This study is concerned with information seeking behaviors and strategies on Twitter, a microblogging social network of some 75 million registered users. Data was collected using an electronic survey distributed to SILS listservs in February 2010. Responses from 126 active Twitter users were analyzed. Findings indicate that Twitter is not used as a search engine so much as a “serendipity engine”. Rather than actively seeking information, most users report they are passive participants in the network, picking and choosing tweets of interest among the constant flow of data. Users enjoy the immediacy of real-time information which is contextualized by a community of diverse individuals. System recommendations are suggested, particularly as they pertain to advanced search features and filtering to reduce noise and locate accurate results in cases where specific information is sought. The exploratory nature of this work lays a foundation for future study while providing insights to scholars and system designers.

Headings:

- Computer communications.
- Information behavior.
- Online social networks.
- Twitter.
THE USE OF TWITTER IN EVERYDAY LIFE INFORMATION SEEKING

by
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A Master’s paper submitted to the faculty of the School of Information and Library Science of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Master of Science in Information Science.

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Approved by

_______________________________________
Diane Kelly
INTRODUCTION

The emergence of the social Web, or Web 2.0, as it is popularly known, transformed communication and information sharing via the Internet in the latter half of the past decade. Web 2.0 refers to applications that foster communities of interest and collaboration, including online social networks (OSNs), blogs, video-sharing sites, folksonomies, and wikis. Sites like these put users at the center of the publishing model, making them active creators and augmenters of content, in comparison to the static Web, in which users are only able to view page content created by others.

Tailor-made content is a growing trend in media and entertainment. Users have essentially become subject filters, picking and choosing sources that have the most relevance to their own lives. Twitter is a relatively new Web tool that thrives on this user-centered model. Launched in July 2006, Twitter is a microblogging website that combines the characteristics of its predecessors, blogs and OSNs, in a unique collaborative environment of real-time information exchange.

Blogs were one of the first forms of personal publishing to become popular within the Web 2.0 framework. Essentially, blogs are diaries or commentary maintained by organizations or individuals which tend to attract specific audiences based upon their subject matter and style. A tremendous amount of diversity has been found among the content of blogs and the motivation for blog maintenance. As Nardi, et al. state in their
“Blogging is an unusually versatile medium, employed for everything from spontaneous release of emotion to archivable support of group collaboration and community.” (Nardi, et al., 2004, p. 46).

While blogs represent a fluid community of users who do not necessarily know one another personally, OSNs are self-organized collections of friends and acquaintances who gather in a virtual space by way of online profiles that serve to anchor and connect them to other individuals. OSNs were first defined in boyd and Ellison’s seminal paper, *Social Network Sites: Definition, History and Scholarship*. The authors distinguish OSNs as “web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system.” In a separate publication, Boyd extended this definition by identifying four unique properties that separate these “networked publics” from other social contexts: persistence, searchability, replicability, and invisible audiences.

Twitter combines the salient features of blogs and OSNs in one. Prompted with the question, “What’s happening?” users post “tweets”, or pithy messages of 140 characters or less, which are then broadcast to a group of friends and interested observers that “follow” the user, or subscribe to his tweet stream. Tweets are circulated through a variety of channels, including email, text message, instant message (IM), mobile phone, email and the Web. As Java, et al. point out, “By encouraging shorter posts, [microblogging] lowers users’ requirements of time and thought investment for content generation…a microblogger may post several updates in a single day.” Because of this, Twitter is also called “constant contact media”, or “quick-ping media” (McFedries, 2007).
A user’s history of tweets is displayed on his profile page, while the user can view a continuous stream of tweets published by those he follows on his homepage. Twitter reveals limited profile information such as the user’s name, location, website URL, and 160 character bio. The user can elect to post this information or may choose not to, and also has the option to apply privacy settings to his tweets so that they are only viewable by pre-approved followers.

Twitter is currently one of the most popular OSNs in the world, ending 2009 with just over 75 million registered users (themetricsystem.rjmetrics.com, 2010). Twitter was the third ranked OSN in compete.com’s January 2009 poll based on monthly visits, which *The New York Times* reports as approximately 54 million per month (Stone, 2009). The website’s membership has exploded since the spring of 2008, when it was estimated there were just over a million total users. The surge in recent celebrity memberships is one reason for this upward trend and increased attention on the site. When Oprah introduced her audience to Twitter in April 2009, some 500,000 to 1.5 million new enrollments were credited to her endorsement over the course of three days.

Given its widespread use and acceptance in the mainstream, Twitter has inspired a great deal of publicity and hype. Two areas that have drawn particular interest in Twitter are commercial marketing and its functional use in work. As Twitter’s co-founder and chief executive Evan Williams points out, “Many people use it for professional purposes — keeping connected with industry contacts and following news. Because it’s a one-to-many network and most of the content is public, it works for this better than a social network that’s optimized for friend communication” (Miller, 2009). Indeed, Twitter is a unique social network precisely because it offers individuals access to others with whom
they do not have tangible connections in their normal lives, e.g. celebrities, vendors, companies, and industry leaders. This access to strangers in a real-time data stream is key to the richness and breadth of information available to anyone in the network.

Twitter is still a very new Web tool, particularly in reference to its popularity. As site traffic has increased, the value of information exchange among its network has also risen. Yet while more and more people are incorporating Twitter into their daily routines, little research has been conducted on the effect this technology has on people’s lives. Many questions remain unanswered, particularly as they relate to people’s selection of Twitter among a variety of possible information sources.

This research pertains to how users search and find information related to their personal and professional interests on Twitter. Areas of exploration include how users incorporate this information into their daily lives and whether users feel this social networking tool gives them a unique advantage that can be leveraged as speculators purport. This study examines the following two research questions:

**Question 1:** How and why is Twitter incorporated into everyday life information seeking?

**Question 2:** How do Twitter users locate information sources on the site that are relevant to their information needs?

As more and more content is produced and disseminated across the Web, there is a considerable need for systems that can help users navigate this increasingly complex information universe. Twitter is a Web 2.0 tool that can save people time and energy in their information-seeking tasks. It does so by making users curators of content. Users determine their information sources and are treated to a continuous stream of real-time
updates on topics of interest to them. This highly personalized model puts users in control of their information acquisition.

Twitter presents a rich social framework that has yet to be adequately addressed by scholars. The reason research on the topic is extremely limited at present can be partly attributed to the fact that Twitter is so new, particularly in terms of its mainstream popularity. Yet there is a distinct need to investigate characteristics of this network from both the systems and human perspective to learn about the advantages and disadvantages it presents to information seeking.

This study’s findings can provide useful information to sociologists, psychologists, communications scholars, information and library science scholars, system designers, and others researching computer-mediated communication to broaden and diversify current understanding in the field. The implications are both practical and theoretical. In practical terms, this study may help system designers to better assess user needs in order to improve the structure and utility of social software. In theoretical terms, the study may help towards improving and refining the current state of knowledge. The study will help to determine motivations for Twitter ELIS use and will discern the perceived value of the site for information seekers.

**LITERATURE REVIEW**

This literature review draws together a body of research that is fundamental to the microblogging phenomenology. It addresses such topics as everyday life information-seeking, information dissemination and knowledge building, the strength of weak ties in
networks, as well as previous research and trends specific to the study of Twitter. Since the latter is in its infancy, most scholarly attention has been exploratory and descriptive. Topics and themes are emerging, however, particularly word-of-mouth information diffusion and users’ reliance upon their social ties—both strong and weak—as trusted sources of a continuous stream of original information.

**EVERYDAY LIFE INFORMATION SEEKING**

Savolainen coined the term “everyday life information seeking” (ELIS) in his 1995 paper of the same title. His work is fundamental to ELIS research in the field of information and library science. In this seminal study, Savolainen defined several concepts for understanding how people’s habits, beliefs, attitudes, and values affect their information seeking and choice of information resources. The article reviews two major dimensions of ELIS: the seeking of practical and orienting information. Savolainen also introduces the concepts “way of life” and “mastery of life”. “Way of life is defined as the ‘order of things,’ manifesting itself, for example, in the relationship between work and leisure time, models of consumption, and nature of hobbies. Mastery of life is interpreted as ‘keeping things in order’” (p. 259) and refers more to the cognitive processing of individuals as they respond to situations, risk factors, and the control of circumstances at hand. It is important to note that Savolainen does not separate work from the plethora of everyday life information seeking, as he recognized there is frequently overlap between the two for the needs and applications of information in people’s lives.

