they loved text messaging more. Some female participants claimed "text messaging is my form of communication." One male participant commented this way: "If you see a boy pressing phone keys all the time, he must be playing games. If a girl is doing the same thing, she must be sending messages."

Even though two thirds of participants are female users, clearly there were gender differences of mobile text messaging technology across sites. Figure 4.7 shows that female participants tend to send more text messages with emotion-related purposes (expressing and co-experiencing) than their male peers. Male participants tend to send more text messages for task-related communication (as shown from the higher percentage of messages for purposes of informing, instructing, coordinating, and switching). This pattern corresponds to Tannen’s findings: Women communicate for “rapport talk,” and men communicate for “report talk” (1990).

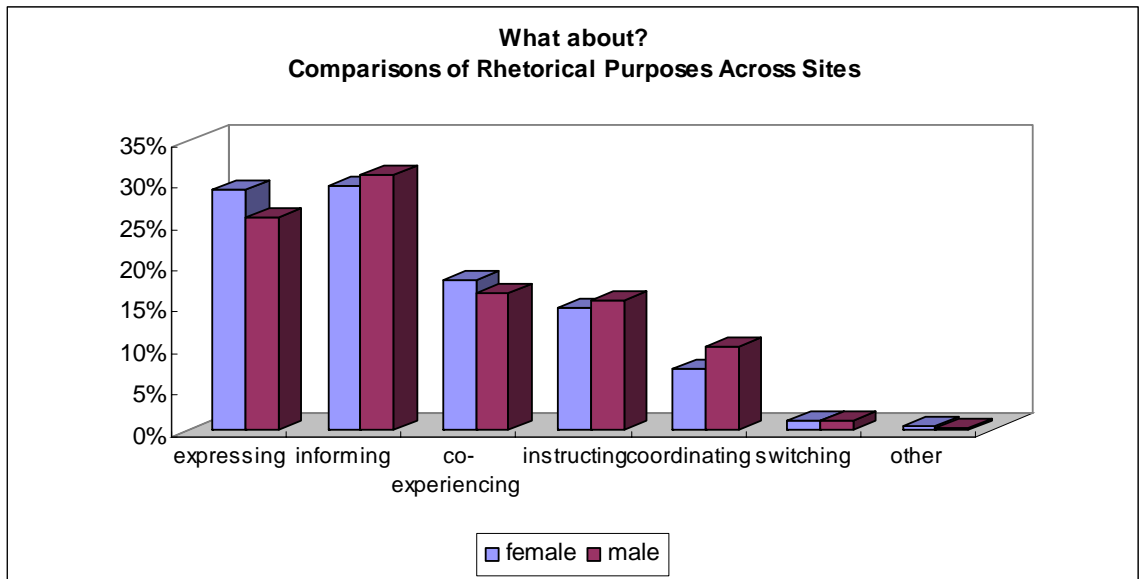


Figure 4.7 Gender Difference of Messaging Purposes

The emotional attachment that female participants had for mobile text messaging should be understood in a historical context. At the time when cell phones were still regarded as “a status symbol,” a Gallup report (Gallup Organization, 1991) found that more women

(82%) agreed that cell phones helped their personal lives than men (72%). Researchers noticed that cell phones helped middle-class women creatively manage their responsibilities for home and children by providing “remote mothering” assistance and facilitating “parallel shift” between job and home (Rakow & Navarro, 1993). The emergence of short text messaging service provides more possibilities for female users. The survey commissioned by an American wireless carrier announces that 87% of 30-40 year-old women said that text messaging would help them improve their personal and business communications (m-Travel, 2002). In Europe, where mobile text messaging is more popular, a recent study shows that female users in the age group of 12 to 25 are apparently more enthusiastic about using SMS as a means of communication than male users (Peters et al, 2003).

Emerging Genres: Generic Patterns of Mobile Text Messages

The various uses of mobile messaging take on different genre patterns as they interact with local contexts. Below are some genre differences between the sites.

Social Motive: Having Fun vs. Staying in Contact

American participants used this technology mostly to have fun conversations with friends. Participants were interested in sending fun messages to show that they cared for the recipient. Some participants even utilized popular slang to create humor in messages. In contrast, Chinese participants liked to stay in contact with new, old, local, distant, offline,

and online friends. They valued this social affordance and ranked it as their top purpose for text messaging.

Rhetorical Purpose: Expressing vs. Informing and Instructing

A bigger percentage of American text messages have emotion-related purposes.

