

**ACCIDENTAL DISCOVERY OF INFORMATION ON THE USER-DEFINED SOCIAL
WEB: A MIXED-METHOD STUDY**

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University of Pittsburgh, 2011

Frequently interacting with other people or working in an information-rich environment can foster the *accidental discovery of information* (ADI) (Erdelez, 2000; McCay-Peet & Toms, 2010). With the increasing adoption of social web technologies, online user-participation communities and user-generated content have provided users the potential for ADI. However, ADI on the Social Web has been under-examined in the literature of library and information science. This gap needs to be addressed in order to get a more complete picture of human information behavior.

The objectives of this dissertation were to develop the propositions that describe and explain ADI behaviors among individual users of web-based social tools. Two research questions were addressed: 1) What are the characteristics of ADI on the Social Web? 2) What are the users' perceptions about ADI on the Social Web?

This dissertation used a sequential mixed-method research design involving three data collection methods: a survey, and follow-up logs, and interviews. The sample includes 45 participants in an academic environment. Among the survey participants, a purposeful sample of 13 individuals completed follow-up incident logs and in-depth interviews. Qualitative analysis with Stata 12/MP (StataCorp, 2011) and qualitative analysis with ATLAS.ti v.6 (<http://www.atlasti.com/>) were performed on the data. The results presented include descriptive statistics and thematic findings.

The important findings include: 1) ADI on the Social Web has many unique characteristics that can be identified within the six elements of *user*, *motivation*, *context*, *information behavior*, *information*, and *information need*; 2) participating users considered the Social Web as a useful environment for ADI, and they even used some self-developed strategies to facilitate ADI; 3) prior experience and anticipation of ADI can be the motivations to use particular social tools; 4) social tools can serve as information grounds where users gather together and form relations, precipitating conditions which foster ADI; 5) users considered ADI on the Social Web as supplementary to their overall information acquisition; the unexpected information that they found was most beneficial for addressing long-term information needs. The findings of this study expand on existing information behavior theories and offer practical insights for the design of information services and library instruction.

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1.0 INTRODUCTION

This chapter provides the background and problem statement, terminology, research questions, significance and contribution of this dissertation study, and a description of the organization of the remaining sections.

1.1 BACKGROUND AND PROBLEM STATEMENT

Web 2.0 was coined at the O'Reilly Media Web 2.0 conference in 2004, which highlighted a major turning point in the landscape of the Web. One of the well-recognized changes is that the entire web is becoming more and more “social.” Now it is common to see websites or online services with some kind of social components. This trend of moving from the *Web* to the *Social Web* is pushed by the rapid and unceasing development of various Web 2.0 social tools such as Facebook™, Twitter™, blogs, wikis, etc. If the *Web* indicates traditional channels of information delivery and related services which are usually static platforms without interaction (i.e., Web 1.0), the *Social Web* can be considered as a new concept of Web space incorporating users' social activities (i.e., Web 2.0). There are a number of significant characteristics distinguishing the *Social Web* from the traditional *Web*. For example, the Social Web emphasizes (1) social

interaction and the users' role as participants, (2) the use of communities or social networks as central sources of information, and (3) the use of collective intelligence (O'Reilly, 2005).

The adoption of online social tools has steadily increased among Internet users. The 2009 Pew Internet national survey showed a dramatic increase in the percentage of people using social tools (Smith, 2009). For example, 46% of participants reported some uses of social networking sites such as MySpace™, Facebook™ or LinkedIn™, compared to only 8% in 2005. Also, the uses of Twitter™ or other status update services have tripled since 2008 (Smith, 2009).

With its increasing adoption rate and distinctive features, the Social Web has become a promising research context for observing new information behaviors. In recent years, researchers have begun to study Social Web information behaviors. For example, Scale (2008) explored the concept of social search using Facebook™ as a social search engine from an information seeker's perspective. Scale's study focused on the relationship between social networking sites and the development of social search. In another study, Millen et al. (2007) investigated how social bookmarking tools could be used to support exploratory search. They presented the results of a field study regarding how a corporate social tagging system was used. In their study, three types of search activities were observed: "community browsing, personal search, and explicit search" (Millen, et al., 2007, p. 21). They concluded that social bookmarking services could be used to support various kinds of exploratory search, to provide better personal bookmark management, and to enhance social navigation.

The two aforementioned studies and most other information behavior researches have focused on studying *intentional information acquisition* (i.e., the information behavior of active seeking triggered by users' information needs). However, in many circumstances, users discover information on the Social Web merely by accident (i.e., accidental discovery of information

[ADI]). For example, a user may unexpectedly obtain certain information that happens to address his/her previously unsolved problem when routinely checking his/her Twitter™ account. This experience of *accidental discovery of information* (ADI) refers to accidentally bumping into (useful or personal interest-related) information as opposed to intentionally looking for it (Erdelez, 1995). Also known as *serendipity* (“Serendipity,” 1989), the chance of bumping into unexpended information can be increased by frequently interacting with other people or being exposed to an information-rich environment (Erdelez, 2000; McCay-Peet & Toms, 2010).

The current Social Web, relying on online user-participation communities and user-generated content, provides excellent opportunities for accidental information acquisition. When an individual accesses a social site, he/she may have some purposes to fulfill. However, with the interactivity of social features and the contents other users share on the site, the individual can deviate from the original objective and be led to other information resources that are unrelated to his/her original purpose. Alternatively, a user may routinely use a social tool, and in the process of following the variety of discussions and links to unknown destinations with information of interest. During this deviating or surfing process, the Social Web users may come across a great deal of expected useful information, which can play an important role in their everyday information acquisition and learning behaviors.

However, *ADI on the Social Web* remains under examined in the human information behavior literature. Motivated by this research gap in the area, this dissertation aims to (1) identify the characteristics of users’ ADI behaviors when using web-based social tools, and (2) explore the users’ perceptions about the Social Web as an environment for ADI and the relationship between ADI and their information behaviors. The ultimate goal is to generating an array of preliminary propositions that can be used to describe and provide an initial explanation

for individual behaviors and perceptions associated with ADI in the Social Web context. This dissertation is expected to expand the existing ADI research and information behavior theories, and to offer practical insights for library instructions and system design.

1.2 TERMINOLOGY

This section provides concise definitions and descriptions for the key terms used in this study including *Social Web* and *accidental discovery of information* (ADI). Related terms (i.e., *information encountering*, *serendipity*, *browsing*, and *exploratory searching*) and the broader terms (i.e., *opportunistic acquisition of information*) of ADI are also listed and explained for comparison.

Social Web is an umbrella term which refers to the web-based space constructed with social tools supporting users to communicate, collaborate, share experiences or resources with others, to subscribe to user-generated content, and/or to carry on social search. In order to specify the Social Web in a way that supports studying individual users' ADI, this study introduces the concept of the user-defined Social Web and further established it as *a group of social tools that individuals regularly use*. This operational definition implies that the scope of the Social Web is decided by the individual users. That is, the social tools (e.g., Facebook™, Twitter™, Skype™, etc.) which a user regularly use form the user's own Social Web space.

Accidental discovery of information (ADI) in information behavior research has no formal and well-acknowledged definition, but the concept of ADI has been investigated for years as the terms of *information encountering* (Erdelez, 1995), *incidental information acquisition* (Heinström, 2006; Williamson, 1998), *serendipity* (Foster & Ford, 2003; McCay-Peet & Toms,

2010), *serendipitous information acquisition* (Heinström, 2006) or *information scanning* (Shim, Kelly, & Hornik, 2006). The descriptions and natures of those terms were slightly different depending on the contexts in which they were studied. These related studies show that ADI happens when one is actively looking for other information or merely carrying on an everyday routine without involving intentional information acquisition activities. Thus, this dissertation broadly defines ADI as ‘accidentally acquiring useful (or personal interest-related) information without intentionally looking for it.’

ADI is not an intentional behavior. Erdelez (1995) suggested that users’ information acquisition can range from “very casual, not planned ‘bumping’ into information, to organized, active, and planned information seeking” (p. 12). Users’ cognitive anticipation of acquiring information can also vary from low to high levels of expectation (Erdelez, 1995). Thus, in the spectrum of information acquisition, ADI is at very left (low level) on both of the users’ involvement and expectation dimensions while *information seeking* is typically at very right (high level).

ADI can be easily confused with *browsing* or *exploratory search*. ADI is different from them in that it is an incident of successful acquisition, while browsing and exploratory search are “processes that may end up unproductive” (Heinström, 2006, p. 581). Also, exploratory search and some browsing activities are purposeful seeking processes, triggered by some conscious information need. In contrast, the information accidentally encountered is merely serendipitous; that is, the information need is perceived only when the information is discovered (Williamson, 1998). However, browsing and exploratory search can be precipitating conditions that facilitate ADI (Cunha, 2005; McCay-Peet & Toms, 2010).

Information encountering (IE) was earlier defined by Erdelez (1997) as “memorable experiences of accidental discovery of useful or interesting information” (p. 412). This definition assumes that the ADI experience is memorable. That is, people are able to remember their ADI experiences and provide reliable description about the recalled ADI experiences. However, not all researchers accept this assumption (Heinström, 2006).

Erdelez (2005) later refined the definition of IE to “an instance of accidental discovery of information during an active search for some other information” (p. 180). This later definition of IE, which incorporates only the incidents happening during information seeking process, narrowed down the scope of its first version. This definition was useful for studying ADI in the controlled research environment, however, considered too specific to be directly employed for this dissertation.

Opening to the possibility of finding deviations from Erdelez’s earlier definition and avoiding the confusion with its later revision of IE, this dissertation uses the more broad-ranging term ADI in lieu of IE to describe the incidental aspect of information acquisition.

Serendipity was coined by Horace Walpole, a politician and writer, who used this word in a letter to the British diplomat in 1754. In his letter, Walpole recounted an old Persian fairy tale known as “Three Principles of Serendip” and created serendipity to refer to “the combination of accident and sagacity in recognizing the significance of a discovery” (Fine & Deegan, 1996, p. 434). Over the years, the original meaning connoting the important role of insightful sagacity in discovery or focusing on “looking for one thing and finding another” has shifted and broadened (Gritton, n.d.). The dictionaries of modern English and many information behavior researchers now have defined *serendipity* as the faculty of making fortunate and unexpected discoveries by accident. It also can mean the phenomenon or an instance of such a discovery (McCay-Peet &

Toms, 2010; “Serendipity,” 1989; “Serendipity,” 2000; “Serendipity,” 2008a; “Serendipity,” 2008b; “Serendipity,” 2010). This meaning is identical with the phenomenon of ADI considered in this study.

Opportunistic acquisition of information (OAI) is one example of information acquisition non-linear approaches. Linear, purposeful information acquisition has dominated research focus for decades. Recent studies (Foster, 2004) proposed that there are some forms of information acquisition other than linear, purposeful information acquisition. OAI is a form of non-linear information acquisition that is casual, non-problem specific, and non-actively seeking (Erdelez, 2005). Erdelez (2005) considered ADI as a form of OAI and suggested that there might be other forms of OAI to explore.

1.3 RESEARCH QUESTIONS

This study seeks to provide an initial characterization of accidental discovery of information (ADI) as it occurs on the Social Web. Two general research questions were addressed:

- Research Question 1 (RQ1): What are the characteristics of ADI on the Social Web?
- Research Question 2 (RQ2): What are the users’ perceptions about ADI on the Social Web?

To address RQ1, this study uses a conceptual framework with the six elements, adapted from Erdelez’s (1997) model, to explore the characteristics of ADI on the Social Web:

1. **User**: the individual who experiences ADI via the Social Web;
2. **Motivation**: the individual’s motivation to use the Social Web;

3. **Context:** the context (i.e., the Social Web and precipitating conditions) in which the ADI occurs;
4. **Information Behavior:** the individual's actions, feelings and thoughts when ADI occurs on the Social Web;
5. **Information:** the information accidentally encountered via the Social Web;
6. **Information Need:** the information needs or problems that ADI on the Social Web addresses.

RQ2 aims to examine how users are aware of the Social Web as an environment for ADI and their perceptions of the relationship between ADI on the Social Web and their information seeking processes. The research results were later compared and contrasted with the findings of previous study of web users' ADI behaviors.

1.4 SIGNIFICANCE AND CONTRIBUTION OF THE STUDY

As new web tools emerging, the web culture and users' information behaviors are going to be changed accordingly. Today's web users are more than just using search engines. They become accustomed to using a variety of tools that involve interactive and social activities. As a result, the enormous amount of user-generated content available on the Social Web requires the users' instant relevance judgments in order to harness the power of the information. These phenomena may result in new modes of information behavior and lead a new generation of users who must adapt to the use of new technologies, new information resources, and new ways of thinking within the Social Web in order to meet their information needs.

However, little empirical research has been done to understand the impact of the Social Web on information users. This dissertation seeks to fill the gap in research on information behaviors on the Social Web in literature. It also intends to extend the previous research on opportunistic information acquisitions, and develop a more holistic understanding of information users' behavior. It would be helpful for future researchers to develop a more complete model of information behavior, which would further support the design of information systems adapted to information users' characteristics and needs.

From the practical perspective, this dissertation hopes to provide a first step towards answering questions regarding how the Social Web may promote ADI, how users can take advantage of social tools and create opportunities for ADI, and how users manage information accidentally discovered on the Social Web. This can provide insights for the design of library instruction sessions; for example, teaching how to use social media, social bookmarking sites, or random search engines as information resources, and suggesting users see ADI via social media as an information acquisition approach.

1.5 ORGANIZATION OF DISSERTATION

The remainder of this dissertation consists of five chapters:

2.0 LITERATURE REVIEW provides a review of the literature, situating this study in user-centered information behavior research, and providing additional background about the two key components of this study: *ADI* and the *Social Web*.

3.0 METHODOLOGY describes the methodology of this study. It is divided into several sections: research design, operational definitions, research plan including methods of data

collection and analysis, including a description of instrument development, the pilot study, sample selection, data collection procedures, and the stages of quantitative and qualitative data analysis. The data collection instruments are all presented in the Appendixes.

4.0 FINDINGS presents the results of the study, including both quantitative and qualitative data from the survey, interviews and logs.

5.0 DISCUSSION discusses the integrated findings, specifically addressing the two general research questions (i.e., RQ1 and RQ2).

6.0 CONCLUSION concludes the dissertation by presenting study implications, identifying limitations, and suggesting future research directions.

2.0 LITERATURE REVIEW

This chapter presents topics that are relevant for exploring *accidental discovery of information (ADI) on the Social Web*. The review of relevant literature is divided into the following three sections:

- **2.1 User-centered Information Behavior Research.** This section provides an overview of the broader context of user-centered information behavior in which ADI is situated, positions this study within contemporary areas of inquiry, and discusses implications for this study.
- **2.2 Accidental Discovery of Information.** This section reviews the development of ADI during the past few decades. The background literature for the related concepts is discussed, including concepts such as the non-linear perspective on information seeking, opportunistic information acquisitions, and information encountering. How ADI is conceptualized in the information behavior and retrieval literatures is also examined. The section then examines literatures that address characteristics of ADI on the Web and use of accidentally discovered information. Implications for this study are also provided.
- **2.3 What is Social Web?** This section reviews the works devoted to defining the Social Web and based on them proposes a meaningful way of classifying web-based social tools for the purpose of studying information behaviors.

2.1 USER-CENTERED INFORMATION BEHAVIOR RESEARCH

This study considers ADI as one type of information behavior. Therefore, this section examines how information behavior research has evolved, how information users become the focus of interest, and how the theories and research methods in this field have developed.

2.1.1 The Definition of Information Behavior

Information behavior is no longer limited to active information seeking in the Library and information Sciences (LIS). Wilson (2000) provided an all-encompassing definition for information behavior:

Information Behavior is the totality of human behavior in relation to sources and channels of information, including both active and passive information seeking, and information use. Thus, it includes face- to-face communication with others, as well as the passive reception of information as in, for example, watching TV advertisements, without any intention to act on the information given. (p. 49)

This definition acknowledges *passive* information seeking as an important part of human information behavior. This study, based on this broad definition, conceptualizes Accidental Discovery of Information (ADI) as a type of information behavior and involves both passive information acquisition and information use behavior.

2.1.2 The Origin of Information Behavior Research: ‘System-centered’ Approach

Human information behavior research originated in the field of library science and documentation. The direct stimulus of its development was the information needs of post-World War II military and industrial development projects (Lilley & Trice, 1989). During the 1940s, a great amount of scientific literature was published, which focused attention to how scientists used information in science and technology research. The Royal Society Scientific Information Conference in 1948 has been described as “the beginning of the modern study of human information seeking behavior” (Wilson, 2000, p. 50).

In the years since the 1948 Royal Society Conference, researchers continued to be concerned with scientists’ use of information. In the 1958 International Conference on Scientific Information, a number of papers were devoted to scientists’ use of information sources and systems (Herner, 1958; Herner & Herner, 1958; Hogg & Smith, 1958; Spurr, 1958). These earlier information behavior studies were mostly system-oriented focusing on describing system features rather than examining human aspects of information use. Their ultimate goal was to design technological systems to enable scientists to make better use of documents and sources such as abstracts, patents, reviews, journal articles, the library, etc.

2.1.3 ‘User-centered’ Revolution in Information Behavior Research

System-centered (or document-focused) research continued to dominate studies of information use for many years. However, in the late 1970s and 1980s, there was a major shift towards a user-centered paradigm. With this shift, *constructivism* began to be applied in the information behavior research. Fisher et al. (2005) noted that, in constructivism, “individuals are seen as

actively constructing and understanding of their worlds, heavily influenced by the social world(s) in which they are operating” (p. 11). The methodological assumption in constructivism is that by analyzing behavior or responses, researchers gain access to mental models. It assumes that language is essentially a neutral instrument for reporting observations and thoughts (Fisher, et al., 2005).

When constructivism is applied to the information behavior context, information is subjective. That is, information users do not merely receive information passively; instead, they actively make sense of their surrounding reality and attach personal meanings to information (Talja, Tuominen, & Savolainen, 2005). Therefore, individual users’ cognitive states become an important element in understanding people’s holistic information behavior and, ultimately, improving information systems.

Belkin (1980) developed the concept of *anomalous states of knowledge* (ASK) in order to describe people’s cognitive states. ASK theory works from the premise that information needs arise from a recognized anomaly in a user’s knowledge about a topic or situation. The user encountering an anomalous state of knowledge is unable to specify precisely what is needed to resolve the anomaly. Belkin et al. (1982) further used this concept to suggest that information retrieving systems should be designed to help users to build representations of their ASK instead of singly asking users to specify their information needs as request to the system. With the aid of information retrieving systems, the user could get to know his/her ASK, and then he/she can take steps to fill the gap till his/her cognitive state is changed and the anomaly is resolved.

In addition to changing the focus of research from systems to users, the user-centered revolution of late 1970s and 1980sd also brought in new forms of research inquiry. The research questions changed from ‘what?’ questions (e.g., What information systems or sources do people

use?) to ‘how?’ questions (e.g., How do people use information systems?). At the same time, methodological approaches switched from quantitative to qualitative methods. Dervin and Kuhlthau are two highly cited researchers associated with these changes (Wilson, 2000).

Dervin’s (1983) sense-making theory is an influential theory which adopts a user-centered viewpoint. Sense-making theory is based on the premise that when people face situations in which information problems arise, they are encountering a cognitive gap that prevents them from making sense of the situations. To bridge this gap, individuals begin seeking information to help them make sense of the situations (Dervin, 1983). Sense-making theory implies a set of conceptual and theoretical assumptions and related methodologies for studying information assessing how people make sense of their worlds and how they use information in the information seeking process.

Kuhlthau (1991, 1994) developed information search process (ISP) model based on the sense-making model (Dervin, 1983), the ASK hypothesis (Belkin, 1980) and the theory of constructivist learning. The ISP model suggested that information users experience states of *actions, thoughts, and feelings* through six stages (i.e., Initiation, Selection, Exploration, Formulation, Collection, and Presentation). This model provided information behavior researchers with the insights that the *behavior, cognitive, and affective* aspects are all essential dimensions of a complete, user-centric understanding of human information behavior. In the research on ADI, Erdelez’s (1995) study used the same constructivist approach as a first step in understanding information encounters by examining information users’ actions, thoughts, and feelings when information was encountered.

2.1.4 Implications for This Study

This study of the accidental aspects of individual users' information acquisition on the Social Web is part of the LIS field's ongoing effort since the 1940s to understand all aspects of human information behaviors. By focusing on human factors associated with individuals' ADI on the Social Web, this proposed study is situated within the broad context of the current user-centered paradigm and constructivism. It incorporates the aforementioned the three dimensions (i.e., actions, thoughts, and feelings) of information behavior to explore ADI on the Social Web. Based on the concepts and assumptions of constructivism, the methodological approach of this study is to empirically study ADI experiences by collecting self-reported qualitative data from individual participants.

2.2 ACCIDENTAL DISCOVERY OF INFORMATION

This section consists of three parts. It first describes the development of ADI during the past few decades. Then, how ADI is conceptualized and defined in the information behavior and retrieval research is discussed. The last part reviews the frameworks and process models of ADI, aiming to identify important areas of inquiry related to the research questions of this study.

2.2.1 Background of Accidental Discovery of Information

For several decades, scholars in the human information behavior domain have acknowledged the existence and the value of the nonlinear information acquisition. The berrypicking approach

represents one of the earlier examples (Bates, 1989). Voigt (1961) also mentioned scientists' current, everyday, and exhaustive approaches to information. Therefore, the concept of non-linearity and opportunistic information acquisition (OIA) is not new, but it was hidden beneath the dominance of intentional information-acquisition research for a long time, and served primarily as a secondary complement to the models of linear information behavior. *Accidental discovery of information* (ADI) that is not sought for, as a form of non-linear OIA is also peripheral and is largely neglected in the traditional information behavior research.

This situation has gradually changed. Recently, there is a growing interest in empirically investigating concepts of non-linearity and OIA (Erdelez, Toms, Rioux, & Miwa, 2002). Foster (2004) described the Nonlinear Model of Information Seeking Behavior based on empirical research. This model embodies the core principles of the non-linear perspective. Foster and Ford (2003) explored the nature and role of serendipity in information seeking contexts and reinterpreted the notion of serendipity as a phenomenon arising from purposive or non-purposive components of information acquisition by qualitatively studying the information seeking behavior of interdisciplinary scholars. Toms (2000a, 2000b) focused on serendipitous retrieval and provided evidence demonstrating that serendipitous information is often rewarding and valuable. Miwa (2002) conceptualized *source encountering* as "users experience a feeling of opportunistic hope when they encounter unknown but seemingly useful information sources while purposefully looking for information on the Internet" (Miwa, 2002, p. 522).

Research by Zhang (1992) started to explore the characteristics and context of ADI and influenced the subsequent research on this topic. Built upon Zhang's initial descriptive, quantitative accounts of ADI, Erdelez conducted a series of qualitative studies (Erdelez, 1995, 1997, 1999, 2004; Erdelez, et al., 2002) labeled people's accidental discovery of information as

information encountering (IE) and further constructed the concept of IE in a more systematic way. She developed a functional model demonstrating how IE related some background, problem, or interest that can occur and deviate an information seekers' focus from the original information seeking activity forming a non-linear approach of information acquisition.

In a recent study by Erdelez (2005), she identified IE as a specific type of opportunistic information acquisition (OAI) occurring during an active search for some other information. In contrast to intentional, active, and planned information seeking, OAI indicates the form of information acquisition that is casual, non-problem-specific, and non-directed (Erdelez, 2005). The ADI discussed in this dissertation is also under the umbrella of OAI. Instead of limiting the focus of ADI in active information seeking contexts, this study seeks to develop a more complete view of how people acquire or discover information by accident in the Social Web context.

2.2.2 Conceptualizing Accidental Discovery of Information

The concept of accidental information discovery is complex and there has been no official definition for it so far. Zhang (1992) had identified ADI as a specific type of information behavior but did not precisely define it. Until 1995, Erdelez, one of the earliest researchers who were particularly focused on people's opportunistic information acquisition, acknowledged that the ADI discussed in Zhang's study is closely related to the concept of *information encountering* as she defined. In Erdelez's initial study (1995), the concept of ADI, termed as *information encountering* (IE), is defined as "a form of information acquisition that is not planned or anticipated. It is characterized by users' low involvement or no involvement in looking for information that was acquired, and by a low expectation or no expectation that such information

will be acquired” (p. 3). Recently she revised the definition to “an instance of accidental discovery of information during an active search for some other information” (Erdelez, 2005, p. 180), that is apparently much narrower than her initial definition. It should also be noted that, in the literature of information behavior and retrieval, the discussion of ADI is still in its early stage of investigation and not yet mature.

Although a well-acknowledged definition of ADI is lacking in LIS literature, *serendipity* has been discussed for many years in the areas of arts and humanities (Colbbledick, 1996), management (Svensson & Wood, 2005), organizational behavior study (Roffe, 1999), education (Kjölberg, 2003) as well as in the sciences (Roberts, 1989), in terms of creativity generation, learning process, and scientific discovery. These discussions have provided useful and valuable insights to understand ADI. In each of these areas, however, serendipity could be characterized in a very different way. For example, in science research, serendipity has been seen as the outcome of a prepared mind (Fine & Deegan, 1996). And for management and business sciences, the value of serendipity extends to getting the “people” resource (Eagle, 2004). For the other example, Svensson and Wood (2005) defined serendipity as “the mix of leadership effectiveness by accident and sagacity” (p. 1001).

In order to conceptualize ADI for the purpose of this study, Table 1 summarizes the definitions of various terms of ADI derived from related studies in the fields of information behavior and retrieval.

Table 1. Definitions of ADI in Literature of Information Behavior and Retrieval

Synonyms of ADI	Author	Definition	Operational or Alternative Definition	Research Type
Incidental Information Acquisition	Williamson (1998)	"People find information unexpectedly as they engage in other activities" (p. 24)	"... is seen as synonymous with accidental information discovery" (p.24)	naturalistic conversation via phone; interviews
	Heinström (2006)	"... acquiring (useful or interesting) information while not consciously looking for it" (p.580)	<ul style="list-style-type: none"> • also use 'serendipitous information acquisition' in text • use in survey questions with "Useful information can be found in unexpected contexts," "I incidentally come across useful information when I am not looking for it," and "When I search information about one topic, I find information that I can use for another purpose" (p. 584). 	survey
Information Encountering	Erdelez (1995)	"... a form of information acquisition that is not planned or anticipated." "It is characterized by users' low involvement or no involvement in looking for information that was acquired, and by a low expectation or no expectation that such information will be acquired" (p. 3)	"bump into useful information without actively seeking for it"	survey and interviews
	Erdelez (1997)	"memorable experiences of accidental discovery of useful or interesting information"(p. 142)	"bump into useful information without actively seeking for it"	survey and interviews
	Erdelez (2004)	"during search for information on one topic information users accidentally come across information related to some other topic of interest" (p. 1013)	noticing the IE triggers embedded in the provided search list	controlled study
	Erdelez (2005)	"an instance of accidental discovery of information during an active search for some other information" (p. 180)	a specific type of <i>opportunistic acquisition of information</i>	based on research (Erdelez, 2004)
Information Scanning	Shim et al. (2006)	"information gathered incidentally from sources in the environment"	"How much attention do you pay to information about health or medical topics on ...?"	survey
Passive Attention	Wilson & Walsh (1996)	"such as listening to the radio or watching television programs, where there may be no information-seeking intended, but where information acquisition may take place nevertheless"		non-empirical research
Passive Search		"occasions when one type of search (or other behavior) results in the acquisition of information that happens to be relevant to the individual"		

Table 1 (Continued)

Synonyms of ADI	Author	Definition	Operational or Alternative Definition	Research Type
Serendipity	Foster & Ford (2003)	“a phenomenon arising from both conditions and strategies – as both a purposive and a non-purposive component of information seeking and related knowledge acquisition” (p. 321)	Serendipity has the effect of reinforcing or strengthen the existing problem conception or solution; or taking it to a new direction.	interviews
	de Bruijin & Spence (2008)	“... occurs when a user’s gaze happens to fall upon a representation – perhaps an image and two or three words - of some information of interest” (p. 3)	<ul style="list-style-type: none"> • a product of opportunistic or involuntary browsing • recognized as a ‘process’ that can be supported by interaction interface • identifying information relevant to a latent goal 	experiments
	André, schraefel, Teevan, & Dumais (2009)	“1) the finding of unexpected information (relevant to goal or not) while engaged in any information activity; 2) the making of an intellectual leap of understanding with that information to arrive at an insight” (p. 306)	<ul style="list-style-type: none"> • occurs when a search results is judged by the participant as interesting but not highly relevant • ‘Partially relevant’ or ‘not relevant’ information are potentially sources of ADI. 	controlled study
	McCay-Peet & Toms (2010)	“the process of serendipity in knowledge work , moving from a search for a solution to a Task A, the observation of a trigger, the bisociation between two previously unrelated subjects, and the unexpected solution to Task A or B” (p. 378)	instances of serendipitous episodes	interviews
Serendipitous Information Retrieval	Toms (2000a)	“occurs when a user with no a priori intentions interacts with a node of information and acquires useful information”	Serendipity can be induced by prompting for keywords or giving a list of suggested similar articles.	controlled study

Note. This table was created by the author, based on the definitions of ADI defined by various researchers. References are provided in the text of the table.

As can be seen in Table 1, even though confined to the domain of information behavior and retrieval, there are a diversity of definitions and descriptions for ADI. This diversity reflects on the various terms to name the concept of ADI, which include *incidental information acquisition*, *information encountering*, *information scanning*, *passive attention/search*, *serendipity*, or *serendipitous information retrieval*. Moreover, the nature of these ADI synonyms are different in that some of them regard ADI as a phenomenon or instance (Erdelez, 2005; Foster & Ford, 2003), and the others focus on the *process* of ADI (de Bruijin & Spence, 2008; McCay-Peet & Toms, 2010). How ADI is conceptualized determines how research can be

designed and conducted. Table 1 also indicates that conceptualizing ADI as a *process* is more convenient for performing controlled studies in labs.

André et al. (2009) identifies two axes for classifying ADI and its equivalences: 1) the type of information encountered (i.e., relevant or irrelevant to the goal), and 2) the information activity engaged in at the time of ADI (i.e., goal-directed or non-goal-directed). Using these two attributes, Table 2 presents how these synonyms of ADI reviewed above can be differentiated.

The other observation from this literature review is that the methodologies for investigating ADI mostly use qualitative approaches, and the data collection methods include surveys and/or interviews. This is because the research on the concept and definition of ADI is relatively immature. Also, ADI, by its nature, is difficult to be systematically controlled or predicted (Foster & Ford, 2003). Given this condition, qualitative inquiry and methods are more feasible and accessible to understand the true phenomenon. This led to the use of qualitative data collection as part of the research design.

This study, extending on what is known about ADI in the information behavior and retrieval literature, takes a broad view and conceptualizes ADI as

- accidental incidents of acquiring useful (or personal interest-related) information without involving intentional information acquisition;
- covering both situations of purposeful and unpurposeful information activities engaged in at the time of discovering unexpected information. It could happen when one is actively looking for some other information or merely carrying on an everyday routine activity;
- the information accidentally discovered is not (or very low) relevant to the original goals of information seeking engaged in at the time of ADI.