Savolainen conducted his study in the fall of 1993 by interviewing two groups of people in Finland whose ways of life were assumed to be extremely different due to their social classes—one group was identified as middle class (teachers), the other as working
class (workers). Education and the nature of their professional tasks were central to the assumptions that way of life would contrast dramatically between these groups. A total of 22 subjects were interviewed with 11 subjects in each group for equal representation. The specific questions addressed in the study were: (1) How do way of life and mastery of life determine ELIS practices in regard to seeking orienting information?; (2) How do way of life and mastery of life affect ELIS practices in regard to seeking practical information that serves in the resolution of specific problems?; and (3) What is the value of the above research framework in the study of information seeking? Interviews lasted about 1 hour and 30 minutes each and were thematic, focusing on work tasks, leisure activities, ways of seeking information and the types of media used. After general discussion, the subjects were asked to describe a problematic situation they had recently encountered. Their responses were examined through qualitative analysis to identify the problem-solving behavior and seeking of practical information (p. 270).

Savolainen’s findings suggest that information seeking takes place in the context of the larger net of an individual’s psychology – his or her values, attitudes, and interests. “ELIS receives its meaning through these [characteristics]. In most cases, the relevance of different information sources and channels is evaluated on the basis of their familiarity and effectiveness in information use situations” (p. 267). Another significant finding was that the selection of information resources was not always a question of the content, but rather the form and its familiarity and accessibility to the individual:

“Indeed, all motives of mass media use cannot be reduced to purposeful information seeking alone. For example, some part of the regular reading of daily newspapers may be explained by referring to the individual’s unreflected feeling of attachment and belonging in the community. Thus a newspaper can be seen as a sign of this quality of belonging, eliciting interest to see how the community evolves.” (p. 273-274)
This statement is particularly relevant to a study of Twitter in that it exemplifies the multidimensionality of the website as a social network as well as information channel. Users are not likely to choose or frequent Twitter for its informational content alone. There are social implications that go beyond information bits; individuals are likely to become accustomed to the familiarity of the technology and the feeling of being tied to a community in this forum.

Additionally, in addressing the weaknesses of his study, the author makes recommendations for methodology design in future ELIS research. He admits that “reconstructions given by informants in unique interviews tend to remain quite unspecified due to difficulties in the recollection of various phases of problem solving” (p. 291). He suggests that longitudinal studies with interviews and logs would be preferable for maintaining an accurate and detailed record of information seeking processes and transactions.

Savolainen built upon this early research in his 2004 article, *Conceptions of the Internet in Everyday Life Information Seeking*. Similar to the methods and findings of the paper above, this study was based on interviews with 18 Finnish people from 2001 to 2002 exploring their attitudes and acceptance of the Internet as a source preference for ELIS. Two major concepts of the Internet were identified. “First, in metaphorical conceptions, the Internet was primarily conceived in terms of space or place, for example, a library or bazaar. Second, conceptions based on actual use experiences of the Internet significantly drew on quality judgments of the networked sources” (p. 219).

The mental model of the Internet as a physical space with areas of varying quality has compelling implications for the Twitter study. It is important to note the year in
which this study was conducted. In 2001-2 the Internet was relatively new and subjects’
comments indicated a sense of being confused and overwhelmed by this chaotic and vast
“assembly” or “global network” (p. 224). One subject described the Internet as a “big
bang” and said “there is a lot of good information and a big amount of correct
information…one may find two totally opposite interpretations of the same issue. So,
you have to know very well where and what to search” (p. 224). Viewed in this
framework, Twitter may become a preference for users because it is an assembly of their
own trusted sources and a space where they can go to converse with contacts they know
can provide quality information.

THE STRENGTH OF WEAK TIES

Granovetter’s 1973 study The Strength of Weak Ties was groundbreaking for its
time and continues to be one of the most cited and discussed pieces of literature in
sociology and network theory. The author addressed a major gap in sociological theory
by connecting the micro and macro levels of social networks and challenging the
common wisdom that individuals are more likely to receive benefits from others with
whom they share stronger social ties. Granovetter’s major argument was that “those to
whom we are weakly tied are more likely to move in circles different from our own and
will thus have access to information different from that which we receive” (p. 1371). In
other words, the more exposure an individual has to a diversity of ideas and novel
information, the more advantage he has to leverage.

Granovetter performed a labor market study of recent professional, technical, and
managerial job changers in suburban Boston, asking “those who found a new job through
contacts how often they saw the contact around the time that he passed on job
information to them.” The frequency of contact was used as a measure of tie strength (p. 1371). Of the respondents, 55% percent reported they saw their contact occasionally (more than once a year but less than twice a week) and 27.8% reported they saw their contact rarely (once a year or less). Another significant finding was the directness of the messages or information. The author expected long paths to be involved. “But in 39.1% of the cases information came directly from the prospective employer, whom the respondent already knew; 45.3% said that there was one intermediary between himself and the employer; 12.5% reported two; and 3.1% more than two.” (p. 1372). These short paths for information meant the receiver had greater opportunity to utilize the message and get the job before others heard about the vacancy.

Granovetter’s study is central to my own research questions since it goes to the heart of information diffusion processes. As Granovetter’s findings suggest, individuals can gain quite a bit by placing themselves in the flow of novel information outside the purview of their daily experience. On a site like Twitter, users have the opportunity to receive direct messages from industry experts, organizations, celebrities, and individuals of interest who control or are privy to information channels to which users would otherwise have no access. The particulars of the study, namely its focus on work-related benefits, also directly relate to my research questions about searching Twitter for professional information purposes.

MICROBLOGGING, A NEW FORM OF COMMUNICATION

McFedrie’s 2007 editorial Technically Speaking: All A-Twitter described the idiosyncrasies of Twitter microblogging, along with its lingo, pros and cons, fans and critics. According to McFedrie, Twitter—and sites like it—are known as “notification
tools”, “quick-ping media”, or “constant-contact media”. The author noted major criticisms of the site stemmed from people’s aversion to the banality of trivial updates and the potential narcissism of users. At its best, however, McFedrie recognized the power of “virtual omnipresence” and the ability to be “ultraconnected” in a real-time information stream.

Empirical research on Twitter also began at about this time. In their exploratory study, *Why We Twitter*, Java, et al. examined the “topological and geographical structure of Twitter’s social network and attempt to understand the user intentions and community structure in microblogging” (p. 57). They collected a total of 1,348,543 tweets from 76,177 distinct users by aggregating data from the Twitter API every 30 seconds over the course of two months. They mathematically analyzed this data in several ways, including parsing growth patterns, user activity and retention, network properties (who followed whom and instances of mutual acquaintance in the graph), geographical distribution, and user intention (how and for what purpose users were tweeting). The last of these features incorporated the HITS algorithm, revealing hubs and authorities for information within the network. Separately, the authors also identified communities in the network (“vaguely defined as a group of nodes more densely connected to each other than to nodes outside the group” (p.60)).

The authors found that Twitter is a social network where communities of interest propagate not only to exchange information but also to share personal feelings and daily life experiences. The diversity of information flowing through this network is striking. The authors distinguish four main user intentions: (1) daily chatter; (2) conversations; (3) sharing information/URLs; (4) reporting news; and three main categories of users: (1)
information source; (2) friends; (3) information seeker. It is important to note the definitions ascribed by the authors to two of these three categories:

**Information Source** An information source is also a hub and has a large number of followers. This user may post updates on regular intervals or infrequently. Despite infrequent updates, certain users have a large number of followers due to the valuable nature of their updates. Some of the information sources were also found to be automated tools posting news and other useful information on Twitter.

**Information seeker** An information seeker is a person who might post rarely, but follows other users regularly.

*(p.63)*

*Why We Twitter* describes this microblogging universe (or the colloquial “twitosphere” (McFedries, 2007)) and its many unique characteristics. The data suggests the website’s purpose and usage is primarily informational with strong social and community orientation. The article also provides several definitions and a framework for understanding the communication and information exchange taking place within the network. Significant findings reveal that many users participate in the network primarily as recipients rather than as posters, and that some users are information hubs due to the quality of the information in their posts despite the infrequency of their updates. This would indicate the value of the information being exchanged on Twitter and justify its incorporation as a source preference in ELIS.