Participants sent higher percentages of text messages to express their feelings and shared moment-by-moment experiences. In comparison, Chinese participants sent more messages to inform and to instruct about a variety of daily tasks.

Chat Pattern: Small Talk vs. In-Depth Conversation

American chats were usually short. A majority of messages can be regarded as small talk (as used during voice calls) in which participants had quick exchanges updating each other about their life (e.g., “watching TV”) and other minute life details. In comparison, long chats exchanged between friends were very common in Chinese message logs. Participants usually had more in-depth conversations over various topics, and thus a greater percentage of Chinese messages had informing purposes than American messages did.

Text Feature: Shorthand vs. No Shorthand

A distinctive linguistic pattern for Latin language-based text messages is its wide use of shorthand. To reduce text entry load, users developed a shorthand system to represent different words with numbers and abbreviations based on sounds. For example, “18er”

means “later,” “n” means “and,” “b4” is “before,” “k” means “OK,” etc. This shorthand is so popular that almost every person who texts uses shorthand in his/her messages; nearly all American participants employed shorthand in their text messages. In comparison, Chinese, as a script language, does not have such an affordance, and so the use of shorthand in Chinese messages was very rare. One user typed “88” in her message logs (which stands for bye-bye, a Latin word).

Communication Style: Casual vs. a Hybrid of Casual and Formal

Text messaging was a casual means of communication at the American site. It was used mostly for small talk between peers and close friends, primarily for having fun, coordinating plans, and connecting to each other. In comparison, text messaging at the Chinese site was used for more than just a casual conversation. It was a hybrid genre for both casual and formal communication. Participants would send messages for fun, but they also texted more for formal tasks and texted to people other than their peers. For example, students texted their teachers for sick leave, and a bride texted to her friends for wedding invitations.

Genre theory suggests a new genre usually evolves from an old genre, or its predecessor. The use difference at two sites is related to different predecessors in two local contexts. At the American site, the predecessor for mobile text messaging was instant messaging. With the user model of instant messaging in mind, participants regarded mobile text messaging as casual conversation which was not appropriate for formal communication.

At the Chinese site, instant messaging was not the predecessor of mobile text messaging as many participants adopted these two technologies almost at the same time. With a strong written tradition in China, Chinese participants interpreted text messaging as a written genre which has a formal status.

Interactions between Uses and Contexts

These genre differences record the dynamic interactions between various use activities and local cultural and technological contexts. Combined with the data from the survey, open-ended questionnaire, interview, and observation, they illustrate how mobile messaging technology mediates different social practices in different contexts. In the following section, I will discuss interactions and mediations from the angle of immediate contexts and broad socio-cultural contexts within the framework of cultural usability in a general and overarching fashion. More detailed explorations on these interactions based on individual cases can be found in Chapters 5-7.

Factors from Immediate Contexts

To compare and contrast across cases, here I approach immediate contextual factors primarily on the aspect of the local technological systems. In some ways, my discussion here is detached from the concrete use activities as it is impossible to generalize 41 individual cases. The discussion below should be regarded as a backdrop for understanding various use activities in their local contexts.

The local IT infrastructure affected the use of mobile messaging. First, as illustrated in Figure 4.2, most American participants have had a wide range of communication technologies available to them. Because of a higher penetration rate, American participants had more access to computers, the Internet, email, and instant messaging. For quick communication, American participants had a choice of which media to select, accomplishing the same purpose without having to bang away on a phone keypad. In contrast, the technologies that were available to most Chinese participants were mobile messaging and wireless phones. In that situation, participants often chose mobile messaging to initiate actions and inform other people to coordinate and manage their daily tasks. Since text messaging has a high penetration rate at the Chinese site, it was more convenient for participants to use text messaging to contact people for various work and personal activities.

The following conversation¹⁰ illustrates how a Chinese user tried various communication technologies to contact friends and accomplish tasks. Friend A wants the participant to help her find Ling to borrow a large sum of money. She emailed Ling before, but did not receive a response. So she texted the participant for help. Fortunately the participant caught Ling on MSN messenger right away.

Time	Sender	Message Text	Place¹¹
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¹¹ “Place” refers to where the participant received a message.

