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ADAPTATION AS AN INTEGRATED ENDEAVOR:

LEARNING FROM THE TIMELINE DEPLOYMENT STUDY

A Thesis in

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by

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ABSTRACT

The past few years have witnessed the explosive growth of Online Social Networks (OSNs) and they have played an important role in people's daily life. OSN providers frequently introduce new user interfaces, aiming to improve user experience. However, as it is hard to design a perfect interface that exactly fit all users' needs, such frequent interface changes have resulted in multiple expected and unexpected consequences. This problem has drawn significant attention from both industries and academies. Lots of previous studies have focused on user adaptation issues in organizational contexts, but less has been done to understand user adaptation in the context of OSNs. In this thesis we conducted a qualitative interview study to analyze factors that affect user adaptation and strategies that users apply to cope with the problems during their adaptation process. The findings reveal both promoters and barriers of user adaptation and also identified two types of adaptation strategies: routine strategies and user-created strategies. Based on these findings, we suggest the user adaptation in the context of OSNs could be critically considered as an integrated endeavor.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGEMENTS

Chapter 1

Introduction

Chapter Overview

This research aims to investigate the way that Online Social Network sites (OSNs) users adapt to a new interface and factors that promote and impede their adaptation process. This chapter begins with the research motivation. Then, we highlight the aims of this research and research methods. Finally, we present the structure of the thesis.

Research Motivation

Online Social Networks (OSNs) has grown significantly in recent years. During this time, user interfaces have been changed and redesigned significantly and frequently. This dynamism could result in multiple expected and unexpected consequences. In 2006, the deployment of "News Feed" by Facebook resulted in an immediate privacy outcry from users (Hoadley, Xu, Lee, & Rosson 2010). New Profile, launched as a new interface of Facebook in 2009, was protested fiercely by users for a long time (Zheng, Shi, Xu, & Zhang 2012). Recently, Facebook has been nominated as one of 15 most unliked companies in America List. One major reason is the introduction of Timeline (Shetty 2012). According to a survey, 51 percent of users are worried about the new Facebook Timeline, and only 8 percent of users like Timeline (Shetty 2012). Thus, it is important to understand why a new interface is so hard for users to accept, what drives users to adapt to a new interface, and how users adapt to a new interface.

To our best knowledge, there are two main streams of research addressing user acceptance phenomenon. The *first stream* literature primarily focuses on the antecedents of user acceptance and usage of new technologies, and generates various models of user adoption (Venkatesh, Morris, &Davis 2003), such as technology acceptance model (TAM) (Davis 1989), theory of planned behavior (TPB) (Ajzen 1991), unified theory of acceptance and used of technology (UTAUT) (Venkatesh et al. 2003), etc. The *second stream* of research, which applies a process approach[1], mainly focuses on users' adaptation (Orlikowski 1996; Tyre and Orlikowski 1994, 1996). This body of literature presents a rich picture of the complex nature of user adaptation and described how users change their beliefs, skills, attitudes, and work procedures (Tyre and Orlikowski 1994; Zhou, Ackerman, & Zheng 2011) to adapt to new technologies.

While a body of user acceptance research has explained why and how users react to a new technology, most of them examine this complex phenomenon in organizational settings. User acceptance issues in the context of OSNs have not been widely discussed in current literature. As Alvesson and Kärreman (2007) noted that new contexts might bring important changes in theories, and each change may reveal the breakdown of theories that results in the creation of new knowledge. Compared to organizational groupware acceptance patterns, we believe online social networks like Facebook will be associated with different adaptation patterns given the various unique characteristics of OSNs. *First*, OSNs change their interface and update new features quite frequently. Therefor, how to make the change smooth without users' resistance is imperative. *Second*, OSNs have a huge population of users and users have very diverse technological background. Ensuring everyone understands how to use the new interface is difficult but important. *Third*, OSNs provide free services which are not mandatory to use compared with, for

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[1] Process Approach: A body of previous research study user adaptation by decomposing the process of initial implementation and constructing process model to achieve a better understanding of the dynamics occurs between technology and user environment (e.g. discontinuous pattern (Tyre and Orlikowski 1994), improvisational model (Orlikowski and Hofman 1997) and gradual reduction of misalignment (Leonard-Barton 1988)).

example, new financial system in companies or EMR system in hospital. So OSNs lose users more easily. *Fourth*, information in each user's account is personal, thus, privacy problem is also extant and unique in OSNs.

Because OSNs own such unique characteristics and each unique characteristic requires proper design to make sure that changes are acceptable, designing for such sites is extremely difficult. As Leonard-Barton (1988) noted, a new technology almost never fits perfectly into the user environment. Thus the interface often needs to be adapted by users to fit with their use. We believe we can gain design inspirations by understanding how users are involved in the adaptation process. However, few studies have looked at how users adapt to the new interface of social media in general, or Facebook in particular. While two studies examine users' responses to interface changes from privacy lens (Hoadley et al. 2010; Zheng et al. 2012), it is not sufficient to provide us a whole picture of users' reactions to new interface changes.

Furthermore, although the above two streams of literature have provided substantial visions into different aspects associated with users' adaptation issue, we believe there is a need to combine both streams of literature toward a whole picture of factors affecting users' intention of adaptation and users' actual behaviors in the adaptation process.

Research Aims and Objectives

The aim of this study is to investigate how OSNs users adapt to the new environment and various factors that affect users' adaption process. As such the research has the following objectives:

1. To investigate adaptation strategies that users apply to adapt to new interface of OSNs;

2. To investigate factors that promote and impede users' adaptation to the new interface of OSNs;

3. To investigate the process of users adaptation to new interface in OSNs;

4. To investigate design implications that we can learn from adaptation to benefit future interface design OSNs.

The Research Methods

We applied qualitative research method to examine Facebook users' perceptions and behaviors adapting to the new interface – Timeline.

To better understand how Facebook users adapted to Timeline, we chose semi-structured interviews as our data collection method. Qualitative interviews offered us an opportunity to collect insight into the participants' perceptions and experiences on interface changes and Timeline use. Study participants were recruited by snowball sampling, covering a broad range of situations. The diversity of user background and wide age range provided us a chance to reveal common themes across a variety of users adaptation experiences, rather than focusing exclusively on a particular usage situation. Based on this, we uncovered a series of common perceptions and behavioral patterns.

All interviews were recorded and transcribed. Then the transcriptions were inductively coded by the author followed by discussions with advisor to iteratively generate and refine themes, which continued until a sense of saturation was reached. Chapter three will present the details of the research methods.

Structure of the Thesis

The thesis is organized into five sections. The first section presents the research motivation and research questions. The second section summarizes the extant literature on user acceptance, user adaptation, OSNs and Facebook interface changes. The third section describes the research methods and the fourth section presents the results of our study. The last section discusses the contributions and implications of our paper and suggests an agenda for future research.

Chapter 2

Literature Review

Chapter Overview

The first chapter underlined the research problems addressed in this study which are echoed here as the exploration of OSNs users' responses and interactions with the new interface. This chapter provides the theoretical foundation, and identifies gaps in the existing research to justify further research of the issue.

Theoretical Foundation

The introduction of a new information technology produces multiple expected and unexpected consequences (Griffith 1999). Numerous efforts have been made by researchers in various fields to explain why and how users will react to a new technology. To date, there are two main streams of research addressing this complex phenomenon. *The first stream* primarily focuses on the antecedents of user acceptance and usage of new technologies and generates various models to illustrate user adoption pattern (Venkatesh et al. 2003), such as technology acceptance model (TAM) (Davis 1989), theory of planned behavior (TPB) (Ajzen 1991), unified theory of acceptance and used of technology (UTAUT) (Venkatesh et al. 2003), etc.

The second stream of research, which applies a process approach, mainly focuses on users' adaptation (Orlikowski 1996; Tyre and Orlikowski 1996). This body of literature presents the complex nature of user adaptation and explains how users change their beliefs, skills,

attitudes, and work procedures (Tyre and Orlikowski 1994, Park and Chen 2012, Zhou, Ackerman and Zheng 2011) to adapt to new technologies.

User Acceptance Theories

Understanding user acceptance and usage of new technology has been one of the most developed streams of research in IS feild (Venkatesh et al. 2007). Researchers have developed multiple theoretical models from theories in psychology and sociology to explain users acceptance phenomenon (Venkatesh et al. 2003). Figure2-1 shows the basic conceptual framework of the class of models explaining individual acceptance of information technology (Venkatesh et al. 2003).
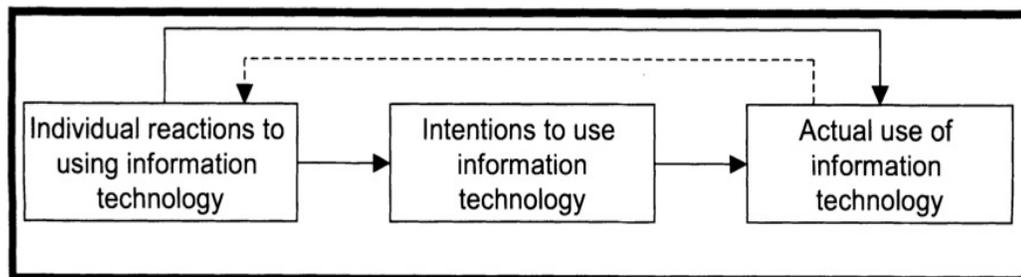
Figure **2-1**: Basic Concept Underlying User Acceptance Models.

(Source Venkatesh et al. 2003, p 427)

We will briefly review several widely used user acceptance theories/models. Grudin (1988, 1997) studied user acceptance of groupware technology in organizational settings. The result demonstrated that factors like difficulty of assessing use outcomes and network effects would affect overall adoption progress. Particularly, this study underlines the difference of designing socio-technical systems and highlights the importance to understand "disparity between who does the work and who gets the benefit" (Grudin 1994, p. 96). That means groupware users would make the cost-benefit analysis when they decide whether to use a technology.