Zhao & Ronson’s *How and Why People Twitter: The Role that Microblogging Plays in Informal Communication at Work* expands upon this seminal paper. The authors studied how microblogging might act as an informal communication medium for collaboration in the workplace. The authors conducted semi-structured phone interviews (about 40 to 60 minutes each) with 11 participants (seven men and four women) from a large IT company. They had two sets of research questions, “including (1) people’s current micro-blogging practices (characteristics of content shared, what makes them
share such information on Twitter); and (2) their experiences micro-blogging with co-workers (consequential effects that micro-blogging have or might have on collaborative work; issues encountered, opinions and anticipated feature needs). Questions were asked from both sender and receiver perspectives.” (p. 245).

The authors’ findings repeated those of Java, et al. above. “Our interviewees reported using Twitter for a variety of social purposes, including … (2) raising visibility of interesting things to one’s social networks; (3) gathering useful information for one’s profession or other personal interests; (4) seeking for helps and opinions.” (p. 245).

Many of the study’s subjects preferred Twitter to regular blogging because the compressed format of 140 characters was easier and less taxing on time and mental resources; because of this, they tended to read and post more messages. The live updates in real-time were reported as being more useful and valuable to subjects than older information, particularly for products and services related to work tasks. One subject described finding information using review sites and more established resources prior to Twitter and pointed out how often the reviews were old and outdated.

“So I have no idea what people are thinking about the product today. But if you take the same term in Twitter, you will literally get what people are thinking about that product now … after doing research on twitter (sic), I get a sense, by reading some of the tweets, that the product may lack some maturity. I am able to trust that information just because that information is far more recent than those from Amazon or any other review sites.”

(p. 246-7)

The authors describe Twitter as a “people-based RSS feed”. Users curate sources from which they gather information by selecting whom to follow. Trust is identified as one of Twitter’s major benefits because people tend to follow others with similar interests who are active in their hobbies or professions. One subject said “he considered information gathered in his personal Twitter account as more relevant to his individual
interests and as having higher credibility.” (p. 247). Another subject said that by subscribing to experts’ updates, she “could keep current on industry status without having to go out and look for information.” (p. 247). The value of this information is due to the authors’ findings that posters tend to update and share when they find something truly interesting they expect will be useful to others.

In *Twitter Power: Tweets as Electronic Word of Mouth* the authors narrowed their focus to the trends of brand microblogging and the effects of electronic word-of-mouth (eWOM) on consumer opinion. They aggregated and analyzed data sets from Twitter over a 13-week period using an API provided by Summize. There were a total of 650 reporting episodes (13 reporting periods x 50 brands) (p.2173). For each brand the authors sought to determine the sentiment for a given period based upon the adjectives people used in their tweets; these adjectives were coded either as positive or negative along a 5-point Likert scale and then measured with the Bayes model to pick the sentiment with the greatest probability among a set of Twitter posts.

The authors addressed three research questions: 1) What are the overall eWOM trends of brand microblogging?; 2) What are the characteristics of brand microblogging?; 3) What are the patterns of microblogging communications between companies and customers? Several significant findings emerged from the data. Roughly 19% of all the recorded tweets mentioned an organization or product, 20% of which expressed a sentiment or opinion. That 80% did not express a sentiment “suggests people are also seeking information, asking questions, and answering questions about brands via their microblogs” (p. 2184). Additionally, the authors found general patterns in the way companies use Twitter for eWOM branding. Typically, companies used their Twitter
profiles as a forum to answer customers’ questions and allow them to express feedback (p. 2186).

The authors conclude that “Customer brand perceptions and purchasing decisions appear increasingly influenced by Web communications and social networking services, as consumers increasingly use these communication technologies for trusted sources of information, insights and opinions” (p.2186). Just as the subject described in *How and Why People Twitter*, this group of researchers contend that Twitter can be a powerful tool to disseminate product and purchasing information due to the trust inherent to the network. Since many users look to Twitter as a direct messaging tool on topics of interest to them, manufacturers and marketers can command the influence of this forum to increase their visibility and positive returns. The authors note their study was limited to major brands and suggest that future research could investigate small or local brands as a contrast or addition to their findings.

Finally, related to the word-of-mouth effect, Sankaranarayanan, et al. (2009) propose using Twitter as a news wire service, called *TwitterStand*, composed of user-generated content. Given the unique qualities of Twitter’s service, including its ability to capture real-time information and disseminate it broadly to a wide audience of followers, the authors believe there is untapped potential to capture and transmit tweets aggregated and targeted to various themes (aside from news, this could be sports, product recalls, celebrity gossip, etc.). The authors explore a design concept, which includes a map interface to establish geography and key algorithmic strategies to reduce “noise” (tweets with little informational content). They also discuss hashtags, an existing system feature that clusters posts with labels for easy search and browsing. “Hashtags are used as search
keys on the Twitter track interface to proactively search Twitter for more tweets belonging to a particular topic.” This is the only discussion of hashtags in the current literature, and pinpoints a prime means of searching and finding information in the Twitter system as it relates to my research questions.

As microblogging is still such a new form of communication, specifically related research is extremely limited at present. Most studies are descriptive in nature and attempt to identify unique characteristics of the Twitter model, along with the implications this technology may have for the future of social networks and information exchange. Current literature establishes that Twitter is used for information gathering and it is considered a reliable and trustworthy source because users select whom they follow for topics that are important to them. While the literature recommends improvements to the system design so that information can be more easily targeted and extracted—thereby optimizing its use as a tool for knowledge discovery—no studies have been conducted specifically on user search behavior in the Twitter system.

Literature on ELIS, information diffusion, and the strength of weak ties is fairly well established, but not as it relates to microblogging and its impact. There is a tremendous amount of potential for research into the specific nature and conditions of Twitter and other constant-contact media. Clearly, reality outpaces academia’s ability to describe phenomenona and synthesize concepts related to them. There is a distinct and immediate need to conduct further investigation into this technology as it influences people’s lives, communication, problem-solving and information seeking behaviors in profound new ways.
METHOD

This study used a convenience sample of students, alumni, and faculty from the School of Information and Library Science at the University of North Carolina at Chapel Hill. The study design was reviewed and approved by the IRB Committee (Study # 10-0329) in February 2010. Participants were recruited through email invitations sent to the SILS Announce, SILS Alumni, SILS Undergraduate, SILS Master’s, and SILS Ph.D. listservs. Participation was entirely voluntary and self-selected. Though subjects were not offered monetary payment, they were informed that they had the opportunity to enter a prize drawing to win one of two $25 Amazon.com gift cards by including their email addresses at the end of the survey.

Data for this study was collected through an online survey created with Qualtrics software provided by UNC’s Odum Institute for Research in Social Science. The survey instrument was pre-tested by an Odum advisor and a frequent Twitter user with no SILS affiliation. The former helped to refine response categories and the latter suggested additional questions regarding organization and filtering as well as more answer categories to address higher frequency usage (i.e., creating a category for users who might tweet or read tweets 16 - 35 times per day or more). The final survey (Appendix A) consisted of approximately 30 closed and open-ended questions. Certain questions branched according to participants’ answers, therefore some participants were asked several more questions than others in order to explain their behavior as it related to particular information-seeking strategies. The survey took an average of 15 minutes to complete.
The recruitment email was distributed to listservs in late February 2010 and included the URL to the electronic survey. Survey responses were anonymous and did not include a consent form. An information sheet was provided as the first page when participants clicked on the URL to the electronic survey. The recruitment email and information sheet notified participants that they were free to answer or not answer any particular question and had no obligation to complete answering the questions once they began.

As participation was voluntary and self-selected, anyone subscribed to the SILS listserv(s) who received the email describing the study was able to take the online survey. However, for purposes of inclusion in the data analysis, the criteria was limited to active Twitter users, defined as individuals who had a Twitter account and logged in a minimum of once per week. The survey included questions addressing the frequency of Twitter usage to filter out respondents that did not meet these criteria.

The survey was open for ten days. A reminder email was sent on the 7th day. There were 131 total responses, of which, only 126 were analyzed since the participants met the criteria stated above.