Table 2. Classification of ADI Synonyms

		Information discovered is relevant to the goal of search/browsing.		
		Yes	No	Cover both conditions
Purposeful search/browsing is engaged at the time of ADI.	Yes	<ul style="list-style-type: none"> • Serendipity (Foster & Ford, 2003) 	<ul style="list-style-type: none"> • Information Encountering (Erdelez, 2004, 2005); • Passive Search (Wilson & Walsh, 1996) 	<ul style="list-style-type: none"> • Serendipity (André, Schraefel, et al., 2009; McCay-Peet & Toms, 2010) • Serendipitous Information Retrieval (Toms, 2000a)
	No	None	<ul style="list-style-type: none"> • Information Encountering (Erdelez, 1995, 1997); • Incidental Information Acquisition (Heinström, 2006; Williamson, 1998); • Passive Attention (Wilson & Walsh, 1996); • Information Scanning (Shim, et al., 2006) 	None
	Cover both conditions	None	<ul style="list-style-type: none"> • Serendipity (de Bruijn & Spence 2008) 	None

Note. This table was created by the author in order to continue André, et al.'s (2009) efforts to integrate various terms of ADI in the axial classification. References are provided in the text of the table. The cells filled with N/A are categories without associated literature found. It is likely because unpurposeful activities are usually not goal-directed; thus the information accidentally discovered during unpurposeful activities is not used to fulfill any goal.

2.2.3 Characteristics and process of ADI in the Internet-based environment

Erdelez (1995, 1997) proposed a conceptual model for exploring the characteristics through a four-dimensional analysis of *information user*, *environment*, *information encountered*, and *information needs addressed*. She suggested that this framework was established to describe accidental information discovery in various information environments. The four components of the model and findings from Erdelez's earlier research (1995, 1997) are summarized in the following paragraphs.

Information User. Based on the discussions with interviewees, four types of information users were identified: super-encounter, encounter, occasional encounter, and non-encounters. The classification is based on a user's attitude towards IE and the frequency of IE experiences. *Non-encounters* are people who seldom encounter information by accident. *Occasional encounters* perceive the encounter merely as a lucky behavior. *Encounters* do not perceive how these experiences connected to their information behavior. *Super-encounters* are people who very often experienced IE, who rely on it, and consider it as an important element of their information behavior. They are sensitive to information stimuli, willing and capable of information encountering.

The individual users' IE experiences can be explored with the three dimensions: acts (i.e., behavioral), feelings (i.e., cognitive), and thoughts (i.e., affective). Erdelez's study (1995) found that the acts immediately before IE could be categorized into information-related activities (i.e., information seeking or browsing) and non-information-related activities (e.g., performing routine works, passively exposed to some medium, etc.). For the cognitive and affective elements of IE, Erdelez (1995) suggested comparing and analyzing users' feelings and thoughts before and after the happening of IE. Her findings showed that most of the IE experience were changed from negative feelings before the event of IE to positive feelings after it. Users' cognitive statuses were also changed from non-information-behavior related thoughts to information-behavior-related thoughts (e.g., recognizing self's latent information need, determining the quality and adequacy of encountered information for use, identifying situations which the information can be fitted in, etc.).

Environment. Erdelez (1995) also found that information encountering occurred in both venues where information services are provided (e.g., libraries or seminars) or not provided (e.g.,

shops or home). The unexpected information was gathered from printed materials, the Internet, or people, and participants were able to specify which type of environments or media they found conducive for IE.

Information encountered. Participants were able to articulate the encountered information is problem-related or interest-related. Erdelez (1995) suggested that problem-related information had often been sought in some time before, but interest-related information usually had not been sought. The encountered information was used in several ways, including being applied in some specific action or accomplishment; addressing some information need; sharing with others; or involving management or organization activities such as filing, saving, and recording information for future use.

Information need addressed. Her study also indicated that the information needs addressed by IE were varied in terms of currency. Most information needs reported in the study were 'present', which means the information is useful for dealing with current problems or needs. Only a few IE experience are related to addressing future information need, and no episode was found with past information need.

In a subsequent work, Erdelez (2000) investigated IE specifically on the Web using group interviews, individual interviews and a survey with the participants recruited from the pool of super-encounters interviewed in her 1995 study. Erdelez presumed that, over the five years, the technical advancement in accessing and processing information on the Internet and the proliferation of the Web as an information rich environment would have an influence on super-encounters' attitude towards IE on the Web. However, the result of group interviews surprisingly revealed that the super-encounters continued to dislike using the Internet and the Web for information encountering. The participants in Erdelez's study were people who have been

already used to and satisfied with traditional environments. This can limit the findings and therefore underestimate the real situation of the new web user generation. Erdelez's study, however, provided initial findings about ADI on the Web and can be considered as the comparison base for the results of this dissertation.

Erdelez (2000) also proposed that there is a series of functional components which can be identified within an IE episode: noticing, stopping, examination, storing, use, returning. Within this process, a trigger leading to unexpected information catches an information user's attention (i.e., noticing); the user temporarily diverged from the activity at hand and pay attention to the encountered information (i.e., stopping); then the user take time reading or explore it a little more (i.e., examination); the user may save the information for future use (i.e., storing), use it to address some problem and/or share it with others (i.e., use), and then returning to the previous activity that was interrupted with IE. Erdelez conceptualized ADI as a process in favor of conducting controlled experimental studies in the web search context (Erdelez, 2004).

While Erdelez was focusing on the process of an information encountering episode, Cunha (2005) and McCay-Peet & Toms (2010) situated serendipitous discovery as one of the components in the information seeking process. As inspired by Cunha (2005), McCay-Peet and Toms (2010) proposed that the process of serendipity in a knowledge work is consisted of five steps: While *searching for a solution to problem A* and being immersed in certain *precipitating conditions*, an individual observe a *trigger* (e.g., image, text, audio), and made a *bisociation*, which is a surprising association made between previously unconnected pieces of information, leading the individual to find an *unexpected solution for problem A or B*.

Among the elements of this process, understanding *triggers* of serendipity has been the research focus of the information retrieval literature. Researchers had been trying several ways to

induce serendipity by information technologies for the past decade; for example, providing a list of suggested similar articles while browsing or prompting keywords while searching (Toms, 2000a), embedding partially-relevant or similar items in search results (André, Teevan, & Dumais, 2009; Erdelez, 2004), or color-coding the relevance of hyperlinks in an interactive information retrieval system (Beale, 2007).

In additions to triggers, precipitating conditions that “when present, increase the chances for serendipitous discovery” (Cunha, 2005) also play an important role in facilitating ADI. Cunha (2005) proposed three precipitating conditions, derived from Fine and Deegan’s (1996) three principles of serendipity: 1) temporal happenstance, which means people make accidental discoveries because they are lucky to be in the right place at the right time; 2) active learning and analysis, in which people discover unexpected information when they make a puposeful search task and learn through the process of analysis, and 3) relational serendipity, which indicates accidental information discovery is made through social connections and interactions.

Before the information accidentally discovered becomes useful, a meaningful association among previouly unrelated information needs to be made (i.e., bisociation). In the stage of bisociation, McCay-Peet and Toms (2010) found that people may experience a period of time for mental incubation, which means the conditions when a trigger is noticed and examined but bisociation is delayed because a “surprise spark” or creative reasoning is not made yet. This trigger may be stored in memoy and recalled some time later and then the process of serendipity may continue.

When thinking of designing systems or tools for supporting ADI experience, the three building blocks of ADI, including triggers, precipitating conditions and incubation, need to be considered carefully (McCay-Peet & Toms, 2010). However, studies on precipitating conditions

and incubation are scarce in the literature; this dissertation hence included the examination of these elements in the Social Web context.

2.2.4 Use of discovered information

Information use has been seen as one of the essential elements for understanding human information behavior. Wilson (2000) described *information use behavior* as to what “consisted of physical and mental acts involved in incorporating the information found into the person’s existing knowledge base” (p. 50). In addition to this type of direct use of information, the storing, organizing, and sharing of information is also closely linked to information use. Erdelez (2000) has also identified that *use* is one of the stages in the process of ADI. She suggested that information users, after examining the encountered information, might carry out activities of “mentally or physically storing,” “using it for personal needs,” and/or “sharing with others.” With that in mind, this dissertation attempts to examine these activities of information use in the Social Web contexts and asks why-, what- and how-questions around these behaviors. The different types of use of encountered/serendipitous information are also discussed in the following paragraphs.

In recent years, the use of encountered/serendipitous information has drawn much attention. Marshall and Bly (2005) interviewed 20 diverse individuals in their study on how people clip and use information they encounter in their everyday reading at work and at home. They identified five reasons motivating to clip and save reading materials. These reasons include: the documents have immediate value or might contain potentially useful information (28%). The latter condition was more common than the former. The clippings for potential use are saved for long-term reference. The other reasons for clipping and saving reading materials

include evoking memories (11%), reminding actions (14%) and sharing (41%). Among these motivations, sharing forms a significant use for encountered materials. Marshall and Bly (2004) also proposed that the function of sharing encountered information is far beyond just informing the recipient. Such function also includes establishing mutual awareness, educating/raising consciousness, using common interests to develop rapport, and demonstrating knowledge of the recipient's unique interests. The sharing practices are not only to share information, but also to "strengthen social ties by demonstrating shared interests or values" (pp. 223-224). However, the contents of some shared clippings may not actually have immediate value to the recipient. The researchers (Marshall & Bly, 2005; Marshall & Jones, 2006) also identified some barriers to effective use which include (1) the failure to find saved clippings, (2) forgotten clippings, (3) limited or ineffective strategies for re-encountering needed information, (4) lack of good ways for organization, and (5) inability to recover context or establish an item's authority by metadata. These barriers reflect that, so far, people do not have or are not provided with effective and efficient approaches to store, manage, and organize encountered information and this limited the value and function of encountered information in people's information acquisition.

Talja (2002) identified five types of information sharing in the academic context, within which the *social information sharing* can be related to the sharing of encountered information with others. This type of sharing is not strictly goal-oriented and it can function as "relationship- and community-building activities" (p. 3146). The participants reported that there is an emotional need of feeling the belongingness to a scholarly community. And sharing the information about potentially relevant documents among researchers working in different fields can fill such emotional need. Sharing of information represents the "signs of respect and that their work is valued" (p. 3149). Other functions related to social information sharing include

“maintaining an outward stance of cooperation”, “working to further their own interests or knowledge claims”, or “veiling and smoothing contests or differences in perspective” (p. 3149).

Erdelez and Rioux (2000) examined the process of sharing encountered information with others. They identified sharing enthusiasm with content, and good feelings associated with helping others, etc. motivate people to engage in *information acquiring-and-sharing* (IA&S) behavior. Informed by examining e-mail sharing strategy, Rioux (2004) lately developed a conceptual framework of this IA&S behavior, in which an individual performs a set of combined activities and sequential processes including storing, recalling, associating, and sharing (Rioux, 2005).

The aforementioned works on sharing encountered information reflect that in addition to mentally immediate using for addressing problems on hand, storing, and sharing are also common activities of information use. This dissertation included the examination of these elements in the Social Web context.

2.2.5 Implications for This Study

Previous researches have focused more on users’ actions of information behavior. In addition to that, Wilson (1999) further suggested that information needs, motivation, cognition, and affect are all important components in the study of human information behaviors. This dissertation proposed that Erdelez’s (1995, 1997) framework for studying ADI and a few other studies on the process of ADI (Cunha, 2005; McCay-Peet & Toms, 2010) had provided a good start to investigate elements of ADI on the Social Web. Thus, the specific areas of inquiry for addressing the two research questions of this study are:

- What are the characteristics of the six elements including 1) individual users, 2) motivations to use the Social Web, 3) user's information behavior (i.e., actions, feelings and thoughts), 4) context (i.e., social tools and precipitating conditions that facilitate ADI), 5) information (i.e., information objects and contents) accidentally discovered on the Social Web, and 6) information needs or problems to be addressed as the ADI happens on the Social Web?
- What are the information users' perceptions about 1) the Social Web regarding ADI, and 2) the relationship between ADI on the Social Web and their overall information acquisition processes and strategies?

Table 3 integrated a hierarchical list of components of ADI, which were used as a guide for the design of instrument questions and a preliminary coding scheme for data analysis.

Table 3. The Components for Studying ADI

Element	Typological Factor	Attribute
User	Type of user	super-encounter, encounter, occasional encounter, non-encounter
Motivation	Reason to use social tools	anticipation, prior experience of ADI
Context	Type of tool	communication, collaboration, sharing, subscribing, social search
	Type of precipitating condition	temporal, analytic, relational
Information Behavior	Action	
	Activity before ADI	information seeking (exploratory search/ systematic search), everyday routine
	Type of use after ADI	problem addressing, saving, sharing
	Feelings	negative, positive
Information	Thoughts	instant bisociation, incubation
	Type of information	academic, everyday-life, professional
	Type of content	interest-related, problem-related
	Type of information object	image, text, audio
Information Need	Currency	past, current, future

Note. This table was created by the author, derived from literature review of the 2.2 section.

2.3 WHAT IS SOCIAL WEB?

To contextualize the Social Web for exploring ADI, this section discusses the concept of the Social Web and provides a way of classifying social tools in terms of how they can be used.

2.3.1 Social Web and Social Tool Classification

When searching on Google, many of the discussions about the Social Web can be found from a technical or commercial perspective and articulated by industry experts, bloggers, and journalists in popular media. For example, Connolly (2008) describes the Social Web with three categories: (1) general, (2) commerce-oriented, and (3) brand enhancement/awareness-oriented. This classification, however, may not be meaningful in terms of a research framework used to understand how users interact with each other via social tools.

From the perspective of Internet users, the Social Web is actually constituted by various social tools. These tools can serve as a mediator that enables users to interact with each other. Social tools are also known as *social software*. They are products of Web 2.0 technologies. Simply speaking, social software is “any software that enables people to interact with one another” (Obasanjo, 2004). To be more specific, social software can be defined as “software which supports, extends, or derives added value from human social behavior — message-boards, musical taste-sharing, photo-sharing, instant messaging, mailing lists, social networking” (Coates, 2005).

The Social Web has already been discussed in scholarly literature for almost 10 years. However, most of current studies in the Library and Information Science (LIS) domain focus only on one or a few social tools among which wikis, blogs, and social networking sites (e.g.,

Facebook™) seem to be the tools receiving much of the attention. These discussions are often limited to understanding how their functions can be applied to improve library services. As social tools are getting more and more important for Internet users in today's world, LIS researchers have recognized the need for more efforts to explore the potential of social tools in supporting information seeking and discovery.

Like other Web 2.0 technologies, the rapid developments of new social tools surprise users everyday. However, an official list of social applications does not exist due to its ever-growing quantity of tools. The nature of its mixed features within a single social tool makes it almost impossible to classify social tools into a number of distinct and non-overlapping categories. For instance, a social networking site can at least include features of friending (i.e., the act of requesting the other to be the user's friend), grouping, messaging, announcements, and individual message boards, photo sharing, blogs or journals, searching, etc. (Mathews, 2007, p. 79).

A few studies have tried to classify social tools into various groups. For example, Obasanjo (2004) proposed an insightful classification of social software, which consists of the five classes: 1) communication, 2) sharing, 3) discovery of old and new contacts, 4) relationship management, and 5) collaborative or competitive gaming. This classification identifies the core features of social software and also incorporates the principles of social networking advocated by O'Reilly (2005).

This dissertation defines *social tools* as web-based applications and services that support people to communicate, collaborate, share experiences or resources with other users, subscribe to user-generated content, and carry on social search. This definition attempts to capture users' information-related social activities on the Social Web. Based on this definition, social tools can

be organized into the following five categories: (1) communication tools, (2) collaboration tools, (3) sharing tools, (4) subscribing tools, and (5) social search tools.

The main function of *communication tools* is for connecting people, allowing users networking and communicating. This category can include social networking sites (e.g., Facebook™, MySpace™, LinkedIn™, LiveJournal™), instant messaging (e.g. MSN Messenger™), microblogging (e.g., plurk™, Twitter™), online forums, bulletin board system, livestreaming services (e.g., FriendFeed™, AlertThingy™, SocialThing™), chat rooms, web-based email services (e.g., Gmail™), etc.

Collaboration tools enable two or more users to communicate with each other. It can also be used to identify information for accomplishing a task or solving a problem (Talja & Hansen, 2006). This category can include online communication and conferencing tools (e.g., online chat, video conferencing), collaborative working and management tools (e.g., Google Docs™, Zoho.com™), creative collaboration tools (e.g., Kalabo.net™, Novlet.com™, Writeboard.com™, SubEthaEdit™, wikis), collaborative mindmapping (e.g., MindMeister™), etc.

Sharing tools allow users to distribute experiences or/and resources. This category can include blogs, media sharing sites (e.g., Flickr™, YouTube™, podcasts, Jing™), social news sites (e.g., Digg™, Reddit™, Propeller™), social bookmarking (e.g., del.icio.us™, SiteJot™), social cataloging (e.g., LibraryThing™, CiteULike™), etc.

Subscribing tools enable users subscribe to user-generated content or media for consistently receiving the most updated information from specific recourses (e.g., Google Reader™, Netvibes™, Pageflakes™, My Yahoo!™, Rojo™, Bloglines™, Fwicki™, etc.).

Social search tools allow users to search information in the social networks or to search information with the help of social computation (Scale, 2008; Sharma, 2007). This category can

include people search tools (e.g., ex.plode.us™), human intermediary search tools (e.g., Swicki™, Rollyo™, Wink™, tag engines), and user-generated content search tools (e.g., Yahoo! Answers™, WikiAnswers.com™, Wikipedia™). People search tools enable users to find information about people across social networks and public records on the Web. Human intermediary search tools incorporate user input to refine results retrieved (Scale, 2008; Sharma, 2007). User-generated content search tools enable users to search content produced by end-users.

The aforementioned classification is not intended to be exhaustive and mutually exclusive, but to offer an alternative idea of how social tools could be classified in a more meaningful way for the purpose of studying information behaviors. In this classification, a tool can simultaneously have more than one feature relating to communication, collaboration, sharing and/or search. Which category a tool belongs to depends on how it can be used. For example, instant messaging (e.g., MSN Messenger™) can be used as a communication tool. However, when multiple users perform a same task such as a team project, instant messaging can be used as a collaborative platform allowing users to discuss or generate ideas together. In addition, instant messaging can also be used as a sharing tool to transfer pictures or files. Finally, when users are looking for answers or opinions via instant messages, it can be used as a search tool.

2.3.2 Implications for This Study

This section, based on an investigation of the social tools available on the Internet, provides a five-category social tool classification in terms of how they can be used. These five categories (i.e., communication, collaboration, sharing, subscribing, and social search tools) are used in this study to design the survey question Q2 (see Appendix A) for understanding how participants self-categorize the social tools they regularly use.

2.4 SUMMARY

This chapter reviews the backgrounds of information behavior research (section 2.1), ADI (section 2.2), and Social Web (section 2.3), providing important insights for research design of this dissertation.

The section 2.1 establishes ADI is a type of information behaviors and positions this study within the context of the user-centered research and constructivist paradigm. Therefore, human factors of actions, thoughts, and feelings have to be included when studying ADI on the Social Web. Based on constructivism, qualitative data collection is useful to explore individuals' ADI experience.

The section 2.2 reviews definitions of ADI and conceptualizes ADI in this dissertation as accidental incidents of acquiring useful (or personal interest-related) information without involving intentional information acquisition. The previous researches present that ADI is identifiable and can be empirically studied in a systematic way. This dissertation uses a conceptual framework with six elements to explore ADI on the Social Web. This framework is adapted from the Erdelez's conceptual model (1995, 1997) and studies on processes of ADI (Cunha 2005; McCay-Peet & Toms, 2010). The following areas of inquiry are included in order to address the two general research questions (i.e., RQ1 and RQ2) of this dissertation:

- The characteristics of the 1) information user, 2) motivation to use the Social Web (i.e., social tools users regularly use) for the sake of ADI, 3) user's information behavior (i.e., actions, feelings and thoughts), 4) context (i.e., social tools and precipitating conditions facilitating ADI), 5) information (i.e., information objects and contents), and 6) information needs or problems to be addressed by the ADI via the Social Web. The detailed components, which were later used as preliminary coding scheme during

qualitative data analysis, of the six elements are integrated and presented in Table 3 (see page 31).

- The users' perception about 1) the social tools they used regarding ADI, and 8) the relationship between ADI on the Social Web and their information acquisition processes.

These areas of inquiry guided the design of question items in the data collection instruments and the data analysis. The chapter of 5.0 DISCUSSION also used this structure to present findings.

The section 2.3 introduces the concept of the 'user-defined' Social Web and a social tool classification employed in this dissertation. In this dissertation, the Social Web refers to the web-based space constructed with social tools supporting users to **communicate, collaborate, share** experiences or resources with others, to **subscribe** to user-generated content, and/or to carry on **social search**. This definition is established based on the information activities that users can engage in by existing online social tools. The social tools then can be classified into the five categories: communication tools, collaboration tools, sharing tools, subscribing tools, and social search. In order to specify the Social Web in a way that supports studying individual users' ADI, the concept of the user-defined Social Web is further introduced and defined as *a group of social tools that individuals regularly use*. This operational definition implies that the scope of the Social Web is decided by the individual users. That is, the social tools (e.g., Facebook™, Twitter™, Skype™, etc.) which a user regularly use form the user's own Social Web space. The five categories of social tools were used in the survey question to ask respondents self-categorize the tools they regularly used. The details of research and instrument design are described in the next chapter of 3.0 METHODOLOGY.

3.0 METHODOLOGY

The purpose of this dissertation is to develop an initial understanding of individual users' ADI behaviors in the user-defined Social Web context by addressing the two research questions (RQ):

RQ1: What are the characteristics of ADI on the Social Web?

RQ2: What are the users' perceptions about ADI on the Social Web?

The key methodological issues presented in this chapter include research design, conceptual framework, operationalization of investigated constructs, research plan, study participant, data collection and analysis, and justification of study trustworthiness.

3.1 RESEARCH DESIGN

This dissertation used an exploratory and descriptive research design, with the objective of generating an array of preliminary propositions that can be used to describe and provide an initial explanation for individual behaviors and perceptions associated with ADI in the Social Web context.

The previous exploratory studies on ADI (Erdelez, 1995; McCay-Peet & Toms, 2010) mainly relied on participants' recall of their recent or overall ADI experiences during interviews. Although this method has proved its ability to provide rich information with regard to accidental

discovery of information, there remains a concern related to the reliability of the recalled data: a few things, even once directly experienced, still might be completely forgotten (Fowler, 1995, p. 22). Also, people are likely to reconstruct missing parts in their memories by imagination or augmenting a remembered fragment with their own knowledge (Medin, Ross, & Markman, 2004, p. 227). To mitigate the risk of causing recall biases and to maximize the understanding of the investigated phenomenon, this study took a mixed-methods approach, in which “the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study” (Johnson & Onwuegbuzie, 2004, p. 17). Described below includes details in each of the three stages that employ mixed-methods strategy in this dissertation:

Data collection. Multiple methods of the survey, interview, and logging were performed in the sequential three phases. Both qualitative and quantitative data were generated. This produced not only subjective data (e.g., discussions of interviews), but also quasi-objective data (e.g., frequency of specific social tools use and ADI occurrence) for cross-verification.

Data analysis. Inductive and deductive reasoning were both used in a mixed way. Qualitative data were analyzed using an initial (deductive) coding scheme derived from literature review in the beginning, and later the coding scheme was inductively refined over time based on the collected data in this study. The qualitative data generated from the logs and interviews were first interpreted by inductive analysis, and then they could be quantified when necessary. The quantitative data collected with the survey were first tackled using deductive analysis, and then supported by narrative explanations derived from qualitative data of open-ended questions and interviews.

Result reporting. The data and findings generated from multiple methods were integrated in the last stage, and then discussed and interpreted to address the research questions.

In this dissertation, there are three purposes for adopting this mixed-methods approach: 1) For methodological triangulation, “seeking convergence and corroboration of results from different methods studying the same phenomenon,” 2) for complementarity, “seeking elaboration, enhancement, illustration, and clarification of the results from one method with results from the other method,” and 3) for generating rich data to expanding “the breadth and range of research by using different methods for different inquiry components” (Johnson & Onwuegbuzie, 2004, p. 22).

Although both were used, qualitative and quantitative paradigms are not necessarily equally blended in a mixed-methods research (Johnson & Onwuegbuzie, 2004). This study gives dominant status to the qualitative paradigm because of its exploratory nature.

3.2 CONCEPTUAL FRAMEWORK

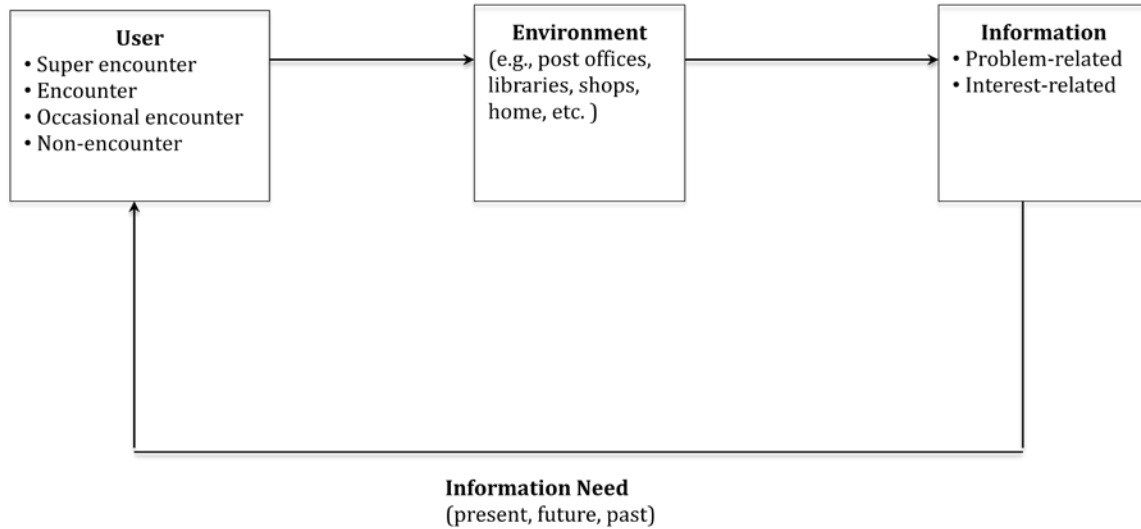
A conceptual framework of six elements was used in this dissertation: 1) *User*, 2) *Motivation*, 3) *Context*, 4) *Information Behavior*, 5) *Information*, and 6) *Information Need*. The six elements of this framework were developed built on the Erdelez’s conceptual model of information encountering (Erdelez, 1997). Her model was designed specifically for studying individual users’ ADI incidents by investigating the four elements: *information user*, *environment*, *information*, and *information needs*. Each element in Erdelez’s model has been discussed in the previous chapter. Built on Erdelez’s model, the concept of each element regarding ADI was further modified to incorporate a new context of the Social Web in order to form a more adequate

structure. Thus, the framework for studying ADI in this dissertation includes six elements described below:

- **User** is the individual user who experiences ADI on the Social Web;
- **Motivation** indicates the user's motivation to use the Social Web for the sake of ADI;
- **Context** means the context (i.e., the Social Web and precipitating conditions) in which the ADI occurs;
- **Information Behavior** involves the user's actions, feelings and thoughts at the time of ADI on the Social Web;
- **Information** is the information accidentally discovered by the user on the Social Web;
- **Information Need** indicates the information needs or problems addressed by the ADI on the Social Web.

It should be noted the *Environment* in Erdelez's original model was replaced by *Context* because the original study was focusing on physical environments rather than specifically Internet-based contexts (see Figure 2). The *Context* element in this dissertation includes two components: 1) the *user-defined Social Web* (i.e., the social tools individuals regularly use); and 2) the *precipitating conditions* that facilitate accidental information discovery in this context. This dissertation also includes *Information Behavior* to look at information user's actions, feelings and thoughts at the time of ADI, which were originally affiliated to *User* in the Erdelez's model. *Motivation* was also included to explore whether users would use Social Web for the purpose of ADI. Figure 2 below illustrates the six key components that construct an individual's ADI incident in the Social Web context. This framework was used to identify important characteristics of ADI on the Social Web and assist the development of data collection instruments and data analysis plans in this dissertation.

Erdelez's model^a



The modified conceptual framework^b

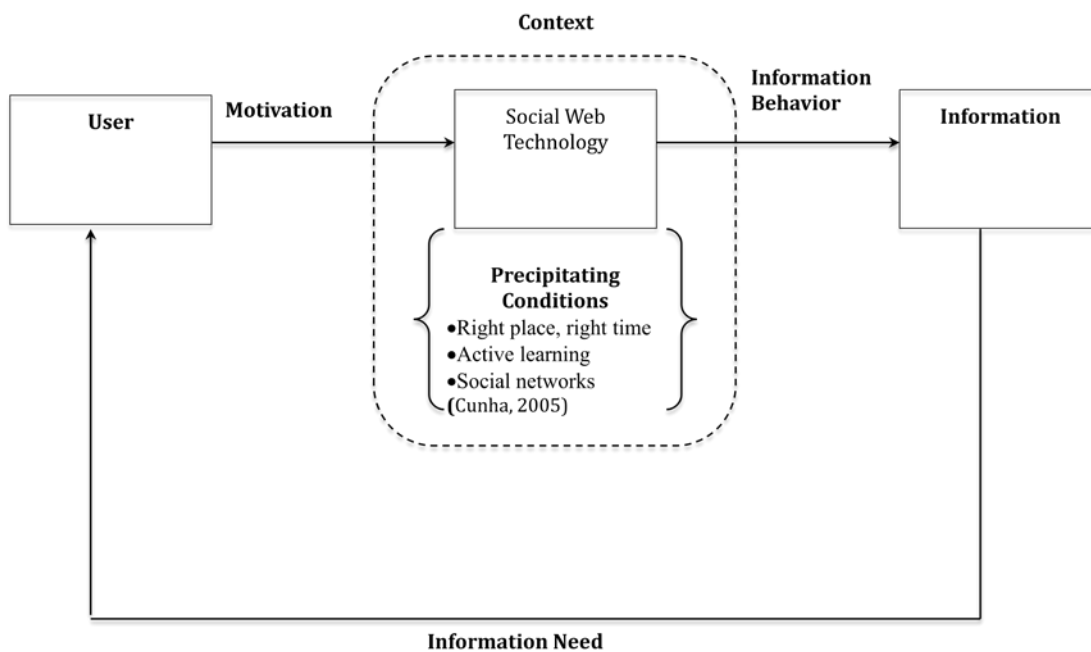


Figure 1. Erdelez's Model vs. the Modified Conceptual Framework

Note. a. Model created by the author, based on Erdelez's descriptions of her model of information encountering (1995, 1997). b. The framework used in this dissertation, built on Erdelez's model.

To address *RQ1 (What are the characteristics of ADI on the Social Web?)*, the characteristics of each element in the conceptual framework were examined. Some of the typological factors and attributes for these elements have been identified in the previous chapter as summarized in Table 3 (see page 32).

To address *RQ 2 (What are the users' perceptions about ADI on the Social Web?)*, this study further explored how participants perceived the user-defined Social Web (i.e., social tools they regularly use) for as an environment ADI and how they perceived the relationship between ADI on the Social Web and their overall information seeking processes.

3.3 OPERATIONAL DEFINITION

This dissertation aims to explore individuals' accidental discovery of information (ADI) behaviors on the Social Web. Therefore, the two key concepts (i.e., *ADI* and the *Social Web*) need to be operationalized for supporting data collection. The section 3.3.1 and 3.3.2 provide operational definitions of *ADI* and the *Social Web*.

3.3.1 Operational definition of ADI

The operational definition of ADI in this dissertation is 'accidentally acquiring useful (or personal interest-related) information without intentionally looking for it.' *Useful information* refers to information that can be used to address specific problems or information needs. *Personal interest-related information* indicates information of individual users' interest, which can be seen as individuals' long-term or latent information needs. This dissertation posits that

ADI is a type of information acquisition that is distinguishable from ‘active information seeking’ in the fact that, for ADI, users’ involvements (intellectual and physical) and expectation for the acquired information are both at the lower level (Erdelez, 1995). Moreover, this dissertation considers ADI as a set of ‘perceivable experiences,’ which can be described by the participants. Based on this presumption, empirically studying individuals’ ADI experiences could be done by collecting responses from participants.