9:43 AM	friend A	bang wo lian xi Ling, wo you ji shi zhao ta (Please help me contact Ling. I have something urgent.)	office
9:44 AM	participant	wo ye zhi you ta de MSN, ni hen ji ma? Gei ta fa Email hao le (I only have her MSN account, are you urgent? Just send her an email.)	office
9:45 AM	friend A	wo gei ta fa you jian ta dou bu hui. wo you ji shi zhao ta, ni zai MSN shang kan dao ta, jiao ta gen wo lian xi (She never replies to my email. I have something urgent, if you see her on MSN, please ask her to contact me.)	office
9:49 AM	participant	hao de. ta gang shang xian, wo ba ni de shou ji gei ta le (Sure. She just came online, and I gave her your cell phone number.)	office
10:02 AM	friend A	wo que qian, fang zi yi shi mai bu diao, ni bang wo zhuan gao kan kan ta na li neng fou jie wo 5wan, 4wan ye hang, ming nian kai chun huan ta. (I need money. My condo can't be sold right away. Please ask her whether she could lend me 50K, 40K is also ok, I will return it to her the coming spring.)	office
10:02 AM	participant	wo gen ta shuo le, ta jiao ni bie ji, ta wan xie shi hou chu qu mai dian hua ka gei ni dian hua.	office

(I just forwarded this to her. She wanted you not to be anxious,
and she will go to buy the phone card later and call you.)

10:04 friend A ni jiao ta ba you xiang qing kong, wo jia dian hua *****, wo zai office
AM jia li deng ta.

(Please ask her to empty her email box. My home phone number is
*****, and I'll be waiting for her call at home.)

10:05 participant hao le, ni qu shen qing le MSN ba. ta zai shang mian, wo zuo shi le, office
AM 88.

(Well, you should apply for an MSN account. She is there online,
and I need to go back to my work, bye-bye.)

10:06 friend A en, hao de, ma fan ni le. office
AM (En, well, thank you.)

Other than the issue of trial and error of various communication channels between friends, this text conversation also shows how deeply the texting technology is embedded into ordinary people's lives. Chinese participants chatted about such varied topics as borrowing money, buying a house, reviewing sports games, sending gifts, and so on.

On the other hand, most of the chats found in the American data were "small talk" — as some of the American participants defined it — in which people had quick exchanges about what was going on. Text messaging was used more for conveying these users' care

and feelings as in the following two examples, where there is a higher percentage of messages involving purposes of expressing and co-experiencing.

Time	Sender	Message Text	Place
8:10 PM	friend	Hey, What are you up to?	dorm
9:10 PM	participant	Watchin (watching) friends u (you)?	dorm
9:12 PM	friend	Just got out of work and getting something to eat	dorm
9:15 PM	participant	Liz n i [and I] made piza [pizza] on english muffins	dorm
9:15 PM	friend	sound's good	dorm

Time	Sender	Message Text	Place
5:53 PM	participant	Rise and shine sweetheart	driving
6:31 PM	boyfriend	Evenin (evening) hun (honey)	work
7:12 PM	participant	I am at my aunts party--where are you this evening	party

It is interesting to see how participants' experiences with instant messaging influenced their experiences with mobile messaging. Most American participants had used Instant Messaging for a few years before they adopted text messaging. During the interviews, I found the conceptual model of instant messaging was so deeply rooted in some of them that they kept comparing mobile messaging to instant messaging. The frequent comparison often leads to one conclusion: Mobile messaging is just instant messaging

without computers but not as easy to use. During their daily use, they tended to reserve longer conversations for instant messenger. In contrast, most Chinese participants started using mobile messaging and instant messaging at the same time (some of them had never used IM before the study), and they did not have a conceptual model of instant messaging when they started using text messaging. Furthermore, for most of them, the Internet was not as easy to access as the cell phone was. Participants tended to regard them as two parallel technologies and seldom combined them during these interviews.

Second, the structure of cell phone plans affected the use of text messaging. This is part of the affordances from the service network. As described in Chapter 3, phone minutes and text rates were calculated differently at the two sites. At the American site, participants usually had phone plans with free night and weekend minutes along with monthly minute allowances, making it sometimes cheaper to call than to text. At the Chinese site, participant's phone plans usually did not include free phone minutes but had discounted text packages. Therefore, some people thought texting saves money.

Third, the stage of adoption affected use. According to Rogers (1995), technology adoption usually goes through five stages: innovators, early adopters, early majority, late majority, and laggards. The American site was still at the stage of early adopters, so it had not reached a critical mass for text messaging. However, the Chinese site was at the stage of early majority, and it had already reached the critical mass. Participants at the American site usually went through an adoption moment triggered by a series of events.