The survey used varying Likert and nominal scales of measurement for single answer, closed questions. The survey also included multiple-choice closed questions and open-ended questions in which participants were free to provide responses in their own words.
RESULTS

There were a total of 131 responses to the survey, but only 126 of these respondents met the criteria of having a Twitter account and logging in at least once per week. Quantitative data was analyzed with Excel software to provide descriptive statistics. Qualitative data was narrowed into a coding scheme through an iterative process based upon categories of repeat responses in the manifest content.

RESPONDENT DEMOGRAPHICS

The researcher attempted to collect demographic data from survey respondents, although a few individuals chose to skip some or all of these questions. When asked his or her affiliation with SILS, 121 respondents answered. Figure 1 displays the breakdown of responses. Most respondents were either SILS alumni (52%) or SILS master’s students (32%).

FIGURE 1. Respondents’ SILS Affiliation (121 responses)
One hundred and twenty-three individuals chose to respond to questions asking them to identify their gender, age group, and employment/student status. Of these respondents, 69% were female and 31% were male. 20% were 18-24 years of age, 40% were 25-30, 26% were 31-39, 11% were 40-49, and 3% were 50-64. The majority of respondents (a combined 64%) were employed either full or part time (Figure 2).

**FIGURE 2.**
*Respondents’ Employment and Student Status (123 responses)*

Table 1 displays the occupations of the 99 individuals who identified themselves as having other than student status and chose to describe the nature of their work. As to be expected, the vast majority of respondents work in library, education, and information technology roles and settings. Some jobs had overlap between categories (e.g., a Web developer working for a University library); in such instances, the respondent’s job was labeled according to the job’s most salient features associated with daily tasks (the aforementioned case is included under Web development).
TABLE 1.
Nature of work/places identified by respondents (99 responses)

<table>
<thead>
<tr>
<th>TYPE OF WORK</th>
<th>INSTANCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Libraries</td>
<td>36</td>
</tr>
<tr>
<td>Student Assistant: RA/TA</td>
<td>20</td>
</tr>
<tr>
<td>Web Development</td>
<td>8</td>
</tr>
<tr>
<td>IT</td>
<td>7</td>
</tr>
<tr>
<td>Archives</td>
<td>6</td>
</tr>
<tr>
<td>Communications, Marketing &amp; PR</td>
<td>5</td>
</tr>
<tr>
<td>Education</td>
<td>5</td>
</tr>
<tr>
<td>Corporate Information Management/Analysis</td>
<td>4</td>
</tr>
<tr>
<td>Academics &amp; Research</td>
<td>3</td>
</tr>
<tr>
<td>Publishing</td>
<td>2</td>
</tr>
<tr>
<td>Digital Projects</td>
<td>2</td>
</tr>
<tr>
<td>The Arts</td>
<td>1</td>
</tr>
</tbody>
</table>

Length, Frequency, and Types of Twitter Use

The first questions on the survey pertained to respondents’ length and frequency of Twitter use. Respondents were asked how long they had had an account, how frequently they logged in to read or write tweets, and whether their use of Twitter had increased, decreased, or stayed about the same since they first joined the network. Results are shown in Figures 3, 4, and 5. 83% of all respondents reported having their Twitter account for over 6 months. 52% of all respondents had been active for over a year. A little over half of all respondents reported that their use of Twitter had increased since they first joined the network. 21% claimed their usage had decreased over time.
Thirteen people (10%) reported checking their Twitter feed over 35 times per day to read other people’s tweets, while no one reported tweeting as often. In fact, the most prolific tweeters fell into the 16-35 tweets per day category, and only three people (2%) claimed to do so. Only eleven people (8% of survey respondents) reported tweeting five times per day or more compared to the sixty-nine people (55%) who claimed to read tweets this often. Additionally, five people (4%) reported that they did not write tweets at all, while only one person (1%) reported that they did not use Twitter for the purpose of reading tweets. Overall, the survey respondents showed much greater reading than writing activity on Twitter.
When asked to rate their agreement with the statement “Twitter is one of the first places I look for information about current topics”, 50% of respondents agreed or strongly agreed. Agreement increased to 62% when the statement was changed to read “Twitter is one of the first places that I find information about current topics.” Similarly, the number of neutral respondents increased between statements from 14% to 19%, which meant that while 36% of respondents disagreed that Twitter was one of the first places they would look for current information, only 19% disagreed that the site was one of the first places where they would actually find it. Figures 6 and 7 demonstrate the shift between answers as well as the diminishing disagreement.
When asked to characterize the nature of the tweets they follow, 10% of respondents reported the tweets are strictly professional, 19% reported they are strictly personal, and the majority of respondents, 71%, reported they are a mix of both personal and professional.

Figure 8 shows the types of individuals and organizations survey respondents reported following on Twitter. Additional responses in the “other” category included events, religious groups and thinkers, librarians, book reviewers, artists, health and weight loss, blogs, local news, labor unions, fictional characters, writers, literary agents, and one respondent’s yoga instructor. The most popular category was friends & family (108 responses), followed by cultural institutions (87 responses), celebrities (63 responses), and industry leaders (61 responses). Other types of individuals and
organizations with a strong following included academics & researchers (57 responses), technology sources (52 responses), and humorous sources (51 responses).

**FIGURE 8.**
*Types of individuals and organizations respondents follow on Twitter*

Figure 9 shows reasons why respondents choose to follow particular individuals and/or organizations. 79% of respondents reported they follow these entities to receive information related to their work. This was followed closely by 71% who said they use Twitter to keep with what is happening in their friends’ and family’s lives. 57% reported they use Twitter to receive information related to their hobbies. Another 41% follow for comic relief, 40% to stay current with pop culture, 25% to receive information about coupons and sales, and 17% to get to know public figures more intimately. Other reasons include getting current news, finding jobs, receiving wisdom and inspiration, monitoring information about events, “to make connections with people you had no access to
beforehand”, to follow fiction written in real-time, to receive prayer requests and opportunities, and a sense of obligation.

**FIGURE 9.**
*Respondents’ reasons for following individuals and/or organizations on Twitter*

Respondents were asked whether they use Twitter to 1) ask questions seeking information and 2) ask questions seeking advice. Responses to both questions were very similar, with a significant portion reporting that they do neither (Figure 10). Twenty-one percent answered that they never ask questions seeking information and 29% said they never ask questions seeking advice. The largest category for both responses was “rarely”, with 39% of respondents reporting that they rarely ask questions seeking information and 40% of respondents reporting that they rarely ask questions seeking advice. Those who claimed to do so often accounted for only 4% (information) and 2% (advice) of the sample.
**Organization and Filtering Strategies**

A group of survey questions pertained to organization, filtering, and information seeking strategies on Twitter. Eighteen percent of respondents reported using more than one account (e.g., personal and professional) to organize and filter those they follow.

Forty-two percent use external third-party applications. Forty percent use the Twitter list feature. Twenty-two percent of all respondents follow other Twitterers’ lists.

Table 2 outlines several reasons that were provided when this 22% were asked to explain why they choose to follow other people’s lists. The numbers in the right hand column represent the instances in which the theme was mentioned rather than discrete responses by individuals. Numerous participants reiterated that following lists that have already been created saves them the time of collecting the sources themselves. It also makes it easy to parse the information and saves space in their feed. Instead of following
the numerous Twitterers on the list individually, respondents can simply subscribe to the list as a whole and filter accordingly when desired.

Respondents also mentioned trust and common interests as being important factors in their decision to follow another person’s list(s). One respondent said, “For my professional Twitter account, I like to be informed about which other Twitter leaders my followers deem important.” Another wrote “They have already sought out users, and I am willing to trust their curated lists.” Many respondents found lists to be a good way to branch out and find other Twitterers of interest. One respondent commented, “I subscribe to other lists to see how other people and Twitter accounts are grouped together. Filtering through over 500 Twitter accounts is easier with lists that people have created and may lead me to other interesting accounts, such as artists or musicians.”