Technology Acceptance Model (TAM) has been widely used to explore technology adoption on organizational-level (Davis 1989). This model claims that users evaluate a technology from two perspectives when they decide whether to adopt it: perceived ease-of-use and perceived usefulness. That means potential users would assess the tension between how difficult a system is to handle and the benefits they can obtain from using the system. While TAM has been considered over-simplifying the adoption process (Bagozzi 2007), it indeed provides a critical thinking of factors affecting a new technology adoption.

Another widely used acceptance model is the unified theory of acceptance and use of technology (UTAUT; Venkatesh et al. 2003). Venkatesh et al. (2003) developed UTAUT as a comprehensive synthesis of eight theories/models of technology acceptance and use. This model identifies four factors that influence behavioral intentions to adopt a new technology in organizational contexts, including performance expectancy, effort expectancy, social influence, and facilitating conditions.

To date, UTAUT has served as a baseline model and has been applied to various technologies in both organizational and non-organizational settings. There are three general kinds of extensions for UTAUT (Venkatesh 2012). The first kind is adding new constructs to enlarge the scope of the endogenous theoretical mechanisms (e.g., Chan et al. 2008). The second type is including exogenous predictors of the UTAUT variables (e.g., Yi et al. 2006). The third type is applying UTAUT in new contexts, such as new user populations like healthcare professionals (Yi et al. 2006), new cultural settings like China and India (Gupta et al. 2008), and new technologies like health information systems (Chang et al. 2007). Nevertheless, our literature review of this stream of work revealed that little research did in OSN setting which is extremely different from other contexts. Thus, although the numerous studies contribute to understanding UTAUT in different contexts, there is still the need for exploring user acceptance issue in OSN context.

8

Technology Adaptation

The other stream of research mainly applies a process approach focusing on users'

adaptation (Orlikowski 1996; Tyre and Orlikowski 1994, 1996). A new technology almost never

fits perfectly into the user environment (Leonard-Barton 1988). Thus, misalignments often

happen between the technology and users' practices. To eliminate these misalignments, users

need to take time and efforts to learn and adapt to the new technology (Leonard-Barton 1988).

The adaptation is considered as a necessary process after the new technology rollout because

designers can barely design a technology that exactly fits users' needs, and users usually do not

participate in the original design process and thus cannot fully understand the technology

immediately after deployment (Leonard-Barton 1988).

User adaptation has been widely studies and diversely understood. Authors like Rice and

Rogers (1980), Ives and Olson (1984), Clark (1987), Poole and DeSanctis (1988) and Leonard-

Barton (1988) use diverse labels to describe the alterations or adjustments made to a technology

by users (See table 2-1). Although similar or same concepts are defined differently across studies,

definitions presented in Table 2-1 shows that the studies all basically emphasize on a

phenomenon: how users interact with new IT to reduce misalignments between users' needs and

IT (Clark 1987; Leonard-Barton 1988; Tyre and Orlikowski 1994). Here, we adopt definition of

user adaptation from Beaudry & Pinsonneault (2005): "the cognitive and behavioral efforts

exerted by users to manage specific consequences associated with a significant IT event that

occurs in their work environment"(p.496), since this definition integrates the different dimensions

studied in previous research.

Technology adaptation is crucial to shape both individual and organizational behavior in

different workplaces (Park and Chen 2012) and also benefits future technology development and

research activates (Tyre and Orlikowski 1994). To understand the adaptation process, a body of

organizational and social behavioral literature has presented a rich picture of the complex nature

of user adaptation by constructing models between technology and users, for example, gradual reduction of misalignment by Leonard-Barton (1988), improvisational model by Orlikowski and Hofman (1997), and discontinuous patterns by Tyre and Orlikowski (1994). Some theories also illustrate the nature of adaptation. Adaptive structuration theory proposed by DeSanctis and Poole (1994) demonstrates complex interactions between individual, group and features of the technology. Diffusion of innovations theory proposed by Rogers (1995) looks at user adaptation from a social learning perspective and claims that individuals make adaptation decision when they notice influential others using this technology and achieving benefits from it. These studies offer us diverse understandings of adaptation. However, these studies did not offer insight of what motivates users to contribute efforts to adapt systems. Thus, they provide limited insight into how systems can be redesigned.

Table **2-1**: User Adaptation Definitions.

Authors	Concept	Definition
Rice & Rogers (1980)	Reinvention	Reinvention is defined as the extent to which an innovation is changed during its adoption and implementation.
Ives & Olson (1984)	Adaptation	Adaptation refers to through alteration or alignment, the technology meets users' needs.
Clark (1987)	Appropriation	Refers to "a situation where the user starts by recognizing the potential value of a particular IT and manages to narrow the absorption gap between the requirements of the IT and its own limited capacities, then begins to creatively modify, refine, and use it in such a way that it will meet his/her needs. Appropriation implies the continuous, cumulative, and incremental modification of an innovation in all its aspects" (p. 156).
Leonard-Barton (1988)	Reinvention	Refers to "the alteration of the initial innovation as users change it to suit their needs or use it in ways unforeseen by developers" (p. 253).
Leonard-Barton (1988)	Adaptation	Refers to "the reinvention of the technology and the simultaneous adaptation occurring at multiple levels within the organization" (p. 253).
Majchrzak & Cotton (1988)	Adjustment	Four different aspects: "changes in job satisfactions, work commitment, psychological and stress problems, and perceived quality of life" (p. 48).
Poole & DeSanctis (1988)	Appropriation	Refers to "concerns alterations brought by users to the technology while using it" (p. 9).
Poole & DeSanctis (1990)	Appropriation	The way that a group of users adapts, and reproduces the structures of a technology.
DeSanctis and Poole (1994)	Appropriation	A series of users acts could reveal a deep structuration process of IT use.
Sokol (1994)	Adaptation	Refers to "the adjustments and changes following the new IT implementation. The adaptations may concern the physical aspects of the technology as well as the procedures, beliefs, knowledge, or relationships of the users" (p. 99).
Orlikowski (1996)	Appropriation	Appropriation means that "the continuous, progressive, and mutual adjustments, accommodations, and improvisations between the technology and the users" (p. 69).

Tyre & Orlikowski (1996)	Adaptation	Modifications brought to the technology, working procedures, and users' beliefs (p. 791).
Beaudry & Pinsonneault (2005)	Adaptation	The cognitive and behavioral efforts exerted by users to manage specific consequences associated with a significant IT event that occurs in their work environment (p. 496).

(Source: Adapted from Beaudry & Pinsonneault 2005, p. 497)

OSNs and Facebook

Online Social Networks (OSNs) has grown significantly in recent years. During this time, user interfaces have been changed and redesigned significantly and frequently by the systems. This dynamism could result in multiple expected and unexpected consequences. In 2006, the deployment of "News Feed" by Facebook resulted in an immediate privacy outcry from users (Hoadley, Xu, Lee, & Rosson 2010). New Profile, launched as a new interface of Facebook in 2009, was protested fiercely by users for a long time (Zheng, Shi, Xu, & Zhang 2012). Recently, Facebook has been nominated as one of 15 most unliked companies in America list. One major reason is the introduction of Timeline (Shetty 2012). According to a survey, 51 percent of users are worried about the new Facebook Timeline, and only 8 percent of users like Timeline (Shetty 2012). Thus, it is important to understand why a new interface is so hard for users to accept, what drives users to adopt a new interface, and how users adapt to a new interface.

Compared to organizational groupware acceptance patterns, we believe online social networks like Facebook will be associated with different adaptation patterns given various unique characteristics of OSNs. Boyd and Ellison (2007) define OSNs as "web-based services that allow individuals to: 1) construct a public or semi-public profile within a bounded system; 2) articulate a list of other users with whom they share a connection, 3) view and traverse their list of

connections and those made by others within the system" (Boyd and Ellison 2007, p.2). This definition informs us of uniqueness of OSNs.

Self identity

OSNs provide users a virtual space to create an online identity which is presented by a personal profile. Researchers have made lots of efforts to investigate identity presentation that can be defined as the process during which users share part of themselves with others (Altheide 2000). Identity presentation primarily focuses on the user profile, where users can make public or semipublic presentations of themselves. New members are offered blank profiles, which they personalize by filling information about themselves into a series of standard fields. Profiles and interactions with other users together play an imperative role in shaping identity presentation. For example, Facebook profiles allow users to contribute content by posting comments and status, sharing videos, and tagging photos. This mechanism offers users opportunities of portraying themselves freely under certain limitations[2]. A number of papers attempted to answer whether profiles reflect accurate images of the owners. In one study, researchers tested whether accurate portrayals of the users' personalities by 133 Facebook users (Gosling, Gaddis, & Vazire 2007). In a more interesting study, strangers rated participants based solely on the participants' profiles, and then compared the ratings with participants' self-ratings and the ratings by several people who knew the participants offline. The findings suggested that OSN profiles almost accurately reflect real personality image of profile owners (Back et al. 2010). Other studies also supported this finding and concluded that profiles fairly convey the images of their offline identity, though self-enhancement might happen (Waggoner, Smith, & Collins 2009; Weisbuch, Ivcevic, & Ambady 2009). Since OSN users consider the profile as their second face (Zheng et al. 2012), they care deeply how profiles display their information.

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[2] For example users cannot choose preferred interface and customize layout of the interface.