3.3.2 Operational definition of Social Web

In this dissertation, ADI was investigated in the context of the Social Web that is user-defined by the research participants. The operational definition of *Social Web* is ‘a group of social tools that individuals regularly use.’ *Social tools* are defined as ‘web-based applications and services that support people to communicate, collaborate with users, share experiences or resources, subscribe to user-generated content, and carry on social search.’ This definition captures users’ information-related *social activities* through online social tools (i.e., communication, collaboration, sharing, subscribing, and social search). Based on this definition, social tools were organized into the following five categories:

Communication tools. Its main function is connecting people, allowing users networking and communicating. The scope of this class includes social networking sites (e.g., Facebook™, MySpace™, LinkedIn™, LiveJournal™), instant messaging (e.g. MSN Messenger™, Skype™), social messaging (e.g., Plurk™, Twitter™), online forums, life-streaming services (e.g., FriendFeed™, AlertThingy™, SocialThing™), chat rooms, web-based email services (e.g., Gmail™), etc.

Collaboration tools. This kind of tool enables two or more users to communicate to identify information for accomplishing a task or solving a problem. The scope includes online communication and conferencing tools (e.g., online chat, video conferencing), collaborative working and management tools (e.g., Google Docs™, Zoho.com™), creative collaboration tools (e.g., Kalabo.net™, Novlet.com™, Writeboard.com™, SubEthaEdit™, wikis), collaborative mindmapping (e.g., MindMeister™), etc.

Sharing tools. They allow users to distribute experiences or/and resources including blogs, media sharing sites (e.g., Flickr™, YouTube™, podcasts, Jing™), social news sites (e.g., Digg™, Reddit™, Propeller™), social bookmarking (e.g., del.icio.us™, SiteJot™), social cataloging (e.g., LibraryThing™, CiteULike™), etc.

Subscribing tools. They enable users subscribe to user-generated content or media for consistently receiving the most updated information from specific recourses (e.g., Google Reader™, Netvibes™, Pageflakes™, My Yahoo!™, Rojo™, Bloglines™, Fwicky™, etc.).

Social search tools. They enable users to search in the social networks or with the help of social computation (Scale, 2008; Sharma, 2007). The scope includes people search tools (e.g., ex.plode.us™), human intermediary search tools (e.g., Swicki™, Rollyo™, Wink™, tag engines) and user-generated content search tools (e.g., Yahoo! Answers™, WikiAnswers.com™, Wikipedia™). These human intermediary search tools incorporate user input to refine results retrieved. People search tools enable users to find information about people across social networks and public records on the Web. User-generated content search tools enable users to search content produced by end-users.

During the data collection, the participants were asked to categorize a set of social tools that they regularly used into five categories that they used to construct their own Social Web

spaces (see Appendix A for the survey questionnaire). The method of self-categorization reflected how they actually use the tools based on different types of social activities (i.e., communication, collaboration, sharing, subscribing, and social search).

3.4 RESEARCH PLAN

This dissertation adopted an explanatory sequential mixed-methods design and followed a multi-phase research plan, which is summarized in Table 4.

Table 4. Research Phases of This study

Phase	Objective	Procedure	Product
1	Instrument development	<ul style="list-style-type: none"> Conducted a pilot study to test data collection instruments Revised research plan Improved instruments IRB submission 	<ul style="list-style-type: none"> Survey questionnaire (Appendix A) Question prompt sheet for ADI incidents logs (Appendix B) Semi-structured interview protocol (Appendix C)
2	Data collection Data analysis Sample selection	<ul style="list-style-type: none"> Conducted the survey ($N = 45$) Performed data screening, initial descriptive statistical analysis and content analysis Purposefully sampled from survey participants 	<ul style="list-style-type: none"> Numeric data and text data Descriptive statistics Participants selected for log and interview sessions
3	Data collection Data analysis	<ul style="list-style-type: none"> Conducted 7-day logs on 13 participants Integrated episodes from the survey and logs Coding and content analysis 	<ul style="list-style-type: none"> Text data (53 ADI episodes yielded from logs)
4	Data collection Data analysis	<ul style="list-style-type: none"> Conducted in-depth semi-structured interviews ($N = 13$) Develop iterative coding scheme Coding and thematic analysis 	<ul style="list-style-type: none"> Text data (transcripts & field notes yielded from interviews) Codes and themes
5	Advanced data analysis Reporting findings	<ul style="list-style-type: none"> Re-coding, grouping data Synthesize and interpret all collected data Compare results with previous findings in literature Use descriptive and thematic form to present the findings 	<ul style="list-style-type: none"> Findings Discussion Implications Future research

The data collection methods were implemented sequentially, starting with the survey in Phase 3 followed by the logs and interviews in Phase 4 and 5. The survey collected descriptive quantitative data; logs and interviews yielded qualitative data. The quantitative data were further used to select participants in the later qualitative data collection. The qualitative phase were conducted as a follow-up to help explain the initial quantitative results.

It is a characteristic of qualitative approaches that the researcher involves iterative analysis along with data collection. Thus, in the phase 3 and 4, the process of data collection was intertwined with the process of data analysis. Each data collection session was influenced by its previous session due to the investigator's cognitive intention toward addressing the research questions. The data collection and analysis procedures outlined in the Table 4 are elaborated in the next section.

3.5 DATA COLLECTION AND ANALYSIS

This section includes the descriptions of the five research phases regarding data collections and analysis procedures, which were outlined in the Table 4.

3.5.1 Phase 1: Instrument development

Guided by the two general research questions and the conceptual framework of this dissertation, The three data collection instruments were developed in the period of Phase I: 1) a survey questionnaire, 2) a question prompt sheet for logging ADI incidents, and 3) a semi-structured interview protocol. Pilot studies were conducted to test the quality of these three instruments.

This section first introduces the detailed contents of the three instruments and follows with a description of what was learned from the pilot study.

Survey Questionnaire. The survey questionnaire is composed of three parts (see Appendix A for full text), each of which includes both closed-ended and open-ended questions. Part I is designed to know what social tools individuals regularly use, how individuals use social tools, and the frequencies of ADI occurrence via different social tools. Three questions (Q1-Q3) are designed for these purposes. Q1 asks “How frequently do you use such a tool?” (i.e., using five check boxes with text labels of *Never*, *Rarely*, *Sometimes*, *Often*, *All the time*, from left to right). Responses to this question represent the landscape of an individual’s self-defined Social Web space. Q2 asks “How do you usually use the tool?” (i.e., using five check boxes with text labels of *Communication*, *Collaboration*, *Sharing*, *Subscribing*, *Social search*; each of these social tool classifications are defined and given examples on the previous page). This question allows multiple choices and the responses show how participants self-categorize the social tools they regularly use. Q3 asks “How frequently do you bump into useful information (or information of your interest) when using this tool?” (i.e., using five check boxes with text labels of *Never*, *Rarely*, *Sometimes*, *Often*, *Always*, from left to right). Participants need to go through the social tool list one by one to answer Q1-Q3. If they check *Never* for Q1, Q2 and Q3 are to be skipped. The social tool list containing forty social tools was refined through the pilot study. Appendix G provides an overview of the forty social tools used in the questionnaire.

Part II is designed to understand users’ perceptions and attitudes to Social Web as an environment for information acquisition. Q4.1-Q4.10 ask participants to check the box that most clearly describes their perceptions about a list of statements about their information seeking and ADI experiences via the social tools they regularly use (i.e., using four check boxes with text

labels of *Strongly Disagree*, *Somewhat Disagree*, *Somewhat Agree*, *Strongly Agree*, from left to right). Q4.11-Q4.12 are designed to ask to answer the frequency of information seeking and ADI occurrence via social tools (i.e., using four check boxes with text labels of *Never*, *Rarely*, *Sometimes*, *Often*, from left to right). Q5 and Q6 ask to specify which social tool(s) the participants feel the most and the least useful for ADI (i.e., open-ended questions). Q7 asks how they usually use the encountered information by giving a checklist of several usages (i.e., immediately use it to address academic work, immediately use it to address everyday-life work; immediately use it to address professional work; save it in some way for future use; share it with others; do nothing with it) and also ask participants to specify why they do nothing with the information and how they save and/or share it (i.e., open-ended questions). Q8 asks participants to recall their most recent experience of ADI and provides five check boxes for indicating when the ADI incident happened (i.e., using five check box with text labels of *Today*, *Yesterday*, *Within the last week*, *Within the last month*, and *Never*). Q8.1 provides an open-question space for describing the incident in detail.

Part III collects demographic data. Q9-Q14 ask participants' gender (i.e., check boxes with text labels of male and female), age range (i.e., check boxes with text labels of 20-25, 26-30, 31-35, 36-40, and 41+), frequency of Internet use (i.e., check boxes with text labels of *All the time*, *Several times a day*, *Several times a week*, *Several times a month*, and *Never*), new technology adoption, native language, and life roles (i.e., open-ended spaces for five labels).

Question Prompt Sheet. The sheet contains a list of questions, which helps participants to recall details of critical ADI incidents and prompts responses relevant to the research questions (see Appendix B for full text). The participants participating in logging are asked to

- state the date when ADI occurred;

- indicate the tool when ADI occurred;
- describe the encountered information including its content, type and source;
- describe what he/she was doing immediately before ADI occurred;
- describe the feelings and thoughts at the time when ADI occurred;
- explain why the encountered information was useful or interesting for him/her;
- indicate if he/she had expected to get this information (Yes/No);
- indicate if he/she had ever tried to seek this information (Yes/No);
- describe what he/she did with the information they had encountered (addressing problems, saving or sharing).

Most of the questions are open-ended, allowing participants to describe incidents in their own words. Only two closed questions are used when the precise answer of *Yes/No* is desired.

Interview Protocol. The interview session is conducted in a semi-structured form, going through a series of stages including introduction, revisiting the responses to survey and log questions, discussion, and concluding remarks and thanks (see Appendix C for the full text). During the discussion, the pre-prepared questions are first asked of all interviewees to gather comparative data, and then more open-ended questions are added to delve into details more deeply or raise any matters, which may have been overlooked. The interviewer (i.e., the researcher for this dissertation study) remains open to allowing interviewees to “go off in unexpected direction” (Gorman & Clayton, 2005, p. 134).

IRB Submission. After compiling the three instruments, the research plan was submitted to the University of Pittsburgh Institutional Review Board (IRB) for review. Overall, potential risks associated with participation in the study are unlikely and of low risk. First, there is little likelihood of any physical risk as a result of participation in this research project. The subjects

were asked to perform any tasks as a part of data collection procedure that could result in physical harm. Second, for the psychological risk, the survey participants were asked to provide information about their demographic data (age, gender, education, and race/ethnicity). These questions have a small likelihood of low psychological risk. This study was approved by the IRB on December 2, 2009 and expired on December 1, 2010 (see Appendix D for the IRB approval letter) for collecting data from human subjects.

Pilot Studies. The aim of the pilot studies is to 1) identify and discard ambiguities or difficult questions; 2) ensure each question gives an adequate range of responses; 3) re-word or re-scale any questions that are not answered as expected. The pilot studies were conducted on 5 graduate students in exactly the same way as it will be administered in the main study.

According to the results of the pilot studies, two of the five participants had difficulties recalling their most recent experience of ADI when they were doing the survey questionnaire. It shows the necessary of including log sessions as a supplementary method to collect individuals' ADI episodes. The major refinement for the questionnaire also included removing the rarely used or little known tools from the social tools list. In the end, forty tools were left in the final version for formal data collection.

The other refinement is that the questions to ask respondents' feeling and thoughts before ADI were discarded. The initial idea to collect these information was inherited from Erdelez's conclusion in her study (1995) that information users' affects generally would turn from negative to positive feelings before and after ADI, and that their cognitive thinking also experienced a change from non-information behavior-related thoughts to information behavior-related thoughts. The pilot studies observed that users might be able to describe how they felt and what they were thinking (affective and cognitive aspects) *after* ADI. However, almost all participants

are unable to recollect their feelings and thoughts *before* ADI occurred. Thus, identifying the change in users' feelings and thoughts before and after ADI was no longer the areas of inquiry during the formal data collection.

3.5.2 Phase 2: Survey and purposeful sampling

A wide variety of users' ADI experiences on the Social Web need to be explored in order to gain an initial understanding of the research question. The web users with different backgrounds were therefore selected to gather a variety of ADI experiences. The 45 participants were recruited from graduate-level students at the University of Pittsburgh. The collected quantitative data were analyzed using Stata 12/MP (Statacorp, 2011). Content analysis was performed on the quantitative data from open-ended questions.

With the aid of the survey questionnaire, participants with high frequency of ADI experience on the Social Web were purposefully selected for the follow-up phases of data collection. It means that the study recruited participants who frequently found information by accident on the Social Web, to produce rich data to understand the phenomenon.

This study used purposeful sampling, which is most common approach of qualitative research. One of the issues is sample size determination. In the literature of guidelines for qualitative research, most of the discussions have recommended *theoretical saturation* as the basis for establishing purposeful sample sizes (Guest, Bunce, & Johnson, 2006). Guest, et al. (2006) operationalized the concept of *theoretical saturation* as “the point in data collection and analysis when new information produces little or no change to the codebook” (p. 65) and provided evidence-based recommendations regarding non-probabilistic sample sizes for interviews. They found that “saturation occurred within the first twelve interviews and basic

elements for metathemes were present as early as six interviews” (p. 59). In her information encountering study, Erdelez (1995) recruited twelve subjects in the interview sessions. In the other similar qualitative study (Rioux, 2004), the author interviewed sixteen participants to achieve his theoretical saturation in studying information acquiring-and-sharing behavior. Based on Guest et al.’s (2006) practical guideline and the previous similar studies on accidental information behaviors (Erdelez, 1995; Rioux, 2004), this study initially set the goal to recruit at least 12-16 participants in the interview sessions and planned to increase if necessary. In the end, the saturation was reached by 13 participants.

3.5.3 Phase 3: Data collection and analysis for logs

The participants selected in the Phase 2 were contacted and asked for their willingness to complete the log and interview sessions. The participants who responded to the request were first asked to keep ADI incident logs for one week (7 days). They were provided with a question prompt sheet to help them observe and record their everyday ADI experience. The responses were saved in text files by participants and emailed to the researcher before the date of the interview appointment. The data were then imported into ATLAS.ti v.6 (<http://www.atlasti.com/>) for qualitative content analysis.

3.5.4 Phase 4: Data collection and analysis for interviews

After the log session, the participant attended a scheduled interview. The interview session was audio-taped. During the session, the investigator kept field notes, systematically distinguishing observational notes and reflexive notes. The observational notes are objective descriptions to

record observations and events during the interview session. The subjective reflexive notes are for reflections and insights about themes/patterns (i.e., theoretical notes) and methodology (i.e., methodological notes) (Gorman & Clayton, 2005).

Each interview session was transcribed into text data and saved in a text file. A continuous data comparison and coding process were employed as soon as data from the first interview were collected and transcribed. In an iterative fashion, the initial codes, code schemes, and interview protocol were continuously revised as the data was collected. Thus, initial analyses were informed by subsequent analyses and collections. ATLAS.ti v.6 was used to manage and code text data generated from the interview transcripts, field notes, and logs that were collected in the next phase.

3.5.5 Phase 5: Advanced data analysis

In this phase, a more comprehensive analysis was conducted. The process involves data recoding, grouping, finding relationships, comparing and verifying. As the analysis continues, the themes or categories relevant to the area of inquiry emerge. The researcher continuously searches for themes and categories until no new relevant information emerged, thereby achieving theoretical saturation.

3.5.6 Phase 6: Reporting findings

In the last phase, a final and comprehensive data analysis was conducted on the all collected data. Findings are reported in the chapter 4.0 FINDINGS and discussed in the chapter 5.0 DISCUSSION. The final report of the findings presents both quantitative and qualitative

information. The data from the survey produces descriptive statistics (e.g., frequency and percentage) for the reader to capture the backgrounds of the participants and the sketch of certain interesting themes. The qualitative data are presented in a thematic approach, in which the research “follows a typology of themes or topics that either inform the investigation at the outset or emerge during data collection and analyses” (Gorman & Clayton, 2005, p. 235). For the study to be replicable, the analytical procedures and process are reported as completely as possible. The decisions and practice regarding the coding process are reported in detail. The plan of quality control and the methods used to ensure the trustworthiness of the study, which is easily neglected by a lot of qualitative inquirers, are reported in the next section.

3.6 ENSURING RESEARCH QUALITY

Conventional inquiry traditionally relies upon a set of four criteria for establishing the rigor of any individual inquiry (Pickard & Dixon, 2004):

- Truth value, established by internal validity
- Applicability (or generalizability), determined by external validity
- Consistency, determined by reliability
- Neutrality, determined by objectivity

These criteria of rigor developed for being used in positivist research do not satisfy the needs of qualitative methodology and, in particular, constructivist inquiry (Lincoln & Guba, 1985, 1986). Recognizing this gap, Lincoln and Guba (1985) proposed four criteria for evaluating interpretive research work: *credibility*, *transferability*, *dependability*, and

conformability. They are the naturalistic equivalents of internal validity, external validity, reliability, and objectivity.

Although this study collected both quantitative and qualitative data, it relied more on qualitative methodology and inductive analysis. Thus it is more appropriate to use the approaches of ensuring research quality that were adapted to the constructivist, naturalistic, qualitative research paradigm.

3.6.1 Credibility

Credibility is the naturalist equivalent to internal validity in conventional positivist research. In qualitative research, credibility is enhanced “by having (the findings) approved by the constructors of the multiple realities being studied” (Lincoln & Guba, 1985). Credibility can be shown by prolonged engagement with the research participants, persistent observation of those participants, triangulation of the techniques used to study those participants and their contexts, peer debriefing, and member checks. The approaches of multiple data collecting methods, prolonging the time period of interaction with participants, and member checks are used to ensure the internal validity of the study.

As mentioned in the Methodology section, the data in this study were collected by employing multiple data collection methods including the surveys, logs, and interviews to maximize the understanding of ADI on the Social Web. The data collected by different methods can be cross-verified. It thus increases the credibility of the study. Also, during the development of study design, it was recognized that the reconstructive nature of surveys and interviews might cause potential threats to trustworthiness of the study data (i.e. some participants need to recall and recreate their ADI experiences in order to provide answers to the survey and interview

questions). Therefore, instead of using one-time data collection, surveys, logs are added to the methodology. Also, the surveys, logs, and interviews were performed in different time points to prolong the period of interaction with the participants.

The other effort of this study to ensure credibility is the member check. By discussing with a sample of participants, the researcher can ensure the accuracy of the data, interpretations and conclusions. Member checking is a vital part of a constructivist inquiry in order “to check with the actors who are the subject of (the research) focus how they interpret (the researcher’s) interpretations. But, at the same time, to not marginalize (the researcher’s) voice” (Dervin, 1997, p. 31).

3.6.2 Transferability

Transferability, the naturalist equivalent to external validity, refers to “the extent to which the researchers’ working hypothesis can be applied to another context” (Zhang & Wildemuth, 2009). In constructivist inquiry, the goal is to allow for transferability of the findings rather than wholesale generalization of those findings. Because transferability of a naturalistic study depends on similarities between sending and receiving contexts, the researcher collects and reports sufficiently detailed and precise descriptions of data in context to allow judgments about the findings’ transferability to different settings or contexts (Erlandson, Harris, Skipper, & Allen, 1993, p. 33). The researcher provides ‘rich pictures’ on an individual level, and the reader then gathers, or already has, empirical evidence concerning the cases to which they wish to apply the findings. If sufficient similarities between the two contexts are identified by the reader, then it is reasonable for that reader to apply the research findings to his/her own context.

The method to ensure transferability in this study is ‘thick description,’ the researcher provides data sets and rich descriptions to make sure the judgment of transferability is possible on the part of other researchers (Zhang & Wildemuth, 2009).

3.6.3 Dependability

Reliability traditionally refers to “the extent to which a procedure yields the same answer time after time” (Gorman & Clayton, 2005). The naturalist enquiry uses dependability as the criteria for the traditional notion of reliability. It has the similar concept that dependability also involves the replicability of a study. Bradley (1993, p. 437) defined dependability as “the coherence of the internal process and the way the researcher accounts for changing conditions in the phenomena.” Different from the situation of positivist/quantitative research, the researcher in naturalist/qualitative research also plays the role of an instrument. It causes some challenges to ensure dependability. One of the approaches qualitative methodology writers recommend is to establish dependability through the ‘inquiry audit’, in which an external ‘auditor’ is asked to examine the inquiry process. The auditor also needs to examine the accuracy of the data produced by the research relating to transcripts and levels of saturation in data collection. In order to allow for this, an ‘audit trail’ (Lincoln & Guba, 1985) has to be maintained by the researcher along with their own research journal. An audit trail is a documented record of the steps undertaken and the decisions made in moving from the raw transcripts to the final interpretation of the data. This ensures that “proceedings and developments in the process of the research can be revealed and assessed” (Flick, 2002, p. 229).

This study ensures dependability by compiling an audit trail of the researcher’s analytical process. In addition to creating an audit trail, the researcher made efforts to establish

dependability by keeping thorough notes during interviews; using multiple methods of data collection (i.e., survey, interviews and logs); fully and carefully explaining the data-gathering procedures and methods used (i.e. thick description) so its adequacy and logic can be determined by readers or other researchers, increasing the study's replicability. This study provides the following materials that will guide researchers who are interested in replicating this study:

- All the instruments (see Appendix A, B, and C)
- Finalized data coding scheme for interview data (see Appendix E)
- Sample interview segments with codes (see Appendix F)

This approach to maximize dependability was adapted from a similar qualitative study conducted by Rioux (2004). In order to ensure confidentiality, all identifying information linked to participants was removed.

3.6.4 Confirmability

Confirmability refers to “the extent to which the characteristics of the data, as posited by the researcher, can be confirmed by others who read or review the research results” (Bradley, 1993, p. 437). Confirmability is vital in order to limit investigator bias. In constructivist research, it is accepted that the knowledge and experience of the investigator would have impacts on the findings, but it is important to demonstrate that the tacit knowledge has been transferred by the interpretation of the investigator to such an extent that the original meaning from participants has been changed (Pickard & Dixon, 2004). The concept of finding a way of studying human behavior that could generate objective results is contradictory to the constructivist epistemology. The alternative is to ensure that the results, accepted as the subjective knowledge of the researcher, can be traced back to the raw data of the research, that they are not unduly influenced

by the “observer’s worldview, disciplinary assumptions, theoretical proclivities and research interests” (Charmaz, 1995, as cited in Pickard & Dixon, 2004).

The major technique for establishing confirmability is also through audits of the research processes and findings. “Dependability is determined by checking the consistency of the study processes, and confirmability is determined by checking the internal coherence of the research product, namely, the data, the findings, the interpretations, and the recommendations” (Zhang & Wildemuth, 2009). As mentioned above, the auditing is done by use of an audit trail, which provides a means of ensuring that “constructions can be seen to have emerged directly from the data, thereby confirming the research findings and grounding them in the evidence” (Pickard & Dixon, 2004). The materials that were maintained in this study for audits include raw data, field notes, theoretical notes and memos, coding rules and process notes.

3.7 SUMMARY

The goal of this dissertation study is to develop an initial understanding of individual users’ information behaviors of ADI in the Internet-based environment of the Social Web by addressing the two exploratory research questions:

RQ1: What are the characteristics of ADI on the Social Web?

RQ2: What are the users’ perceptions about ADI on the Social Web?

The investigation uses an exploratory and descriptive research design, adopting a mixed-methods approach but giving more emphasis on the qualitative paradigm because of the exploratory nature of the study. Surveys, interviews and incident logs were used to gather data from the participants who were purposefully sampled from a population of heavy computer

users. Research quality was ensured by member checking, triangulation by using multiple methods, maintaining an audit trail, and thick description. Findings that emerged from this study are presented in the chapter of 4.0 FINDINGS.

4.0 FINDINGS

This chapter reports findings derived from the quantitative and qualitative results of using the sequential mixed-method research design outlined in 3.0 METHODOLOGY. Based on the sequence of the multiple data collection methods, this chapter is divided into three sections.

The first section presents the survey data results with quantitative data analysis for closed ended questions and a small number of qualitative analyses for the open-ended questions. It includes participants' demographics, a summary of participants' social tool use, their self-categorization of social tools, the frequencies of ADI by different tools, and their overall perceptions to experiences of ADI via social tools. The main purpose of this section is to provide descriptive information for a preliminary understanding of the investigated phenomenon.

The second section discusses the results of ADI episodes based on qualitative content analysis. The episodes were collected from the open-ended questions for the recent experience of ADI, as collected on the survey questionnaire (see Appendix A: Q8.1) and the 7-day ADI incident logs (see Appendix B for the prompt question list). These ADI incidents provide information to address *RQ1: What are the characteristics of ADI on the Social Web?*.

The third part reports the findings of the semi-structured interviews with thematic headings. The techniques of qualitative content analysis were used. This part mainly contributes to answering *RQ2: What are the users' perceptions about ADI on the Social Web?*.

The organization of these findings is to allow readers to easily map the data onto the questions in the instruments that generated the data. It also reflects the true sequence of data generation and how the understanding of investigated phenomena was accumulated through these three phases of data collection and analyses.

4.1 SURVEY DATA REPORT

At the beginning of the data collection efforts, a paper-and pencil survey questionnaire (see Appendix A for the full text) was used to both select participants (via purposeful sampling techniques) for logs and in-depth interviews during later research phases, and to gather preliminary data about participants' behaviors associated with ADI on the Social Web.

A total of 45 paper-and-pencil survey questionnaires were distributed by hand to graduate student volunteers at University of Pittsburgh. Seventeen (38%) students were recruited by snowball sampling, with one-on-one access from School of Information Sciences. Twenty-eight students (62%) were recruited by the in-class mode from two classes in the Master of Library Information Science program (33%) and the Master of Business Administration program (29%). After checking the quality of responses, all questionnaires were used for analysis.

4.1.1 Background analysis of survey participants

Table 5 tabulates the demographic information gleaned from Q9 to Q14 on the survey questionnaire (see Appendix A). The result shows that the number of males (49%) and females (51%) are almost balanced. Most participants (96%) ranged in age from 20 to 35 years old. Over

half of the participants (58%) are English native speakers. The 19 non-native English speakers (42%) are composed of participants whose first language was Chinese (14/45 or 42%), Hindi (1/45 or 2%), Korean (2/45 or 4%), Kurdish (1/45 or 2%), and Tagalog (1/45 or 2%). Eighty percent of all participants are full-time students. Doctoral students (73%) are more represented than master's degree students (27%) among participants.

The survey participants are all frequent users of Internet information sources. Eighty-four percent of participants reported using Internet sources all the time – tools such as the Web, email, social tools, and/or online databases; the rest (16%) of them reported using these tools several times a day. Survey participants' academic backgrounds also imply they are computer heavy users: Library and Information Sciences (56%), Information Sciences and Technology (9%), dual MBA and MS-MIS (Master of Business Administration and Management Information Systems) program (29%), Telecommunication & Networking (4%), and Biostatistics (2%).

Table 5. Survey Participants' Demographic Information (*N=45*)

Demographics	Item	Frequency	Percent
Gender	Male	22	49%
	Female	23	51%
Age	< 20	0	0%
	20-25	15	33%
	26-30	19	42%
	31-35	9	20%
	36-40	1	2%
	> 40	1	2%
Frequency of Internet Use	Never	0	0%
	Several times a month	0	0%
	Several times a week	0	0%
	Several times a day	7	16%
	All the time	38	84%
New Technology Adoption	Non-adopter	1	2%
	Late adopter	21	47%
	Early adopter	23	51%
Native Language	English	26	58%
	Chinese	14	42%
	Hindi	1	2%
	Korean	2	4%
	Kurdish	1	2%
	Tagalog	1	2%
Enrollment Status	Full-time student	36	80%
	Part-time student	9	20%
Academic Level	Master's student	12	27%
	Doctoral student	33	73%
Major	Biostatistics	1	2%
	Info. Sciences & Tech.	4	9%
	Library & Info. Sciences	25	56%
	MBA/MS-MIS Dual	13	29%
	Telecom. & Networking	2	4%

4.1.2 Diverse backgrounds among participants

In addition to the background information shown in Table 5, the participants were also asked to label five ‘tags’ of primary occupational, social or recreational roles about themselves in the open-ended question (see Appendix A: Q14). Because of the limited time and resource, this study did not recruit a large number of survey participants from various locations. The purpose of including this question is to ensure that participants have diverse backgrounds. It also provides information that is useful to understand the participants’ information behavior contexts related to their life roles.

For occupational (or professional) roles are, by the order of frequency of tags reported from high to low, student (89%), programmer (24%), researcher or research assistant (24%), job seeker (11%), teacher or teaching assistant (9%), librarian or librarian intern (9%), software engineer or engineer (7%), scientist (2%), social scientist (2%), machine operator (2%), IT consultant (2%), entrepreneur (2%), decision support analyst or business analyst (2%), designer or scale modeler (2%), database administrator (2%), nurse (2%), psychologist (2%), biostatistician or data analyst (2%).

For social roles, the tags reported are friend (36%), daughter (20%), husband (9%), wife (7%), sibling (7%), father (2%), and mother (2%).

The participants also reported diverse recreational roles include rower, golfer, hiker, runner, swimmer, martial artist, atheist, racquetball player, blogger, writer, reader, knitter, cook, baker, wine and beer enthusiast, a person who likes shopping, traveler, library lover, frequent physical library user, graphic designer, photographer, Facebook™/email addicted, gamer, geek for technology, gadget freak, gizmos lover, techie, cat owner, animal lover, Pittsburgh native,

love to party, misanthrope, volunteer, bilingual, musician, bridal consultant, spiritualist, liberal, Marxist, Christian, vegetarian, curious learner, and knowledge seeker.

4.1.3 Use of social tools

This study operationally defines the Social Web as ‘the social tools that individual users regularly use’. Therefore, to examine the use of social tools is a good start to understand the context in which ADI is investigated. The questionnaire of this study lists 40 frequently seen web-based social tools (see Appendix G for the overview of the 40 social tools). In Q1 on the questionnaire (see Appendix A), participants need to report how frequently they use each of these tools.

Table 6 presents the social tools associated with the five frequency levels of use (i.e., *Never*, *Rarely*, *Sometimes*, *Often*, and *All the time*). The social tools are listed by the order based on the frequency of being selected into each frequency level of use, from high to low. The top five social tools with the highest frequency are highlighted.

The result shows that the most popular social tools (i.e., the social tools that appear within the top five in the frequency level of *All the time* or *Often*) are email, blogs, bookmarking tools on browsers, Facebook™, Google Talk/Chat™, MSN Messenger™, Wikipedia™, and YouTube™. And the less popular tools (i.e., the social tools appears within the top five in the frequency level of *Never* or *Rarely*) are audio/video conferencing, Blogline™, ex.plode.us™, Flickr™, Fwicky™, Google Docs™, Google Wave™, MySpace™, Picasa™, Plurk™, Reddit™, Wink™, Yahoo! Answers™.