**TABLE 2.**
*Respondents’ reasons for following other Twitterers’ lists (27 responses)*

<table>
<thead>
<tr>
<th>REASON FOR FOLLOWING OTHERS’ LISTS</th>
<th>INSTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saves time and/or space</td>
<td>8</td>
</tr>
<tr>
<td>Common interests</td>
<td>8</td>
</tr>
<tr>
<td>Trusted source</td>
<td>6</td>
</tr>
<tr>
<td>To find other interesting Twitterers &amp; feeds</td>
<td>4</td>
</tr>
<tr>
<td>Real-time data about events</td>
<td>1</td>
</tr>
</tbody>
</table>
**Searching and Saving Tactics**

Nearly half of all respondents said they rarely searched for specific topics on Twitter (Figure 11). Another 30% said they rarely use hashtags (Figure 12). A little over half of respondents said they never bookmark Twitter items to find them again in the future (Figure 13).

**FIGURE 11., 12., and 13.**
*Figure 11: Frequency with which respondents search for specific topics on Twitter*
*Figure 12: Frequency with which respondents use hashtags to follow topics on Twitter*

**Figure 11: Specific Search**
- Often: 5%
- Sometimes: 39%
- Rarely: 44%
- Never: 12%

**Figure 12: Hashtag Use**
- Often: 12%
- Sometimes: 40%
- Rarely: 30%
- Never: 18%

**Figure 13: Bookmark Items**
- Often: 11%
- Sometimes: 15%
- Rarely: 19%
- Never: 55%
Ninety-seven participants responded to the question asking how they search for specific topics on Twitter. The most frequent response was standard keyword search in the search bar on the right side of the Twitter interface. Table 3 shows the number of instances for each category in the respondents’ answer set. Of the participants who reported typing specific queries into the search box, a combined 48% claimed they rarely or never refined these queries. Participants also used hashtags, third-party applications, Twitter’s trending topics, and websites like search.twitter.com. Some participants reported typing their search query into Google and connecting to Twitter from there.

**TABLE 3.**  
*Respondents’ methods of searching for specific topics on Twitter (97 responses)*

<table>
<thead>
<tr>
<th>SEARCH METHOD</th>
<th>INSTANCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keyword search in the Twitter search bar</td>
<td>52</td>
</tr>
<tr>
<td>Hashtags</td>
<td>26</td>
</tr>
<tr>
<td>Search in third-party application (Brizzly, Echofon, TweetDeck, Tweetie)</td>
<td>10</td>
</tr>
<tr>
<td>Trending topics</td>
<td>9</td>
</tr>
<tr>
<td>Google search as a means to connect to Twitter</td>
<td>3</td>
</tr>
<tr>
<td>search.twitter.com</td>
<td>2</td>
</tr>
<tr>
<td>addictomatic.com</td>
<td>1</td>
</tr>
</tbody>
</table>

Hashtags are designed to aggregate information about a particular topic under a known label or taxonomy. As evidenced in Table 3 above, they provide a popular tactic for specific searches. Ninety-one participants provided their reasons for why they use hashtags as a way to follow topics. One of the most common answers was the use of hashtags to follow events (namely, conferences). Respondents also reported that hashtags are the most efficient means of search because they provide the strongest search relevance and are the easiest and most guaranteed way to get to information about a
particular topic. One respondent described hashtags as “a controlled (or at least pseudo-controlled) vocabulary for searching”, while another said, “For me, its’ the same as searching within a specific subject heading at the library.” Yet another respondent reported that “I find that most people do not misuse the hashtags.”

Many respondents said they use hashtags simply for novelty’s sake or out of curiosity, often because they are funny or clever. Hashtags also allow respondents to see the connections between people (i.e., unexpected groupings who are interested in the same things) and measure the mood related to a topic. One respondent said that hashtags offer “a sense of ‘tapping into’ the social stream of thought, to get a feel of the zeitgeist/prevalent opinion on a topic.” Another wrote, “It's a great way to see what other people are thinking/saying about what's going on, while it happens. Also, it brings a bunch of voices together, and you end up seeing the thoughts of people you don't know alongside those you do.” Table 4 illustrates these categories and each instance in the respondents’ answers.

**TABLE 4.**
*Respondents’ reasons for using hashtags to follow topics on Twitter (91 responses)*

<table>
<thead>
<tr>
<th>REASON FOR USING HASHTAGS</th>
<th>INSTANCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency/strongest search results</td>
<td>39</td>
</tr>
<tr>
<td>To follow events</td>
<td>28</td>
</tr>
<tr>
<td>Novelty/curiosity</td>
<td>11</td>
</tr>
<tr>
<td>To measure the current mood related to a topic</td>
<td>10</td>
</tr>
<tr>
<td>To see who is posting on a topic</td>
<td>2</td>
</tr>
<tr>
<td>search.twitter.com</td>
<td>2</td>
</tr>
<tr>
<td>addictomatic.com</td>
<td>1</td>
</tr>
</tbody>
</table>
Although the majority (55%) of respondents reported they never bookmark Twitter items, a combined 26% claimed to do so sometimes or often. When asked how they choose to bookmark, 45 people responded with methods ranging from saving the URL in the browser or a delicious account to the most common approach of selecting the favorites feature for the item in the Twitter interface or third-party application. It is notable that the embedded information in tweets was identified as more important than the general content. This is self-evident from respondents reporting they save the URLs to a browser, delicious, or Google Reader. The two individuals who send themselves emails also said they did so only in cases where the tweet has an interesting link. Table 5 identifies the variety of practices used to bookmark, along with each instance of a respondent who claimed to use the method.

**TABLE 5.**
*Respondents’ methods of bookmarking Twitter items (45 responses)*

<table>
<thead>
<tr>
<th>BOOKMARKING METHOD</th>
<th>INSTANCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favorites feature (Twitter or external application)</td>
<td>27</td>
</tr>
<tr>
<td>Bookmark URL in delicious</td>
<td>7</td>
</tr>
<tr>
<td>Bookmark URL in browser</td>
<td>6</td>
</tr>
<tr>
<td>Send tweet to email account from phone</td>
<td>2</td>
</tr>
<tr>
<td>IM or Evernote</td>
<td>1</td>
</tr>
<tr>
<td>Bookmark URL in Google Reader</td>
<td>1</td>
</tr>
<tr>
<td>Drag URL to browser toolbar</td>
<td>1</td>
</tr>
</tbody>
</table>

**Characteristics and motivations of Twitter use**

A group of survey questions was designed to elicit information about participants’ Twitter-related motivations, preferences, and behaviors. The first of these questions asked respondents to discuss why they joined Twitter (Table 6). One-hundred eighteen
people responded. A recurrent theme was curiosity about the site stemming from general interest in social media and new technologies. Most people said they wanted to see what they hype was about. In many cases this was enough to motivate individuals to join, but was often coupled with Twitter’s rising adoption among friends and family as well. In fact, a number of individuals reported experiencing peer pressure to join the site.

Several people felt that it was important to be familiar with the technology because of its relevance to their field and the possibility that its use would become integral to their work lives. A sizeable group said they joined Twitter to set up an official presence for their employers or to keep up with competitors, partners, colleagues, and industry leaders. Many wanted to take advantage of the professional feedback available on the network related to issues and trends in their field.

Some individuals were lured to the site in order to follow specific individuals or organizations, such as celebrities or sports teams. One such respondent had joined in order to read a novel called Fuel Dump that was being written in real-time by a user named Scharpling. Others were drawn to the site because the concise format provides simplicity and ease of communication:

I have “revelations” about my profession and the use of technology and it's an easy way to quickly share a concise thought with my colleagues rather than writing for publication or even keeping my blog current.

[I joined] just to get status updates from people... I enjoy using Twitter much more than Facebook to hear little blips of information without all the distracting add-ons.

I was going on a trip that put me with very uncertain and mostly nonexistent Internet access, so I wanted a way to update friends and family about where I was through my phone.
Many people mentioned that they hoped to become more informed through using the site. As one respondent wrote, “It's an easy "newsfeed" to learn what people are talking about and what resources they discover.”