Privacy issue

Although the design of OSNs encouraging information input enhances general user experiences (Burke, Marlow, & Lento 2009), the personal information sharing on OSNs results in potential privacy threats. According to previous literature, privacy threats of OSNs mainly include unintended disclosure of personal information, ruined image or reputation because of gossip and rumors, stalking, second use of personal data, unwanted contact, and hacking (Boyd 2008; Wang, Xu, & Grosslags 2011; Taraszow, Arsoy, Shitta, & Laoris 2008; Zheng, Pan, Xu, & Zhang 2012 Debatin, Lovejoy, Horn, & Hughes 2009). The tradeoff between benefits and threats associated with privacy settings brings a dilemma for OSNs and their users. In order to achieve commercial benefits, OSNs intend to set access control weak to encourage information contribution and exchange. However, they need to avoid the risk of a privacy outcry like the Facebook privacy panic of news feed (Hodley et al. 2009), MySpace pedophile outcry (Raynes-Goldie, 2010), and a privacy scare of Google buzz (Helft 2010). Interestingly, Facebook has the most comprehensive privacy settings in OSNs but meets significant privacy problems (Anthonysamy, Rashid, & Greenwood 2011). From users' perspective, Gross and Acquisti (2005) describes this dilemma precisely in OSNs: "*The relation between privacy and a person's social network is multi-faceted. In certain occasions we want information about ourselves to be known only by a small circle of close friends, and not by strangers. In other instances, we are willing to reveal personal information to anonymous strangers, but not to those who know us better*"(p.72).

In order to explain this phenomenon and achieve a better understanding of privacy issues on OSNs, researchers have focused on behavioral intentions of information disclosure and users attitudes toward privacy. The most comprehensive study, which was conducted by Gross and Acquisti (2005), surveyed more than 4,000 Facebook users recruited from Carnegie Mellon University. The findings showed that participants intended to disclose large volumes of personal

information on Facebook. The results shows that over 50% of participants were willing to provide their address; 40% of participants provided their phone number; and only a small amount of participants reset the privacy settings to limit information disclosure (Gross and Acquisti 2005). Over time, another study surveyed 205 participants in 2007 and found that only 10% of student participants provided their current address (Fogel and Nehmad 2009). Moreover, a recent study recruiting 1,740 participants revealed that almost 30% participants reset privacy default setting to a more secure status, which suggested that users' privacy awareness had increased (Dey, Jelveh, & Ross 2012). Such a change could be partially explained by unwanted information disclosure resulted from new features or new interfaces of OSNs which are designed for encouraging information disclosure (Zheng, Pan, Xu, & Zhang 2011).

Nevertheless, some studies have found an inconsistency between privacy concerns reported by users and real privacy behaviors (Acquisti and Gross 2006; Stutzman & Kramer-Duffield 2010). For example, 16% of participants revealed both home address and classes location on their Facebook profile, though they clamed they were "very worried" about the risk of disclosure of above two pieces of information (Acquisti and Gross 2006). In an attempt to understand this disparity, a study found that privacy concern was largely depending on perceived privacy violation but relative less determined by the expected harm (Krasnova, Kolesnikova, & Guenther, 2009).

To summarize, privacy issues as a salient problem existing in OSNs are very unique compared with other organizational context.

Facebook

So far, Facebook is the most popular OSN in the world (Kreutz 2009). As of June 2013, Facebook had over 1.1 billion users who spent more than 700 billion minutes per month on the site and mobile phone (Facebook 2013). Facebook is now integrated with over seven million

websites and applications (Facebook 2013). Facebook passed Google to become the most visited website in the United States in March 2010, taking 7.07% of all U.S. web traffic (Dougherty 2010). Facebook's dominance extends very far beyond the United States, with over 75% of current users residing outside of the country and 70 languages available on the Facebook site (Facebook 2013). In brief, from its foundation in February 2004, Facebook has developed as an OSN star by creating an enormous new area where millions of social interactions occur every day. Because of the repressiveness of Facebook in OSNs, we choose Facebook as the place to investigate the motives, patterns, and strategies of the user adaptation in our study.

Facebook Interface Change

Facebook changes its interface very frequently and sometimes very dramatically. Thus, it is even hard to recognize Facebook when it was established. We demonstrate the history of Facebook interface changes with a series of screenshots in Appendix A.

Few studies have looked at how users adapt to the new interface of social media in general, or Facebook in particular. Hoadley et al. (2009) did relative work looking at the degree to which Facebook users were upset by introduction of News Feed feature and why, and examining the influences of the News Feed privacy outcry on user behavior changes. The results demonstrated an easier information access and an illusory loss of control prompted by the introduction of News Feed features triggered users' privacy concerns. Although this study is related to interface change, the focus is what factors trigger privacy concern, thus adaptive behaviors are not captured. Zheng et al. (2012) has done a more recent study constructing a rich picture of triggers of users' privacy concerns, privacy attitudes, and intended behaviors associated with the deployment of the New Profile on Facebook. However, they examine users' responses only from privacy lens that is not sufficient to provide us an overall picture of users reactions to new interface change; and the data source of this study is user comments posted on the official

Blog of Facebook that hardly describe users' actual behaviors and real social interactions in their regular online activities on Facebook.

One possible reason that there is little research explores user adaptation of Facebook interface is because adaptation has been well studied in organizational settings, for example, companies and hospital. However, compared to organizational adaptation patterns, we believe OSNs like Facebook will demonstrate different adaptation patterns given various unique characteristics of OSN.

To better understand OSN users' adaptation to new interfaces, we studied the rollout of Timeline that is the new interface introduced by Facebook in 2012. We present the adaptation of Facebook users to Timeline by describing users' perception and adaption strategies.

<center>**Chapter 3**</center>

<center>**The Research Methods**</center>

<center>**Chapter Overview**</center>

This chapter describes the research methods applied in this study. The first section briefly introduces the Facebook Timeline interface. The next section details the data and data collection method. Finally, we elaborate data analysis process followed in this study.

<center>**Facebook Timeline Introduction**</center>

Timeline is an entirely new personal profile design of Facebook, which has been launched globally from January 24th 2012. It presents users' entire Facebook history, as well as any personal history users choose to put in, including comments, posts, status updates, photos and videos in a chronological order.

Timeline is a significant innovation compared to previous versions of the user profile. The most prominent feature is adding a cover photo at the top of the profile. Users can change this photo to any photo they'd like it to be. Timeline is divided into two columns, with a line down the middle to represent the path of time. Users are allowed to add important life moments that have not been captured by Timeline, especially those that happened before the user joined Facebook.

Timeline applies an algorithm to evaluate the most essential events of users' life and summarizes them into users' timeline, which can be modified to their satisfaction. Undesirable moments can be hidden from the Timeline. Besides, users have a seven-day preview period,

<center>18</center>

during which users can delete the content that is on their profile and hide what users don't want

displayed.

Figure **3-1**: Early Version of User Profile on Facebook.

Figure **3-2**: Facebook New Interface—Timeline.

Data and Data Collection

In this study, we applied a qualitative method to examine the Facebook users' perceptions and behaviors adapting to the new interface – Timeline.

To better understand how Facebook users adapted to Timeline, we chose semi-structured interviews as our data collection method. Qualitative interviews offered us an opportunity to collect insight into the participants' perceptions and experiences on interface changes and Timeline use. Study participants were recruited by snowball sampling. The author posted status and sent messages to friends on Facebook to broadcast study recruitment information. And the author's Facebook friends forwarded this massage to their Facebook friends. We studied 14 Facebook users.

The study participant covered a broad range of situations: from Ph.D students with strong technical background to charity agent employee with basic computer skill; from high school student to managers with almost 20 years work experience. The diversity of user background and wide age range provided us a chance to reveal common themes across a variety of users adaptation experiences, rather than focusing exclusively on a particular usage situation. In doing so, we uncovered a series of common perceptions and behavioral patterns.

At the beginning of the interview, participants were asked several short questions to gather demographic information (e.g., gender, age, occupation), and questions on Facebook-use (e.g., how long they use Facebook, how often they login Facebook, what functions they use). The length of interviews lasted approximately 40 minutes to 2 hours. And all interviews were audio-recorded, and transcribed for further data analysis. The method produced a gorgeous set of recalling of the new interface use experience, with individual transcripts averaging 15 pages. We explored the following questions in the semi-structured interviews:

✓ *The interviewee's experience of previous interface changes before the Timeline was launched*

✓ *The interviewee's experience of adapt to the Timeline*

✓ *The interviewee's perception of pros and cons of the Timeline*

Among the 14 interviewees (See table 3-1 for detailed information), 8 were female and 6 male. 10 participants were American, 3 were Asian, and 1 was European. The age range of participants was between 18-40 at the time of the study. 11 of our interviewees were experienced at least 3 times Facebook significant interface changes. All participants had computers and had access to the Internet at home. 10 of them used both a computer and a smartphone to login Facebook.

Table **3-1**: Participants' Information.