Table 6. Social Tools by Frequency of Use

Q1) How frequently do you use such a tool? (Check ONE)		
Frequency of Use	N	Social Tools
Never	1035	Ex.plode.us ⁽⁴⁵⁾ , Fwicky ⁽⁴⁵⁾ , Blogline ⁽⁴⁴⁾ , Wink ⁽⁴⁴⁾ , Reddit ⁽⁴³⁾ , MySpace ⁽⁴¹⁾ , Plurk ⁽⁴¹⁾ , Google Wave ⁽³⁹⁾ , Jing ⁽³⁸⁾ , LibraryThing ⁽³⁹⁾ , CiteULike ⁽³⁶⁾ , My Yahoo! ⁽³⁶⁾ , Digg ⁽³⁵⁾ , tag clouds ⁽³⁵⁾ , Google Blog Search ⁽³⁴⁾ , del.icio.us ⁽³³⁾ , AIM ⁽³¹⁾ , WikiAnswers ⁽²⁹⁾ , podcasts ⁽²⁸⁾ , Dropbox ⁽²⁷⁾ , mailinglist ⁽²⁶⁾ , MSN Messenger ⁽²⁵⁾ , Twitter ⁽²²⁾ , wikis ⁽²²⁾ , Flickr ⁽²⁰⁾ , LinkedIn ⁽²⁰⁾ , Yahoo! Answers ⁽¹⁹⁾ , audio/video conferencing ⁽¹⁴⁾ , online forum/message boards/BBS ⁽¹⁴⁾ , Skype ⁽¹³⁾ , Google Talk/Chat ⁽¹²⁾ , blogs ⁽⁷⁾ , Google Docs ⁽⁷⁾ , YouTube ⁽³⁾ , and Facebook ⁽¹⁾
Rarely	247	Flickr ⁽¹⁸⁾ , audio/video conferencing ⁽¹⁷⁾ , Yahoo! Answers ⁽¹⁵⁾ , Google Docs ⁽¹³⁾ , Picasa ⁽¹¹⁾ , YouTube ⁽¹¹⁾ , podcasts ⁽¹⁰⁾ , Skype ⁽¹⁰⁾ , Twitter ⁽¹⁰⁾ , wikis ⁽¹⁰⁾ , blogs ⁽⁹⁾ , LinkedIn ⁽⁸⁾ , Digg ⁽⁸⁾ , AIM ⁽⁷⁾ , bookmarking tools on browsers ⁽⁷⁾ , del.icio.us ⁽⁶⁾ , Dropbox ⁽⁶⁾ , Google Blog Search ⁽⁶⁾ , WikiAnswers ⁽⁷⁾ , Jing ⁽⁶⁾ , blogs ⁽⁴⁾ , Facebook ⁽⁴⁾ , Google Reader ⁽⁴⁾ , Google Talk/Chat ⁽⁴⁾ , Google Wave ⁽⁴⁾ , mailinglist ⁽⁴⁾ , MSN Messenger ⁽⁴⁾ , online forum/message boards/BBS ⁽⁴⁾ , tag clouds ⁽⁴⁾ , LibraryThing ⁽³⁾ , MySpace ⁽³⁾ , My Yahoo! ⁽³⁾ , Bloglines ⁽¹⁾ , Plurk ⁽¹⁾ , and Reddit ⁽¹⁾
Sometimes	221	Blogs ⁽¹⁸⁾ , Wikipedia ⁽¹⁷⁾ , Google Docs ⁽¹⁵⁾ , audio/video conferencing ⁽¹¹⁾ , LinkedIn ⁽¹¹⁾ , online forum/message boards/BBS ⁽¹¹⁾ , YouTube ⁽¹¹⁾ , wikis ⁽¹¹⁾ , Skype ⁽¹⁰⁾ , bookmarking tools on browsers ⁽⁹⁾ , Facebook ⁽⁷⁾ , Twitter ⁽⁷⁾ , WikiAnswers ⁽⁷⁾ , Dropbox ⁽⁶⁾ , Google Reader ⁽⁶⁾ , Google Talk/Chat ⁽⁶⁾ , Picasa ⁽⁶⁾ , podcasts ⁽⁶⁾ , Yahoo! Answers ⁽⁶⁾ , CiteULike ⁽⁵⁾ , Flickr ⁽⁵⁾ , tag clouds ⁽⁵⁾ , del.icio.us ⁽⁴⁾ , Google Blog Search, mailinglist ⁽⁴⁾ , LibraryThing ⁽³⁾ , AIM ⁽²⁾ , Digg ⁽²⁾ , My Yahoo! ⁽²⁾ , MSN Messenger ⁽²⁾ , Google Wave ⁽¹⁾ , and Plurk ⁽¹⁾
Often	156	Facebook ⁽¹⁵⁾ , Wikipedia ⁽¹⁴⁾ , bookmarking tools on browsers ⁽¹³⁾ , YouTube ⁽¹²⁾ , blogs ⁽¹⁰⁾ , Google Talk/Chat ⁽⁹⁾ , online forum/message boards/BBS ⁽⁹⁾ , Google Docs ⁽⁸⁾ , mailinglist ⁽⁷⁾ , MSN Messenger ⁽⁶⁾ , email ⁽⁵⁾ , Skype ⁽⁵⁾ , Twitter ⁽⁵⁾ , AIM ⁽⁴⁾ , LinkedIn ⁽⁴⁾ , My Yahoo! ⁽⁴⁾ , Yahoo! Answers ⁽⁴⁾ , Dropbox ⁽³⁾ , Google Reader ⁽³⁾ , Flickr ⁽²⁾ , Picasa ⁽²⁾ , wikis ⁽²⁾ , audio/video conferencing ⁽¹⁾ , del.icio.us ⁽¹⁾ , Google Blog Search ⁽¹⁾ , Google Wave ⁽¹⁾ , Jing ⁽¹⁾ , MySpace ⁽¹⁾ , Reddit ⁽¹⁾ , tag clouds ⁽¹⁾ , WikiAnswers ⁽¹⁾ , and Wink ⁽¹⁾
All the time	141	Email ⁽⁴⁰⁾ , Facebook ⁽¹⁸⁾ , Google Talk/Chat ⁽¹⁴⁾ , Wikipedia ⁽¹⁰⁾ , MSN Messenger ⁽⁸⁾ , YouTube ⁽⁸⁾ , online forum/message boards/BBS ⁽⁷⁾ , Skype ⁽⁷⁾ , bookmarking tools on browsers ⁽⁴⁾ , Dropbox ⁽³⁾ , audio/video conferencing ⁽²⁾ , Google Docs ⁽²⁾ , Google Reader ⁽²⁾ , LinkedIn ⁽²⁾ , Plurk ⁽²⁾ , AIM ⁽¹⁾ , blogs ⁽¹⁾ , del.icio.us ⁽¹⁾ , Picasa ⁽¹⁾ , podcasts ⁽¹⁾ , Twitter ⁽¹⁾ , WikiAnswers ⁽¹⁾ , and Yahoo! Answers ⁽¹⁾

Note. The first column lists the five levels of frequency (i.e., Never, Rarely, Sometimes, Often, and All the time) for use of social tools, which are multiple-choice items in survey question Q1, shown in the first row. The ‘N’ in the second column represents the total of responses selecting each level of frequency. The third column reports the tools in the order based on the frequency of being selected into each frequency level of use. The superscripted number in the parenthesis indicates that tool’s reported frequency. The top five social tools with the highest frequency in each level are highlighted.

4.1.4 Self-categorization of social tools

Social tools are difficult to exclusively classify because of their complex and flexibility of features. This study provides a classification of five types in terms of how they can be used. The five types of use include communication, collaboration, sharing, subscribing, and social search. The main function of the tools used for supporting each type of use are explained as below:

1. **Communication tools** connect people, allowing users networking and communicating;
2. **Collaboration tools** enable two or more users to communicate to identify information for accomplishing a task or solving a problem;
3. **Sharing tools** allow users to distribute experiences or/and resources;
4. **Subscribing tools** enable users subscribe to user-generated content or media for consistently receiving the most updated information from specific recourses;
5. **Social search tools** allow users to search information or people in social networks or with the help of social computation.

This classification covers fundamental social activities that users might be engaged in when they are using social tools. Which social tool belongs to which type of use is settled through the process of self-categorization by the survey participants. In Q2 on the questionnaire (see Appendix A), participants were asked ‘how do you use this tool?’ and needed to select one or more among the five types of use for the specific tool they were answering to.

Table 7 presents the result of how social tools were categorized by the participants. The social tools are listed in the order based on the frequency of being categorized into each type of use. The top five social tools with the highest frequency are highlighted. The result indicates that the five most representative social tools used for communication are email, Facebook™, Skype™, Google Talk/Chat™, and audio/video conferencing; for collaboration are email, Google Docs™,

audio/video conferencing, Facebook™, and Google Talk/Chat™; for sharing are Facebook™, email, YouTube™, Google Docs™, Flickr™, online forum/message boards/BBS, and Picasa™; for subscribing are bookmarking tools on browsers, Facebook™, mailinglist, YouTube™, blogs, Twitter™, Wikipedia™, Google Reader™, and podcasts; and for social search are Wikipedia™, YouTube™, Facebook™, Yahoo! Answers™, and LinkedIn™.

There are some tools, such as Facebook™, email and YouTube™, appearing among the top five social tools in more than one type of use, showing the highly complex and flexibility of such tools. Collaboration is achieved by mostly communication and sharing so it can be found that these three social activities share a lot of commons in social tools categorization.

Comparing the total frequency of the five types of use, the ranking order from high to low is *Sharing* ($N=389$) > *Communication* ($N=352$) > *Collaboration* ($N=228$) > *Social Search* ($N=207$) > *Subscribing* ($N=203$). It implies that the most frequent social activities on the Social Web are sharing and communication, followed by collaboration, while active searching for and monitoring information resources by subscribing might be less engaged.

Also, collaboration is basically through communication and information interaction between individuals. Therefore, collaboration tools must include or share the same features of communication and sharing tools. It may explain why these three activities are correlated in responses.

There are four social tools (i.e., blogs, bookmarking tools on browsers, Dropbox™, and Google Docs™) identified by a few participants that do not belong to any of the five types. This implies that some users may use social tools merely for personal needs (e.g., information saving and management) without getting involved in social activities.

Table 7. Social Tools by Type of Use

Q2) How do you use this tool? (Check ALL THAT APPLY)		
Type of Use	N	Social Tools
Communication	352	Email ⁽⁴⁴⁾ , Facebook ⁽⁴³⁾ , Skype ⁽³²⁾ , Google Talk/Chat ⁽³¹⁾ , audio/video conferencing ⁽²⁹⁾ , MSN Messenger ⁽²⁰⁾ , online forum/message boards/BBS ⁽¹⁹⁾ , Twitter ⁽¹⁶⁾ , LinkedIn ⁽¹⁷⁾ , AIM ⁽¹⁴⁾ , Google Docs ⁽¹¹⁾ , mailinglist ⁽¹¹⁾ , blogs ⁽⁹⁾ , My Yahoo! ⁽⁷⁾ , YouTube ⁽⁷⁾ , Wikipedia ⁽⁶⁾ , Google Wave ⁽⁴⁾ , Jing ⁽⁴⁾ , wikis ⁽⁴⁾ , Flickr ⁽³⁾ , MySpace ⁽³⁾ , Plurk ⁽³⁾ , Dropbox ⁽²⁾ , Picasa ⁽²⁾ , podcasts ⁽²⁾ , tag clouds ⁽²⁾ , del.icio.us ⁽²⁾ , Google Reader ⁽²⁾ , LibraryThing ⁽²⁾ , Reddit ⁽²⁾ , WikiAnswers ⁽²⁾ , Wink ⁽¹⁾ , and Yahoo! Answers ⁽¹⁾
Collaboration	228	Email ⁽³⁹⁾ , Google Docs ⁽²⁹⁾ , audio/video conferencing ⁽¹⁹⁾ , Facebook ⁽¹⁸⁾ , Google Talk/Chat ⁽¹⁵⁾ , Skype ⁽¹¹⁾ , MSN Messenger ⁽¹⁰⁾ , online forum/message boards/BBS ⁽⁹⁾ , Wikipedia ⁽⁸⁾ , wikis ⁽⁷⁾ , Dropbox ⁽⁷⁾ , Yahoo! Answers ⁽⁷⁾ , Google Wave ⁽⁵⁾ , mailinglist ⁽⁴⁾ , WikiAnswers ⁽⁴⁾ , YouTube ⁽⁴⁾ , AIM ⁽³⁾ , blogs ⁽³⁾ , Flickr ⁽³⁾ , My Yahoo! ⁽³⁾ , tag clouds ⁽³⁾ , Jing ⁽²⁾ , LibraryThing ⁽²⁾ , LinkedIn ⁽²⁾ , podcasts ⁽²⁾ , Twitter ⁽²⁾ , bookmarking tools on browsers ⁽¹⁾ , CiteULike ⁽¹⁾ , del.icio.us ⁽¹⁾ , Digg ⁽¹⁾ , Google Reader ⁽¹⁾ , Picasa ⁽¹⁾ , and Plurk ⁽¹⁾
Sharing	389	Facebook ⁽³⁷⁾ , email ⁽³³⁾ , YouTube ⁽²³⁾ , Google Docs ⁽²²⁾ , Flickr ⁽²⁰⁾ , online forum/message boards/BBS ⁽²⁰⁾ , Picasa ⁽²⁰⁾ , blogs ⁽¹⁸⁾ , Google Talk/Chat ⁽¹⁸⁾ , Skype ⁽¹⁵⁾ , Yahoo! Answers ⁽¹²⁾ , Wikipedia ⁽¹¹⁾ , MSN Messenger ⁽¹⁰⁾ , Twitter ⁽¹⁰⁾ , del.icio.us ⁽⁹⁾ , LinkedIn ⁽⁹⁾ , audio/video conference ⁽⁷⁾ , CiteULike ⁽⁷⁾ , Digg ⁽⁷⁾ , mailinglist ⁽⁷⁾ , tag clouds ⁽⁷⁾ , WikiAnswers ⁽⁷⁾ , wikis ⁽⁷⁾ , My Yahoo! ⁽⁶⁾ , bookmarking tools on browsers ⁽⁵⁾ , Google Wave ⁽⁴⁾ , Jing ⁽⁴⁾ , GoogleReader ⁽³⁾ , LibraryThing ⁽³⁾ , My Space ⁽³⁾ , Plurk, podcasts ⁽³⁾ , AIM ⁽²⁾ , and Google Blog Search ⁽²⁾
Subscribing	203	Bookmarking tools on browsers ⁽²¹⁾ , Facebook ⁽¹⁵⁾ , mailinglist ⁽¹⁵⁾ , YouTube ⁽¹⁵⁾ , blogs ⁽¹³⁾ , Twitter ⁽¹³⁾ , Wikipedia ⁽¹³⁾ , Google Reader ⁽¹²⁾ , podcasts ⁽¹¹⁾ , email ⁽⁹⁾ , online forum/message boards/BBS ⁽⁹⁾ , Flickr ⁽⁸⁾ , LinkedIn ⁽⁸⁾ , Google Blog Search ⁽⁵⁾ , wikis ⁽⁵⁾ , Picasa ⁽⁴⁾ , LibraryThing ⁽³⁾ , tag clouds ⁽³⁾ , WikiAnswers ⁽³⁾ , CiteULike ⁽²⁾ , My Yahoo! ⁽²⁾ , Reddit ⁽²⁾ , Yahoo!Answers ⁽²⁾ , Bloglines ⁽¹⁾ , del.icio.us ⁽¹⁾ , Digg ⁽¹⁾ , Dropbox ⁽¹⁾ , Google Docs ⁽¹⁾ , Google Wave ⁽¹⁾ , MySpace ⁽¹⁾ , MSN Messenger ⁽¹⁾ , Plurk ⁽¹⁾ , and Skype ⁽¹⁾
Social Search	207	Wikipedia ⁽²⁶⁾ , YouTube ⁽²²⁾ , Facebook ⁽²⁰⁾ , Yahoo! Answers ⁽¹⁶⁾ , LinkedIn ⁽¹⁴⁾ , blogs ⁽¹⁰⁾ , wikis ⁽¹⁰⁾ , bookmarking tools on browsers ⁽⁹⁾ , Google Blog Search ⁽⁹⁾ , email ⁽⁸⁾ , online forum/message boards/BBS ⁽⁸⁾ , WikiAnswers ⁽⁸⁾ , Twitter ⁽⁷⁾ , CiteULike ⁽⁶⁾ , del.icio.us ⁽⁵⁾ , Digg ⁽⁵⁾ , Flickr ⁽⁴⁾ , tag clouds ⁽⁴⁾ , LibraryThing ⁽²⁾ , My Yahoo! ⁽²⁾ , MSN Messenger ⁽²⁾ , Dropbox ⁽¹⁾ , Google Talk/Chat ⁽¹⁾ , Plurk ⁽¹⁾ , mailinglist ⁽¹⁾ , MySpace ⁽¹⁾ , podcasts ⁽¹⁾ , and Reddit ⁽¹⁾
Not belong to any of above	6	Blogs ⁽³⁾ , bookmarking tools on browsers ⁽²⁾ , Dropbox ⁽¹⁾ , Google Docs ⁽¹⁾

Note. The first column lists the five types of use (i.e., communication, collaboration, sharing, subscribing, and social search) for social tools, which are multiple-choice items in survey question Q2, shown in the first row; ‘not belong to any of above’ is for tools without being selected as one of the five types. The ‘N’ in the second column represents the total of responses selecting each type of use. The third column reports the tools in the order based on the frequency of being categorized into each type of use. The superscripted number in the parenthesis indicates that tool’s reported frequency. The top five social tools with the highest frequency are highlighted.

4.1.5 Social Tools conducive to frequent ADI

In Q3 on the questionnaire (see Appendix A), participants were asked to assess how frequently they experience ADI when using the specific tools they were answering to. Tools with high frequency of ADI can be seen as those conducive to frequent ADI.

Table 8 presents the social tools associated with the five frequency levels of experiencing ADI (i.e., *Never*, *Rarely*, *Sometimes*, *Often*, and *Always*). The social tools are listed by the order based on the frequency of being selected into each frequency level, from high to low. The top five social tools with the highest frequency are highlighted.

The result shows that the most conducive social tools (i.e., the social tools appears within the top five in the frequency level of *Always* or *Often*) for ADI are blogs, bookmarking tools on browsers, email, Facebook™, Google Docs™, Google Talk/Chat™, mailinglist online forum/message boards/BBS, Wikipedia™, wikis, and YouTube™.

The less conducive tools (i.e., the social tools appears within the top five in the frequency level of *Never* or *Rarely*) are AIM™, audio/video conferencing, bookmarking tools on browsers, Dropbox™, Facebook™, Flickr™, Google Docs™, Google Talk/Chat™, Jing™, MSN Messenger™, Picasa™, Skype™, and YouTube™.

Table 8. Social Tools by Frequency of ADI

Q3) How frequently do you bump into useful information (or information of your interest) when using this tool? (Check ONE)		
Frequency of ADI	N	Social Tools
Never	69	Google Docs ⁽¹⁰⁾ , audio/video conferencing ⁽⁹⁾ , bookmarking tools on browsers ⁽⁸⁾ , Skype ⁽⁸⁾ , Google Talk/Chat ⁽⁵⁾ , Jing ⁽⁵⁾ , AIM ⁽⁴⁾ , Dropbox ⁽⁴⁾ , email ⁽³⁾ , Twitter ⁽³⁾ , Flickr ⁽²⁾ , Picasa ⁽²⁾ , blogs ⁽¹⁾ , del.icio.us ⁽¹⁾ , LinkedIn ⁽¹⁾ , MSN Messenger ⁽¹⁾ , Plurk ⁽¹⁾ , and podcasts ⁽¹⁾
Rarely	149	Facebook ⁽¹¹⁾ , Skype ⁽¹⁰⁾ , audio/video conferencing ⁽⁹⁾ , Dropbox ⁽⁸⁾ , YouTube ⁽⁸⁾ , AIM ⁽⁷⁾ , Flickr ⁽⁷⁾ , MSN Messenger ⁽⁷⁾ , Picasa ⁽⁷⁾ , Google Docs ⁽⁶⁾ , LinkedIn ⁽⁶⁾ , Twitter ⁽⁶⁾ , email ⁽⁵⁾ , online forum/message boards/BBS ⁽⁵⁾ , bookmarking tools on browsers ⁽⁴⁾ , del.icio.us ⁽⁴⁾ , Google Talk/Chat ⁽⁴⁾ , Google Wave ⁽⁴⁾ , podcasts ⁽⁴⁾ , Yahoo! Answers ⁽⁴⁾ , blogs ⁽³⁾ , My Yahoo! ⁽³⁾ , Digg ⁽²⁾ , Google Reader ⁽²⁾ , Bloglines ⁽²⁾ , Google Blog Search ⁽²⁾ , Wikipedia ⁽²⁾ , wikis ⁽²⁾ , CiteULike ⁽¹⁾ , mailinglist ⁽¹⁾ , MySpace ⁽¹⁾ , tag clouds ⁽¹⁾ , and WikiAnswers ⁽¹⁾
Sometimes	235	Email ⁽¹⁴⁾ , YouTube ⁽¹⁴⁾ , online forum/message boards/BBS ⁽¹³⁾ , Google Talk/Chat ⁽¹²⁾ , blogs ⁽¹¹⁾ , Yahoo! Answers ⁽¹¹⁾ , Facebook ⁽¹⁰⁾ , Flickr ⁽¹⁰⁾ , LinkedIn ⁽¹⁰⁾ , Picasa ⁽¹⁰⁾ , Wikipedia ⁽¹⁰⁾ , Google Docs ⁽⁹⁾ , mailinglist ⁽⁹⁾ , Skype ⁽⁸⁾ , wikis ⁽⁸⁾ , bookmarking tools on browsers ⁽⁷⁾ , Twitter ⁽⁷⁾ , audio/video conferencing ⁽⁶⁾ , Google Reader ⁽⁶⁾ , MSN Messenger ⁽⁶⁾ , tag clouds ⁽⁶⁾ , Google Blog Search ⁽⁵⁾ , podcasts ⁽⁵⁾ , WikiAnswers ⁽⁵⁾ , LibraryThing ⁽⁴⁾ , del.icio.us ⁽³⁾ , Digg ⁽³⁾ , AIM ⁽²⁾ , Google Wave ⁽²⁾ , Jing ⁽²⁾ , My Yahoo! ⁽²⁾ , CiteULike ⁽¹⁾ , Dropbox ⁽¹⁾ , MySpace, Plurk ⁽¹⁾ , and Reddit ⁽¹⁾
Often	207	Blogs ⁽¹⁹⁾ , Wikipedia ⁽¹⁷⁾ , bookmarking tools on browsers ⁽¹³⁾ , Facebook ⁽¹³⁾ , YouTube ⁽¹³⁾ , email ⁽¹⁰⁾ , Google Docs ⁽¹⁰⁾ , mailinglist ⁽⁹⁾ , wikis ⁽⁹⁾ , online forum/message boards/BBS ⁽⁸⁾ , CiteULike ⁽⁶⁾ , Google Talk/Chat ⁽⁶⁾ , LinkedIn ⁽⁶⁾ , MSN Messenger ⁽⁶⁾ , Skype ⁽⁶⁾ , WikiAnswers ⁽⁶⁾ , Yahoo! Answers ⁽⁶⁾ , audio/video conferencing ⁽⁴⁾ , Digg ⁽⁴⁾ , Flickr ⁽⁴⁾ , Google Blog Search ⁽⁴⁾ , Twitter ⁽⁴⁾ , del.icio.us ⁽³⁾ , Google Reader ⁽³⁾ , My Yahoo! ⁽³⁾ , tag clouds ⁽³⁾ , Dropbox ⁽²⁾ , MySpace ⁽²⁾ , Plurk ⁽²⁾ , podcasts ⁽²⁾ , AIM ⁽¹⁾ , LibraryThing ⁽¹⁾ , Picasa ⁽¹⁾ , and Wink ⁽¹⁾
Always	94	Wikipedia ⁽¹⁶⁾ , email ⁽¹²⁾ , Facebook ⁽¹⁰⁾ , YouTube ⁽⁶⁾ , Google Talk/Chat ⁽⁵⁾ , online forum/message boards/BBS ⁽⁵⁾ , WikiAnswers ⁽⁴⁾ , wikis ⁽⁴⁾ , Yahoo! Answers ⁽⁴⁾ , blogs ⁽³⁾ , Dropbox ⁽³⁾ , Google Docs ⁽³⁾ , Google Reader ⁽³⁾ , podcasts ⁽³⁾ , audio/video conferencing ⁽²⁾ , Twitter ⁽²⁾ , bookmarking tools on browsers ⁽¹⁾ , CiteULike ⁽¹⁾ , del.icio.us ⁽¹⁾ , Digg ⁽¹⁾ , Flickr ⁽¹⁾ , LibraryThing ⁽¹⁾ , My Yahoo! ⁽¹⁾ , and Reddit ⁽¹⁾

Note. The first column lists the five levels of frequency (i.e., Never, Rarely, Sometimes, Often, and Always) for bumping into information (i.e., ADI), which are multiple-choice items in survey question Q3, shown in the first row. The 'N' in the second column represents the total of responses selecting each level of frequency. The third column reports the tools in the order based on the frequency of being selected into each frequency level of ADI. The superscripted number in the parenthesis indicates that tool's reported frequency.

4.1.6 Frequency of use with different types of social tools

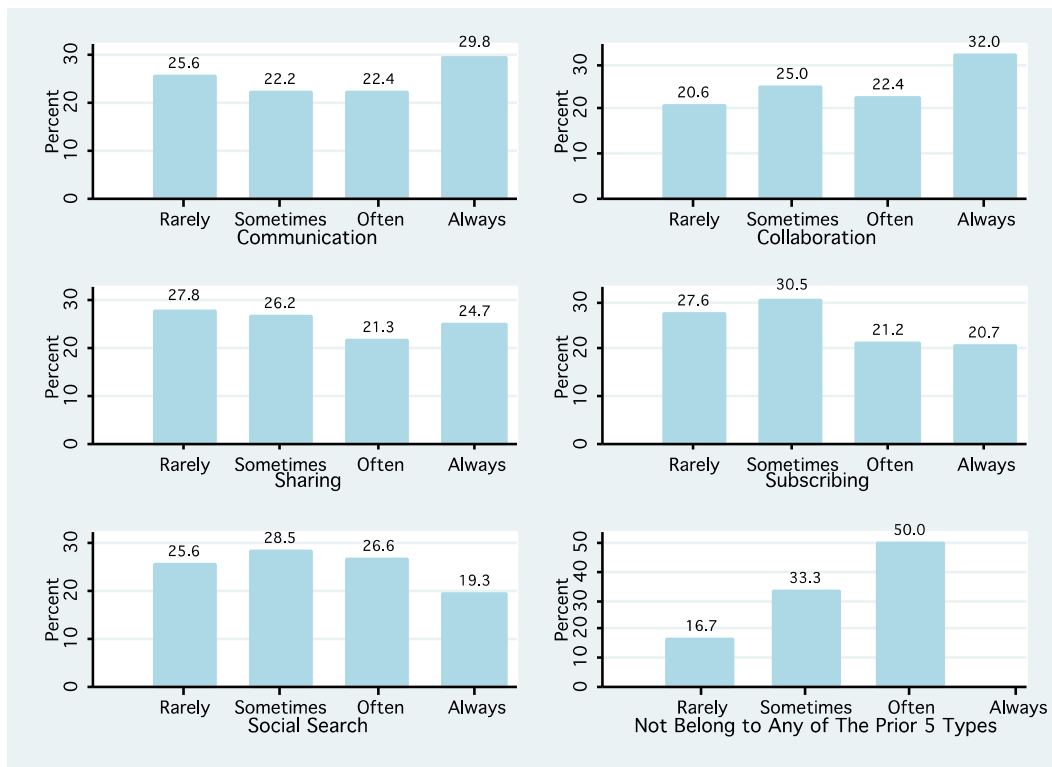
The data generated from Q1 and Q2 were combined to determine the frequency of use with different types of social tools. The combined data shows the intensity of different types of tools being used. The results are presented in Table 9 and Table 10. Table 9 reports the mean, standard deviation, minimum, and maximum of the scores of the frequency of use (i.e., Rarely = 1; Sometimes = 2; Often = 3; All the time = 4) for each type of tools. And Table 10 displays the distribution of the percentage of the frequency scores with different type of tools.

Comparing the means of the scores of frequency of use among the five types of tools, the ranking order from high to low is *Collaboration* (*Mean* =2.658) > *Communication* (*Mean* =2.565) > *Sharing* (*Mean* =2.429) > *Social Search* (*Mean* =2.396) > *Subscribing* (*Mean* =2.333). The result implies that *Collaboration*, *Communication*, and *Sharing* tools, among the five types, are used with relatively higher intensity. It can be explained by two aspects. First, collaboration with others usually requires intensely interchanging ideas during a period of time. Therefore, when a *Collaboration* tool was reported used, the frequency of its use was usually reported as very high. Second, a lot of users usually log onto tools such as email, instant messenger, or Facebook™, and stay online just for being present for all day. In the contrary, users have no such a need to access *Subscribing* and *Social Search* tools all day, and use them only in certain specific moments; for example, when users need to bookmark information resources or search for user-generated content.

Table 9. Frequency of Use by Type of Tools

Q1) How frequency do you use such a tool? + Q2) How do you usually use the tool?					
Type of Use	N	Mean	S.D.	Min.	Max.
Communication	352	2.565	1.165	1	4
Collaboration	228	2.658	1.133	1	4
Sharing	389	2.429	1.139	1	4
Subscribing	203	2.350	1.095	1	4
Social Search	207	2.396	1.069	1	4
Not belong to any of above	6	2.333	0.816	1	3

Note. This table reports the result of combining data produced by Q2 (i.e., type of use) and Q1 (i.e., frequency of use), shown in the first row. The very left column lists the five types of social tools use; 'not belong to any of above' is for tools without being selected as one of the five types. The 'N' in the second column represents the total of responses to each type of use. The responses for frequency of use were coded as scores (i.e., Rarely = 1; Sometimes = 2; Often = 3; All the time = 4). This table displays the Mean, S.D. (i.e., Standard Deviation), Min. (i.e., Minimum), and Max. (i.e., Maximum) for the scores of frequency of use.

Table 10. Distribution of Frequency of Use by Type of Tools

Note: This table displays the distribution of the percentage of the scores of the use frequency with different type of tools.

4.1.7 Frequency of ADI with different types of social tools

The data generated from Q2 and Q3 were combined to observe the frequency of ADI with different types of social tools. The combined data can be used to understand which types of social tools are conducive to ADI. The results are presented in Table 11 and Table 12. Table 11 reports the mean, standard deviation, minimum, and maximum of the scores of the frequency of ADI (i.e., Never = 0; Rarely = 1; Sometimes = 2; Often = 3; Always = 4) for each type of tools. And Table 10 displays the distribution of the percentage of the frequency scores with different type of tools.

Comparing the means of ADI frequency among the five types of tools, the ranking order from high to low is *Social Search* ($Mean = 2.620$) > *Subscribing* ($Mean = 2.475$) > *Collaboration* ($Mean = 2.274$) > *Sharing* ($Mean = 2.221$) > *Communication* ($Mean = 1.991$). It shows that *Social Search* and *Subscribing* are the two types of social tools with the relatively higher mean scores for the frequency of ADI. In other words, *Social Search* and *Subscribing* are the two activities more conducive to ADI than the other three types. It also implies that ADI can take place as result of actively seeking for information or regularly monitoring information sources on the Social Web.

Table 11. Frequency of ADI by Type of Tools

Q2) How do you usually use the tool? + Q3) How frequency do you bump into useful information (or information of your interest) when using this tool?

<u>Type of use</u>	<u>N^a</u>	<u>Mean</u>	<u>S.D.</u>	<u>Min.</u>	<u>Max.</u>
Communication	349	1.991	1.190	0	4
Collaboration	226	2.274	1.125	0	4
Sharing	385	2.221	1.118	0	4
Subscribing	202	2.475	1.080	0	4
Social Search	205	2.620	0.940	0	4
Not belong to any of above	6	1.5	1.378	0	3

Note. This table reports the result of combining data produced by Q2 (i.e., type of use) and Q3 (i.e., frequency of ADI), shown in the first row. The very left column lists the five types of social tools; ‘not belong to any of above’ is for tools without being selected as one of the five types. The ‘N’ in the second column represents the total of responses to each type of use. The responses for frequency of ADI were coded as scores (i.e., Never = 0; Rarely = 1; Sometimes = 2; Often = 3; Always = 4). This table displays Mean, S.D. (i.e., Standard Deviation), Min. (i.e., Minimum), and Max. (i.e., Maximum) for the scores of frequency of ADI.