**TABLE 6.**
*Respondents’ reasons for joining Twitterer (118 responses)*

<table>
<thead>
<tr>
<th>REASON FOR JOINING</th>
<th>INSTANCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novelty/curiosity: interest in emerging technology and social media</td>
<td>42</td>
</tr>
<tr>
<td>Friends &amp; family; peer pressure</td>
<td>36</td>
</tr>
<tr>
<td>Professional reasons</td>
<td>21</td>
</tr>
<tr>
<td>Wanted to follow specific individual(s), organization(s), or event(s)</td>
<td>14</td>
</tr>
<tr>
<td>Ease of communication</td>
<td>6</td>
</tr>
<tr>
<td>To be more informed</td>
<td>4</td>
</tr>
<tr>
<td>Fun, current, trendy</td>
<td>4</td>
</tr>
<tr>
<td>To promote a blog or personal venture</td>
<td>3</td>
</tr>
</tbody>
</table>

When asked why they continue to use Twitter, 119 people responded. The most common answer was that Twitter has become a professionally valuable resource, followed by the second most common response that it is a convenient way to keep in touch with others, particularly personal contacts like friends and family. A lot of people find it to be effective for “keeping up to date” on current news and information. Several respondents noted they value the sense of community and the open forum, which provides a window into what others think. The diversity of thought and the sense of being “in the flow” are appealing. As one respondent put it, “I like to check out what is trending because it gives me a different take on current events, and it is interesting to see what's popular at any given time.”
Many people are keen on the fact that Twitter is constantly delivering information—often on topics they might not have been exposed to otherwise—which presents opportunities for growth and learning. This is especially important as it relates to professional interests. It is also a good resource because it does so while not requiring anything of the user. As one respondent put it, “It’s unobtrusive and continues to provide interesting and/or relevant information.” Others provided the following comments:

- It is a nice passive discovery tool. When I see people's status updates about something that I don't know about already, I then go and learn something about it.

- It turns out that people in my field (librarianship) are really using [Twitter]—for work and pleasure. I feel like I have a sense of what my colleagues/mentors/peers are looking at and I can gauge what might be important in technology and librarianship.

- Great way to get discrete information about topics that interest me but are not crucial to daily life.

- It provides me with a great source of hand-picked articles that are interesting to my network. These are relevant to me most of the time.

Table 7 shows the makeup of respondents’ answers as to why they continue to use Twitter. Unique instances for each category are counted in the right column.
Table 7 displays a list of methods respondents use to find new Twitterers and tweets of interest to them. A majority of people responded that they often find new people based upon retweets and @user.name references that are made in their feeds. Additionally, respondents tend to chain, that is, they follow those to whom their followers or followed already subscribe. Along with friend and colleague word of mouth, system recommendations were mentioned in several cases, including third-party applications and websites like TweetDeck, Tweepi, Twiangulate, TweetCongress, UberTwitter, wefollow.com, and TweetCatholic.com. Many people reported they do periodic sweeps of their email address books using Twitter’s Find People feature.
TABLE 8.
Respondents’ methods for finding new Twitterers and tweets of interest (118 responses)

<table>
<thead>
<tr>
<th>FINDING METHOD</th>
<th>INSTANCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retweets and @user.name references</td>
<td>42</td>
</tr>
<tr>
<td>Chaining</td>
<td>37</td>
</tr>
<tr>
<td>External reference (business website, Facebook account, blog)</td>
<td>30</td>
</tr>
<tr>
<td>Industry knowledge/word of mouth</td>
<td>21</td>
</tr>
<tr>
<td>Search for specific topic or hashtag</td>
<td>20</td>
</tr>
<tr>
<td>Twitter’s Find People feature</td>
<td>18</td>
</tr>
<tr>
<td>Friend recommendations</td>
<td>12</td>
</tr>
<tr>
<td>System recommendations</td>
<td>10</td>
</tr>
<tr>
<td>Meet people with accounts in “real life”</td>
<td>7</td>
</tr>
<tr>
<td>References from TV, radio, books, mags, online</td>
<td>5</td>
</tr>
<tr>
<td>Serendipity</td>
<td>1</td>
</tr>
<tr>
<td>Follow Friday</td>
<td>1</td>
</tr>
<tr>
<td>Passively (follow followers)</td>
<td>1</td>
</tr>
</tbody>
</table>

One hundred and eleven people responded when asked what they like about information seeking on Twitter. A large portion mentioned the convenience factor: the concise format of tweets is highly digestible and makes it easy to skim and find interesting things in a short period of time (Table 9). Picking and choosing their sources also means the information respondents receive in their feeds is tailored to their interests and often judged to be trustworthy.

People like that Twitter provides information in real-time and that it is contextualized by the opinions and viewpoints of many different people. This makes Twitter “more personal [and] intimate-feeling than traditional news”. One respondent described this quality as “organic”, while another said “[Twitter] is great for seeking
information about breaking news events and to really see what the "real people" are talking about, instead of being fed information by large corporations.”

Additionally, many people benefit from the serendipity of being in the network’s information flow because they are introduced to unexpected subjects and ideas:

I know it's as current as possible, and allows me to get as in-depth as I want to by clicking on links in the tweets. I like that it is worldwide, which often results in my discovering something new.

I often come across interesting links, thoughts, and people that I normally wouldn't have found on my other social networking sites like del.icio.us, Facebook, or LinkedIn. Thus, the incidental information acquisition is the most beneficial component of information seeking on Twitter.

Given the diversity of the network, some respondents also reported that Twitter is a good place to ask questions and get feedback from a variety of people:

It's open –the answers often surprise you. [There are] more people to ask advice from – not all my friends are interested in the same things I ask questions about. [Twitter] makes experts even more accessible.

One respondent put it simply when he said that Twitter is “the best way that I know to get the most current information.”
TABLE 9.
Aspects respondents like about information seeking on Twitter (111 responses)

<table>
<thead>
<tr>
<th>LIKE ABOUT TWITTER INFO SEEKING</th>
<th>INSTANCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy, low time cost</td>
<td>34</td>
</tr>
<tr>
<td>Timeliness and immediacy of information</td>
<td>23</td>
</tr>
<tr>
<td>Commentary provides context/diversity of thought</td>
<td>20</td>
</tr>
<tr>
<td>Serendipitous learning about new things</td>
<td>10</td>
</tr>
<tr>
<td>Passive information gathering</td>
<td>8</td>
</tr>
<tr>
<td>Personal and informal</td>
<td>6</td>
</tr>
<tr>
<td>Very little/Nothing/do not use it for that purpose</td>
<td>5</td>
</tr>
<tr>
<td>Can pick and choose information that I want to see</td>
<td>4</td>
</tr>
<tr>
<td>Tags make it easy to sort; good search results</td>
<td>3</td>
</tr>
<tr>
<td>Seeing/making connections with people in network</td>
<td>2</td>
</tr>
<tr>
<td>Vetting by trusted human sources</td>
<td>2</td>
</tr>
</tbody>
</table>

Conversely, respondents were asked what they dislike about information seeking on Twitter. 102 people answered. A tremendous number of them referred to the “noise” factor generated by rampant retweeting, mundane updates about personal minutiae, and other kinds of “spam” (Table 10). Superficial tweets and overly personal back-and-forth @ reply conversations were particular categories that stood out in the data but could also be grouped under the larger problem of noise. People used expressions like “high signal to noise ratio”, “hit or miss”, “crapshoot”, and “hard to separate wheat from the chaff” to describe impediments to finding good information on the network.

Many said they are overwhelmed by the amount of information and its disorganized nature. One respondent wrote that it is “too hard to catch up and stay current. [I] have to accept that I will miss a lot of useful information.” Attempting to
read everything or to organize it oneself can be taxing on time and energy, as one respondent pointed out:

It can certainly be overwhelming and distracting. It takes a while to get used to. For a short while at the start, I developed a need to see every tweet, so I would scroll back through the day at night—which, of course, is a black hole. I think filtering/organizing people you follow is important, but hard to learn—you sort of graduate from the website to something like TweetDeck. Even still, I could organize my groups better to have less clutter and more focus. It's definitely a time drain for a full-time student/worker.

Twitter’s rudimentary search feature presents major challenges to finding information for many respondents and the “lack of consistent search tags and terms” is an obstacle to locating topics of interest. Related to this, some people mentioned that the 140 character limit can make it difficult to communicate the full content or meaning of a message, particularly in cases where it would benefit from more precise (i.e., unabbreviated) terminology. Another recurring response was the difficulty in vetting information flowing through the network. People pointed out that false reports, rumors, gossip, and “fake celebrity deaths” are common. It can be hard to determine truth from fiction and identify reliable sources.