Even after they adopted the technology, they found themselves in a situation where they did not have many people to text to. Chinese participants usually took the adoption of this technology for granted, and it was exciting for them to join in such a large circle of texters.

Factors from Cultural Contexts

Local cultural differences defined technology use in another way. First, the social affordance of implicit communication from text messaging is more appealing to people in a high-context culture than to people in a low-context culture. In a high-context culture, people do not state everything explicitly; a large amount of information is conveyed by the context in which it is stated. Quite a few Chinese participants stated in questionnaires and interviews that they liked this affordance of implicit and reserved communication. One participant said she felt this affordance was particularly good for Asian people to express their feelings in a reserved way. “Without text messaging, I would not have been able to come closer to my husband and marry him.” They started dating after texting on their cell phones and exchanged a hundred text messages per day during their heaviest period. Another participant said text messaging reminded her of an old Chinese saying: “The friendship between gentlemen appears indifferent but is pure like water (Jun zi zhi jiao dan ru shui).” Text messaging was mild and enduring for her. In contrast, I did not see the same appreciation for the implicit style from American participants in the interviews or questionnaires.

On the other hand, as a high amount of American text messages were exchanged for expressing feelings, American participants had their actual use value as the implicit affordance. It is also interesting to see how feelings were expressed differently at the two sites. In the example below, two American female participants sent messages to their girl friends. Care and feelings were conveyed in a direct and effusive way, which Asian people would seldom do this way. This cultural difference is another angle to explain why we see a higher percentage of emotion-related messages at the American site.

"HOW R THINGS @ THE APT? MISS U ALL! SAY HI 2 THE GIRLS! MUAH!"

"me and nancy love you"

Second, mobile messaging technology takes on new meanings for identity issues as various use activities unfold and interact with local cultural values. As the study found out, the top texting purpose for Chinese participants was to stay in contact with friends or loved ones. There were a lot of chats between participants and their local, distant, and online friends in the message logs. In those conversations, participants were often engaged in informing-oriented communication. These frequent conversations done to stay in contact were part of the collectivist culture at the Chinese site. In a collectivist culture, relationships are relatively long lasting and individuals feel a deep personal involvement with each other. This long-term relationship orientation is mediated nicely with mobile messaging that allows people to stay in touch in an unobtrusive way.

In contrast, American culture is an individualist culture that does not have a strong orientation towards long-term relationships. The cultural value of individualism shapes the use in another direction. Mobile messaging was primarily regarded as a means for quick exchanges between peers and close friends where fun and amusement for individuals was emphasized.

Below is a typical chat between friends at the Chinese site.

Time	Sender	Message Text	Place
1:17 PM	friend	Yuanyuan ni hao a. Wo shi Zhang Xia. Huai ji de ma? You mei you ba wo wang ji a? (Hey Yuanyuan. I'm Zhang Xia. Do you still remember me? Or have you forgot me?)	Dorm
1:23 PM	participant	Hao jiu mei ni xiao xi le ai. Xian zai hao ma? (I haven't heard from you for a while. How are you doing?)	Dorm
5:27 PM	friend	Yuanyuan, wo shi Zhang Xia ji de ma? Ni gao zhong tong zhuo tong xue, wo zhong wu gei ni fa le xin xi. Ni shou dao mei you ne (Yuanyuan, I'm Zhang Xia. Remember me? I'm your high school classmate who shared a desk with you. I sent you a message at noon. Did you get it)	Dorm
5:46	participant	Wo zhong wu yi jing hui ni le ya. Gang cai zai da dian hua	Dorm

PM (I replied to you at noon. I was talking on the phone a moment ago)

5:51 friend Shi wo mei you shou dao a ni xian zai zen yang a zai na li shang Dorm
 PM xue a. Wo men hao jiu mei you lian xi la ni de dian hua wo huan
 shi xiang Ling Gang wen de ne
 (I didn't get it How are you doing Where are you going to school We haven't contacted each other for quite a long time I got your phone number from Ling Gang)

5:54 participant Wo zai hang zhou . ri zi ma huan hao . wo QQ shi 2*****8, ni Dorm
 PM zai nan jing o.
 (I'm in Hangzhou. I'm doing well. My QQ is 2*****8, you are in Nanjing, right?)

6:02 friend Ni zen me zhi dao de , wo shi zai Nanjing. qu nian wo zai Tianjin du Class
 PM le yi nian xian zai you hui dao nan jing du le. wo de qqshi
 2*****.
 (How did you know that? I'm in Nanjing. I went to Tianjin for school for a year, and now I'm back in Nanjin. My qq is 2*****.)