Table 12. Distribution of Frequency of ADI by Type of Tools

Note. This table shows the distribution of the percentages of the scores of the ADI frequency for each type of tools.

4.1.8 Information acquisition on the Social Web

Most participants perceived that the Social Web (i.e., the social tools they regularly use) is useful for both active information seeking and accidental information discovery. The results from the two sets of questions (i.e., Q4.1 and Q4.2; Q4.11 and Q4.12) provide the evidence.

As represented in Table 13, thirty-nine (87%) participants somewhat or strongly agree that social tools are useful when they need information to address problems. Also, forty-one (91%) participants somewhat or strongly agree that social tools are useful for discovering unexpected information. The distributions of frequency are both skewed to the left end. The follow-up interviews incorporated open-ended questions seeking to provide explanations to this initial finding of perceived usefulness of social tools for problem solving and ADI. The results of the interviews are discussed in the section 4.3.2 of this chapter.

Congruent with findings presented in Table 13, the frequency distributions of using social tools for information seeking and accidental information discovery are both skewed to the left end, as shown in Table 14. It indicates that a majority of the participants are actually using social tools for both active and passive information acquisition.

Table 13. Social Tools for Information Acquisition

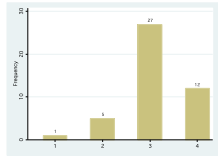
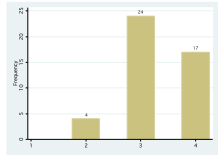
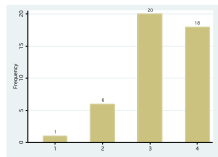
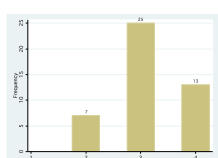
	<i>N=45</i>	Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree	Distribution
Q4.1) Social tools are useful when I need information to address problems.	Frequency (Percent)	1 (2%)	5 (11%)	27 (60%)	12 (27%)	
Q4.2) Social tools are useful for encountering unexpected information.	Frequency (Percent)	0 (0%)	4 (9%)	24 (53%)	17 (38%)	

Table 14. Frequency of Information Acquisition via Social Tools

	<i>N=45</i>	Never	Rarely	Sometimes	Often	Distribution
Q4.11) How often do you use social tools to actively seek information?	Frequency (Percent)	1 (2%)	6 (13%)	20 (44%)	18 (40%)	
Q4.12) How often do you accidentally encounter useful information (or information of your interest) while using social tools?	Frequency (Percent)	0 (0%)	7 (16%)	25 (56%)	13 (29%)	

4.1.9 The most and least useful social tools for ADI

It was found that the participants are able to articulate what social tools are most and least useful for ADI in the open-ended questions (i.e., Q5 and Q6). The reported tools are counted and listed in Table 15 and Table 16.

Table 15 shows that the top three most useful tools reported are Wikipedia, social networking sites (i.e., Facebook™, LinkedIn™), and community-driven Q & A sites (i.e., WikiAnswers™; Yahoo! Answers™; Aardvark™). Table 16 shows that the top three least useful tools for ADI are instant messengers/online chat (i.e., AIM™, iChat™, Google Talk™, MSN Messenger™, Skype™), social networking sites (i.e., MySpace™, LinkedIn™, Facebook™), and YouTube™. And among these, *social networking sites* were reported as the most and the least useful tools at the same. It implies that the use of social networking sites may have potentials for accidental information discovery; however, its value has not yet been recognized by all users.

Table 15. The Most Useful Social Tools for ADI

Q5) Which social tool(s) do you feel are the most useful for accidentally bumping into useful information (or information of your interest)? (Open-ended question)

(N=45)	<u>Frequency</u>	<u>Percent</u>
Wikipedia™	22	49%
Social networking sites (i.e., Facebook™, LinkedIn™)	17	38%
Community-driven Q & A sites (i.e., WikiAnswers™; Yahoo! Answers™; Aardvark™)	10	22%
YouTube™	8	18%
Instant messengers (i.e., Google Talk™, MSN Messenger™)	4	8%
Blogs	4	9%
Twitter™	4	9%
Mailinglist	3	7%
Wikis	3	7%
Online forum/message boards/bulletin board system	2	4%
RSS reader (i.e., Google Reader™)	2	4%
Social bookmarking site (i.e., Delicious™)	2	4%
Cloud tags	1	2%
Google Buzz™	1	2%
Reddit™	1	2%

Note. The reported tools of a similar nature were grouped by overarching names (e.g., using *social networking sites* to contain Facebook™ and LinkedIn™) and counts were combined. The originally reported tools of a group are listed within the parentheses by the order of frequency from high to low.

Table 16. The Least Useful Social Tools for ADI

Q5) Which social tool(s) do you feel are the <u>least</u> useful for accidentally bumping into useful information (or information of your interest)? (Open-ended question)			
	(N=45)	<u>Frequency</u>	<u>Percent</u>
Instant messenger/online chat (i.e., AIM™, iChat™, Google Talk™, MSN Messenger™, Skype™)		17	38%
Social networking sites (i.e., MySpace™, LinkedIn™, Facebook™)		13	29%
YouTube™		5	11%
Twitter™		4	9%
Google Docs™		3	7%
Photo sharing site (i.e., Flickr™, Picasa™)		2	4%
Audio/video conferencing		1	2%
Blogs		1	2%
Dropbox™		1	2%
Email		1	2%
Browser bookmarks list		1	2%
Google Wave™		1	2%
Jing™		1	2%
Mailinglist		1	2%
Wikipedia™		1	2%

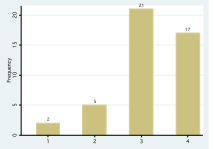
Note. The reported tools of a similar nature were grouped by overarching names (e.g., using *social networking sites* to contain MySpace™, LinkedIn™ and Facebook™) and counts were combined. The originally reported tools of a group are listed within the parentheses by the order of frequency from high to low.

4.1.10 Social Web user's expectations for ADI

As presented in Table 17, a majority (85%) of the participants somewhat or strongly agree that they expect they will bump into useful information (or information of interest) when they are using or about to use social tools. The distribution of frequency is apparently skewed to the left end. It implies that Social Web users might not think of that they would acquire the specific information, but they might presume there must be something to be discovered on the social tools. It also implies that the users might consider Social Web as an *information ground* for accidental discovery. Information grounds, proposed by Fisher, Landry, and Naumer (2007), are social settings in which “people come together for a singular purpose but from whose behavior emerges a social atmosphere that fosters the spontaneous and serendipitous sharing of information.”

The follow-up interviews incorporated an open-ended question seeking to verify this initial finding of users' expectations for ADI when using or about to use social tools and their perceptions to Social Web as an information ground. The results of the interviews are discussed in the section 4.3.2 of this chapter.

Table 17. Users' Expectation for ADI on the Social Web

	<i>N</i> =45	Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree	Distribution
Q4.3) I expect I will bump into useful information (or information of your interest) when using or when about to use social tools.	Frequency (Percent)	2 (4%)	5 (11%)	21 (47%)	17 (38%)	

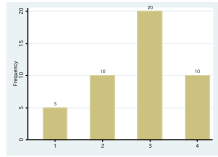
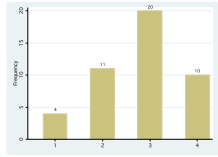
4.1.11 Anticipation and previous experience of ADI and use of social tools

As shown in Table 18, two-third (66%) of the participants somewhat or strongly agree that both the anticipation and previous experience of ADI are one of the reasons to use social tools. The distributions of frequency are skewed to the left end. It implies that ADI might be one of the motivations for users to use social tools. In other words, Social Web users might generally experience a cognitive state with conscious intentions to use social tools for the sake of ADI. This behavior is analogous to de Bruijin and Spence's (2008) *Opportunistic Browsing*:

Opportunistic Browsing (OB) is [an] intentional [activity], but the user is unaware of any goal being pursued. The attitude underlying OB is 'let's see what's there' (p. 3).

The follow-up interviews incorporated an open-ended question seeking to verify this initial finding of users' motivation to use social tools for ADI. The results of the interviews are discussed in the 4.3.2 section of this chapter.

Table 18. Users' Anticipation and Experience of ADI

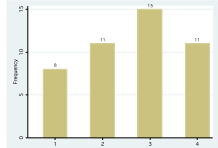
	N=45	Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree	Distribution
Q4.4) The anticipation of bumping into useful information (or information of your interest) is one of the reasons I use social tools.	Frequency (Percent)	5 (11%)	10 (22%)	20 (44%)	10 (22%)	
Q4.5) The previous experience of bumping into useful (or information of your interest) via social tools is one of the reasons I continue to use social tools.	Frequency (Percent)	4 (9%)	11 (24%)	20 (44%)	10 (22%)	

4.1.12 ADI on the Social Web as an information acquisition strategy

As shown in Table 19, slightly more than half of the participants (57%) somewhat or strongly agree that ADI is one of their strategies to acquire information. It might imply that many users have seen ADI on the Social Web as part of their overall information acquisition process. However, there were still a fair number of participants (43%) who do not agree with it.

The follow-up interviews incorporated an open-ended question seeking to further explore the reasons why they agree or disagree with this statement. The results of the interviews are discussed in the section 4.3.3 of this chapter.

Table 19. ADI on the Social Web and Users' Information Acquisition Strategy

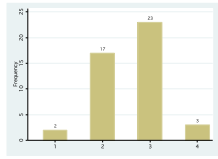
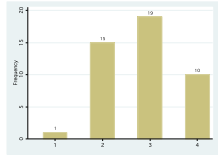
	<i>N</i> =45	Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree	Distribution
Q4.6) Bumping into information via social tools is one of my strategies to acquire information.	Frequency (Percent)	8 (18%)	11 (24%)	15 (33%)	11 (24%)	

4.1.13 Quality of information

As shown in Table 20, more than half of the participants agree that the information accidentally discovered on the Social Web is trustworthy (58%) and useful (64%). Trustworthiness and usefulness are both qualities of good information (Lee, Strong, Kahn, & Wang, 2002). The result indicates that many users perceived the information they discovered on the Social Web as of high quality in terms of usefulness and trustworthiness.

The follow-up interviews incorporated the questions to further explore the reasons why they agree or disagree with the two statements. The results of the interviews are discussed in the section 4.3.2 of this chapter.

Table 20. ADI and Quality of Information

	<i>N</i> =45	Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree	Distribution
Q4.7) The information, which I accidentally encountered via social tools, is usually <u>trustworthy</u> .	Frequency (Percent)	2 (4%)	17 (38%)	23 (51%)	3 (7%)	
Q4.8) The information, which I accidentally encountered via social tools, is usually <u>useful</u> .	Frequency (Percent)	1 (2%)	15 (33%)	19 (42%)	10 (22%)	

4.1.14 Social Web as a main source of information

Table 21 shows that almost all of the survey participants (98%) perceived Internet as their main source of information. By contrast, approximately two-third (62%) of participants strongly or somewhat disagree that social tools are their main source of information. The follow-up interviews incorporated an open-ended question seeking to further explore the reasons why they agree or disagree with the statements. The results of the interviews are discussed in the section 4.3.2 of this chapter.

Table 21. Participants' Main Source of Information

	<i>N</i> =45	Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree	Distribution
Q4.9) I use the <u>Internet</u> as my main source of information.	Frequency (Percent)	0 (0%)	1 (2%)	11 (24%)	33 (73%)	
Q4.10) I use the <u>social tools</u> as my main source of information.	Frequency (Percent)	6 (13%)	22 (49%)	13 (29%)	4 (9%)	

4.1.15 What users do with the information from ADI

As shown in Table 22, the type of use that the most (73%) participants reported is ‘share it with others’. The second highest of use reported is saving it in some way for future use (69%). Next are the uses for immediate problems, and ‘to address everyday-life problems’ was reported as the highest category (67%). The least frequently reported is ‘do nothing with it’ (24%).

The open-ended question asked what tools they usually use to share accidentally encountered information was further asked of the participants. Shown in Table 23, the most frequently used tools to share are social networking sites (47%), email (38%), and online chat/instant messenger (36%).

Thirty-one participants who answered ‘save it in some way for future use’ were asked to articulate how they usually save and manage the information accidentally encountered via social tools. Table 24 listed the categories inductively derived from open-ended questions. For each category, I created the descriptions based on the collected information, and a number of quotes inclusively representing the strategies for saving and managing information with numbers for total occurrences in each category.

Eleven participants, who answered ‘do nothing with it,’ were also asked to provide explanations in the open-ended question. The categories for their free answers are inductively identified and listed in Table 25, with descriptions of each, original quotes, and occurrences of responses.

Table 22. Using Information from ADI

Q7) How do you usually use the information you accidentally encountered? (Please check ALL THAT APPLY.)			
	<i>N=45</i>	<u>Frequency</u>	<u>Percent</u>
Share it with others		33	73%
Save it in some way for future use		31	69%
Immediately use it to address everyday-life work		30	67%
Immediately use it to address academic work		14	31%
Immediately use it to address professional work		12	27%
Do nothing with it		11	24%

Table 23. Tools for Sharing Information from ADI

Q7.2) Please specify what tools you usually use to share accidentally discovered information: (Open-ended question)			
	<i>N=45</i>	<u>Frequency</u>	<u>Percent</u>
Social networking sites (i.e., Facebook™, LinkedIn™, Yammer™)		21	47%
Email		17	38%
Online chat/instant messenger (i.e., AIM™, Google™ Talk, iChat™, MSN™ Messenger, Skype™)		16	36%
Microblog (i.e., Twitter™, Plurk™)		5	11%
Google™ Doc 4		4	9%
Google™ Buzz		3	7%
Google™ Reader's 'share' feature		2	4%
Wikipedia		2	4%
Google™ Calendar		1	2%
Del.icio.us™		1	2%
YouTube™		1	2%
Through real life conversation		1	2%

Table 24. Inductive Categories for Saving and Managing Information

Inductive category	Description	Strategy	Occurrence
Clip-and-save	The participants adopt a more traditional mode of clip-and-save either the link or information object itself. The saved are mainly for personal use.	<ul style="list-style-type: none"> • “write it down” or “make physical notes” (2) • “saving it as files in local discs and organized by folders” (6) • “bookmarking in browsers” (17) 	25
New adoptions	The participants develop new adoptions to the features supported by web technologies. The types of the saved information are diverse. The saving strategies consider ease of sharing, re-finding, or re-using.	<ul style="list-style-type: none"> • sharing it as saving (2): “share it on my Facebook wall or tweets”; “tell someone by sharing it on Facebook” • “emailing themselves” as saving; managing by tagging and grouping; re-finding it by the search feature supported by email systems (7) • “Just don’t delete” the information and re-find it by search (1) • “I usually save or share on the same platform where I encountered information.” (1) • “make friends with persons on Facebook or LinkedIn” (1) • saving information objects in online spaces (2): “save a copy on Google Docs”; “I use Google site to collect useful information.” • “save it in social bookmarking sites” (3) 	17
Looking for a better way	The participants recognized the need of and looking for a better strategy to save and manage information encountered via social tools.	<ul style="list-style-type: none"> • “[I am] searching for a good method. Do you have a suggestion?” (1) 	1

Note. Responses can be codified in more than one inductive category if they involved more than one reason for choosing ‘Do nothing with it’.

Table 25. Inductive Categories for ‘Do Nothing’

Inductive category	Description	Quote	Occurrence
Just for mentally use	The participants learn from the accidentally encountered information through digesting or extracting, and then keep in mind.	<ul style="list-style-type: none"> • “<i>extract the idea of the information for the academic work</i>” • “<i>Just memorize it</i>” • “<i>I learned social/professional information about someone, and it became conversation material.</i>” 	3
Low quality of information	The participants think the accidentally encountered information is incomplete or untrustworthy.	<ul style="list-style-type: none"> • “<i>Lack of reliability</i>” • “<i>Look at it and move on due to the lack of time for broken information</i>” 	2
Because it is trivial	The participants think the discovered information is interesting but useless or not important to any specific condition.	<ul style="list-style-type: none"> • “<i>It’s just trivial information I find interesting.</i>” • “<i>It could be interesting, but just not useful.</i>” • “<i>Some are just general knowledge or interests that isn’t applicable for other use.</i>” • “<i>It’s interesting, but just satisfies curiosity.</i>” 	4
Not immediately useful	The participants recognized the value or usefulness of the accidentally encountered information, but have not made bisociation (i.e., a surprising association made between previously unconnected pieces of information).	<ul style="list-style-type: none"> • “<i>It is not immediately useful.</i>” (2 occurrences) • “<i>This happens nine times out of ten. I read and may reference later, but generally forget about it.</i>” 	3

Note. Responses can be codified in more than one inductive category if they involved more than one reason for choosing ‘Do nothing with it.’

4.1.16 Recalling the most recent event of ADI on the Social Web

The survey participants were asked to recall their most recent event of ADI via social tools in order to increase trustworthiness of the collected data. To be able to assess the quality of these collected ADI episodes, the participants were also asked to check the specific time when the most recent ADI incidents occurred. As shown in Table 26, twenty-nine (65%) participants reported that ADI occurred on the day of the survey conducted or the day before. Cumulative 94 percent of participants reported ADI incidents happened within the past week. It indicated that the majority of the participants are able to recall and identify recent ADI events. However, it was worth noticing that although there is only one case, a participant reported ‘unable to recall’ the most recent experience. It verified the necessity of using logging as a complementary measure to collect ADI episodes. The ADI episodes collected by the survey and logs are combined and discussed in the following section of the qualitative data report.

Table 26. Recalling When of the Most Recent ADI Event

Q8) When did your <u>most recent experience</u> of accidentally bumping into useful information (or information of your interest) happen via social tools? (Please check ONE)				
	<u>Frequency</u>	<u>Percent</u>	<u>Cumulative Frequency</u>	<u>Cumulative Percent</u>
Today	13	29%	13	29%
Yesterday	16	36%	29	65%
Within the past week	13	29%	42	94%
Within the past month	2	4%	44	98%
Unable to recall	1	2%	45	100%
Total	45	100%		

4.1.17 Purposeful selection of participants for logging and interviews

As demonstrated in the previous sections, many individuals among the 45 survey questionnaire participants frequently use Internet sources and possess a variety of social and life roles. Given these characteristics, this formed an appropriate pool from which to select potential participants for interviews in which their accidental information discovery could be further delved.

In the end of the questionnaire, the participants were asked to leave their contact information if they were willing to participate the follow-up log and interview sessions. Thirty-one participants left their contact information, indicating they were identified as potential interview participants. Participants purposefully selected for in-depth interviews were those who self-reported *Sometimes* or *Often*, instead of *Never* or *Rarely*, encounter unexpected information via social tools. This purposeful sampling strategy followed the principles of “selecting information-rich cases” (Patton, 2002, p. 242). Information-rich cases are people who are more likely to provide rich data for understanding the investigated phenomenon. Thus a total of 29 survey participants (64%) were selected to be interviewed.

In the end, 13 participants were both reachable and researchable for further study and attended the interview sessions. The 13 interviewees also kept 7-day logs and returned log sheets before the day they attended the scheduled interview sessions. Findings from these interviews and ADI episodes, collected from survey as well as incident logs, are detailed in the next two sections.

4.2 DATA ANALYSIS OF ADI EPISODES

A total of 71 ADI episodes were collected from the survey and logs. After the initial analysis, 18 episodes were eliminated based on the following three criteria:

- An episode for formal analysis must be an ADI incident in which the discovered information is *not* or *very low relevant* to the original purpose of the information behavior they were engaged in; otherwise it is judged as a purposeful seeking behavior. Fifteen episodes that were judged as purposeful seeking behaviors were therefore eliminated.
- An episode for formal analysis must be an ADI incident that occurred on social tools. Three episodes in which the ADI incidents were through other venues (i.e., TV and websites without supporting social activities) instead of social tools were therefore eliminated.
- An episode for formal analysis should be able to provide a complete view of the ADI incident. One episode with a very short answer was therefore eliminated.

A total of 53 episodes were retained for the formal analysis. The technique of qualitative content analysis was used. The coding activities include the first stage of question-based coding (i.e., analysis based around respondents' answers to particular questions in the log prompt sheet), the second stage of coding using predefined codes derived from the literature review, and the third stage of finding new codes added to the predefined code scheme. The data reported in this section are contributed to the following areas of inquiry, addressing the Research Question 1:

- The characteristics of the social tools used when ADI occurred (*Context* element)
- The precipitating conditions facilitating ADI (*Context* element)

- The characteristics of social tool user's actions, feelings and thoughts when ADI occurred (*Information Behavior* element)
- The characteristics of the information (i.e., information objects, contents) acquired from ADI on the Social Web (*Information* element)
- The characteristics of information needs or problems to be addressed by the ADI on the Social Web (*Information Need* element)

4.2.1 The social tool used when ADI occurred

The reported social tools used when ADI occurred are converged to the three tools including Facebook™ (21/53 or 40%), Google Talk/Chat™ (9/53 or 26%), Wikipedia™ (9/53 or 26%). The rest of the tools (i.e., blogs, mailinglist, MSN Messenger™, LinkedIn™, WikiAnswers™, Wikipedia™, Yahoo! Answers™, and YouTube™) were reported in less than 3 occurrences. The result is congruent with the survey data presented in Table 8, in which Facebook™, Google Talk/Chat™, and Wikipedia™ are among the top five tools that were reported as tools for *always* experiencing ADI.

Also, the three tools (i.e., Facebook™, Google Talk/Chat™, and Wikipedia™) appear to overlap with the top five tools that were reported as those used *all the time* by the participating users (see Table 6). It implies that the social tools conducive to ADI are also those routinely and very frequently used by users.

4.2.2 Actions before ADI occurred

The data about activities the participating users engaged in immediately before ADI occurred are collected by using the question asking “What were you doing right before bumping into the information?” on the data instruments (i.e., the survey and log template).

The categories for activities before ADI occurred, followed by the description, example answers, and occurrence for each type, are provided by Table 27.

Table 27. Actions Before ADI

Action Before ADI	Description	Example Quote	Occurrence
Conversation	Users perform formal or informal interaction with other people.	<ul style="list-style-type: none">• “When I was checking Gmail, my friend told me through Google Talk that ...”• “My friend poked me on the Faceook ...”• “Talking to a friend using Google Talk and he told me ...”	9
Looking for information	Users are trying to locate information resources or a piece of information within the resource related to some specific need or problem.	<ul style="list-style-type: none">• “Looking up something, linking a link to something else of interest”• “I was looking up ... and a documentary regarding ... was mentioned as a recommended article to read.”	10
Non-goal-directed browsing	Users make ADI by unpurposeful browsing. The attitude underlying the browsing is ‘let’s see what’s there’.	<ul style="list-style-type: none">• “I was browsing Yahoo Answers and came across ...”• “Looking for things to read on Facebook”	30
Routine tasks	Users make ADI when they are doing routine activities.	<ul style="list-style-type: none">• “Checking email”• “Checking the notices on Facebook”	4
Total			53

4.2.3 Actions after ADI occurred: Types of information use

The data about actions after the ADI incidents occurred is collected by the question of “What did you do with the information?” on the questionnaire and log prompt sheet. The codes used to analyze the participants’ answers including predefined codes derived from literature review (i.e., Addressing immediate information needs or problems, sharing, and saving) and new-added codes emerged from the data. The categories for types of information use, followed by occurrences for each type, are provided by Table 28. Congruent with the survey data, sharing is the activity with the highest frequency.

With the functions inside social tools, active and passive sharing behaviors had been developed. *Active sharing* indicates that users take explicit action to share items. A lot of social tools made sharing mechanism very easy; for example, simply clicking ‘like it’ button on a Facebook™ post and then the entry can be seen by friends within the network. It explains why a lot of participating users were willing to actively share information. *Passive sharing* indicates that users take no action but items are shared. It occurred when the tools provides functions allowing automatically sharing the item when the item is saved. Two episodes are found as passive sharing. They both saved others’ contact information with Facebook™ and at the same time were conscious that the connection or saved information can be seen by others. As one of the participants answered, “*I added him to my network, and he appears in my profile (everyone can see it), so that people in his network can see me and probably networking with me.*”

Similar with sharing, saving also can be active and passive. *Active saving* indicates the user takes explicit action to save an item, requiring a conscious effort from users, who needs to know they will want to return to an item in the future. For example, some participating users reported saving by “*copy and paste into Google Docs,*” “*bookmarking the page in browser,*”

“*[marking the date on] Google Calendar,*” etc. *Passive saving* indicates the user takes no action for the purpose of saving but items are kept. A lot of participating users consciously utilize this mechanism of automatic saving supported by the systems to retain the information for potential future use. The example quotes of answers are listed:

- “*Just don’t delete it.*”
- “*I made comments on the entry and it appeared and saved in my Facebook wall.*”
- “*I shared it by email and it left a copy in my email box.*”

This study found that the participating users are more relying on (or preferring) passive, instead of active, approach to keep information items.

Table 28. Types of Information Use

Type of Use	Occurrence
Addressing immediate information needs or problems	5
Sharing	28
Active	26
Passive	2
Saving	19
Active	7
Passive	12
Leading to take actions	6
Further exploring	1
Buying	1
Start using or doing	4
Do Nothing	10
Total ^a	68

Note: a. Answers were coded in several categories if the participant provided several possible types of information uses. Hence, the total number of occurrences here is not equal to 53 (i.e., the total number of episodes).

4.2.4 Feelings and thoughts when ADI occurred

The lesson learned from the pilot studies was that feelings and thoughts at the time ADI occurred were not easy to recall. To ensuring the quality of the data, the data regarding affection and

cognition were only collected by the logs. The logs ask participants to record episodes when ADI occurs. The 19 episodes collected by the logs provided data to address this area of inquiry.

The reported affective states at the time of ADI are all positive, which include *excited*, *interested*, *happy*, and *glad*. The example answers are listed in Table 29.

Table 29. Types of Affective State

Affective State	Quote
Excited	<i>"I feel excited."</i> <i>"Very excited!"</i>
Interested	<i>"Feel interesting"</i> <i>"Very interesting"</i> <i>"I was interested."</i>
Happy	<i>"I feel happy about it."</i> <i>"I feel happy."</i> <i>"Very happy"</i>
Glad	<i>"I was glad to see the information."</i>

In contrast to the answers to affective states, many participants did not provide their cognitive states at the time of ADI. Only four episodes provided the data. The reported cognitive states can be classified into three types:

- Thinking to share it:

"I thought it would be interesting or useful for others too."

- Want to look for more information about it:

"[I] want to know what it is and search from Google and Wikipedia to learn more about the information."

"I was wondering what sort of deals were going to be available."

- Thinking about how to use it:

"I can use it in my project. But I need more information to be sure."

These cognitive states imply what participants would do next, including sharing, seeking, or mentally use the information.

4.2.5 Types of information

The data on types of information were collected from the answers to the questions “What is the information about?” and “Why do you think this information is useful or interesting?” on the questionnaire and log prompt sheet. The codes used to analyze the participants’ answers including predefined codes derived from literature review (i.e., professional, academic, and daily life) and new-added codes emerged from the data. The categories for type of information, followed by the description, example answers and occurrence for each type, are provided by Table 30. It shows that the major of the episodes were related to daily-life activities or events.

Table 30. Types of Information

Type of Information	Description	Example Quote	Occurrence
Professional	Information related to professions, job seeking, and career building	<ul style="list-style-type: none"> • “<i>management consulting tips</i>” • “<i>found information that can be used to answer a specific question I am certain will be asked in the interview</i>” 	6
Academic	Information related to research/learning interests and school works	<ul style="list-style-type: none"> • “<i>found information regarding a school project</i>” 	14
Daily-life	Information related to daily-life activities or events	<ul style="list-style-type: none"> • “<i>found a video about how to renew window tint</i>” 	31
Recreation/Hobby		<ul style="list-style-type: none"> • “<i>got invited to a party</i>” 	10
Personal/Family life		<ul style="list-style-type: none"> • “<i>the death of a colleague</i>” 	10
Consumption	(The subcategories emerged from the data.)	<ul style="list-style-type: none"> • “<i>information about products deal</i>” 	7
Health			4
Physical activity			2
Things Happened around			1
For fun	The information providing amusement	<ul style="list-style-type: none"> • “<i>found a link to funny news</i>” 	2
Total			53

4.2.6 Information needs or problems addressed

Information need is a complex concept for analysis. A few typologies of information needs can be found in the previous literature on information behavior, as presented below:

- *Immediate and deferred needs* are immediately followed by information seeking and deferred needs or not (Kirkelas, 1983);
- *Short-term needs and long-term interests* trigger action and are intended for immediate consumption. Long-term interests are useful for future information consumption (Taylor, 1986);
- *Applicational needs and nutritional needs* motivate users to seek for answers for specific questions or problems. Nutritional needs are for “maintaining the general competence of the individual” (Mick, Lindsey, & Callaha, 1980, p. 349);
- *Kinetic needs and potential needs* lead users to seek information relevant to a specific problem and potential may never be put into action (Childers, 1975);
- *Expressed needs and latent needs* are needs converted to demands (i.e., search words or phrases) to information systems, while latent needs do not get converted into demands (Lancaster, 1979);
- *Current approach, everyday approach, and exhaustive approach.* A scientist’s use of information arises from three different needs. First, current approach is the need to know what other scientists have recently done or are doing. The everyday approach typifies a need for some specific piece of information. The needs derive from the exhaustive approach when the research worker starts work on a new investigation he needs to find and check through all the relevant information existing on a given subject (Voigt, 1961);
- *Past, current, and future.* Erdelez (1995) investigated the information needs addressed by information encountering and categorized the needs into three types based on their currency. Current needs are concerned with the problems on the do-it-now list but not necessarily actively involved in pursuing it. Past needs are problems that were concerns sometimes in the past. And the future needs are the problems that will become concern sometime in the future.

These discussions on the typologies of information needs provided useful insights to analyze the information needs addressed by ADI via social tools. The episodes were analyzed by the predefined codes of *short-term needs* and *long-term needs*. The short-term needs are problem-related, while the long-term needs are interest-related. During the analysis, the type of *latent needs* emerged from the data. These three types of information needs have different levels of: 1) currency, 2) users' consciousness of the needs, and 3) tendency to involve information seeking. The results, followed by the description, example answers as well as occurrence for each type, are presented in Table 31.

Table 31. Types of Information Need

Type of Information Need	Description	Example Answer	Occurrence
Short-term needs	The needs are related to specific questions or problems. The information is for immediate consumption. The needs can be converted into demands to search in information systems, and therefore might be addressed by active seeking.	<ul style="list-style-type: none"> • “I checked out it and then used it in the project.” • “I have seen ... very often but don’t know the name of it.” • “It provided implementation solution to my ongoing project.” • “The information helped me to make the final decision to purchase ...” 	8
Long-term needs	The needs are related to topics of interest for ongoing learning or maintaining the general competence. They can only be vaguely expressed, so therefore may not be easily sought by systematic search. Exploratory search or browsing might be more feasible for this type of needs.	<ul style="list-style-type: none"> • “My friends told me the news about the supplement for eyes.” • “The information is useful because it is related to my academic interests.” • “It addressed my consumer information need.” 	41
Latent needs	The needs have not been recognized before but emerge at the time of ADI. The needs have not yet been developed into a conscious need or desire which can trigger them to active information behaviors.	<ul style="list-style-type: none"> • “It fulfilled my curiosity.” • “This didn’t fill that need in any way but it was interesting.” 	4
Total			53

4.3 QUALITATIVE ANALYSIS OF INTERVIEWS

A total of 13 survey participants participated the follow-up interview sessions. The interview discussions were transcribed into texts and analyzed with the techniques of qualitative content analysis. The coding process was aided with the qualitative data analysis software (i.e., Atlas.ti™) and involved both inductive and deductive coding strategies. Appendix E presents the finalized coding scheme for the interview data.