	Name	**Occupation**	**Gender**	**Age**	**Number of Friends**	**Citizenship**	**Years join Facebook**	**How often use FB**
P1	Peter	Post-doc	Male	29	494	American	2005, 7 years	Several times daily
P2	Steve	Ph.D student	Male	25	600	American	2005, 7 years	Several times daily
P3	Giuseppe	Ph.D student	Male	27	486	Italian	2009, 3 years	Two times daily
P4	Kay	Employee	Female	25	500	American	2007, 5 years	Several times daily
P5	Mary	Undergraduate	Female	24	Around 600	American	2007, 5 years	Everyday
P6	Tea	Undergraduate	Female	23	766	American	2008, 4 years	Several times daily
P7	Kayla	Ph.D student	Female	25	937	American	2006，6 years	At least 3 times a day
P8	Jane	Senior of high school	Female	18	Around 500	Indian	2008, 4 years	Daily
P9	John	Ph.D student	Male	26	314	American	2006，6 years	Several times Daily
P10	Tony	Master	Male	24	Around 400	American	2006, 6 years	Several times

								Daily
P11	Ying	Master	Female	26	310	Chinese	2009,3 years	Twice Daily
P12	Jenny	Undergraduate	Female	22	420	Chinese	2010, 2 years	Several Times Daily
P13	Carrie	Employee	Female	36	500	American	2007	Twice Daily
P14	Collin	Manager	Male	40	432	American	2007	Twice Daily

Data Analysis

To discover factors affecting user adaptation process and users' adaptation strategy, we conducted interviews to explore the full story of how users adapted to the new interface, what coping mechanisms they applied, and what inner experience they had. All responses were inductively coded. Two coders conducted initial data analysis sessions right after the first few interviews to extract the key issues. Interviews were audio-recorded and transcribed into text as soon as possible. We chose first four interview transcripts for the first round of data analysis. We still utilized an open coding approach on sample to identify salient concepts by each researcher. The factors affecting users adaptation and coping strategies were identified as the key concepts from the first stage of analysis. Once those main themes were identified, then axial coding was made to identify categories. The themes and categories generated by two coders were discussed and revised to reach agreements. The Results as the coding guideline were used to guide the next round of coding for the successive interviews. When the second round of the analysis were not able to find a new concept and category, it demonstrate the saturation of the theory (Strauss and Corbin 2008), therefore we can stop recruiting and interview other participant. Through these procedures, we were able to uncover factors affecting users' adaptation process and how users adapt to the new interface.

Chapter 4

Empirical Findings and Analysis

Chapter Overview

This chapter reports the empirical findings of this research and the critical analysis. The first section shows the factors that affect (promote or impede) users' adaptation. The second section describes users' adaptation strategies to the new interface (See Figure 4-1).
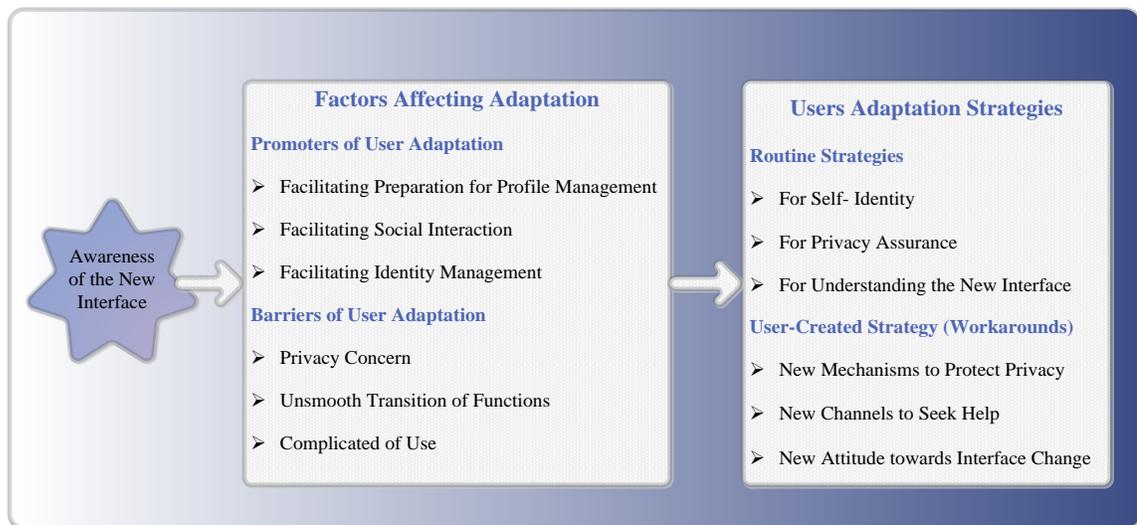

Figure **4-1**: Findings Structure.

Factors Affecting Adaptation

Promoters of User Adaptation

Facilitating Preparation for Profile Management

Our interviews suggest that one perceived opportunity for user adaptation was that Facebook gave users 7 days to manage the new profile—Timeline –before made it public, rather than publishing users' personal profile right after forcing them to adopt the new interface as Facebook did previously. This period of time allowed users to make preparation for adaptation psychologically and behaviorally. This mechanism did not only give users time to understand Timeline and manage their personal information properly to reduce the risk of exposing inappropriate contents to the public; but also alleviate the pressure and panic resulting from the big change of environment and users' unfamiliarity of new functions.

Participants in our study made a comparison of different ways of Facebook launching interfaces between Timeline and the previous profile. When the previous profile was released, all the users' profiles were changed over night in a mandatory manner. Users suddenly confronted a different environment with a different layout, different functions, and different privacy settings, but have little awareness of how to handle the new interface and manage their profile properly. Thus, our participants were under pressure of out of control over their profile, and took the risk that some inappropriate information they intended to hide were exposed, which might jeopardize their public image. As a participant said:

[P7]"I still remembered when I woke up to check my Facebook, I totally couldn't recognize my profile. I felt so angry that my relationship status appeared on the top of my profile which I intentionally hide…but I didn't know how to remove it…"

However, after adopting the timeline, users had 7 days to manage their public identity before the profile was published. During this period, they could learn how to use the Timeline and manage the profile contents that were automatically generated by Facebook. Consequently, such mechanism reduces the risk of accidental disclosure of improper information. According to another participant:

[P5]"Timeline is totally different…it gives me some time to figure out how it works and how every year was summarized [by Facebook]… It gives me a good opportunity to go over my photos, because I have a lot of photos, like 1,800, and make sure everything appropriate to my family, my friends and my professors."

Additionally, the period of time also provided users a cushion to accept the new interface emotionally, and thus help ease users' anxiety resulted from interface change. Our participants expressed their panic of sudden interface change because they needed to confront an unknown environment without any choice and they felt they had little control over their profile. Although the timeline was still mandatory, 7 days as a preparation period help them reduce the panic.

[P3] "I'm sick of [interface] change! They suddenly make everything different. I don't know what's going on…but this time they give me some time to think, to prepare. At least it makes me less nervous. You know, when you gradually get familiar with it, you will be relaxed."

Facilitating Social Interaction

Another positive factor attracting user adaptation was that users believed the Timeline could better facilitate social interactions with their friends compared to the old version. Timeline adopted a new way to organize users' information and events: chronological order. This way was

considered more effective and efficient to organize the contents of user profile, and therefore became a "social assistant" to facilitate user social actions.

Timeline automatically summarized each user's information that he/she posted and uploaded on Facebook in years and months, thus a user could easily search and locate specific information like previous posts, sharing, photos at the specific time. Participants expressed the conviction that this function like a "social assistant" provided convenience and support during a social interaction. For instance, a user often met a problem that he/she received a message or a post from an unfamiliar Facebook contact who had a conversation on Facebook before with him/her. When this happened, the user intended to search the conversation that might help to recall the memory who the person was, but it is almost impossible in the previous version which only displayed a member's basic information, several tagged pictures and some recent post.

[P5] "Before timeline, you need a bunch of clicks to find something you need, and most of time you are waste of your time because you just can't find it even though you know it is there…"

However, it is not the case in Timeline. Since Timeline displayed and organized all user' information orderly, a user could track a particular conversation by year and month. A participant described her feeling:

[P7] "It's kind of embarrassing that you don't know the person who are you talking with. So I really think Timeline is useful to help me track the information as long as I roughly remember when it happened."

Some participants believe that making information organized not only supported social interaction with an unacquainted contact, but also benefited the communication with close friends. A close friend might start a conversation by mentioning a post he/she left on a user's

profile, but the conversation might be stuck if the user could not recall the post. Thus, users

needed a feature to assist them to search some content they need. Although a user still cannot

precisely search a specific post, Timeline did provide a channel for user to track something based

on their vague memory, and thus facilitate the social interaction. A participant provided an

example happened to her:

[P5] *"… my best friend might say 'do you remember that I post on your wall' one month*

ago', You know I don't have such a good memory to remember every post, but I can easily go

back and locate the time and find the post I want. Otherwise, I will feel guilty. "

Facilitating Identity Management

Facilitating identity management contributes a lot to users acceptance of Timeline. Our

participants believed that the personal profile is his/her "second face" that presents and portrays

who he/her is. As an interviewee explained that: *"how you decorate your room can always reflect*

your taste. Similarly, when someone visit my profile, I hope he can feel what kind of person I

am." Thus, they treated their personal profile as their own territory and they believe they should

have autonomy to manage their profile freely.

Compared with the previous profile, our participants believed that timeline granted users

much more flexibilities to manage profile in their own way. In the prior version, contents

displayed in the profile were strictly limited. The pervious profile mainly showed a profile

picture, five tagged pictures, basic information, and several recent posts. In doing so, everyone's

profile looked like dressing in a "uniform". However, the timeline gave users more flexibility to

portray their colorful life. For example, in addition to a profile picture, users were also allowed to

upload a cover photo that was much larger than the profile photo. The profile photo usually

showed the real face of a user, but the cover photo could be any picture the user likeed. Our interviewees thought cover photo was a brilliant idea to help them express themselves.

[P7]*"…it is large and beautiful! The picture is the first thing people see. So it is very important to reflect who you are… you can also change the cover photo as you like. "*

Besides, some participants call timeline as "*the real page*". Because the timeline granted users freedom to edit the contents on their profile and reorganize their story as they wish. For example, a user could add a story or a event that he/she considered special at a particular moment, and he/she can also hide something considered not important or inappropriate.

[P11]*"It does not force you to put something there, you can edit or remove the stories in the timeline."*

[P8]*"You can have it more organized, you can have it in you way. You can make you fun page for people to explore."*

Barriers of User Adaptation

Privacy Concern

Data from all the interviews suggest that one barrier of user adaptation is users' privacy concern. Although users believe chronologically arranging information is more organized, it leaves a back door for stalkers, the third part applications and other unpleasant visitors to easily locate their personal information, consequently their privacy is actually threatened.