6:12 participant Deng Lan gao su wo de. Wo xian zai zai shang ke, xia ci liao o. Class
 PM (Deng Lan told me about that. I'm in class, talk to you later.)

6:30 friend Ni you mei you Wu Dong de dian hua a ni you he ta lian xi ma. Class

PM		(Do you have Wu Dong's phone number Do you stay in touch with him)	
6:32	participant	Mei you. wo dou mei he ta men lian xi guo.	Class
PM		(No. I didn't stay in contact with them.)	

In the above example, a participant named Yuanyuan was reconnecting with her old school friend, and they exchanged several messages with an informing purpose. The implicit affordance of text messaging makes this contact less abrupt. The whole conversation took ten turns. The example below is of an American participant who was also reconnecting with her former school friend. After a quick exchange, they decided to switch to a phone conversation.

Time	Sender	Message Text	Place
11:57 AM	friend	Hey! Hows (How's) Albany?	Class
12:00 PM	participant	Urgh – 2 (too) much to type. I'll call U (you)	Class

Third, different representations of mobile messaging technology within local cultures played an important role for its local uses. Mobile text messaging has been regarded as a pushing force for Internet economy in China. A few major Chinese Web portals began to turn a profit after they provided text messaging services three years ago. This huge market success makes text messaging an eye-catching cultural phenomenon celebrated by

the mass media, wireless carriers, phone manufacturers, and even the government. A few Chinese participants mentioned during their interview that at the time they adopted text messaging, text messaging was promoted as a new technology, a new means of communication, and even a new cultural practice that everyone should not miss. It represents the direction of an advanced culture within the Chinese discourse context of “Three Representations¹².”

In comparison, besides TV commercials, the biggest marketing campaign for text messaging at the American site was the texting-to-vote for *American Idol*, a popular talent show on the Fox TV network. Text messaging is primarily seen as a fun and entertaining means of communication.

Fourth, local cultural preferences of literacy or orality furthered the use of mobile text messaging in different directions. With a script-based language and 4000 years of written history, literacy culture is highly valued in China. Text messaging is interpreted as writing rather than as conversation. Participants spoke about how they were attracted to the power of the written communication of text messaging during their interviews. One participant said, “The presentation is totally different when you say the same thing in the written form. You could use more effective words to describe what you experienced, and

¹² Three representations was developed by the former president of the Communist Party of China, Jiang Zemin. This policy claims that the Party must always represent the requirements of the development of China's advanced productive forces, the orientation of the development of China's advanced culture, and the fundamental interests of the overwhelming majority of the people in China.

the receiver will be impressed by what you wrote. The verbal conversation is blander.”

Another participant mentioned how she was impressed by the poetic presentation of one text message her friend sent to her. Indeed, the short form of text messages with a 70-character limit has a close resemblance to a classic poetic genre, *ci*, which is used for expressing feelings of the common people and portraying mundane life details. *Ci* reached its peak 1000 years ago, but people continue writing in this genre. As text messaging is recognized as a popular genre, the career of the SMS writer emerged. Some SMS writers even have their own columns on the bigger Web portals. People enjoy circulating good text messages among friends, and dozens of these messages were logged at the Chinese site.

In contrast, at the American site, text messaging was regarded first as orality instead of literacy. Some participant defined it as “a conversation carried out with my hands.” All logged text messages had conversational styles, and many colloquial words and slang can be found there. There were no circulated messages.

Case Preview

The above discussion suggests that the local use of mobile text messaging technology is a very complex process. The instrumental affordances of a technology only provide a blueprint for local use. Users engaged in concrete activities will look for both instrumental and social affordances that best fit their immediate and cultural contexts to accomplish their goals. Users are actively participating in the localization process and

have been developing various uses for the technology beyond its intended use. Moreover, localization practices seem more intriguing with the emergence of mobile technologies. Since the technological artifact is accessible to users at any time and any place, users are looking for an artifact to be more embedded into their life spheres than previous artifacts.

In the following chapters, I will describe how participants used affordances to create their own technologies and how local uses were developed within three individual cases. I will start with a case involving subjectivity and locality, in which we will see how a hypermediated self managed her communication needs with an ensemble of ITs at a critical moment. The second case shows how mobile messaging was used to balance work and life by a young manager in her work setting. The third case describes how a user selected a technology that fit her personality and identity to stay in contact with people she cared for and to coordinate her daily tasks.