This section includes the following three parts:

- The background analysis of the 13 interview participants
- These users' perceptions about the social tools as an environment for ADI (addressing part of RQ2)
- These users' perceptions about the relationship between ADI on the Social Web and their overall information acquisition (addressing part of RQ2)

4.3.1 Background analysis of interview participants

A total of 13 survey participants joined in the follow-up interview sessions. The demographic information was summarized in Table 32. The interview participants ranged in age from 20 to 35 years. Fifty-four percent were male, and 62% were non-native English speaker. All interview participants were recruited from School of Information Sciences at the University of Pittsburgh. Sixty-nine percent majored in Library and Information Science, while 15% majored in Information Science and Technology, and 15% majored in Telecommunication and Networking. Sixty-two percent were doctoral students, and 38% were Master students. Almost all (92%) were enrolled as full-time students.

The interview participants purposefully sampled were required to have the high level of Internet use. Therefore, the frequency of Internet use reported by the interview participants was either ‘all the time’ (85%) or ‘several times a day’ (15%). For new technology adoption, 54% were perceived themselves as late-adopters (i.e., adopting new technologies less quickly than the average person), and 46% were early-adopters (i.e., adopting new technologies more quickly than the average person).

The qualitative data analysis of interview data focused on individuals. To provide understanding of the individual participants, the profiles of the 13 participants’ demographics and their user-defined Social Web, which were collected from the previous survey, are also presented in Table 33.

Table 32. Overview of Interview Participants

	N=13 Frequency (%)		N=13 Frequency (%)
Gender		Academic Level	
Male = 7	7 (54%)	Doctoral student	8 (62%)
Female = 6	6 (46%)	Master student	5 (38%)
Age		Enrollment Status	
20-25	4 (31%)	Part-time student	1 (8%)
26-30	6 (46%)	Full-time student	12 (92%)
31-35	3 (23%)	Frequency of Internet Use	
Language		Several times a day	2 (15%)
English native speaker	5 (38%)	All the time	11 (85%)
Non-English native speaker	8 (62%)	New Technology Adoption	
Major		Late adopter	7 (54%)
Library & Info. Science	9 (69%)	Early adopter	6 (46%)
Info. Science & Tech.	2 (15%)		
Telecom. & Networking	2 (15%)		

Table 33. Profiles of Interview Participants

Participant #	Background Information	User-defined Social Web
1	Male English native speaker Full-time doctoral student LIS major	Audio/video conferencing; blogs; Bookmarking tools on browsers; CiteULike; del.icio.us; Digg; email; Facebook; Flickr; Google Docs; Google Talk/Chat; Jing; LinkedIn; Skype; WikiAnswers; Wikipedia; wikis; Yahoo! Answers
2	Female Non-English native speaker Full-time doctoral student LIS major	Blogs; email; Facebook; Flickr; Google Docs; Google Reader; Google Talk/Chat; MSN Messenger; Skype; Wikipedia; Yahoo! Answers; YouTube
3	Female Non-English native speaker Full-time doctoral student LIS major	Audio/video conferencing; blogs; Bookmarking tools on browsers; CiteULike; del.icio.us; Digg; email; Facebook; Flickr; Google Blog Search; Google Docs; Google Talk/Chat; LinkedIn; mailinglist; MSN Messenger; online forums/message boards/BBS; Picasa; Plurk; Skype; Wikipedia; Yahoo! Answers; YouTube
4	Female Non-English native speaker Full-time doctoral student IS major	Audio/video conferencing blogs; Bookmarking tools on browsers; CiteULike; del.icio.us; Dropbox; email; Facebook; Flickr; Google Docs; Google Talk/Chat; LinkedIn; mailinglist; MSN Messenger; Picasa; Skype; tag clouds; Wikipedia; wikis; YouTube
8	Male English native speaker Full-time Master student LIS major	AIM; email; Facebook; Google Docs; Wikipedia; Yahoo! Answers
9	Male Non-English native speaker Full-time doctoral student LIS major	Audio/video conferencing; Bloglines; blogs; bookmarking tools on browsers; CiteULike; del.icio.us ; Digg; Dropbox; email; Facebook; Flickr; Google Blog Search; Google Docs; Google Reader; Google Talk/Chat; LibraryThing; LinkedIn; mailinglist; MSN Messenger; online forums/message boards/BBS; Picasa; podcasts; Skype; tag clouds; Twitter; WikiAnswers; Wikipedia; wikis; Yahoo! Answers; YouTube
10	Female Non-English native speaker Full-time doctoral student Telecom major	Audio/video conferencing; blogs; email; Facebook; Google Docs; Google Reader; Google Talk/Chat; MSN Messenger; online forums/message boards/BBS; Picasa; Podcasts; Skype; tag clouds; WikiAnswers; Wikipedia; wikis; Yahoo! Answers; YouTube
11	Female Non-English native speaker Full-time Master student LIS major	Blogs; bookmarking tools on browsers; CiteULike; del.icio.us; Digg; Dropbox; email; Facebook; Flickr; Google Blog Search; Google Docs; Google Reader; Google Talk/Chat; Google Wave; LibraryThing; LinkedIn; mailinglist; MSN Messenger; online forums/message boards/BBS; Picasa; Plurk; Podcasts; Skype; tag clouds; Twitter; Wikipedia; wikis; Yahoo! Answers; YouTube
13	Male Non-English native speaker Full-time Master student IS major	Audio/video conferencing; blogs; bookmarking tools on browsers; Digg; email; Facebook; Flickr; Google Docs; Google Talk/Chat; LinkedIn; mailinglist; MSN Messenger; online forums/message boards/BBS; Skype; Twitter; Wikipedia; wikis; Yahoo! Answers; YouTube; renren.com; QQ
14	Male 26-30 Non-English native speaker Full-time doctoral student Telecom major	Audio/video conferencing; blogs; bookmarking tools on browsers; CiteULike; del.icio.us; Dropbox; email; Facebook; Flickr; Google Blog Search; Google Docs; Google Reader; Google Talk/Chat; Google Wave; MSN Messenger; online forums/message boards/BBS; Picasa; Plurk; Skype; tag clouds; Twitter; Wikipedia; Yahoo! Answers; YouTube; Google Buzz
31	Male English native speaker Full-time Master student LIS major	AIM; Audio/video conferencing; email; Facebook; Flickr; Google Docs; Google Talk/Chat; LinkedIn; My Yahoo!; MSN Messenger; online forums/message boards/BBS; Picasa; Skype; Wikipedia; YouTube
39	Female English native speaker Full-time Master student LIS major	AIM; Audio/video conferencing; blogs; bookmarking tools on browsers; email; Facebook; Google Docs; mailinglist; My Yahoo!; online forums/message boards/BBS; podcasts; Skype; Wikipedia; wikis; Yahoo! Answers; YouTube
43	Male English native speaker Part-time Master student LIS major	AIM; blogs; bookmarking tools on browsers; Dropbox; email; Facebook; Google Docs; mailinglist; MSN Messenger; online forums/message boards/BBS; Wikipedia; wikis; YouTube

4.3.2 Perceptions about the Social Web as an environment for ADI

This phase of in-depth interviews addresses the why- and how-questions, which are difficult to collect by merely using the survey. Through the interviews, the cognitive and affective aspects of ADI on the Social Web were also further explored.

The qualitative results reported in this section provide explanations for many initial survey results and contributes to address *how the participating users perceive the social tools they regally use as an environment for ADI*, which is one of the areas of inquiry answering Research Question 2 (i.e., How are the users' perceptions about ADI on the Social Web?).

The data used to address this area of inquiry were collected by using the four sets of open-ended items on the semi-structured interview protocol (see Appendix C for the full text):

- Tell me why you agree or disagree with the statements in Q4.1-Q4.5 and Q4.7-Q4.10 on the questionnaire (see Appendix A).
- Please explain why do you think [the tool(s) reported in questionnaire] is the most or least useful to accidental information discovery?
- A lot of contents on the Social Web are user-generated (e.g., Wikipedia™, Yahoo! Answers™) or user-mediated (e.g., tag clouds, tag engines, Swicki™). How do you feel about it? When would you prefer to use these user-generated/-mediated resources and why?
- Do you think ADI on the Social Web is different from ADI in real life or on the traditional Web? In what way? (e.g., information type, frequency of ADI, etc.)

The analysis activities first performed deductive question-based coding and then carried on inductive open coding to seek key themes within each question-based category. The organization of the report in this section reflects this coding process. The results are grouped with question-based statements, within which the thematic explanations or discussions are presented.

Why social tools were perceived as useful for ADI

The interview participants all perceived that social tools are useful for ADI. As participant #11 remarks, information acquisition on social tools is basically relied on ADI:

Participant #11: *“Bumping into information is the main way to get information on social tools.”*

One of the reasons might be that the functions of some features in social tools increase the opportunities of accessing to resources with both expert- and user-generated content. For example, participants use Facebook™ not only for information exchange with others, but also keep track of topics of interest by subscribing to news feeds, as participant #13 did:

Participant #13: *“I use Facebook to subscribe to one social media called Mashable because I am pretty interested in all kinds of social media. It daily publishes social news on the Facebook and some of them are very interesting and help me to know a lot of stuff, new technologies, and business, sort of things.”*

In addition, social tools supporting many different ways of interactions among users gather people together, naturally forming an environment containing rich information. When users are engaged in information activities (e.g., browsing, searching, active learning) or interacting with others within social tools, the happening of ADI is almost guaranteed. The example remarks are:

Participant #8: *“In any place I investigate, there is always information that I like to know about. Even visit the social tools, of course I can find information that I want to know more about it.”*

Participant #31: *“I guess, well, when I am chatting with friends, or colleagues [by the Facebook or Gmail chat function] in our department. We are doing projects, for instance, we are doing a web development project and information architecture. We are debating what to go with Dreamweaver or open source. We were having a Google Chat session. We are all on different locations and do conference chat, you know, one of the group partners told us there is a source we can use, and I’ve never heard of it and she pasted us the link. It’s another type unexpected information.”*

Participant #39: *“Sometimes it is just a movie I am interested in. I get a lot of things posted on my [Facebook] wall. Sometimes it’s just an interesting video from YouTube. They see what you post, and you see what they post. It’s an information hub I guess. I have friends always debating politics and it’s always interesting to read what they posted. So yeah you can learn very interesting things from here.”*

Participant #43: *“[Social tools such as] discussion forums and blogs [are useful for ADI]. I just read topics. It’s interesting to me, maybe not important but it’s interesting. More curiosity as suppose to finding information. Those information are more related to daily lives, hobbies [of online gaming, video gaming].”*

Why social tools were perceived as useful for addressing problems

Most of the interview participants perceived that social tools are useful for addressing problems.

The tools the participants reported to use for carrying out active information acquisition specifically refer to Wikipedia™, Yahoo! Answers™, online forums, and Facebook™. The participants described that these tools are useful for both known-item and exploratory information seeking:

Participant #13: *“Currently when I am doing the assignments, and I need some explanations for some terms or some programming details, I will search it on the Wikipedia or Yahoo! Answers. I began with Google search, usually it will give me Yahoo Answers, and usually it gives me right answer to solve problems. Sometimes when you don’t know what terms you should put in the Google search box; you just turn yourself to Facebook. Before you know a specific thing, you don’t know the term to describe it; it’s impossible to search for it on the Web.”*

Participant #8: *“If I just want a general idea about a certain topic, I always go straight to Wikipedia and that satisfies me. But if I know I’d like more into it, I’d like look more into professional sources. So if I look for something quick, casual, of course I know I can find some very useful information [on social tools]. I just use it as a casual reference.”*

Participant #4: *“Sometimes when I encounter some problem, I will check Wikipedia. And I didn’t pay attention about whether I get useful information is from social tools because I check online and I got information directly. I didn’t pay attention whether it is a social tool or not. But for me, I think Wikipedia helps me a lot. Sometimes I don’t understand an academic research question, or some specific name and I would like to check it on the Wikipedia.”*

Participant #10: *“When I say it is useful for addressing problems, I mean specifically Wikipedia.”*

Participant #31: *“I guess, for example, when I purchase an iPod, there is a question answer link in the Apple website for people kind of post questions and problems with the product. I could not get my music start. So I posted my question and a couple of hours later, I got response. So it is like a forum.”*

Participant #39: *“It’s very easy and very quick. If you are going for something quick and easy, what you are gonna look for? You are gonna look for encyclopedia? Or just ask a friend who is next to you. And when you have social network, in your fingertip, you can just pop on and see Yahoo! Answers. This is the big one I found accurate information.”*

Some participants would purposefully seek for the user-generated content when they need consumer information for a product because they trust the real people carrying real experience who would provide honesty suggestions:

Participant #31: *“For addressing problems, I think any kind of social networking tools like eCommunities forums is useful because you have users speaking from personal experience rather than a sale representative, they might give you a script answer that may not be very helpful for a customer, in this context. It is user-generated content [emphasis added] that I feel useful. As users always speaking from a personal experience, I think it's like a censorship. There tend to be more honesty. Of course at the same time, there is quite a bit subjectivity as well.”*

Two participants did not think social tools are useful for addressing problems because of their information seeking behavior and personality. The example remarks are:

Participant #11: *“When I need to address information, I always use search engine. I do not expect to receive information that I need from social tools.”*

Participant #43: *“I think it is because I am an introvert, quiet person. I don’t go out of my way to talk to a lot of people. So for me, the social tool, I don’t give as much to find information. I rather do it my self more. I rather use traditional way like search tools like search engines and databases.”*

How expectation to ADI was perceived on the Social Web

Most of the interview participants admitted that they would have a certain level of expectation to ADI when they are using or about to use social tools. This expectation might be cultivated from their prior positive experiences:

Participant #43: *“I was always finding stuff. People always talk things that I never thought before, and I found it is interesting.”*

However, only a small number of participants *strongly* agreed that they would expect for ADI. It might be because participants perceived the uncertainty and unpredictability of its nature. For example, participant #13 commented that fruitful discovery of information does not happen all the time on social tools:

Participant #13: *“I expect [for ADI] but do not expect that much because I have limited time. I couldn’t stick on the Facebook or Google Buzz all the time. Usually there are tons of information if you are truly involved into Facebook or things like that, but not every entry of information is useful for you.”*

Also, participant #39 explained that her primary reason to use social tools is to interact with friends; ADI was perceived as a byproduct:

Participant #39: *“When I use Google, it comes up Wikipedidia and I follow the link. I would of course expect I would find something. But on Facebook, AIM, I don’t expect I would find information. I expect to talk to my friends. It’s just somewhat like a byproduct. Some people have more byproducts than others. I use different tools for different people groups and for different purposes.”*

Why social tools were not perceived as the main source of information

The information generated on the Social Web was perceived as non-authoritative and unpredictable; thus the information discovered is rarely used in academic or professional contexts. The primary reasons people access to a social tool are for interacting with other users; information discovery on social tools is a byproduct. The example remarks about this point are:

Participant #3: *“Social tools for me are for daily-life information. Usually not scholarly work related.”*

Participant #10: *“The Social Web usually gives me the right answer for the chance of fifty-fifty. It cannot guarantee to give me the answer that I want all the time. I use social tools basically for bumping into information instead of for searching purpose.”*

Participant #11: *“My main source of information is through active searching by Google.”*

Participant #13: *“I have so many things to do; I don’t stick on Facebook all day.”*

Participant #39: *“If it’s scholarly, professionally, it’s supplementary. But if it’s about hobbies, daily lives, it is my main source of this type of information.”*

Participant #39: *“They are important but I don’t say they are the [emphasis added] tool.”*

Participant #43: *“Sometimes it is distractive.”*

The participants perceived that the types of information discovered vary depending on what social tools they were using, but mostly are daily life-related and recreational information.

Participant #8: *“Recreation things.”*

Participant #13: *“When I go to Facebook, it’s more daily life [information] I expect. But for LinkedIn, that’s totally professional. For Google buzz, that’s kinda balanced between daily life and professional. So there are differences between sites.”*

Participant #31: *“More like for daily life.”*

Participant #39: *“It’s more like daily life. Just sort of strange questions. Somebody ask me one time, ‘What’s the average amount of touchdowns players make a season?’ I tried actually to find it on NFL.com and so many... found it on yahoo answers. [Researcher: ‘So is it like trivial knowledge? Why do you think this kind of information is important or useful to you?'] I think most knowledge in general is useful. Random knowledge is random but it is not useless. It’s just a matter of when you can use it. We talk football a lot in my family so that is useful in terms of my family unit because we all like football. So yes, it can be, it’s just so very individualized; that depends on what situation you are in.”*

Participant #43: *“Not professionally useful. But for daily lives, I always find things useful.”*

How prior experience of ADI was perceived as a reason to use social tools

Most of the participants perceived that their positive experience of ADI on the Social Web is one of the reasons to keep using specific social tools or features:

Participant #1: *“I do think the reason I go back to it [Facebook] is I find accidental information discovery interesting. Usually almost always, when my friend and I posted an article, something to read, you know, it’s probably interesting enough to them to read, to me to read. I looked at them and usually read the whole thing.”*

Participant #13: *“I definitely agree [that previous experience is a reason to use social tools] because once you can get useful information from certain tools, you just start using it. I have that experience from, not from specific social tools, but from subscription. I subscribe and got a lot of useful information so I started subscribing.”*

Participant #31: *“I think we all creatures of habits and we have serious positive experiences, and useful experiences to Facebook chat, or Gmail chat, then we turn to wanna take the time proved paths that always serve a purpose that was easy to facilitate bumping into information. So that’s why I continue to use social tools.”*

How anticipation of ADI was perceived as a reason to use the social tools

The participants, who considered anticipation of ADI as one of the reasons to use social tools, perceived that anticipation was generated from their overall experience of ADI on the Social Web. The experiences of keeping discovering useful or interesting information via social tools reinforced their motivation to use social tools.

Participant #13: *“Most of the information is unusually encountered on Internet and Facebook or things like that so I definitely anticipate it [bumping into information when I about to use social tools].”*

Participant #43: *“Of course. It [ADI] is the byproduct [of using social tools].”*

The participants who disagreed account for less than half of the interview participants. Participant #31 explained the primary reason to use social tools is not for ADI; instead, socializing and connecting with friends are the main purpose:

Participant #31: *“For me, the primary use of social tools is just to socialize, to stick connecting with friends. But then if there is an event or a party, whenever you know when you prepare for, I’ll say it’s I use it as poster tool for me.”*

Also, Participant #43 commented that ADI via social tools is not quite a reliable approach of information acquisition so he would not consider ADI as a reason to use social tools:

Participant #43: *“Because it [ADI] is not a reliable way to find information. Either ‘have it’ or ‘not have it’ doesn’t matter for me.”*

How trustworthiness and usefulness of information were perceived

Most of the participants think the information discovered by accident on the Social Web is trustworthy, based on their prior positive experiences. They seldom to obtain inaccurate information from social tools:

Participant #43: *“Opinion-based information is trustworthy. Not in the first sight, but over and over the time, this kind of information increases its trustworthiness.”*

Participant #39: *“I never get things too off the wall like they are not inaccurate. I never had it [the experience] before, when someone told me, is completely wrong.”*

However, they still felt they should remain cautious on the authority and objectivity of the user-generated information:

Participant #13: *“Most of the time, I believe they are trustworthy but I have to maintain my attitude with such social media and just don’t put myself all on the Social Web and trust them all. I don’t have any experience encountering fake message but I know there is such a possibility and we have to be aware of that.”*

Participant #31: *“I think in the social setting, it’s hard to tell it’s authoritative because social setting people tend to be getting more subjective experiences and hopes that someone out there can relate.”*

Participant #39: *“If it [Wikipedia] comes up to the top three [within my search results], I probably click on it. If it’s not one of the top three, then I wait until I look up the top three first and then I pick it. It’s very tricky because it’s so prevalent and right there useful. But my little librarian is arguing with me and said ‘it’s not authoritative!’ So there is some debate with me but I would say it’s pretty often my first or second click.”*

Participants generally gave positive remarks on the usefulness of information accidentally discovered on the Social Web. However, they would mostly use the information for non-academic or non-professional contexts:

Participant #8: *“Everyone explores information on social tools and I believe most information I encounter and it gives me a general idea as for what I want to know. Most social tools are not very professional but it doesn’t mean I will ignore the significance it has.”*

Participant #39: *“Although it is not paper quotably, but yeah it is useful.”*

Participant #43: *“Not professionally useful. But for daily lives, I always find things useful.”*

How to decide to save or not

The participants experienced a cognitive process of deciding whether to save or not to save the information at the time they discovered it accidentally via social tools. The most important judgment criterion leading to the decision of physically saving is the professional or academic values of the information:

Participant #1: *“I never save anything that is just interesting. I only bookmark things for professional purposes, for school, and for teaching. If something is really relevant to like what I am doing in my class, I will bookmark the page.”*

Participant #11: *“Most information is not quite relevant to serious work, like schoolwork. It’s just ‘great to know’ but I never think of saving or organizing the information. If I need something important, I will use Google to search. Sometimes I will use Google mail to save the very important information in the draft. I also use Delicious to save useful links.”*

Participant #13: *“If I see something is really important for my academic research, and I really want to keep a record of that, I will save a copy on Google Docs.”*

The other situation forcing users to physically save the discovered information is when the information cannot be easily “convey with words” (in vivo¹), as Participant #39 commented:

¹ *In vivo* is designated when the researcher directly uses descriptive “terms that are used by [participants] themselves” (Strauss, 1987).

Participant #39: *“I guess it would depend on when the specific needs to be saved like my friend sent me a link on Messenger, my sister just had her first baby, about 2 month now, there is actually a website that shows a picture how far the baby can see and how clearly. So I sent that to my sister so she can see how clear her baby can see her. So I thought it is something she would find interesting. I can’t convey that with words, I can’t tell her about it later, she has to see it. That would be something I would save and sent on to someone. With this, I can’t summarize on my own mind and tell somebody else. It’s still on my Facebook wall. But that’s how, to me, I could either transfer or save something I can’t summarize and relay out loud. So if I find something is really important to somebody else and I will send it to them.”*

For the most of the participants, the action of physical saving the discovered information is usually not necessary. A few reasons have been found in the aforementioned survey data: 1) The information is just for mental use, 2) the information is of low quality, 3) the information is trivial, or 4) the information is not immediately useful. The interview discussions also found the evidences for re-verify the survey findings. For example, the news or friends’ updates are usually not saved because the information is just for mental use:

Participant #1: *“News is what I usually to read, political pieces about a current political situation. And I will follow it with that. But you know, anything is interesting I will follow it. I consume it. It’s commodity. I read it and move on.”*

And the comments from Participant #39 confirmed that the information that is not immediately useful is not usually stored. She added that *“no place to put it”* (in vivo) is another reason.

Participant #39: *“[I don’t usually save the information because] there is only so much hard drive on my computer. There are only so many hours in a day. If it is really important, I can just put it down on my hand and recycle it later. So one, there is no place to put it; two, it is not immediately useful.”*

Also, the information only for fun or for entertainment was not saved either:

Participant #3: *“The information I bumped into on the Social Web is not that important; most of them are just for entertainment. So I don’t feel I need to save it.”*

The other condition is when the information or resource is time-sensitive:

Participant #39: *“I never tried to save the website and go back 10 months later and find it again. It’s usually either no longer relevant, or website doesn’t work, or link doesn’t work.”*

In addition to the content-based judgment criteria mentioned above, several reasons are found related to systems or interfaces. Participant #8 and #13 pointed out recalling the saved information is a challenge. The solution for Participant #8 is to attend to it immediately. Participant #13 suggested that a reminder mechanism might support and facilitate re-using the saved information.

Participant #8: *“Whenever I came across some interesting piece of information, I always enforce to look it up immediately because I know if I save it for later, I will completely forget about it.”*

Participant #13: *“There are some troubles re-using the information saved in Gmail. I got hundreds of mails every week, so I start to label some specific mails or I could try the search function in Gmail. If you can remember some piece of the detail of the information, usually you can retrieve the information. But one trouble is that you forgot [everything] about the interesting information. You just totally forgot it. Although it might be extremely useful for your future work, you just forgot it and it became useless.”*

Participant #13: *“For my Gmail account, I can put some labels, and someday the system will automatically pop out a message saying that ‘Hey, you saved this message several weeks ago. Do you want to check them? It might be useful for you now.’ I think that will be pretty interesting.”*

More evidences showing that users developed new behaviors to adapt to the mechanism of social tools are found. With the automatic storing mechanism provided by social tools, participants reported storing strategies or solutions different from traditional clipping-and-saving, which require a conscious effort from the user, who needs to know they will want to return to an item in the future. Many users prefer new approaches by which storing information is a passive action (i.e., the user takes no action but items are stored). The interview participants who rely on passive solutions for saving remarked:

Participant #2: *“[I] never save things; just go back to check the record. Sometimes I would search for more ideas about the topic, or just keep in mind.”*

Participant #11: *“Sharing with other people is a kind of saving. My friend will remember it for me, and the records will be kept by the system.”*

Participant #31: *“In Google Chat, we have all the chats recorded. Sometimes I would wish that it would happen in Facebook.”*

The participants felt there is no need to save because the systems provide passive solutions for storing and re-finding the same or alternative information is easy.

Participant #1: *“If I need to go back to it [the information on Facebook], I usually need to go back for just a few days. So I remember which friend posted and I just go to that page; find the link that way. For Yahoo! Answers, you can look up the same question there. I just Google them so I can rely on my search strategies. They got me there in the first place to find my way back. But that might happen two times a year.”*

Participant #2: *“Use search engines to find it again, or check records if the tools I used have the function to keep all interaction in records.”*

Participant #4: *“Google Talk saves [conversations] by default. When I need the information, just go back to search. I’ve never thought of there should be a tool supporting saving unexpected information.”*

Participant #8: *“I just kept in my mind and said ‘oh, that’s good to know’ And if I want to investigate it again, I know where to look up.”*

Participant #11: *“Most information is not quite relevant to serious work, like schoolwork. It’s just ‘great to know’ but I never think of saving or organizing the information. If I need something important, I will use Google to search.”*

Participant #31: *“I rarely clip anything. I’ll just use Google if I need the information I’ve found but not saved.”*

Participant #39: *“There is only so much hard drive on my computer. I don’t save New York Times articles forever whatever. If I really, really wanted it, I could probably search on the website and pull it up. It’s another issue, if I could find it somewhere else, I don’t have to full up my hard drive to save everything.”*

Characteristics of social tools perceived useful for ADI

The participants are asked to specify what social tool(s) they felt useful for ADI at the survey.

During the follow-up interview sessions, participants were further asked to describe why the

specified tools are useful for ADI. Based on their descriptions, the features or mechanisms provided by these reported tools were identified. The first is the community-based Q & A. The value of it is that users felt that by using community-based Q & A, they can obtain real experiences from real people with different backgrounds and levels of knowledge. ADI may occur when browsing through the answers to questions other users made:

Participant #1: *“I like Yahoo! Answers because if there is not a good answer, at least there is a bad answer and sometimes a bad answer is good enough. Sometimes I got a real expert to answer my question. Sometimes it does promote information discovery at the bottom. There are open questions if you would like to respond to and there are result questions. Sometimes these questions are questions I might ask too. And I would look at these result questions to see the answers. Sometime there is accidental discovery there.”*

The second feature is to provide mechanisms that can create an environment with rich information. The participating users valued the capability of social tools that integrate both authoritative and user-generated content in one place and create new discussions or ideas:

Participant #13: *“I would say Facebook. Not Facebook itself but the IT news I subscribe on Facebook is pretty interesting. And I think they did a good job on Facebook. I think Facebook has the power of the combination of the content itself and comments. They put them together. I cannot only see the information itself; I can also see the reaction of people to that.”*

The third feature is providing links to related items or the mechanism of suggestion. For example, YouTube™ would automatically generate a list of videos of related topics, and recommendation features on some shopping sites provide lists based on items purchased or recommended by other users. The contents on Wikipedia™ may contain manually created list of relevant pages and contextual links within the body of the contents. The example remarks are:

Participant #31: *“I use YouTube for entertainment and I always find something new. In the case of music, and I am just looking at my favorite band and that leads to other music [that] I find there is a similar quality just happen to fall into the seeds of recommendation. YouTube, for me, is like the Google of visual animated information. And Wikipedia is just amazing. I recognize it may not authoritative. But it leads so many things like links of key terms. Sometimes I go straight to Wikipedia as a starting point.”*

Participant #39: *"I am taking copyright class right now and there are a lot of copyright videos [on YouTube]. The linking feature will take you to others of the same topic."*

The participants also articulated some other features that should be incorporated in an environment conducive to ADI, including:

- Serving as an aggregator:

Participant #3: *"Aggregating all messages in one place but also concerns about the information overload."*

Participant #4: *"Aggregator, a portal that you just need to sign in once. But I am worried about some privacy issues."*

- Mechanisms to stimulate response and interaction:

Participant #1: *"Allows scoring. Share links easily. Clear to be searchable. Situate information in a much broader context."*

Participant #10: *"Encourage people to do more responses. Now we already have some features to do so; maybe will improve in the future."*

Participant #13: *"I am now designing a social platform for the IS school. My idea is to integrate more community features to that. Nowadays people from different parts of the world are linked on the Internet, but what about people near each other or work with each other? Like faculties and students in IS school, everyone has a Facebook account, but as I know, not until the last month did we have a IS school Facebook page. It only comes around two months ago. We didn't have that at all so I don't know why people didn't notice that. That shocked me. I think we will provide some useful information for this specific community like there are some interesting research talks. This will be useful for faculties and students. So it serves only the specific community not everyone on the Internet. It allows people in this community not only talk on the class or after class, chat a little while and just go home. It can continue to involve in this community and activities on the Web so everyone gets more and more closed to each other."*

- Supporting storing, organizing, and reusing:

Participant #11: *"... supporting saving, like clipping and tagging."*

- Providing search functions designed for looking for user-generated content:

Participant #1: *"... clear to be searchable; very natural language based."*

Characteristics of social tools perceived not useful for ADI

The participants are asked to specify what social tool(s) they felt least useful for ADI at the survey. During the follow-up interview sessions, participants were further asked to describe why the specified tools are least useful for ADI. Based on their descriptions, the shortcomings of these reported tools were identified:

- The mechanism of updating results or responses out of context:

Participant #1: *"I hate WikiAnswers. You don't know who said it; you can go edit somebody else's question. And I don't usually trust the answers usually too small. I mean the answers [on WikiAnswers] are usually incomplete, lacks of context. I am always looking for broad contexts that I can situate an answer, information need, in a large context."*

- Fail to demonstrate that real people are involved:

Participant #31: *"It [My Yahoo!] is too commercial. I feel lost in the website."*

- Fail to encourage deeply interaction among people:

Participant #8: *"Facebook because when my friends post something, it's just same old thing like 'Hey, I am going to vacation!'; 'Hey, I am going to a council!'; 'Hey, I get drunk!'. It's not really useful. And when they post some articles, those are mostly pop works, you know, pop culture, magazines, like that. I don't find anything useful from Facebook because it's just a networking tool. It's more casual."*

Participant #1: *"I don't like about Facebook is because it's put there and that's it, you know, you can't really find out anything else interesting easily by clicking a bottom and you follow the link that leads you to a story. Maybe there is something interesting in that website, but usually I don't find anything interesting there, very rarely. Like follow-ups, so to me, it doesn't really promote accidental discovery beyond that just the way it says 'Hey, I found this!'. That's kind of the end of this. So it's one-way dialog. That's why [I don't like Facebook]."*

What users like about user-generated content and when to us it

Most of the participants were able to articulate what they liked about user-generated content and recognized the unique situations that user-generated content is useful. Four themes emerge and explain why participating users liked to use user-generated content:

- Providing alternative sources when no existing authoritative information can be found:

Participant #1: *“I like Yahoo! Answers because if there is not a good answer, at least there is a bad answer and sometimes a bad answer is good enough. ... Sometimes I got a real expert to answer my question.”*

- Increasing the chance of ADI:

Participant #1: *“Sometimes it [Yahoo! Answers] does promote information discovery at the bottom. There are open questions if you would like to respond to and there are result questions. Sometimes these questions are questions I might ask too. And I would look at these result questions to see the answers. Sometime there is accidental discovery there.”*

- Using simple language; easy to understand:

Participant #43: *“I like to use some user-generated information for example Wikipedia because it’s a good first reference for something because people make things a lot easier.”*

- Real people; real experience:

Participant #31: *“For addressing problems, I think any kind of social networking tools like eCommunities Forum is useful because you have users speaking from personal experience rather than a sale representative, they might give you a script answer that may not be very helpful for a customer, in this context. It is user-generated content [emphasis added] that I feel useful. As users always speaking from a personal experience, I think it’s like a censorship. There tend to be more honesty. Of course at the same time, there is quite a bit subjectivity as well.”*

There are some specific situations or contexts where the participants thought user-generated content is particularly useful:

- When the information needs are easier to be phrased by natural language question or fail to seek by search engine searching:

Participant #1: *“If I am asking a natural language processing question, I am trying to use social tools. I am usually doing Boolean searching with Google when I try to know something. If I can’t find a way that way, sometimes I try to rephrase my information need into informal question and see if someone has that answer on WikiAnswers or Yahoo! Answers. So I use different strategy to use social tools. It’s not my mainly way to searching.”*

Participant #1: *“If I get Yahoo! Answer through Google search, I will spend time looking. If I am not hurry, just discovering new things. I need an answer and I need it quickly and*

I can't find in Google search results. It's a back-up strategy. But I use it increasingly, a lot increasingly. Like Yahoo! Answers, I use that a lot."