Some interviewees doubt the real purpose of Facebook to display users' information chronologically. They believe Facebook intentionally provides other agents (i.e. government, the

third part application) convenience to collect users' personal information, other than considering users' needs.

[P1]*"Who would more care about this information organized by chronological order? Stalker? Your friends? Or you? When users think about this question, they may find that Timeline is not that useful for them but extremely useful for others"*

[P6]*"I heard from my friends that the corps could see everything you posted on your wall. So the privacy is not well protected…Super easy to find sensitive information in specific time. So it's also easily stalked."*

Further, some interviewees recognize the potential that Timeline may threaten their future career since chronological order makes their employer or professors easily know their whole life.

[P10]*"I don't want my employer or my professors saw something about me in 2009. They could see my party photos, and they realized that you did this before."*

One of our interviewee quit the Facebook after she used Timeline for five months. The reason is that she is in the job market now and she really concerns that her pictures or posts on Timeline may leave her potential employer negative impression. Although she knows privacy settings can reduce her concern, she is so tired to always keep eyes on Timeline to hide improper items.

[P12]*"After adopting Timeline, I often worries the content in Facebook may influence the judgment of my future employer… Although I manage my profile very carefully, there's still risk in there. I feel tired and tense, and I waste too much time on Facebook. That' the reason I deactivate it. "*

In spite of Timeline self, the corresponding privacy setting also result in users' criticisms. All participants noticed that when they adapted to Timeline, their original privacy setting was

changed to Facebook's default settings, which makes almost everything public. Users need to spend many efforts to reset their privacy settings.

[P9] "Everything was public when I adopt the timeline! I don't understand why Facebook doesn't keep my original settings. You know, I am a technology guy, so I know it is not difficult for Facebook to do that. I guess they just don't care members' privacy."

Some participants suggest that Facebook should make the default setting very tight, then users could reset based on their needs, rather than giving users very loose setting at the beginning, especially when users have not been familiar with the system.

[P3] "The default setting should be tighter, instead of making everything public when the new interface is introduced. If users doesn't reset privacy settings right after they adopt Timeline, their privacy is dangerous!"

Unsmooth Transition of Functions

Another barrier to adaptation generating from our data is that the transition of functions from the previous profile to the Timeline is not smooth. The problems mainly focus on Friends Grouping function and Groups function.

Using privacy settings to create different audience zones was a common strategy for keeping different audiences separate from one another in Facebook. Most of our interviewees use such Friends Grouping function to realize groupwise sharing. And Facebook users can create static rules of who has access to what types of data, or they can limit access to specific content case by case. Thus, users often build their friend groups based on how close they are with different people.

Timeline still keeps this function, however, when users adapt to timeline, several new friends groups automatically generated by Facebook appear with users' original self-defined friends groups. Their friends are assigned into different groups and the same friend even appears in several groups simultaneously. Our participants feel very confused and they consider that the groups generated by Facebook are not reasonable for them. Consequently, they need to delete most of the groups and rearrange their friends in different lists.

[P8]"The grouping function is totally disordered. I have my own groups in old profile, for example family, close friends groups. But when I adapted to Timeline, it created many other groups automatically, and friends in each group may repeat, it does not make any sense… I deleted them all and reedited my friends groups."

In terms of Groups function transplanting from the pervious one to the Timeline, our interviewees are also not satisfied. In Facebook, many users join groups, such as Soccer Group, Fashion Group, and College Group. Some groups are open groups which allow everyone to participant freely; some are close groups which require one of group member's permission to join; the third type is secret group which cannot be searched by search engine and request one of members to invite to join. When users adopted the Timeline, they found they cannot find their members of the secret group. Timeline did not save the secret group member list. Thus, they had to track those members based on their memory and rebuild whole friends list.

[P2]"I have a secret group with about 200 members. It's very wired that Facebook did not archive group members list when I transfer from the old profile to Timeline. So when I adopted Timeline, I realized my secret group members disappeared. I have to track those members to maintain connection."

Complicated of Use

Another negative factor impeding adaptation reflected from our data is that the new interface is too complicated to use. Our participants consider that timeline has been the biggest revolution since Facebook was established. They need to spend lots of efforts to figure out how to use the Timeline. Although Timeline still keeps some features as the previous one, these features are rearranged in an extremely different layout, which make many users confused. For example, users feel difficult to figure out how to *"move one friend to another group"*.

The typical problem is users cannot find the button to block friends, unfriend someone and delete information. Compare with the old profile, timeline set more steps for users to find those functions. Some participants believe Facebook intentionally hide these function to make users difficult to remove something from Facebook.

[P5]"I think they did it pretty intentionally… Now you have to go to the options and then go to submenu, then you may find the last one is 'delete', if you don't carefully check every single option, you cannot find it."

[P7]"I just think they add more steps to make it much more difficult, for example, 'unfriend' is much harder than before. In the ex[profile], there is a friends list, you can click the options on the side, then you can unfriend someone. But now, you need to go to other's page, and find the friends button and then find the unfriend button ".

All interviewees felt that it was burdensome to handle Timeline. It requires much more time to maintain the whole profile. Our interviewees consider that it is not necessary to make the profile complicated since Facebook is only a tool for them to connect with families and friends.

[P6]"I think I waste too much time on Facebook…it is getting more and more complex and for the people like me (who are not techno savvy at all) it is just getting too much to just be in touch with your friends. Guess one day, I will just have to quit it…"

Users Adaptation Strategies

The Timeline brought changes but also challenges to OSNs users. The challenges of using the interface forced users to develop strategies to help them fit the new interface. By examining their adapting process, we identified two types of adaptation strategies: (1) Routine Strategies, which presented as commonly used mechanisms supported by the system; (2) User-Created Strategies, which presented as workarounds including three salient adaptation cases 1) new mechanisms to protect privacy, 2) new channel to seek help, and 3) new attitudes towards interface change.

Routine Strategies

We define routine strategy as commonly used mechanisms that are supported by the new interface. After deployment of the new interface, users begin to apply strategies to adapt to the new interface. From our interviews, we identify three kinds of routine strategies commonly adopted by users corresponding to different purposes (See Table 4-1).

The first kind of routine strategies is applied for self-identity. During our interviews, the first thing users did after they obtain the Timeline was changing their cover photo to make their profile more personal and special. Another common strategy is adding, editing or deleting events, posts, and pictures, by which users could remove something inappropriate and add something beautiful in order to perfect their image.

The second type of routine strategies is used for privacy assurance. According to our participants, they checked their privacy settings right after they shift to the Timeline to make sure the privacy settings as tight as they expected. Then, they usually went over their timeline and delete or hide some events, posts or pictures that were considered as privacy threats. Additionally, they checked friend list in order to identify ones who may threaten their privacy. Our participants also read the new privacy policy to enhance their understanding of how to protect their privacy in the new environment.

The third category of routine strategies is used for generally understanding the new interface. Based on our interviews, participant watched introduction video to gain an overview of the Timeline. They also played and tried to new feature of the Timeline to figure out how the timeline worked. If they met problems, they intended to ask questions via Facebook help service.

Table **4-1**: Routine Strategies.

Purpose	Routine Strategy
For Self- Identity	➢ Change cover photo ➢ Add or delete events ➢ Edit, delete, or hide posts ➢ Add, delete, or hide pictures
For Privacy Assurance	➢ Manage privacy settings ➢ Edit, delete, or hid posts ➢ Delete, or hide pictures and events ➢ Manage friend list (delete or block friends) ➢ Read privacy policy
For Understanding the New Interface	➢ Watch introduction video ➢ Play new features ➢ Ask questions via Facebook help service

Routine strategies reflect how users interact with the new interface, and to what extent the system could support users to fulfill their needs. However, our participants found it was either hard to carry out those strategies or not sufficient to resolve the problem by using those strategies. To successfully adapt to the new interface, users need to think of other supplement approaches.

User-Created Strategies (Workarounds)

Although routine strategies could help users adapt to the new interface to some extent, they are not sufficient to cope with all the challenges and complications resulted from misalignment between the new interface and users needs. To resolve such kind of problem, users created novel strategies which are not supported by the new interface—workarounds.

New Mechanisms to Protect Privacy

Compared to previous profile, the newly-deployed timeline interface dramatically increased the explosion of users' personal information. In order to keep their information under controll, users asked close friends to check information displayed on their timeline, blocked a lot of friends they less trusted, and set alarms by phone to remind themselves to check how Facebook summarized their moments. These new workarounds helped them reduce the privacy concern induced by the design of the new system. By engaging in this process, users found new strategies to complement the limitation of privacy settings, thus adapted the interface to fit their privacy needs.

Before the Timeline interface was introduced, user profile displayed the basic information of users (e.g., profile picture, name, birthday, place to live, and education background), five tagged pictures, a part of friends list and a few resent updates. User can hide

some basic information by privacy settings, such as birthday. Although some privacy problems emerged from the previous version (Zheng et al. 2012), users basically only need to take care of their basic information and tagged pictures.

After the Timeline interface deployment, users complained fiercely regarding how intrusive the timeline was to automatically present and summarize users' entire Facebook history, as well as any personal history people choose to put in, in a chronological order. They thought the Timeline opened a door for stalkers, the third part applications and other unpleasant visitors to easily locate their personal information, thus their privacy was actually threatened. Besides, users noticed that their original privacy setting was changed to Facebook default settings, which made almost everything public, when they adapted to Timeline in the first place. Although users could hide or delete events from timeline by privacy settings, they thought privacy settings were too confused to use and trust.

To cope with the problem that privacy setting was confused and untrusted, users asked friends to help. At first, a user who had privacy concern defriended one best friend, and asked him/her to check what kind of information he/her could see, and then the user could went through and updated privacy settings to make sure settings were correct and functional, then the user refriended this friend again. Another strategy they took was blocking a lot of friends who were considered untrusted (e.g. friends barely contacting with) or important (e.g. professors, bosses or ex-girl/boy friend) and then unblocking these friends when every single item on timeline was considered appropriate for every audient.