One interesting finding was that a few people felt the site was too public, particularly because unwanted followers or bots can subscribe to their feeds. On the other hand, one person felt there was too much privacy control and that the ability to lock an account defeats the purpose of Twitter.
TABLE 10.
Aspects respondents dislike about information seeking on Twitter (102 responses)

<table>
<thead>
<tr>
<th>DISLIKE ABOUT TWITTER INFO SEEKING</th>
<th>INSTANCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information overload, i.e. disorganized, repetitive, high signal to noise ratio</td>
<td>55</td>
</tr>
<tr>
<td>Rudimentary search</td>
<td>12</td>
</tr>
<tr>
<td>Info not always reliable; hard to vet sources</td>
<td>8</td>
</tr>
<tr>
<td>140 characters can limit clarity or completeness of message</td>
<td>6</td>
</tr>
<tr>
<td>Superficial</td>
<td>5</td>
</tr>
<tr>
<td>Lack of formality, too personal</td>
<td>3</td>
</tr>
<tr>
<td>Too public, i.e. unwanted followers or bots</td>
<td>3</td>
</tr>
<tr>
<td>Nothing</td>
<td>2</td>
</tr>
<tr>
<td>Too much self-promotion</td>
<td>2</td>
</tr>
<tr>
<td>Difficulty separating the social and professional</td>
<td>1</td>
</tr>
<tr>
<td>“Everything” or “too much”</td>
<td>2</td>
</tr>
<tr>
<td>System failures due to high traffic</td>
<td>1</td>
</tr>
<tr>
<td>The new retweet feature</td>
<td>1</td>
</tr>
<tr>
<td>Privacy controls defeat the purpose of Twitter</td>
<td>1</td>
</tr>
<tr>
<td>Would prefer paginated results to “more” feature</td>
<td>1</td>
</tr>
<tr>
<td>Medium is too fast and sloppy (i.e. typos common)</td>
<td>1</td>
</tr>
</tbody>
</table>

Finally, respondents were asked if there were anything they would change about information seeking on Twitter (Table 11). Though a total of 89 people answered the question, only 43 of these responses were substantive. Many people replied that they couldn’t think of anything at the time. Of those who offered suggestions, the majority named Twitter’s rudimentary search as an area for improvement. Most respondents desired advanced search features, i.e., Boolean logic and date specific filtering. There were even ideas for location-based searches:
I would love other geographical searching that isn't just (one) country-based but region based. What is everyone in EUROPE saying about ChatRoulette? What are people saying about ChatRoulette in Southwest Australia? Maybe a Google-map-mode where one could highlight a certain region and only see the tweets coming from there—like down my street or from the UN headquarters etc.

One person said it would be easier to find new Twitterers to follow in her professional field if Twitter were indexed and companies or individuals could enter a type of keyword identification when tweeting.

The fervent emphasis on improved search was followed in numbers by an appeal to expand filtering capabilities. Respondents also wished to enhance Twitter’s trending topics to provide more insight, to be more targeted to their tastes, and to “be more regulated and official”. As one person wrote, “[Twitter should] filter by age groups. Especially for trending topics. I don't care about Justin Bieber.” Another person wrote that he liked how the third-party application Brizzly allows its users to explain trending topics. He felt this might be abused in the larger Twitosphere, however. Yet another respondent fancied the notion of visualization tools to promote context and make connections between tweets streaming through the network:

Wish there were better tools for zeitgeists. I'd love to know the top mentioned terms for Raleigh, NC. Seems like there could be a lot more done with trending in general. What about visualizations of trending topics? …Seems like there's a lot of room there.

Several people wanted Twitter to offer conversation threading so they could easily read dialogue between parties without the unrelated interruptions. Highlighting the professional sample from which this study drew its data, several respondents wanted hashtags to be easier to search for, possibly by having Twitter standardize them or
provide system guidance or Amazon-style recommendations based upon their previous searches.

**TABLE 11.**
Things respondents would change about information seeking on Twitter (43 substantive responses)

<table>
<thead>
<tr>
<th>THINGS TO CHANGE</th>
<th>INSTANCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create advanced search (Boolean, date and location based, improve Find People tool)</td>
<td>17</td>
</tr>
<tr>
<td>Better filtering</td>
<td>7</td>
</tr>
<tr>
<td>Improve trending topics</td>
<td>4</td>
</tr>
<tr>
<td>Conversation threading</td>
<td>4</td>
</tr>
<tr>
<td>Standardize hashtags</td>
<td>3</td>
</tr>
<tr>
<td>Better bookmarking</td>
<td>1</td>
</tr>
<tr>
<td>Ability to make some tweets public while keeping others private</td>
<td>1</td>
</tr>
<tr>
<td>Shorten links more to increase actual tweet content</td>
<td>1</td>
</tr>
<tr>
<td>Add system recommended hashtags</td>
<td>1</td>
</tr>
<tr>
<td>Show connections between people like LinkedIn</td>
<td>1</td>
</tr>
<tr>
<td>Add pagination</td>
<td>1</td>
</tr>
</tbody>
</table>

**DISCUSSION**

Findings from this study proved very similar to previous Twitter research and reinforce many of the behavioral and motivational models uncovered there. As in Java, et. al, respondents reported that Twitter is a useful tool for information seeking because of the breadth and diversity of its streaming content. Twitter offers people access to a wide variety of channels and allows them to be embedded in various networks and connect with influence makers.
Many respondents identified the personal tone and intimate spirit of this content as part of its allure. Although some Twitterers’ frequent and mundane updating tends towards the trivial, overall, respondents said they enjoy the editorial disposition of tweets and how that puts current events and trends into perspective. Rather than getting biased or inaccurate depictions solely from mainstream media, Twitter is handy for measuring the current mood and revealing how people are thinking about and responding to issues. This commentary is not always serious. Many people follow humorous sources for comic relief and describe fun and entertainment as part of Twitter’s appeal.

The element of serendipity is also a huge draw. Respondents like the openness of the network and the fact that they are constantly exposed to new things they would not otherwise be in their day-to-day lives. This is demonstrated by the diminishing disagreement from Statement No.1, “Twitter is one of the first places I look for information on current topics” to Statement No. 2, “Twitter is one of the first places I find information about current topics”. Though there may not be conscious seeking or intention, people regularly acquire unexpected information from the network.

Several free form responses stressed the value of these occurrences. Generally, people like that they can select the information they obtain from tweets by skimming and choosing whether to investigate it more thoroughly. They have the option to delve more deeply by opening links or taking their exploration into other arenas once they have been introduced to a topic on the site. Many people said they learn new things by using Twitter. Clearly, the survey sample is comprised of innately curious individuals (as evidenced by the number of people who originally joined Twitter to see for themselves
what it was all about) and incidental information acquisition fits nicely with their modus operandi.

Passive consumption was repeatedly mentioned as something people liked about information seeking on Twitter. As one respondent said, “I can be lazy and the information comes to me.” This likely explains why 44% of respondents reported they rarely search for specific topics and 55% reported they never bookmark items for future reference. Twitter seems better suited for happenstance. Many people talked about tapping into the “mood” or “zeitgeist” present on the network, and several people said they prefer to use standard search engines and other tools for the purposes of information seeking. This would seem to indicate that Twitter serves a particular function within a realm of information discovery tools. It is less efficient for on-target searches and more useful for gathering data to infer a collective atmosphere or frame of mind.

Automatically collecting information in short bursts fits with the ease, simplicity, and timeliness of the service that many people described as their favorite aspects of Twitter. As discovered in Java et. al and Zhao & Rosson, a significant portion of respondents said that Twitter was great for getting concise delivery of up-to-the-minute information from a group of trusted sources on topics of interest to them. Reinforcing those authors’ research, many respondents also liked Twitter because it was easier to update and read than other forms of social media, like blogs and Facebook. One respondent said:

I like that [Twitter] is constantly updated as opposed to websites or blogs… I like that I can choose exactly what I see and if I get tired of someone or something I delete them. Most people don't really care how many followers they have after a certain point so I don't feel like I'm hurting their feelings
(unlike un-friending someone on Facebook).

Another wrote:

It’s a low key outlet for thoughts or interesting things I find. I feel like I know my audience on it and am more comfortable expressing myself here than on Facebook.