- When real people's opinions and prior experiences are needed:

Participant #2: *"Related to daily lives, I would more like to see what other people think."*

Participant #3: *"When I need consumer information like some reviews for a product."*

- When know-how knowledge is needed:

Participant #11: *"Sometimes my interest or problem is so trivial, like how to stop hiccup. This kind of question, related to daily life."*

- In the initial phase of exploring a topic:

Participant #8: *"The only time I make use of these sources is when I said if I just want a casual, to get some general idea, Wikipedia suits me fine. But if I want to get more details, of course, I consult more professional sources."*

Participant #43: *"I like to start from Wikipedia because user-generated information means more simple, easier to understand. And it got a lot of links, other information that I can use."*

Participant #31: *"I will use Wikipedia at the starting point because it is not authoritative. These contents [found on Wikipedia] are useful for all of the situations; not limited to daily-life situations."*

Participant #39: *"I sometimes use it in the beginning of exploration. It [Wikipedia] is a good linking tool finding information that I would use as definitive information. But, once again, I have used it as in personal reasons a piece of information that is helpful. But I can't say this is the number one place I find information but it's where I can get really good introduction for a topic or a broad information. ... It better be personal use, something is not being quoted in paper."*

- Trying to generate new ideas and think out of the box:

Participant #10: *"[I would like user-generated content] when I need different ideas regarding my academic interest."*

Unique characteristics of ADI experience via social tools

The participants recognized that the uniqueness of the Social Web originates in the participation of end users. As Participant #31 commented, communication among users and the input of users' personal experiences make the Social Web more attractive:

Participant #31: *“More experiences, more attractivity. The traditional way is very one-dimensional. Now it's multi-dimensional because you have people, who are able to put in their personal experiences. It's the personal communication that, I think, makes the Web more attractive.”*

Several participants were able to describe the unique characteristics of ADI experiences that happened on the social tools. Participants #39 and #43 perceived that, compared to the traditional way of one-dimensional information transferring and publishing, the Social Web has more ADI experiences, more unexpected information for exploration, and more information of diverse types:

Participant #39: *“... more unexpected information; a lot of different things; more randomly searching.”*

Participant #43: *“Compared to traditional way, Social Web is different in at least types of information, and frequency of serendipity is higher.”*

4.3.3 Perceptions about ADI on the Social Web and overall information behavior

The interview data also address *how the participating users perceive about the relationship between ADI on the Social Web and their overall information acquisition*, which is one of the areas of inquiry addressing Research Question 2 (i.e., How are the users' perceptions about ADI on the Social Web?).

The data used to address this area of inquiry were collected by using the three sets of open-ended items on the semi-structured interview protocol (see Appendix C for the full text):

- Tell me why you agree or disagree with the statement: “Bumping into information via social tools is one of my strategies to acquire information” (see Q4.6 on the survey questionnaire).
- Do you think the accidental discovery of information on the social tools is important to you? Why or why not?
- Did you do anything to facilitate accidental information discovery on the Social Web?

To help develop thick description, the researcher also used clarifying/probing questions with interview participants to expand the original/initial data collection instrument items:

- Can you tell me more about that? In what way?
- Can you describe how you did it?
- Can you give me an example of that?
- Is that the only thing you did?

The findings are reported by topical themes around this area of inquiry.

Theme 1: ADI on the Social Web is alternative or supplementary.

For the participants, active information seeking by search engines is the most important strategy for information acquisition, while ADI via social tools was seen as alternative or supplementary to information seeking:

Participant #1: “It [ADI] is not actually a strategy [of information acquisition]; it’s an alternative. I am usually doing Boolean searching with Google when I need information. If I can’t find a way that way, sometimes I try to rephrase my information need into informal question and see if someone has that answer on Wiki Answers or Yahoo Answers. So I use different strategy to use social tools. It’s not my mainly way to searching.”

Participant #13: “Sometimes when you don’t know what terms you should put in the Google search box, you just turn yourself to Facebook. So before you know a specific thing, you don’t know the term to describe it, it’s impossible to search for it on the Web.”

Participant #13: *“I think myself is pretty curious to new stuff so I use social media to inform me new technology, news, and then if I get interested in it, I will search for that information with Google or Wikipedia, things like that. It sort of serves as an inception phase, in the very beginning. And I just turn into the traditional way to search for more information. So I think serendipity is supplementary. It doesn’t happen as frequently as I search. It’s momentary. It just happens. My searching has objectives; I find what I want.”*

Participant #31: *“Sometimes finding information on the Web can be cumbersome because it’s so much out there. So if I come across it, like in Wikipedia it has key search terms, that’s fantastic.”*

Participant #39: *“It [ADI] just sometimes happened. Social networking type interface, not always reliable finding things that you need. It’s a [emphasis added] tool, not the [emphasis added] tool.”*

Also, the information acquired through ADI on the Social Web is supplementary or secondary to the information acquired by the participants’ actively seeking from their main source of information (i.e., Internet), especially when the information is related to professions or academic interests.

Participant #39: *“If it [the information I discovered] is scholarly, profession-related. It’s supplementary.”*

Participant #39: *“Overall it’s more supplemental searching but it’s been accurate enough that I know it is very good secondary information. I say secondary because I can’t say it’s primary. But as a source of accidental information on a whole has given good information, so I say this is secondary. I probably use it in the beginning to explore. It’s a good linking tool finding information that I would use as definitive information. But, once again, I have used it as in personal reasons a piece of information that is helpful. But I can’t say this is the number one place I find information but it’s where I can get really good introduction for a topic or a broad information.”*

Participant #39: *“Yes. I can’t say it [the information on the Social Web] is authoritative. Until we get more comfortable with like Wikipedia. I don’t know it will happen someday, I don’t know. But I am going to assume that it’s not the most accurate source to use. It could change in the future, I don’t know, user-generated content maybe more. I don’t know so until that I have to take it as secondary [information].”*

Participant #39: *“If it’s scholarly, professionally, it’s supplementary. But if it’s about hobbies, daily lives.”*

Theme 2: ADI via social tools was perceived as important to users' overall information behaviors.

Most of the participants perceived ADI via social tools as important to their life or their overall information acquisition behaviors. The reasons they gave are related to the perceived importance of expanding eyes, keeping up to dates with topics of interest, or ongoing learning and exploring. The original responses are listed below:

Participant #3: *"I feel it [ADI on the Social Web] is as important as active searching to me."*

Participant #8: *"I think it [ADI on the Social Web] is very important because that way if I can accidentally encounter information on a regular basis, I will always have more stuff for investigating. And who knows it might give me answers to questions I have been asking myself when I am looking at some article."*

Participant #10: *"I think accidentally discovering things is an important factor or characteristics of Social Web. And that is why I keep on using social tools."*

Participant #11: *"Before participating this research, I haven't thought of it. But now, yes, it [ADI on the Social Web] is important to me."*

Participant #13: *"With my study area, it [ADI on the Social Web] is totally important. In the information science area, we need to keep track of new technologies and the trends and how people react to it."*

Participant #39: *"I think it [ADI on the Social Web] is important to one in many ways to personalize information. It's not just random searches online and finding information. Like my friends posting an interesting story for me; it's opportunity to maybe make different connections that you didn't think before because different people have already thought of it. That's the human quality I do appreciate it. So I would say it's somewhat important or at least influence my day. It influences how I think about things that I may not find on my own."*

Participant #43: *"In some ways, it [ADI on the Social Web] is important. For example, it expands your eyes."*

Theme 3: ADI on the Social Web provides information with “human quality”, leading to “surprises”, idea and creativity generation, and “makes life more colorful.”

The participants liked about ADI on the Social Web are overlapped with how they perceived it is important. The reasons they described how they like it include its “*human quality*” (in vivo code from Participant #39), leading to “*surprises*” (in vivo code from Participant #3, #10, #13), idea and creativity generation, and “*makes life more colorful*” (in vivo code from Participant #2). The original quotes are listed below:

- Providing information with “*human quality*” (in vivo):

Participant #39: “*It’s easy, accessible, and the human quality that I like about ADI on the social tools.*”

- Leading to “*surprises*” (in vivo):

Participant #3: “*I like it [ADI on the Social Web]. I can always have some surprise from social web tools.*”

Participant #10: “*I like it [ADI on the Social Web]. It helps me to know about different ideas.*”

Participant #13: “*It [ADI on the Social Web] provides surprises. It surprises me. I like surprise.*”

- Idea and creativity generation:

Participant #13: “*It [ADI on the Social Web] gives me a lot of information that I did not know.*”

Participant #31: “*I like the surprise factor [of ADI on the Social Web]. I also like to have information from personal experiences. It also can generate creativity or ideas.*”

- Making life more colorful (or interesting):

Participant #1: “*I like it [ADI on the Social Web] because it does bring interesting information to me even though I am wasting my time.*”

Participant #2: “*ADI on the Social Web makes life more colorful.*”

Participant #11: *"I like it [ADI on the Social Web] because there are some information that you are trying to seek it but fail. With social tools, I can receive information just relying on bumping into information. And it makes my life more interesting."*

Theme 4: ADI can be facilitated with users' self-developed strategies.

Although ADI is unpredictable, the participating users developed strategies to facilitate it. The most common approach is bookmarking or subscribing to the sources with contents of interest:

Participant #1: *"I read a lot of blogs through Google news. I do a lot political reading about current political situation. And you know almost entirely blog driven these days. There are accidental information discovery. I read a lot of, way too many, comments on these websites, try to get better understanding how what I just read resonate with the readership, the reader base. Again, try to get context or evaluate information even though it's a terrible strategy, I do it."*

Participant #2: *"I am more like passive person on the Social Web but I do subscribe to others' blogs."*

Participant #3: *"Using blogs to keep the link to other blogs."*

Participant #11: *"I use Google Reader to subscribe to blogs."*

Participant #31: *"YouTube. I have a profile subscribing some people's videos; they release every week so soften. It will pull up everything related to piano."*

Participant #43: *"Bookmarking discussion forums and blogs and go back to checking them once for a while. It's more passive."*

The other participating users' strategy to facilitate ADI is harnessing 'the power of people' by extensively connecting or collaborating with others. People with different backgrounds and similar interests are both good sources of ADI. Examples are listed:

Participant #4: *"I use Google Docs to share some documents with my lab mates and teammates. They will also share with me. Sometimes we have mutual research projects and we need to inform each other's status. So we share documents; we share updates so everybody can know what happened and what's going on next; we also create wiki pages. That's only for our lab. And we update information together. Everybody can know the progress of the project. And these wiki pages kept records and can be showed to new students joined our lab."*

Participant #4: *“In our lab, we actually created a lot of social tools. One of them is a sharing tool about talks. Usually people publish the coming talks and we can go there to bookmark or recommend to other friends, or we can follow some people. Usually we follow our advisor so if our advisor plan to go to that talk, then we’ll go. And I also use CiteUlike. I saved a lot of articles and also try to track my advisor’s article library and some relative researchers’ personal library. So I get a lot of information from there.”*

Participant #13: *“Use the power of people around me. I network with a lot of people and see what they are interested in. It’s not only I check news feeds on Facebook; I also actively poke other people to see what they are interested. Because I know that now I have similar interests with you and what you are looking at now might be interesting to me. So I would actively check others’ status. I would like to see more and more people involved in my network and I can learn something from them.”*

5.0 DISCUSSION

This chapter integrates all the findings, derived from data of the survey, logs, and interviews, to directly answer the two research questions of this study. The first section of this chapter addresses the Research Question 1 (RQ1): *What are the characteristics of ADI on the Social Web?*, organized by the six elements in the conceptual framework. The second section addresses the Research Question 2 (RQ2): *What are the users' perceptions about ADI on the Social Web?*.

The discussions on the integrated findings in this chapter, different from the previous chapter of 4.0 FINDINGS, seek to extend interpretations and provide the key concepts for understanding the investigated phenomenon. This chapter is also the product of the final stage of the advanced data analysis, which involved the activities of 1) re-coding and grouping all collected data, 2) synthesizing and interpreting the integrated data, and 3) comparing and contrasting results with previous findings in the related literature.

5.1 RQ1: What are the Characteristics of ADI on the Social Web?

This section discusses the characteristics of ADI on the Social Web by exploring the six elements in the conceptual framework of this study, including *User*, *Motivation*, *Context*,

Information Behavior, Information, and Information Need. Table 3 shows the details of this explaining scheme.

5.1.1 Characteristics of user

The 13 participants who participated in all the three data collection sessions provided rich information to identify their individual characteristics. The initial idea of identifying the types of the participating users was derived from the study by Erdelez (1995, 1997). As discussed in the 2.0 LITERATURE REVIEW, Erdelez (1995, 1997) found four types of information users who experienced ADI, based on the frequency of ADI experiences they have and their attitudes towards ADI: 1) *non-encounters* are people who seldom acquire information by accident; 2) *occasional encounters* occasionally acquire information and perceive it merely as a lucky behavior; 3) *encounters* often acquire information by accident but do not perceive how these experiences connected to their information behavior; 4) *super-encounters* are people who very often experience IE, rely on it, and consider it as an important element of their information behavior. Compared to Erdelez' finding, this study, however, did not identify such a distinct typology among the participating users. A lot of participants in this study demonstrated complicated attitudes to ADI on the Social Web. For example, the perceived frequency of ADI is not necessarily correlated to how they perceived ADI on the Social Web. A participant who very often obtains unexpected information via social tools may still remain unconscious about the role of ADI via social tools within his/her overall information acquisition behavior. The more important thing is that many participants expressed the impact of participating this research. Participant #11 commented, "*I was not noticing the role of ADI before today, but from now on, I*

will start to be aware of the value of it.” By encouraging or teaching, users can recognize ADI as an important element of their information behavior or learning process.

5.1.2 Characteristics of motivation

The participating users used a particular social tool generally for the reason of engaging in the primary activities the tool mainly supports. For example, if the tool is self-categorized by a user as a communication tool, his/her reason to use the tool is to make interaction with other users. In addition to this main reason, the results of this study support that ADI can be another motivation to use social tools. As demonstrated by the survey and interview data, the prior positive experience of ADI and anticipation for ADI are both the reasons for participating users to use social tools. It is also found that the prior positive experience of ADI is important; the users' anticipation for ADI is actually the result of their prior positive experience of ADI.

5.1.3 Characteristics of context

The characteristics of the context where the ADI occurred are discussed by the two aspects: the user-defined Social Web, which refers to the groups of the social tools individual users regularly use, and precipitating conditions of ADI.

Characteristics of user-defined Social Web

This study found that the participating users viewed or used individual social tools as “*information hubs*” (in vivo code from Participant #39), where the characteristics were identified as similar with the concept of ‘information grounds’ proposed by Fisher, et al. (2007). Information grounds were defined as “people come together for a singular purpose but from

whose behaviour emerges a social atmosphere that fosters the spontaneous and serendipitous sharing of information.”

Table 34 presents the characteristics of information grounds identified by Fisher, et al. (2007) as the comparison base for the characteristics of user-defined Social Web identified in this study. It shows that, the user-defined Social Web, in many senses, was perceived analogous to an information ground, albeit there are slight differences because social tools are more flexible than the traditional mode of information grounds. Social tools break the boundaries of time and locations, while the traditional information grounds require people’s physical presence at a specific time and location.

Table 34. Information Grounds vs. User-defined Social Web

Information Grounds (Fisher, et al., 2007)	User-defined Social Web
<ul style="list-style-type: none"> • People gather at information grounds for a primary, instrumental purpose other than information sharing. • Social interaction is a primary activity at ‘information grounds’ such that information flow is a by-product. • Information grounds are attended by different social types, most if not all of whom play expected and important, albeit different roles in information flow. • People engage in formal and informal information sharing, and information flow occurs in many directions. • Information grounds can occur anywhere, in any type of temporal setting and are predicated on the presence of individuals. • People use information obtained at information grounds in alternative ways, and benefit along physical, social, affective and cognitive dimensions. • Many sub-contexts exist within an information ground and are based on people’s perspectives and physical factors; together these sub-contexts form a grand context. 	<ul style="list-style-type: none"> • Individual users access to the social tools for a primary purpose other than information seeking. • Social interaction is a primary activity within social tools and information discovery of information is a by-product. • Social tools are accessed by users with different social role types. Users contribute to the information generation and information flow with personal experience or knowledge. • Users engage in formal and informal information sharing on the social tool sites, and information flow occurs in many directions (e.g., emailing to individuals or groups, delivering information collaborative platforms such as wikis, etc.). • Social tools gather users and serve as an information hub. With the support of the systems, users can be involved in information flow anytime no matter that other users are concurrently or non-concurrently present. • Users use information obtained at social tool sites in alternative/supplementary ways, and benefit along behavioral, social, affective and cognitive dimensions. • Individual users might use different social tools for different contexts (e.g., using LinkedIn™ for professional connection, Facebook™ for interacting with friends, Google Docs™ for academic purpose); together these various contexts form a grand context of their individual Social Web.

Precipitating conditions for ADI

Precipitating conditions are contexts that “increase the chances for serendipitous discovery” (Cunha, 2005). Cunha (2005) proposed three theoretical precipitating conditions, derived from Fine and Deegan’s (1996) three principles of serendipity: 1) *temporal happenstance*, which means people make accidental discoveries because they are lucky to be in the right place at the right time; 2) *active learning and analysis*, in which people discover unexpected information when they make a purposeful search task and learn through the process of analysis, and 3) *relational serendipity*, which indicates accidental information discovery is made through social connections and interactions. By exploring the activities the participating users engaged in immediately before ADI occurred, the precipitating conditions of ADI on the Social Web can be observed.

This study found that, as presented in Table 27 (see page 99), the activities participating users engaged in before ADI include *conversation*, *goal-directed seeking*, *non-goal-directed browsing*, and performing *everyday routine tasks*. Conversation links to relational serendipity, in which users make ADI because of connecting or interacting with other users. Some participants reported “*When I was checking Gmail, my friends told me through Gmail that ...*”; “*My friends poked me on the Facebook ...*” (quotes collected by logs). These quotes also imply that ADI on the Social Web can be precipitated by temporal happenstance. That is, users make ADI because of being present in the social network. Google Chat™ is embedded in Gmail system. When users are checking emails, they are exposed themselves in the network of Google Chat™ friends.

In addition to relational serendipity and temporal happenstance, active learning and analysis as a precipitating condition was also reported. Some participants reported that they made ADI when engaging in goal-directed, purposeful search or learning: “[*At time of ADI, I was*]

looking up something, linking a link to something else of interest"; *"I was looking up ... and a documentary regarding ... was mentioned as a recommended article to read"* (quotes collected by logs).

In summary, the three of precipitating conditions (i.e., temporal happenstance, active learning and analysis, relational serendipity) identified by Fine and Deegan (1999) and Cunha (2005) were observed in this study. Precipitating conditions also appear to overlap — Relational serendipity often include social networking with other social tool users, who are usually friends or colleagues.

5.1.4 Characteristics of information behavior

ADI in this study was considered as a type of information behavior, explored by behavioral, affective, and cognitive dimensions.

Behavioral dimensions. As presented in Table 27, the activities that participating users engaged in before ADI include *conversation, goal-directed seeking, non-goal-directed browsing,* and *performing everyday routine tasks*; and ADI on the Social Web occurs most often when doing *non-goal-directed browsing*.

The activities after ADI occurs also involve different types of information use, including *addressing immediate problems or ongoing information needs, sharing, saving, and further exploring*, as shown in Table 28. Among these activities, *sharing* is most significant.

Affective dimensions. The results revealed that ADI on the Social Web is a pleasant experience. All of the participating users reported positive feelings about ADI on the Social Web (see Table 29). Erdelez (1995) found in her study that most of the IE experiences are changed from negative feelings before the event of ADI to positive feelings after it. However, this study

did not observe this phenomenon. Emotions before ADI are not easy to recall for the participating users.

Cognitive dimensions. ADI on the Social Web require very little effort on the part of the user. Participating users are able to make a quick cognitive evaluation of the content that they discovered and decide what to do next with the discovered information. However, participating users recognized that they often would under evaluate the usefulness or value of the discovered information and not save it, but found it useful later after a period of time. This can be seen as the evidence of *incubation* – bisociation may not instantly occur at the time of bumping into the information, but the triggers (i.e., the information contents) may be saved in memory and later recalled (McCay-Peet & Toms, 2010). It implies the need to study the incubation stage of ADI and to develop tools supporting incubation periods.

5.1.5 Characteristics of information

Participating users discovered diverse types of information via social tools and can be used in *professional*, *academic*, and *daily-life* contexts. The unexpected information is most beneficial in *daily-life* contexts (i.e., recreation and hobbies, personal or family life, consumption, health, physical activity, and things happening around them).

5.1.6 Characteristics of information need

Three types of information needs addressed by ADI on the Social Web are identified in this study: *short-term*, *long-term* and *latent* information needs. Among these three types, ADI on the Social Web is especially useful for addressing *long-term* information needs, which is related to

topics of interest for ongoing learning or maintaining the general competence. This finding implies that ADI on the Social Web is relevant to learning — Users surf on the Social Web not only for fun, but also to discover and learn something new. Many participating users are realizing the benefits of spending time on social tools because this might yield unexpected and useful results. Although this kind of learning is not generally of interest to educators as it is hard to be identified and measured, this study suggested that users should be taught to take advantage of the possibility of serendipitous learning through the use of social tools.

5.2 RQ2: What are the Users' Perceptions about ADI on the Social Web?

The Research Question 2 was addressed by exploring the two areas of inquiry: 1) the users' perceptions about the Social Web as an environment for ADI; 2) the relationship between ADI on the Social Web and users' overall information behavior.

5.2.1 Social Web as an environment for ADI

This study recruited frequent Internet users as the participants and found that they viewed the Social Web as a conducive environment for ADI. This conclusion is supported by the following results derived from the survey and interview data:

- Social tools were not perceived as the main source of information, but were perceived as useful for ADI.
- Social tools were perceived as useful for addressing problems.

- The prior positive experience of ADI and anticipation to ADI are both motivations to use social tools.
- The information acquired by ADI on the Social Web was perceived as trustworthy and useful.
- User-centered content was perceived as a unique characteristic of Social Web and it plays an important role in ADI.

As the comparison base, Erdelez's study in 1995 did not find the Internet conducive to ADI (termed as information encountering in her study) due to technical, informational, and psychological barriers (Erdelez, 1995). Later in 2000, she did a follow-up study on the 12 respondents previously interviewed in her 1995 study, and found that they continued to dislike the Internet and the Web for ADI (Erdelez, 2000). One of the possible explanations is that the respondents she recruited spent rather limited time on the Web and used it primarily for emailing and occasionally for participating in online discussion groups. In this study, the participants are all frequent users of Internet and web technologies, resulting in different observations. It demonstrates there is a big gap in the studies of web accidental information discovery. With the newly developed web technologies and services such as social tools, the new generation of web users has developed new adaption and information behaviors, in which more research are needed.

5.2.2 ADI on the Social Web and overall information behavior

The findings of this study, derived from the interview data, show that participating users perceived that

- ADI on the Social Web is alternative or supplementary;
- ADI via social tools was perceived important to users' overall information behaviors;

- ADI on the Social Web provides information with human quality, leading to surprises, idea and creativity generation, and makes life more colorful;
- ADI can be facilitated with users' self-developed strategies.

Internet-frequent users recognized ADI on the Social Web is an alternative to active seeking approaches, for example, keyword searching by search engines. They also considered ADI on the Social Web is supplementary to their overall information behavior. ADI is by-product of using social tools but perceived important to them. The Social Web with rich user-generated content provides new challenges and opportunities for ADI. These contents are of “*human quality*” (in vivo code from Participant #39), leading to “*surprises*” (in vivo code from Participant #3, #10, #13) , and stimulating out-of-the-box thinking. This challenges mental models so that new ideas can be generated and new learning can take place. In order to acquire these serendipitous learning experiences, the users in this study reported that they are able to facilitate ADI through their strategic adoption of social web technologies. For example, sometimes users would use the specific social tools in the way different from their original designed purpose in order to increase the chance to receive information. Participant #13 said, “*I use Facebook to subscribe to one social media called... It daily publishes social news on the Facebook and some of them are very interesting and help me to know a lot of stuff, new technologies, and business...*” Facebook™ was a platform designed mainly for social networking, but the participant user used it as a subscribing tool for monitoring the information of interest.

6.0 CONCLUSIONS

This study was conducted to provide an initial understanding and explanation of accidental discovery of information (ADI) in the context of Social Web. ADI and Social Web are both complex concepts for conceptualizing. This study attempted to contribute to the development of this specific area of information behaviors, which can be considered as the continuing effort of user-centered information behavior research. The ultimate goal of improving the understanding of information behaviors is to benefit improving information services and systems for facilitating information acquisition processes of users.

This study addressed the two broad research questions (RQ):

RQ1: What are the characteristics of ADI on the Social Web?

RQ2: What are the users' perceptions about ADI on the Social Web?

The purpose of RQ1 was to provide an understanding of critical elements of the investigated phenomenon (i.e., ADI on the Social Web). RQ2 was focused on an exploration of users' perceptions to the phenomenon.

The above research questions were addressed using a mixed-method research design, involving both quantitative and qualitative methodology. The data collection methods applied in this study included a survey, self-employed log keeping, and semi-structured interviewing. The study recruited 45 participants for the survey from an academic environment. The follow-up logging and interviews were conducted with the 13 participants purposefully sampled from the

survey sample. Quantitative data were analyzed by descriptive statistics and qualitative data were transcribed and analyzed by qualitative content analysis to provide themes and descriptive findings. All the findings are integrated and interpreted to identify key concepts to address the research questions.

This chapter discusses the contribution and implications of these findings for information user, library services, and system design. The remaining sections address the study's limitations and outline the areas that have potential for future research.

6.1 STUDY IMPLICATIONS

This study provides a few implications in the context of information behavior research and library professions. Three groups of implications are discussed in this section:

1. Implications for information system design
2. Implication for library instruction
3. Implications for methodology of information behavior

Implications for information system design

Information systems should have characteristics that facilitate ADI, and avoid including the characteristics that inhibit ADI. The data from the interview participants suggest that the social tools conducive for ADI should have the following features or mechanisms:

- *Providing community-based Q & A*, either as a main feature or as an archive of user-generated Q & A within a website. It involves real experiences from real people with

different backgrounds and levels of knowledge. ADI may occur when browsing through the answers to questions other users made.

- *Suggesting links to related items or mechanisms of recommendation.* For example, YouTube™ would automatically generate a list of videos of related topics, and recommendation features on some shopping sites provide lists based on items purchased or recommended by other users. The contents on Wikipedia™ may contain manually created list of relevant pages and contextual links within the body of the contents.
- *Serving as an aggregator for various social tools or information sources.* Aggregation can create an environment with rich information; for example, integrating both authoritative and user-generated content in one place to create new discussions or ideas.
- *Providing mechanisms to stimulate response and interaction.* For example, Yahoo! Answers™ has a system of points and levels to reward great answers and encourage users' participation. With such mechanisms to stimulate response and interaction, the tool can involve great activity and produce rich contents for serendipitous browsing and learning.
- *Supporting storing, organizing, and reusing.* This study observed that participants sometimes would experience an 'incubation' period before they found the discovered information is useful. This finding supports the need of services, either functions embedded in systems or independent applications, for storing, organizing and reusing the information discovered on the Social Web.
- *Providing search functions suitable for searching user-generated content.* For example, Participant #1 suggested natural language-based search features should be included into the design of systems for ADI.

On the other hand, the following characteristics should be avoided when design systems supporting ADI because they may inhibit ADI:

- *The mechanism of updating results or responses out of context.* For example, Participant #1 commented that he does not like WikiAnswers™, compared to Yahoo! Answers™. On WikiAnswers™, the answer is dynamic. It can be edited and improved upon by multiple users, seeking to a single, complete answer. In addition, identical questions are merged into one and the answers will be combined. Yahoo! Answers™, on the other hand, takes user questions and answers individually. There is no dynamic adding or improving to a single answer, but rather lists of answers submitted by individual users. Thus, users may keep seeing repetitive questions and answers on Yahoo! Answers™. Participant #1 preferred the latter mechanism to the former one because he found answers on WikiAnswers™ are usually incomplete and lacks of broad contexts. This cannot help users to situate an answer or information need in a large context.
- *Failure to demonstrate that real people are involved.* One of the reasons participating users like about ADI on the Social Web is that the discovered information on the Social Web has “*human quality*” (in vivo code from Participant #39). It is the real experiences from real people that they appreciate. Therefore, demonstrating that real people are involved is important.
- *Failure to encourage deep interaction among people.* If a system does not provide enough initiatives or fails to address users’ privacy concern, it will prevent users from engaging in deep interaction. The results of this study support that social connecting and interaction is one of the precipitating conditions fostering ADI. Thus, this issue should also be considered when designing systems.

Implication for library instruction

This study found there is a tendency in users — Those users who know more about the features and mechanism of a social tool are more likely to utilize the tool to develop a strategy or establish an ‘information ground’ conducive for ADI. For example, some participants in this study viewed Facebook™ the least useful tool for ADI, but some others considered it as the most useful tool. This individual difference is generated from the different ways users use it. Users who have positive experiences for ADI in specific tools are those who knew and used some features (e.g., using Facebook™ as a subscribing tool for contents provided by professional communities) that the users who have negative experience don’t use. Also, several participants commented that since they participated in this study they have started to view ADI as one of the elements of information behavior and start to consider the value of ADI when using social tools. These findings suggest that library use instructors may want to incorporate ADI and Social Web. These directions should be considered in the instructional design:

1. Encouraging users’ appreciation of ADI as a supplementary approach of acquiring information, by teaching users to increase the opportunities of serendipitous learning by taking advantage of tools supporting exploratory search, browsing or ADI such as del.icio.us randomizer², visualized search tools (e.g., Zippa³), random search engines (e.g., StumbleUpon⁴, BananaSlug⁵), etc.
2. Suggesting that users choose specific social tools such as social networking sites, human-intermediary search tools, microblogging services, or user-generated content search tools

² <http://delicious.com/browse?source=stacks&sort=recent>

³ <http://www.ziipa.com/>

⁴ <http://www.stumbleupon.com/>

⁵ <http://www.bananaslug.com/>

as information resources; and teaching them to use these social tools as strategies to acquire unexpected information.