To reduce concern that Timeline automatically summarize new events without users awareness, some users set alarms or reminders by phone to remind themselves to check Timeline and edit if needed. This strategy is usually adopted by users who often use smart phone to check newsfeed.

36

During the interviews, one user commented on the adapted practice:

[P5]"I was angry and panic when I first saw Timeline…I thought it's intrusive…After I got more familiar with it and "created" a way to protect myself, I feel more comfortable to use it. But the down side is you need to invent a lot of energy and time to maintain it. Sometimes it makes you too tired to use, but when you think of the social consequences and convenience bringing to you and your friends, families, you decide to go on."

As the quote indicated, the user considered the new way of protecting privacy an important way of using Timeline, since it helped them adapt more smoothly. On the other hand, we can see it is not easy for users to transfer to a new interface. Users need to keep balancing or evaluating the benefits and threats to complete adaptation process.

New Channels to Seek Help

After the Timeline implementation, users found the new interface was much more complex than the old version. Friend management, group management, and photo management sections changed dramatically. For example, in the Timeline, a large number of users could not figure out how to block a friend. Surprisingly, Facebook didn't provide detailed instructions or customer service to guide users. Because of this, users began asking help from other users on Facebook official blog and technology forums like Yahoo. The use of new channel was an adapting process for users, demonstrating new ways to leverage the difficulties in using Timeline.

We take blocking friends as an example. Previously, users were able to defriend or block friends very easily. Users can go to the profile of the person they want to block and scroll down to the bottom of the profile, and then they can see three options *Suggest Friends, Remove from*

Friends and *Report/Block this Person* on the left side of the profile. Thus, users could simply click the button to complete the requirement.

After the Timeline rollout, users were no longer able to find the above three options. As the layout was completely different, users needed to find and click a small icon *"Friends"* on the cover photo of the profile of the person they want to block, and then browse the submenu, and finally they could find the block option on the bottom of the submenu. Although the icon *"Friends"* was very salient, lots of users could not find this button because users did not mentally link the icon *"Friends"* to block option.

To cope with such kind of problem, users need to seek help. Some users tried to find Facebook official video tutorial to learn how to use, however, the tutorials were too general and brief to solve the concrete problem. Some users attempted to use help service provided by Facebook, but they finally lost their patient because of the long period waiting and unsatisfied answer. One interviewee describe her experiences:

[P7]"...after I take the tour and I still don't know where things are, I either go to the little "Ask" box, you know the little- the help box or ask a question box or whatever it is... really it hasn't been very helpful...they [Facebook] hid the option pretty well this time and so when I asked- I went into the ask box because I couldn't find where you delete a picture at, so I said 'How do you delete a picture?' and it gave me options like 'did you mean 'How do you upload a picture?' 'Did you mean how do you tag a friend' 'Did you mean how do you untag a friend?', you know and so that wasn't really very helpful because then I don't think they want me to remove any of the photos..."

Finally, users chose to find new channels to seek help. Facebook official blogs was originally used to let users express their opinions towards new interface or new features introduced by Facebook. Gradually, it became a forum on which users asked questions and other

users who could solve the problem would answer them. Besides, some users found technology forums like yahoo was effective and efficient to get answer. Thus, Facebook official blogs and technology forums were a very important channel for users to deal with problems.

One participant commented on the help seeking practice during the interview:

[P3]"…the blog and yahoo are really helpful for me to adapt to the new interface, but it still takes me a while to understand it… if they change it again, soon…that'll make me angry. Because I finally got used to the Timeline…But it's never like 'Oh my gosh, I'm never using Facebook again', because it's free service and I have so many social connections here. It is big deal for me."

This quote points out users' need for other channels of seeking help to fill the gap between the existing service support, that needs to be more effective and efficient, and the new design of interface, that requires users' a lot of efforts to understand. At the same time, users are evaluating their efforts and benefits they receive. They would like to spend their energy and time to cope with the problem when they believe it is worthwhile.

In summary, Facebook blogs and forums are a workaround created to adapt to the new interface uses. This adaptation helped Facebook users to get familiar with new system efficiently. In this instance of adaptation users interacted with the interface differently, but also actively created new solutions beyond the current interface use. In this case, blogs and forums were developed as a new help support tool. Combined with the Timeline, they become the new customer service system in Facebook platform.

New Attitude towards Interface Change

Facebook users did not only change the way they interacted with the Timeline and create new channel to extend Timeline help support; they also have new cognitive strategy to adapt new interface use. One representative case was that users decided adopt Timeline very early in order to have sense of control cognitively. Facebook updated their interface very frequently and forced users to adopt new interfaces no matter how users resisted to accept them. Thus, users felt they did not have control over their personal profile. That is users did not have option to choose an interface they liked. To make themselves feel better, many users adopt the new interface immediately to make their profile under controlled, rather than let Facebook mandatorily change their interface at the last minute. This new attitude as a kind of cognitive strategy helped Facebook users actively adapt to the new interface psychologically, and thus provide more sufficient preparation for users adaptation.

As table 1 indicated, most of our interviewees have at least 5 years membership on Facebook. That means they have experienced several significant Facebook interface changes. Usually, Facebook gives users a notification that a new interface is ready to take a period before Facebook makes the new interface mandatory use. If users click the button "take the new interface", users will get the interface immediately and cannot get the old one back; if users ignore this notification, users will get the new interface automatically on a particular date made by Facebook.

Previously, when Facebook announced that users could move to the new interface, users intended to wait for a period until the day Facebook forced all users to adopt the new one. During this period, users vented on the Facebook official blog to express their dissatisfaction and fight for their right that they should have choices to adopt the new one or keep the old one. They hoped

Facebook could change mind not to force them to change by their protest. However, all users needed to adapt to the new one eventually.

In contrast, after the Timeline was introduced by Facebook, many users adopted Timeline immediately, rather than waiting until the last minute like they did previously, although they were not satisfied with the Timeline. They believe adopting the new interface early let them feel that they chose the Timeline instead of being forced to take it.

One interviewee explained the rationale of her decision:

[P9]"I usually just wait for it to happen. I feel like it usually automatically does. I remember in college, there was a big change on Facebook and I don't remember what it was but I remember not liking it so I just waited for it to happen. I think the only one that I did adopt was Timeline. Because I knew it would happen eventually and I wanted to feel like I was in control of it, though I am not totally satisfied with it…So I was like 'Oh, well it's going to happen anyway. Might as well just do it'"

In this case, the mandatory deployment of the new interface made users feel out of control over their personal profile. Since users considered their profile as their own territory (Zheng et al. 2012), they feel offended when Facebook change their profile without permission. However, the past experiences told them that Facebook would not give their choice anyway. In order to gain the sense of control, they made the decision to adopt early to avoid mandatory change. Although it seems users only have the illusion of control, this new attitude helped them adapt to the new interface easier psychologically and thus contributed to the ultimate adaptation.

Chapter 5

Discussion, Design Implications, Conclusions, Limitations and Future Recommendations

Discussion

User adaptation as a combination of routine strategies and workarounds developing process

In this study, when a newly deployed interface is not able to meet Facebook users' needs, users not only apply routine strategies but also develop workarounds during their adaptation process. New strategies applied by users fill the gap between users' needs and existing system, and these strategies include uses of new mechanisms to protect their privacy, new channels to seek help, and immediate adoption to gain a sense of control. As the Timeline introduction produced problems in users' original practice, they made efforts to fix issues and optimize system by creating workarounds. During the process of creating workarounds, Facebook users converted their role from passive end user to active end users through the process of adaptation and thus improved the original system design.

Actually, adaptation is a critical process in designing sociotechnical systems especially in OSNs. Since OSNs have huge population of users with extremely diverse background and technology using experience, a good system design requires both knowledge of HCI and sufficient consideration of different user background and needs. Traditionally, this problem is referred to as symmetry of ignorance (Poissant, Pereira, Tamblyn, &Kawasumi 2005) in the HCI field: designers and users lack knowledge of each other's expert domain, and are consequently incapable to communicate effectively and understand each other. In our case, designers are supposed to understand users' needs much easier than other field like healthcare domain because

42

OSNs designers can be real users and have their own Facebook accounts, for example. However, being real users can also be a challenge for designers. It is difficult for them to think and design from other users' perspective, and thus they may not be able to recognize potential problems. Because of this, the adaptation phase after system rollout is inevitable. And we believe designers will benefit if they can learn from users adaptation process. As demonstrated in our study, Facebook users were enforced to involve in appropriation process and resolving difficulties during the adaptation period because no designer would understand sufficiently about their using situation to help them adapt the system use. The adaptation of new interface needs Facebook users to create new workarounds, which is essential to eventually make interfaces fit users' needs.

Pervious literature usually examined system adaptation as a system evaluation study or a deployment study (Zhou et al. 2011). Although design and evaluation are closely connected, they typically separated in practice. However, in our case, users do not simply evaluate and reveal deficiencies of the interface design; they also create new channels and new mechanisms in the course of adapting to new interface. From this viewpoint, design can be extended to the moment when users engage to adapt to new interface rather than ending at the point of deployment. Therefore, our analysis suggest the importance of understanding user activities during adaption period otherwise users creation and needs—privacy protect mechanisms, customer support and requirement of control—would still be ignored in future design.