3. Teaching that specific tools such as social bookmarking/cataloging sites or subscribing tools can be used to manage information accidentally discovered on the Social Web.

Implications for methodology of information behavior

Finally, this study has implications for the use of mixed-method study within LIS scholarship. This study used a triangulated, multi-phase research method combination may guide and spark interest among other researchers in the field for using this multiple methods approach. The research design, instrument development, and data collection as well as analyses are described in detail in this dissertation. This may then contribute to the richness of the growing body of information behavior science and theory.

6.2 STUDY LIMITATIONS

Although this study design makes many efforts to ensure the trustworthiness of the research, it does have limitations linked to the research design. The first limitation relates to the limitations intrinsic to the nature of qualitative inquiries. The exploratory qualitative methodology in this study is designed to produce findings that give in-depth insight into a particular phenomenon that is observable in a particular context. This study is not intended to produce generalizable explanations. Specifically, the descriptive findings reported by the study participants cannot be generalized to the academic population from which the study sample is drawn, or to some other population, because this study does not adhere to strict sampling procedures. Formal sampling

was not necessary for the exploratory purpose of this study. Instead, purposeful sampling was used to ensure that rich data of ADI experiences on the Social Web were collected from the participants.

The second limitation is that participants in this study are all graduate students of the information professions. Although the unit of analysis in this study is primarily focusing on individuals, some of the information behaviors reported in this study may be unique to this population.

Furthermore, the incidence of ADI is unpredictable. The researcher cannot actually observe ADI behaviors as they occurred. People's mental and cognitive states are not directly observable either. The data collection has to primarily rely on self-reporting. This limitation may result in under-analysis of the phenomenon.

6.3 SUGGESTIONS FOR FUTURE RESEARCH

The area of ADI research is immature and underdeveloped in the information behavior research. There remains a lot of room for future research. First, more efforts should be focusing on how to support ADI in the Social Web environments. As presented in this study, information users are increasingly relying on the web-based social tools for ADI. Future research is needed to comparatively address different types of social tools (e.g. collaboration tools, social networking tools, etc.) and identify what characteristics encourage and what inhibit ADI. The potential directions for exploring this research area include

- characteristics of triggers (i.e., serendipitous content) and precipitating conditions;

- characteristics and processes of ADI in different contexts, for example, tasks, social networks;
- the timing of providing triggers;
- how to support saving, management, and reusing of discovered information.

Developing tools or approaches to support ADI is another potential research area. Current researches are primarily focusing on the triggers of ADI. Personalization (André, Schraefel, et al., 2009), use of ambient intelligence (Beale, 2007), social navigation technologies (Brusilovsky, 2008) are promising directions regarding finding the triggers for ADI and facilitating bisociation. These technologies may involve using the techniques of visualization, collaborative filtering, social tagging, recommendation systems, social search and browsing, etc.

Supporting the process of incubation is also important. Bisociation is not always immediate. Sometimes accidental information requires a process of synthesis to become useful for an individual. This study found that many participating users would try to re-find the specific information learned from ADI a while ago. It is the evidence of incubation. Sawaizumi, Katai, Kawakami, and Shiose (2007) tested the effectiveness of using a physical card system as an aid for the incubation stage of ADI. The 14 participants were asked to record interesting observations over a period of six months. Sawaizumi et al. (2007) recognized that keeping down the encounters on the cards is the process of externalizing notices from our brains. It provided the students with opportunities to think more deeply, and then creativity can be nourished. More similar studies for incubation are needed in the ADI research.

APPENDIX A. SURVEY QUESTIONNAIRE

Participant #: _____

Date: _____

Location: _____

Purpose of the Survey

People are usually looking for answers to address some problems or queries by seeking information online. However, we may often accidentally bump into useful information (or information of your interest), which you are not looking for on purpose. This serendipitous way of acquiring information is called “accidental information discovery” or “serendipity.” This survey is part of a dissertation research project, which aims to understand people’s experiences of accidental information discovery while using various social tools.

Overview of the Survey

This survey will take you about 20 minutes to finish. Before we start the questions on the next page, here is a little overview regarding what’s included in this survey.

Part I: to evaluate your use of social tools and the frequency of acquiring unexpected information via social tools.

Part II: to understand your experience of finding useful information via social tools and your general perceptions to the experience.

Part III: to record some background information about you so that I could further analyze the results accordingly.

Turn to the next page to continue reading.

Part I. Use of Social Tools and Accidental Information Discovery

In Part I, I will be asking you to classify the social tools you use into 5 categories: (1) communication, (2) collaboration, (3) sharing, (4) subscribing, and (5) social search.

If you are not familiar with any of them, you may find definitions and examples under each title:

1. **Communication tools:** Tools that support information transfer and/or exchange for the purpose of communicating and social networking. (e.g., Facebook™, MSN Messenger™, Twitter™, online forums)
2. **Collaboration tools:** Tools that enable two or more users synchronously or asynchronously communicate to identify or generate information for accomplishing a task or solving a problem. (e.g., MSN Messenger™, audio/video conferencing, wikis)
3. **Sharing tools:** Tools that support distribution of experiences or/and resources. (e.g., blogs, Flickr™, YouTube™, del.icio.us™, CiteULike™)
4. **Subscribing tools:** Tools that enable users subscribe to user-generated content or media for consistently receiving the most updated information from specific recourses. (e.g., Google Reader™, Netvibes™, Pageflakes™, My Yahoo!™, Rojo™, Bloglines™, Fwicki™)
5. **Social search tools:** Tools that support search/exploration in the social networks (e.g., ex.plode.us™), search with the help of social computation (e.g., Swicki™, tag clouds or tag engines), or search for the user-generated information (e.g., Yahoo! Answers™, Wikipedia™).

Note:

One tool can be classified into two or more categories.

Some social tools have multiple functions, so you may check more than one category depending on how you use it. Please check all that apply.

EXAMPLE:

MSN Messenger™ can be a communication tool or a collaboration tool. If you use MSN Messenger™ for communication but not for collaboration, you would check MSN Messenger™ as the Communication Tools category but not the Collaboration Tools category.

Turn to next page to start the survey.

	Q1) How frequently do you use such a tool? (Check ONE) Note: Skip Q2 and Q3 when you answer 'Never' to Q1.					Q2) How do you use this tool? (Check ALL THAT APPLY)					Q3) How frequently do you bump into useful information (or information of your interest) when using this tool? (Check ONE)				
Tool List	Never	Rarely	Sometimes	Often	All the time	Communication	Collaboration	Sharing	Subscribing	Social search	Never	Rarely	Sometimes	Often	Always
AIM™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Audio/Video conferencing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bloglines™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blogs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bookmarking tools on browsers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CiteULike™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
del.icio.us™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Digg™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dropbox™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
email	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ex.plode.us™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Facebook™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flickr™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Q1) How frequently do you use such a tool? (Check ONE) Note: Skip Q2 and Q3 when you answer 'Never' to Q1.					Q2) How do you use this tool? (Check ALL THAT APPLY)					Q3) How frequently do you bump into useful information (or information of your interest) when using this tool? (Check ONE)				
Tool List	Never	Rarely	Sometimes	Often	All the time	Communication	Collaboration	Sharing	Subscribing	Social search	Never	Rarely	Sometimes	Often	Always
Fwicki™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Google™ Blog Search	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Google Docs™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Google Reader™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Google Talk/Chat™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Google Wave™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jing™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LibraryThing™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LinkedIn™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
mailinglist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MySpace™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My Yahoo!™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MSN Messenger™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
online forums/ message boards/ BBS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Q1) How frequently do you use such a tool? (Check ONE) Note: Skip Q2 and Q3 when you answer 'Never' to Q1.					Q2) How do you use this tool? (Check ALL THAT APPLY)					Q3) How frequently do you bump into useful information (or information of your interest) when using this tool? (Check ONE)				
Tool List	Never	Rarely	Sometimes	Often	All the time	Communication	Collaboration	Sharing	Subscribing	Social search	Never	Rarely	Sometimes	Often	Always
Picasa™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Plurk™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Podcasts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reddit™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Skype™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
tag clouds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Twitter™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WikiAnswers™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wikipedia™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
wikis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wink™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yahoo! Answers™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YouTube™	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Part II. General Perceptions to Information Acquisition via Social Tools

Q4) Keeping in mind the social tools you regularly use, check the box that most describes your perception to each statement and question below.

(Check ONE box for each)

	Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree
4.1) Social tools are useful when I need information to address problems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.2) Social tools are useful for encountering unexpected information.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.3) I expect I will bump into useful information (or information of your interest) when using or when about to use social tools.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4) The anticipation of bumping into useful information (or information of your interest) is one of the reasons I use social tools.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.5) The previous experience of bumping into useful (or information of your interest) via social tools is one of the reasons I continue to use social tools.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.6) Bumping into information via social tools is one of my strategies to acquire information.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.7) The information, which I accidentally encountered via social tools, is usually trustworthy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.8) The information, which I accidentally encountered via social tools, is usually useful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.9) I use the Internet as my main source of information.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.10) I use the social tools as my main source of information.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Never	Rarely	Sometimes	Often
4.11) How often do you use social tools to actively seek information?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.12) How often do you accidentally encounter useful information (or information of your interest) while using social tools?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q5) Which social tool(s) do you feel are the most useful for accidentally bumping into useful information (or information of your interest)?

Q6) Which social tool(s) do you feel are the least useful for accidentally bumping into useful information (or information of your interest)?

Q7) How do you usually use the information you accidentally encountered?
(Please check ALL THAT APPLY.)

- ☐ Immediately use it to address academic work.
- ☐ Immediately use it to address everyday-life work.
- ☐ Immediately use it to address professional work.
- ☐ Save it in some way for future use.
↳ Q7.1) Please specify how you save and manage the information:

- ☐ Share it with others.
↳ Q7.2) Please specify what tools you usually use to share:

- ☐ Do nothing with it.
↳ Q7.3) Please specify why:

Q8) When did your most recent experience of accidentally bumping into useful information (or information of your interest) happen via social tools? (Please check ONE)

- ☐ Today
- ☐ Yesterday
- ☐ Within the past week
- ☐ Within the past month
- ☐ Unable to recall

Q8.1) Describe more about this incident: (1) What tool did you use when you bumped into the information? (2) What is the information about? (3) Why do you think this information is useful or interesting to you? (4) Had you ever tried to seek this information before? (5) What were you doing right before bumping into the information? (6) How did you use the information? (7) Did you save or share the information? If so, how and why?

Part III. Background Information

Q9) Your gender:

- ☐ Male
- ☐ Female

Q10) Your age:

- ☐ 20-25
- ☐ 26-30
- ☐ 31-35
- ☐ 36-40
- ☐ 41+

Q11) How frequently do you use Internet sources such as the Web, email, social tools and/or online databases? (Check ONE, the most specific.)

- ☐ All the time (Always)
- ☐ Several times a day (Often)
- ☐ Several times a week (Sometimes)
- ☐ Several times a month (Rarely)
- ☐ Never

Q12) Thinking generally about how and why you adopt new technologies, compared with your friends and colleagues, which of the following statements describes you best?
(Check ONE)

- ☐ I like to be the first to try out new gadgets before anyone else.
- ☐ I like to try out new gadgets if any of my friends have them, before they become popular; I think I grasp change more quickly than the average person.
- ☐ I'm careful about new gadgets, I'll try them out if many of my friends have them; I think I adopt them less quickly than the average person.
- ☐ I'm skeptical about new gadgets, I'll only get one when they have proved their worth.
- ☐ I am a traditional person, preferring the old ways, and critical of new gadgets.

Q13) Are you a native English speaker?

- ☐ Yes.
- ☐ No. Your native language is: _____; how long have you been to US: _____ year(s).

Q14) Please describe yourself by giving five labels to your own primary occupational, recreational, and life roles. It could be job title, hobbies, relationships, volunteer activities, etc. If you have more than five roles, please choose the five labels that most describe you.

(e.g., Information Science graduate student, part-time/full-time student, librarian, programmer, research assistant, friend, husband, father, gardener, dog owner, etc.)

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____

Participant #: _____

This is the end of the questionnaire. Thank you very much for your participation!

The results of this survey will be very valuable in helping me to better understand accidental information discovery on the Social Web.

In the next phase, I will be talking with people to ask them further questions about their experiences. You may be a good person to talk to.

If you would be willing to participate in the following-up research (Compensation of \$7 will be provided), please provide your first name and contact information. The interview will be scheduled at your convenience.

Name: _____

Email: _____

----- You may detach and keep the part below -----

If you have any questions or comments, please feel free to contact me.

Chi-Jung Lu
Doctoral Student
School of Information Sciences
University of Pittsburgh

412-xxx-xxxx
chl88@pitt.edu

APPENDIX B. INCIDENT LOG TEMPLATE

For the following days, please fill out **one log sheet each time** you accidentally bumping into useful (or information of your interest) when using online social tools. Thank you for your participating.

After finishing, please email these logs to chl88@pitt.edu or bring it with you to your scheduled interview session.

Participation #: _____ Duration: _____

Question	Answer
1. Today's Date: (mm/dd/yyyy)	
2. <u>What tool did you use</u> when bumping into useful information (or information of your interest)?	
3. <u>What is the information about</u> ? What are the <u>type and source</u> of the encountered information? (e.g., news told by a friend, literature shared by a group member in your project, shopping recommendations, etc.)	
4. <u>Why</u> do you think this information is useful or interesting?	
5. What were you <u>doing immediately before</u> bumping into the information? (e.g., checking email, talking to friend by instant messenger, browsing friends' messages on Facebook™, etc.)	
6. How did you feel and what were you thinking	

at the time you bump into the information?	
7. Have you ever tried to seek this information at any time before you bumped into it? (Yes/No)	
8. What did you do with this information? (Answer all that apply.)	
a. If you used the information <u>to address some problem or information need</u> , specify what the problem or information need is.	
b. If you <u>saved it for future use</u> , specify how you organized or managed the information.	
c. If you <u>shared it with others</u> , specify how or what tools you used to share.	

APPENDIX C. SEMI-STRUCTURED INTERVIEW PROTOCOL

Steps and Objectives	Primarily Asked Questions
<p>1. Introduction:</p> <ul style="list-style-type: none"> Describe the purpose of this follow-up interview; Complete ethics paperwork; Obtain permission to record the conversation; Explain key terminologies (e.g., ADI, Social Web, social tools). 	<ul style="list-style-type: none"> Is the purpose of this study clear to you? Is the procedure of this interview clear to you? Do you have any questions before we begin?
<p>2. Revisiting the responses to survey and log questions; gather more details to address RQ1:</p> <ul style="list-style-type: none"> Refresh the memory; Re-check the accuracy and completeness of the responses on the survey; Ask further details of the most recent experience reported in the survey and the overall ADI experience, especially the why- and how-questions. <p>(Questions with a star sign (*) may be asked depending on their previous responses.)</p>	<p>(Addressing Research Question 1: What are the characteristics of accidental discovery of information on the user-defined Social Web?)</p> <ul style="list-style-type: none"> According to Part II Q1.1-Q1.10, Tell me why you agree or disagree with the statement. Please explain why do you think [the tool(s) reported in questionnaire] is the most or least useful to accidental information discovery? Describe more about the process of the most recent experience(s) you reported in questionnaire and/or logs, for example: <ul style="list-style-type: none"> Do you routinely use this social tool? Is the activity immediately before bumping into the information a routine activity when you surf the Internet? *If you ever tried to seek this information at any time before you bumped into it, describe more about the experience. *How and why did you save or 'clip' the encountered information? Do you feel any problems with managing or reusing the saved information? *How and why did you share the encountered information?
<p>3. Discussion:</p> <ul style="list-style-type: none"> Dig individual participants' perceptions about their overall ADI experience; Focus on seeking responses for addressing RQ2. <p>(Question sequence, language used and exact question formulation will slightly vary among participants. Other relevant or 'digging' questions may emerge during interviews.)</p>	<p>(Addressing Research Question 2: How are the users' perceptions about ADI on the Social Web?)</p> <ul style="list-style-type: none"> Describe your everyday routine activities on the Social Web. What do you like/dislike about bumping into information on the social tools? Why or why not? When would you feel annoying? Do you think the accidental discovery of information on the social tools is important to you? Why or why not? Did you do anything to facilitate accidental information discovery on the Social Web? (e.g., subscribing friends' blog, bookmarking an online forum and checking it routinely) A lot of contents on the Social Web are user-generated (e.g., Wikipedia™, Yahoo! Answers™) or user-mediated (e.g., tag clouds, tag engines, Swicki™). How do you feel about it? When would you

	<p>prefer to use these user-generated/-mediated resources and why?</p> <ul style="list-style-type: none"> • Do you think ADI experience on the Social Web is different from ADI in real life or on traditional Web? In what way? (e.g., type of information, frequency) • Some information may have to be gone through a process of incubation to become important/useful. You might need to experience a process of synthesis to associate two previously unrelated concepts. Do you have similar experiences? • How do you decide to save an unexpected information or not? How do you retrieve this information back? • If you could create an environment of a social tool that is conducive to accidental information discovery, how would it look like?
<p>4. Closing:</p> <ul style="list-style-type: none"> • Collect any final comments, thoughts; • Thank the participant for cooperation. 	<ul style="list-style-type: none"> • Is there anything else related to our discussion that you might wish to tell me, or ask me?

APPENDIX D. IRB APPROVAL LETTER



University of Pittsburgh *Institutional Review Board*

3500 Fifth Avenue
Pittsburgh, PA 15213
(412) 383-1480
(412) 383-1508 (fax)
<http://www.ircrb.pitt.edu>

Memorandum

To: Chi-Jung Lu
From: Sue Beers PhD, Vice Chair
Date: 12/2/2009
IRB#: [PRO09100281](#)
Subject: Accidental Discovery of Information on the User-defined Social Web: An Exploratory Study

The University of Pittsburgh Institutional Review Board reviewed and approved the above referenced study by the expedited review procedure authorized under 45 CFR 46.110. Your research study was approved under:
45 CFR 46.110.(7)

The IRB has approved the waiver for the requirement to obtain a written informed consent for all participants completing the survey portion of the study.

Approval Date: 12/2/2009
Expiration Date: 12/1/2010

For studies being conducted in UPMC facilities, no clinical activities can be undertaken by investigators until they have received approval from the UPMC Fiscal Review Office.

Please note that it is the investigator's responsibility to report to the IRB any unanticipated problems involving risks to subjects or others [see 45 CFR 46.103(b)(5) and 21 CFR 56.108(b)]. The IRB Reference Manual (Chapter 3, Section 3.3) describes the reporting requirements for unanticipated problems which include, but are not limited to, adverse events. If you have any questions about this process, please contact the Adverse Events Coordinator at 412-383-1480.

The protocol and consent forms, along with a brief progress report must be resubmitted at least one month prior to the renewal date noted above as required by FWA00006790 (University of Pittsburgh), FWA00006735 (University of Pittsburgh Medical Center), FWA00000600 (Children's Hospital of Pittsburgh), FWA00003567 (Magee-Womens Health Corporation), FWA00003338 (University of Pittsburgh Medical Center Cancer Institute).

Please be advised that your research study may be audited periodically by the University of Pittsburgh Research Conduct and Compliance Office.

APPENDIX E. INTERVIEW DATA CODING SCHEME

Here is the full list of codes generated from the interview data:

Active searching via social tools	Motivation_Experience_No
ADI is a strategy of IA_No	Motivation_Experience_Yes
ADI is a strategy of IA_Yes	Open code_Context related
ADI is alternative/supplementary	Open code_Library instruction_No
ADI is important_No	Open code_Library instruction_Yes
ADI is important_Yes	Open code_Not rely on
Difference of ADI on the Social Web	Open code_Search engine concern
Expectation to ADI	Perceptions_Dislike about ADI
Facilitate ADI_Users' strategy to facilitate ADI	Perceptions_Like about ADI
Facilitate ADI_Features in ADI environment	Problem_Reusing info
Facilitate ADI_Supporting saving	Problem_Subscribing info
Information type	Social tools are useful for ADI_Yes
Information_How to reuse	Social tools are useful for problem_No
Information_How to save	Social tools are useful for problem_Yes
Information_How to share	Social tools as the main source of info_No
Information_is trustworthy	Social tools as the main source of info_Yes
Information_is useful	Social tools_Effect on information behavior
Information_Why not to save	Social tools_Why least conducive
Information_Why to save	Social tools_Why most conducive
Information_Why to share	User-generated content_Like about user-generated contents
Motivation_Anticipation_No	User-generated content_When to use
Motivation_Anticipation_Yes	

APPENDIX F. SAMPLE INTERVIEW SEGMENTS WITH CODES

This appendix provides some excerpts of the participating users' responses collected by interview sessions. The coding unit is mostly a paragraph in order to keep the context of discussions. A coding unit can be assigned more than one code.

Excerpts:

Participant #4

Codes: [Information_How to reuse] [Information_How to save] [Information_Why not to save]

I often bookmark websites. Saving pictures, videos. Google Talk saves [conversations] by default. When I need the information, just go back to search. I've never thought about there should be a tool supporting saving unexpected information.

Participant #31

Codes: [Perceptions_Like about ADI]

I like the surprise factor of [ADI on the Social Web]. I also like to have information from personal experiences. It can generate creativity or ideas.

Participant #39

Codes: [Social tools are useful for ADI_Yes]

I somewhat agree [with the statement of "social tools are useful for ADI"]. For example, Facebook. Sometimes it's just a movie I am interested in. I get a lot of things posted on my wall. Sometimes it's just an interesting video from YouTube. They see what you post, and you see what they post. It's an information hub I guess. I have friends always debating politics and it's always interesting to read what they posted. So yeah you can learn very interesting things from here.

Participant #23

Codes: [Social tools as the main source of info_No]

The Social Web usually gives me the right answer for the chance of fifty-fifty. It cannot guarantee to give me the answer that I want all the time.





Participant #31













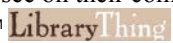

Codes: [Social tools_Why most conducive]









I use YouTube for entertainment and I always find something new. In the case of music, and I am just looking at my favorite band and that leads to other music [that] I find there is a similar quality just happen to fall into the seeds of recommendation. YouTube is like for me the Google of visual animated information.






APPENDIX G. SOCIAL TOOLS LIST

This list contains a concise description to each of 40 web-based social tools, which are used as a check list in the questionnaire for survey participants to report what tools they regularly use, how they use these tools, and the frequency of they experience ADI via these tools. The forty tools are selected in this final list based on the earlier refining process through the literature review and pilot study.

1. AIM™  AOL Instant Messenger (abbreviated AIM; <http://www.aim.com>) is a free chatting program, Using the AIM Buddy List® feature you can see when your buddies are online and available to instant message.
2. Audio/Video conferencing
Audio/video conferencing is a set of interactive telecommunication technologies, which allow two or more people in separate locations to interact simultaneously via two-way video and audio transmissions.
3. Bloglines™  Bloglines (<http://www.bloglines.com>) is a web-based personal news aggregator. Its main feature is Bloglines Reader supporting tracking the most updated websites and blogs of interest.
4. Blogs
A blog (or Web log) is single web page, usually maintained by an individual with regular entries of commentary, descriptions of events, or other materials such as graphics or video. Most blogs are interactive, allowing visitors to leave comments and/or message via widgets on the blogs and it is this interactivity that distinguishes them from other static websites. Many blogs provide commentary or news on a particular subject; others function as more personal online diaries. A typical blog combines texts, images, and links to other blogs, web pages, and media related to its topic.
5. Bookmarking tools on browsers
Each browser has a built-in tool for managing a saved list of Internet bookmarks. Bookmarks are called ‘favorites’ in Internet Explorer browser. Mozilla Firefox browser supports live bookmarks powered by RSS, in which live bookmarks are updated automatically, allows users to dynamically monitor changes to their favorite news sources. Instead of being treated RSS-feeds as HTML pages like most news aggregators do, bookmarks within Firefox are updated in real-time with a link to the original source.
6. CiteULike™  Citeulike (<http://www.citeulike.org>) is a free service, sponsored by Springer, for managing and discovering scholarly references. It features storing references found online, discovering new articles and resources, automated article recommendations, sharing references with peers, finding out who’s reading what you’re reading, storing and searching PDFs.
7. Del.icio.us™  delicious
Del.icio.us (<http://www.delicious.com>) is a social bookmarking service, now supported by Yahoo!, features allowing users to save all their bookmarks online, share them with other people, and see what other people are bookmarking. It can show the most popular bookmarks being saved right now across many areas of interest. In addition, its search and tagging tools help users keep track of their entire bookmark collection and find new bookmarks from people with similar interests.

8. Digg™  Digg (<http://digg.com/news>) is a social news website. Its cornerstone function consists of letting people vote stories up or down, called *digging* and *burying*, respectively.
9. Dropbox™  Dropbox (<https://www.dropbox.com>) is a web-based file hosting service that utilizes cloud computing technology to enable users to store and share files and folders with others across the Internet using file synchronization.
10. Email
Email is a method of exchanging digital messages from an author to one or more recipients. Today's email systems are based on a store-and-forward model. Email servers accept, forward, deliver and store messages.
11. Ex.plode.us™  Ex.plode.us (not available since 2010) was a website search engine that indexed people. It aggregated social data from Flickr™, 43 Things™, jaiku™, Live Journal™, tribe.net™, Twitter™, and YouTube™.
12. Facebook™  Facebook (<http://www.facebook.com>) is a social networking service.
13. Flickr™  Flickr (<http://www.flickr.com>) is an image and video hosting website supported by Yahoo! for users to share and embed personal photographs, the service is widely used by bloggers to host images that they embed in blogs and social media. Users can also form online communities.
14. Fwicky™  Fwicky (<http://www.fwicky.com>) supports RSS management, RSS catalogs, mobile device syndication, and provides RSS widgets and gadgets.
15. Google™ Blogs Search  Google blogs search (<http://blogsearch.google.com>) is Google search technology focused on blogs. It seeks every blog that publishes a site feed (either RSS or Atom).
16. Google Docs™  Google Docs (<https://docs.google.com>) is a web-based word processor, and a spreadsheet and presentation editor that enables users to create, store and share, offered by Google.
17. Google Reader™  Google Reader (<http://www.google.com/reader>) is a web-based aggregator, capable of reading Atom and RSS feeds online or offline, offered by Google.
18. Google Talk/Chat™  Google Talk/Chat (<http://www.google.com/talk>) enables instant messaging and voice over Internet protocol (VoIP) client application, offered by Google.
19. Google Wave™  Google Wave (<https://wave.google.com/wave>) is a web application and computing platform designed to bring together e-mail, instant messaging, wiki, and social networking, with a strong collaborative focus, mixed with spellchecker and translator extensions, which are able to work in concert and in real-time, offered by Google.
20. Jing™  Jing (<http://www.techsmith.com/jing>) is instant screenshot and screencast application, supporting captures anything users see on their computer screen, as an image or short video, and lets users share it.
21. LibraryThing™  LibraryThing (<http://www.librarything.com>) is a social cataloging web application for storing and sharing book catalogs and various types of book metadata. The end-users include individuals, authors, libraries and publishers.
22. LinkedIn™  LinkedIn (<http://www.linkedin.com>) is a business-oriented social networking site mainly used for professional networking.

23. **Mailinglist**
An electronic mailing list is a special usage of email that allows for widespread distribution of information to many Internet users. Each list usually has a topic of interest. People with shared interests subscribe to such a list and receive mails from each other.
24. **MySpace™ **
MySpace (<http://www.myspace.com>) is a social networking website offering an interactive, user-submitted network of friends, personal profiles, blogs, groups, photos, music and videos internationally.
25. **My Yahoo!™ **
My Yahoo! (<http://my.yahoo.com>) is a customizable web page with news, stock quotes, weather, etc. It also can serve as a RSS reader.
26. **MSN Messenger™ **
MSN Messenger (<http://www.msn.com>) is a form of real-time direct text-based communication between two or more people using personal computers or other devices, along with shared clients. It also allows enhanced modes of communication, such as live voice or video calling.
27. **Online forums/ message boards/ BBS (bulletin board system)**
An online discussion site or system where people can hold conversations in the form of posted messages. They differ from chat rooms in that messages are at least temporarily archived. Also, depending on the access level of a user and/or the forum set-up, a posted message might need to be approved by a moderator before it becomes visible.
28. **Picasa™ **
Picasa (<http://picasa.google.com>) is an image organizer and image viewer for organizing and editing digital photos, plus an integrated photo-sharing website, offered by Google.
29. **Plurk™ **
Plurk (<http://www.plurk.com>) is a social networking and micro-blogging service that allows users to send updates (known as plurks) through short messages with links or uploaded images, which can be up to 140 text characters in length. Updates are then shown on the user's home page using a timeline which lists all the updates received in chronological order, and delivered to other users who have signed up to receive them. Users can respond to other users' updates from their timeline through the Plurk.com website, by instant messaging, or by text messaging.
30. **Podcasts**
A podcast is a series of digital media files (either audio or video) that are released episodically and often downloaded through web syndication.
31. **Reddit™ **
Reddit (www.reddit.com) is a social news website. Users (also referred to as redditors) have the option to submit links to content on the Internet or submit posts that contain original, user-generated text. Other users may then vote the posted links 'up' or 'down' with the most successful links gaining prominence by reaching the front page. In addition, users can comment on the posted links and reply to other commentators consequently forming an online community.
32. **Skype™ **
Skype is a software application that allows users to make voice calls and chats over the Internet. Skype has also become popular for its additional features, which include instant messaging, file transfer, and video conferencing.
33. **Tag clouds**
'Tag clouds' is a visual depiction of user-generated tags, typically used to describe the content of web sites. Tags are usually single words and are normally listed alphabetically, and the importance of each tag is shown with font size or color. Thus, it is possible to find a tag alphabetically and by popularity. The tags are usually hyperlinks that lead to a collection of items that are associated with a tag. Sometimes, further visual properties are manipulated, such as the font color, intensity, or weight.
34. **Twitter™ **
Twitter (<http://www.twitter.com>) is a website which offers a social networking and micro-blogging service, enabling its users to send and read messages called tweets.

35. WikiAnswers™  WikiAnswers (<http://www.answers.com>) is an ad-supported wiki-based website where users can submit and answer questions. WikiAnswers.com uses wiki technology and fundamentals, allowing communal ownership and editing of content. Each question has a ‘living’ answer, which is edited and improved over time by the WikiAnswers.com community. The website also combines with free online dictionary, thesaurus, and encyclopedias.
36. Wikipedia™  A wiki-based encyclopedia built collaboratively. It allows users to create and collaboratively edit web pages using a web browser.
37. Wikis
A wiki is a website that allows the creation and editing of any number of interlinked web pages via a web browser using a simplified markup language or a WYSIWYG (i.e., what you see is what you get) text editor. Wikis are typically powered by wiki software and are often used to create collaborative works. It provides an easy way to build a personal or community website. Many users also use it for personal note taking.
38. Wink™  Wink (<http://wink.com>) is a people search engine, which enables users to find people by name and get their phone number, address, websites, photos, work, school, more.
39. Yahoo! Answers™  Yahoo! Answers (also known as Yahoo! Q & A; <http://answers.yahoo.com>) is a community-driven question-and-answer (Q&A) site launched by Yahoo! in 2005 that allows users to both submit questions to be answered and answer questions asked by other users.
40. YouTube™  YouTube (<http://www.youtube.com>) is a video-sharing website on which users can upload, share, search and view videos.

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