Adaptation as an Integrated Endeavor

The findings of this study reveal a multitude of challenges users face during the adaption and strategies they used to cope with the problems they met. These strategies include routine strategies (i.e., changing over photo, managing privacy settings and watching introduction video) and user-created strategies (i.e., uses of new mechanisms to protect privacy, new channels to seek

help, and immediate adoption to gain a sense of control). Meanwhile, in adapting to the new interface, other users and other channels have become the essential part of adaptation. Users negotiate their relationships and activities with the new interface, other users and even other system and artifact. The process of user adaptation is by no means the sole interplay between a user and the new interface (UI), but also involves interplays between the user and other users (UU) and between the user and other channels (UC) (See Fig 5-1). The interplays of UU and UC will finally support the interplay of UI. In this sense, user adaptation can be viewed as an integrated endeavor that emanated between UI, UU and UC. Here, we use the term *integrated endeavor* to refer to the need to understand the complete spectrum of a user's adaptation, instead of merely keep an eye on the user and the interface.
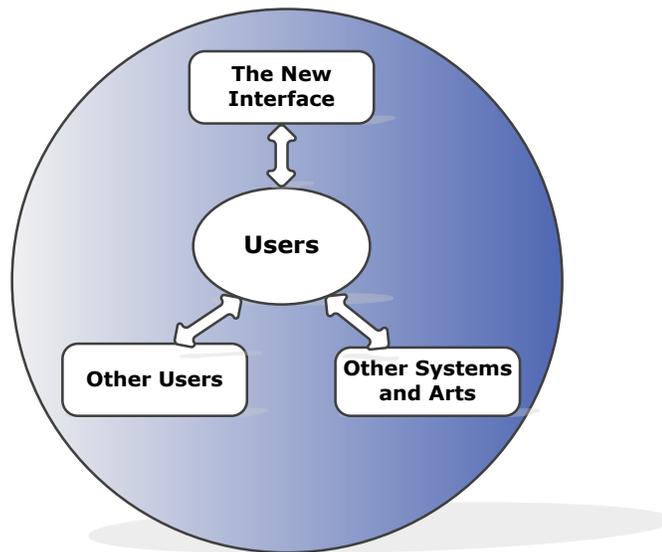
Figure **5-1**: Adaptation as an Integrated Endeavor.

Prior studies in user adaptation have advocated that adapting to the new system should consider mutual shaping behaviors between users and the new system (Leonard-Barton 1988; Tyre and Orlikowski 1994). Nevertheless, the foci of these studies are often the pattern of how users or employees negotiate with the technology to eliminate the misalignment between them;

the experiences of users in developing strategy for adaptation remain a relatively underexplored area especially in the context of OSNs. According to our findings, users adaptation involves not only the negotiation with the new interface, but also the support from other Facebook users (e.g. physical support of helping check appropriateness of the information, emotional support of helping release panic) and other system and artifacts (e.g. knowledge support of providing problem solutions and reminder to check the timeline). Interface change brings both physical task challenges but also emotional challenges. Other Facebook users and other systems and artifact can provide physical support, knowledge support and even emotional support. Those supports are necessary and essential for the success of user adaptation. Hence, adaptation is an integrated endeavor. Design for interface of OSNs needs to consider not only the interplay between user and system, but also the broader spectrum of other users and systems that each connect to various aspects of users adaptation. This framework can be understood as an analytical device that systematizes analysis of strategies for user adaptation and aids in opening an actionable design space for OSN interfaces.

Motivation of Adaptation

Our findings reveal that facilitating preparation for profile management is one perceived opportunity for user adaptation, because Facebook gave users 7 days to manage Timeline before made it public, rather than publishing users' personal profile right after forcing them to adopt the new interface as Facebook did previously. This mechanism did not only give users time to understand Timeline and manage their personal information properly to reduce the risk of exposing inappropriate contents to the public; but also alleviate the pressure and panic resulting from the big change of environment and users' unfamiliarity of new functions. In this sense, this period of time allowed users to make preparation for adaptation psychologically and behaviorally.

As Rogers notes: "too-rapid implementation of the innovation... can lead to disastrous results" (Rogers1983, p. 364). Similarly, Hughes (1971, p. 152) believes that "trying to force the pace" of adaptation is counterproductive. Although above literature intend to suggest that adaptive problem solving in organizations should be gradual and persistent, it is also suitable for OSN setting and even more crucial. In organizations, company can organize training session to control and estimate how fast of the pace of implementation should be. However, in OSNs, huge user population with diverse background and experience make it difficult to adapt with the same pace. Additionally, information in OSN is personal information that makes user more cautious to manage their profile. In this sense, granting users a period of time as a cushion to help them adapt to the new interface is important.

Other two positive factors attracting user adaptation are facilitating social interaction and facilitating identity management. As prior studies of OSNs illustrated (Boyd and Ellison, 2007), social interaction and identity management are crucial reasons that users use OSNs. Our findings not only identify the importance of facilitation of social interaction and identity management for motivating user adaptation, but also unpack users' understanding and exact expectations to the new interface. Users interpret the way of chronologically organizing information as a social assistant to help search and locate particular information, and thus facilitate social interaction. In this sense, design for facilitating social interaction between users should not be limited in facilitating information sharing, posting and tagging, but also information searching. Similarly, users hope their profile can reflect their taste and unique characteristics (e.g. using cover photo to show their type), rather than just portray a positive or negative image by compiled information. Therefore, design for facilitating identity management could be more open-minded and give more flexibility and choices to users.

Desire of control

In our study, we find three positive factors that make users intend to adapt to the Timeline, including facilitation preparation for adaptation, facilitating social interaction, and facilitating identity management. Those factors, from another perspective, reflect a more essential factor—users' desire of control over their personal profile.

After adopting the Timeline, Facebook gave users 7 days to manage their personal information before publish everything to the public, rather than forcing users adopt new interface immediately as before. This policy made users feel that they have some control over their personal profile, and thus users were easier to accept the new interface psychologically. Similarly, Timeline organizing users' information chronologically provides convenience for users to search specific information like their previous posts, sharing, and photos. Therefore, users gain more awareness of what kind of contents on their profile, and thus achieve a sense of control over their information. Furthermore, the Timeline allows users add, hide, and delete stories as needed. This function offers users flexibility to manage their profile. In doing so, users have more autonomy to personalize their profile.

Although a prior study conducted in organizational setting also emphasizes the importance of control a user have (Beaudry and Pinsonneault 2005), the definition of control in that study is different from the one in our case. In that study, authors proposed that what kind of adaptation strategy a user would choose partly depends on how much control he/her has over the IT event. Thus the meaning of control in their study highlights to what extent users can cope with the challenges or problems produced by introduction of the new IT event to complete their tasks (Beaudry and Pinsonneault 2005). However, in our case, control means to what extent users can personalize their own profile to better support social interactions. The reason users long for control might be related to the characteristics of OSNs. The information displayed in OSNs is all

personal information, thus user profile is considered as their virtual territory (Zheng et al. 2012). In doing so, users demand maximum autonomy in their profile management. Compared with pervious versions of interface, Timeline grants users much more control than before. Thus, these three factors emerging form our analysis become the motivation users engaged in adaptation process. Therefore, understanding users' needs sufficiently and granting users appropriate control would encourage users to adopt the new interface and engage in the adaptation process willingly.

Privacy Concern

In our study, privacy concern emerged as a negative factor affecting users adaptation. Compared to early version of profile, the newly-deployed timeline interface dramatically increased the explosion of users' personal information. Although Facebook allowed users reedit their profile (e.g. add, hide, and delete contents on the Timeline), the way that the Timeline displayed information, tractable information, and confused and complex privacy setting, etc. triggered users privacy concern. In order to reduce the privacy concern induced by the design of the new system, users create several workarounds (e.g. asked close friends to check information displayed on their timeline, blocked a lot of friends they less trusted, and set alarms by phone to remind themselves to check how Facebook summarized their moments) and spent much time and energy to maintain the profile.

Pervious literature regarding user acceptance and adaptation didn't take privacy concern into consideration, since study settings were technologies in organizations. The information stored or processed by those technologies primarily was customers' or company's' information rather than employees' own information. Thus, employees' privacy is rarely threatened and privacy concern would not be a salient factor emerged from those studies. However, during adaptation of the new interface, privacy problem has been identified as a main problem. Reasons

are two folds. First, users considered their personal profiles "as their virtual territory and thus claimed ownership of their digital belongings that they were entitled to or that were created by them" (Zheng et al. 2012, P337). Second, users make decisions in their information disclosure in order to manage identity (Palen and Dourish 2003), however, it is difficult for them to negotiate the boundary between privacy and public (Xu, Dinev, Smith, & Hart, 2011). In this sense, the introduction of the new interface "added complexity in privacy boundary management in OSNs"(Zheng et al. 2012, P337).

Packing Adaptation Issue into an Integrated Chain

According to our literature review, there are two main streams of research addressing user acceptance phenomenon. The *first stream* mainly focuses on the antecedents of adoption and usage of new technologies (Venkatesh, Morris, & Davis 2003). The *second stream* of research mainly focuses on users' adaptation and described how users change their beliefs, skills, attitudes, and work procedures to adapt to new technologies. (Orlikowski 1996; Tyre and Orlikowski 1996). Our study combines two stream of literature identifying both promoters and barriers of users adaptation as the motivations that users engaged in the adaptation process. For example, facilitating social interaction as one of the promoters attracts users' interests to adapt to the new interface in order to enjoy the benefits. Meanwhile, privacy concern as one of the barriers drives users thinking of strategies to resolve the privacy problem, and thus make users involve into the adaptation process. Additionally, we also identified two kinds of users adaptation strategies (routine strategies and users-created strategies) to depict a rich picture of users behavioral pattern during the adaptation process. In doing so, we pack both antecedents and behavior into an integrated chain (see Fig 5.1) to present the whole picture of adaptation process.

Design Implications

This section details the specific design recommendations based on our findings.

Support Problem Shooting Service for Users

As we have shown in the study, adapting to the new interface can be challenging for users. Given the "help" service provided by Facebook poorly supports and guides users to adapt to the new system, different users apply different strategies to cope with the problems they met during using the interface. Some asked friends to help to shoot the problem, while others seek help via other channels like technical forums. An interesting discovery in our study revealed that Facebook official blogs serve as not only a venting channel for users to express their opinion or attitudes towards new design, but also an interactive helping platform to discuss and further solve the problem. In this case, the use of technical forums and Facebook official blogs affords new opportunities for users to better solve their problems and easier adapt to the new interface. Therefore, users actually proposed an insightful redesign suggestion.

One interesting thing we want to mention is that Facebook closed the section where users can discuss the new interface in the official blog in June 2012. In other words, Facebook did not allow users to leave massages on the blog anymore. We believe Facebook administrator did not realize the original official blog actually helped their users a lot to adapt the Timeline.

One possible way to support users problem shooting is opening a blog particularly for users to ask questions about how to use the new system. Designers can explain their rational of design to better facilitate users' understanding of the new design. Employees working for customer service can also help in this place. Meanwhile, other users who have the solution are still powerful recourses to help users who meet the problem.

Another possible way is making detailed video tutorials. Although Facebook already made some videos to introduce the new interface, it is too brief and rough to teach users how to use the new one. Each video should be short but focus on a change of the new interface or a new feature. Users can watch the corresponding video to solve the problem. Users usually do not have patient to watch a long video to find a particular problem.

Support Privacy Assurance Mechanisms

As we have shown in early analysis, privacy concern is still a salient factor affecting users adaptation process. In dealing with the potential privacy risk, uses developed various workarounds to cope with the perceived problem. Some users utilize "defriend and refriend" mechanisms to ask their close friends to check the appropriateness of contents displayed on their timeline; some blocks a lot of friends who were considered untrusted (e.g. friends who barely contact) or important (e.g. professors, bosses or ex-girl/boy friend) before every single item on timeline was appropriate for every one. An interesting discovery in our analysis revealed that alarms set by mobiles serves as a reminder to remind phone owner to check his/her Timeline and edit if needed. This finding indicated that the use of these mechanisms affords complement of existing privacy settings for users to protect their privacy. On one hand, the workarounds reflect the defects of privacy setting design. On the other hand, workarounds that users developed also mirrored users do not trust Facebook privacy settings.

One possible solution is providing well-established privacy awareness mechanisms. This solution actually echoed prior work (Squicciarini, Xu, & Zhang 2011). For instance, before summarizing an event or moment, timeline should inform the profile owner that what information and how the event would be presented. Meanwhile, Facebook should not change users' original privacy settings during deployment of the new interface. This mechanism not only protects users

information from disclosure but also provide users securer feeling during the sensitive period when users are unfamiliar with the new interface.

Balance Fashionable Design and Easy of Use

As we have illustrated in the analysis, participants actually advocate the fashionable design of the new interface and believe they were benefited to some extent. For example, new design better facilitates identity management by allowing users to decorate a cover photo or edit profile flexibly. Meanwhile, participants feel anxious because the fashionable design brings another problem: Timeline is complicated to use. Users need to spend more time to understand and learn how the new interface works, pay extra efforts to organize their historical information, posts and photos, and devote more energy to maintain their profile. Although users value the novelty of the design, they tend to appreciate easy of use more. In our analysis, several users express they would quit Facebook if the interface become more and more complicated to use, because OSN is just a small part of their life and is not worthwhile devoting so much time and energy. In this sense, we suggest that designer need to balance the fashionable design and easy of use. It is not reasonable to sacrifice one for another.

<div align="center">

Conclusions

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In this thesis, we explored user adaptation in the context of OSNs by conducting a qualitative interview study. From an integrated view, we investigate the motivations of user adaptation and strategies that users apply to resolve the problems during their adaptation process. We found both promoters and barriers as the motives involve users into user adaptation. We also identified two types of adaptation strategies: routine strategies and user-created strategies. These

findings suggest that when designing a interface in OSNs settings, designers should consider the significance of user adaptation as a user redesign process and an integrated endeavor.

Limitations and Recommendations for Future

The analysis of interviews provides an overall picture of users' perceived factors affecting adaptation and coping strategies they used to solve the problems they met. However, we need a call for caution in generalizability of our results. Although we try to vary the background of participants, it should be noted the pool of participants was still limited to a relative higher education institution. Quantitative study with a more varied population would be constructive to complement this qualitative, explorative study. Additionally, our study only focuses on a specific IT event (i.e., the deployment of the Timeline) on a particular online social networking platform (i.e., Facebook). Future work could study other social networking sites that provide similar features to examine the generalizability of our findings.

This research suggests three recommendations for future study. First, the sequencing and interplay of behavioral and cognitive adaptation strategies should be studied. In our analysis, we have identified several behavioral and cognitive strategies during user adaptation; however, we did not explore the relationship between them. For example, cognitive strategy may result in the reduction of the behavioral strategy. Thus, longitudinal studies might be beneficial to examine the user adaptation process in depth.

Second, our analysis shows adaptation as an integrate endeavor including users, OSN interface, other users and other systems. We believe this framework can be a fruitful starting point for further work in this field. In depth analysis of interplay between one user and others in Facebook, and between users of Facebook and other systems during adaptation are necessary.

Finally, the timing of adaptation efforts should be studied. The coping process might occur at different time for different individuals (Folkman 1992). For example, the coping strategy may occur in the anticipation period, the impact period and post-impact periods. We may call them as pre-deployment, deployment and post-deployment period. When adaptation happens in the pre-deployment period, users can make psychological or behavioral preparation based on the expected consequences. Modifying the technology is also possible during design process. For example users can participate in the discussion and further influence the design of functionalities and features of the new technology (Orlikowski 1996). During the post-implementation period, users can modify their work routine and the technology while using it (Park and Chen 2012). Future research could focus on how adaptation strategies unfold at different points in time and across periods.

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Appendix

Facebook Interface Change Timeline

Facebook has changed interface very frequently and sometimes very dramatically. We demonstrate the history of Facebook interface changes with a series of screenshots:

(Source: http://facebookdevelopment12.blogspot.com/p/interface.html)

Figure **A-1**: The Original Facebook User Interface in 2005.

This is the first, original Facebook user interface in 2005. At that time, Facebook was called "thefacebook".
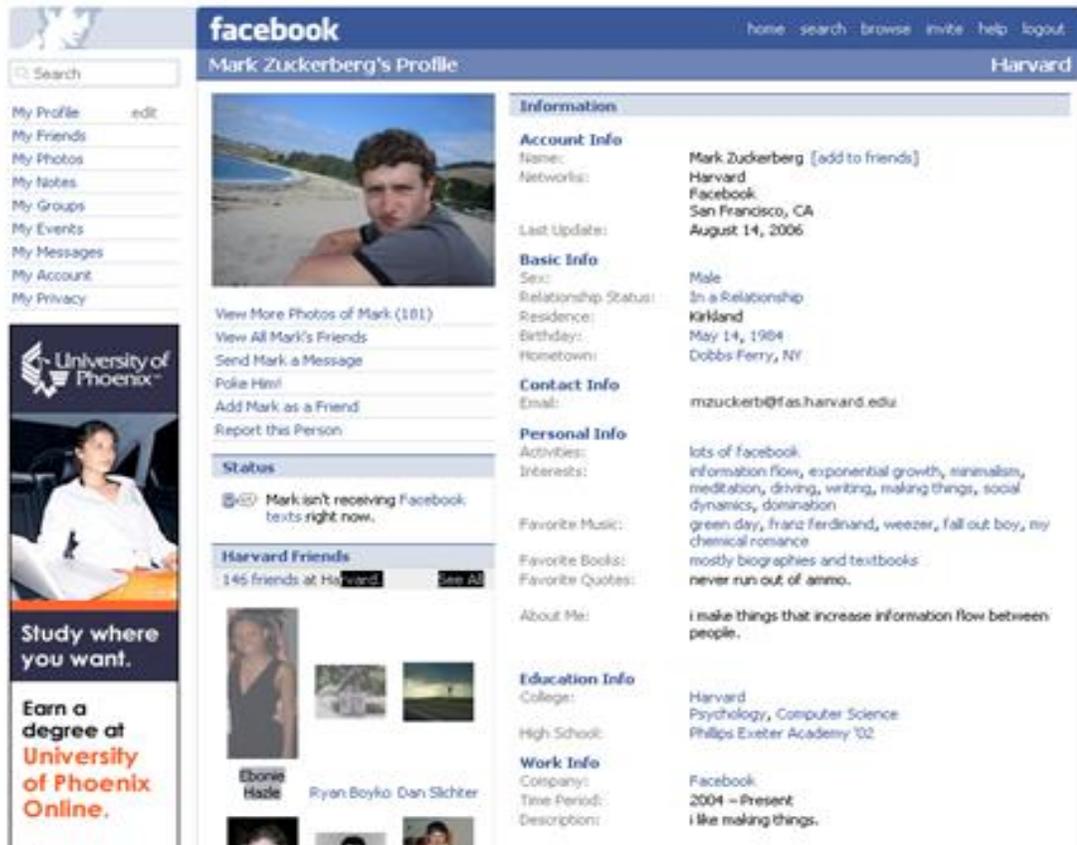
Figure **A-2**: The Second Significant Change of Facebook Interface.

Facebook changed dramatically. One of the big change is that the ads displayed on the right hand side.

Figure **A-3**: Facebook Profile in 2007.

This is another user profile of Facebook in 2007.

Figure **A-4**: Facebook Develops Friends News Cycle .

Figure **A-5**: Ads are Displayed in the Left Corner of the Webpage.

Figure **A-6**: Facebook News Feed .

Figure **A-7**: New Profile .

This is the user profile that most people are familiar with, named New Profile.

Figure **A-8**: The Current Version of Facebook Interface: Timeline .