In fact, two other survey respondents drew contrasts between Twitter and Facebook, saying that information delivery on Twitter was more streamlined and more diverse, respectively. These comparisons are intriguing. The two websites share many similarities, but they also have explicit differences in the design and intent of their systems. Some of the most prominent differences apply to the context of the social networks on both sites and the privacy controls necessary to maintain these social connections and audiences at large. Facebook generally represents a network of contacts with whom the user actually shares a personal bond, while Twitter provides more anonymity and is a tool through which users can gain access to celebrities, industry leaders, corporate bodies, and others in whom s/he takes an interest but with whom s/he has no real life acquaintance.

Since Twitter offers widespread access to the aforementioned entities, the professional value of the service was confirmed by the study’s sample. An overwhelming number of respondents said they continue to use Twitter because it provides useful information about their work and connects them to distinguished thinkers in their field. A significant portion of respondents also said they use Twitter to follow professional conferences. Since the majority of the study’s sample is working alumni, the professional value of the service may partially explain why 52% of respondents reported their use of Twitter has increased since they first joined the network.
Most respondents perceive Twitter as a particular kind of information resource and adjust their expectations for system performance accordingly. This may account for the low response rate when study participants were asked what they would change about information seeking on Twitter if given the chance. The most repeated response was the creation of advanced search and filtering options to target desired information. However, a few people expressed the sentiment that since it is “user-based”, Twitter is “chaotic by nature”. Several other people said that they did not use Twitter for this purpose and would conduct their information searches elsewhere. Most respondents said they find new Twitterers to follow through retweets, @ replies, and chaining. All of this reiterates the themes of happenstance, serendipity, and incidental information acquisition inherent to the network. The data suggests that most people recognize the limitations of traditional keyword search in this uncontrolled forum and therefore seek out and find information on Twitter in other ways.

However, system recommendations can certainly be made from the constructive ideas that respondents offered. First and foremost among them is a requirement for advanced search features and filters to narrow parameters and extract pertinent information. This common desire is further evidence of the value of information flowing through the network and proves that users need a better way to locate it after the fact. Clearly, there is no way to keep up with every tweet, but as many respondents discussed, they would like a method to cull information that may be of interest without having to sift through an abundance of the immaterial. One possibility is a recommendation algorithm based upon the types of links users tend to open in their feeds. The algorithm could help to determine content that would appeal to each user and then set aside a restricted number
of tweets from the day or week in a folder that could be read at the user’s leisure. This way, users could at least sample some of the pertinent information that may have passed them by undetected. Along these same lines, respondents stated that system recommended trending topics would be useful, although this could eliminate Twitter’s element of serendipity, in which so many users seem to take great pleasure.

Finally, while the passive nature of information collection on Twitter may have positive outcomes, it also hints at a pattern of mental indolence that may be increasingly common in our modern age of multimedia and instant gratification. The rise of Web 2.0 has meant a huge increase in the amount of information at people’s disposal and an associated decrease in the amount of expended effort necessary to obtain it. This theme of laziness was oft repeated in respondents’ answers. While individuals must develop new skills in order to balance and manage the mass amount of information on hand, over time, the consequence of this could be less sustained engagement with any one topic or issue.

LIMITATIONS

This study presents many limitations. First and foremost, the researcher is unable to quantify the response rate since the number of active Twitter users among the recipients of the recruitment email is unknown. Second, the convenience sample is drawn solely from SILS, a highly specific population engaged in the information professions. The respondents may therefore be predisposed to using particular tools in particular ways to gather, organize, and manage information flow. Such qualifiers may
present challenges to generalizing these results to the population at large and proving their validity.

Another limitation in this study comes from the imperfect accuracy of self-reported information. Respondents’ answers may be inexact. There is also the possibility that questions and answers have been misinterpreted. In this case, the survey method itself is limiting since there is no opportunity for the researcher to fact-check or expand upon the participants’ responses.

**CONCLUSION**

This study demonstrates Twitter’s importance and utility among a variety of information resources. The findings suggest that given its unorganized mixture of real-time, user-generated content, it is best suited for tapping into collective discussions and measuring trends. It is ideal for synthesizing bits of information in order to gather people’s opinions, feelings, and points of view but much less reliable for extracting specific information artifacts. Twitter could therefore be considered a tool not so much for information seeking as information saturation and awareness, particularly as it reflects the culture, sociology, and psychology within networks. As boyd writes in her article *Streams of Content, Limited Attention*:

Those who are most enamored with services like Twitter talk passionately about feeling as though they are living and breathing with the world around them, peripherally aware and in-tune, adding content to the stream and grabbing it when appropriate. This state is delicate, plagued by information overload and weighed down by frustrating tools.
The exploratory nature of this work lays a foundation for future study while providing useful insights to scholars and practitioners. These findings may contribute to a unified theory of behavior within OSN environments and help sociologists, psychologists, communications scholars, system designers, and others researching computer-mediated communication to broaden and diversify current understanding in the field. In practical terms, this study may help system designers to better assess user needs and behaviors in order to improve the structure and utility of social software. In theoretical terms, the study may help towards improving and refining the current state of knowledge.

Future work might include interviews and ethnographic observation methods to undergird and expand upon these initial findings. Additionally, this study suggests areas that are ripe for further research. Correlations could be explored between those who tend to first look for and find current information on Twitter and the number and variety of sources they follow (i.e., personal v. professional). It would also be interesting to know why users have accounts on both Twitter and Facebook, and how the two websites may be complementary and symbiotic or, conversely, highly idiosyncratic and divergent.
REFERENCES


http://www.businessweek.com/managing/content/oct2009/ca2009106_370257.htm, accessed 10/31/09


Appendix A: Survey Instrument

1. When did you join Twitter?
   ___ less than a month ago
   ___ 1 - 6 months ago
   ___ 7 months – 1 year ago
   ___ 1-2 years ago
   ___ over two years ago
   ___ N/A – I do not have a Twitter account

2. How often do you typically check your Twitter feed to read other people’s tweets? Please choose the first category that fits you.
   ___ more than 35 times per day
   ___ 16-35 times per day
   ___ 5-15 times per day
   ___ 1-4 times per day
   ___ 5 or more times per week
   ___ 1-4 times per week
   ___ less than once per week
   ___ N/A - I do not read other people’s tweets

3. How often do you typically write tweets? Please choose the first category that fits you.
   ___ more than 35 times per day
   ___ 16-35 times per day
   ___ 5-15 times per day
   ___ 1-4 times per day
   ___ 5 or more times per week
   ___ 1-4 times per week
___ less than once per week
___ N/A - I do not write tweets

4. Has your use of Twitter, increased, decreased or stayed about the same since you first created your account?
   ___ increased
   ___ decreased
   ___ stayed about the same

5. Rate your agreement with the following statement: Twitter is one of the first places I look for information about current topics.
   ___ strongly agree
   ___ agree
   ___ neutral
   ___ disagree
   ___ strongly disagree

6. Rate your agreement with the following statement: Twitter is one of the first places I find information about current topics.
   ___ strongly agree
   ___ agree
   ___ neutral
   ___ disagree
   ___ strongly disagree

7. What types of people or groups do you typically follow on Twitter? (check all that apply)
   ___ celebrities (e.g., actors, comedians, musicians, writers)
   ___ cultural institutions (e.g., museums, libraries, theaters)
___ sports teams
___ government agencies
___ schools
___ friends & family
___ magazines & newspapers
___ tv shows
___ social media mavens
___ broadcasters (e.g., television and radio stations)
___ journalists
___ non-profits
___ politicians
___ academics & researchers
___ technology sources
___ travel sources
___ humorous sources
___ retailers
___ industry leaders in your professional field
___ job boards & recruiters
___ other; please explain:

8. Why do you follow the people and/or organizations that you do? (check all that apply)

___ to receive information related to my hobbies
___ to receive information related to my work
___ to receive information about coupons and sales
___ to stay current with pop culture
___ to keep up with what’s happening in my friends’ and family’s lives
___ to get to know public figures more intimately
9. How often do you tweet questions seeking information?
   ___ Often
   ___ Sometimes
   ___ Rarely
   ___ Never

10. How often do you tweet questions seeking advice?
    ___ Often
    ___ Sometimes
    ___ Rarely
    ___ Never

11. Do you use more than one Twitter account (e.g., personal and professional) to organize and filter those you follow?
    ___ yes
    ___ no

12. Do you use any external applications (e.g., Filttr or TweetDeck) to organize and filter those you follow?
    ___ yes
    ___ no

13. Do you use the list feature to organize and filter those you follow?
    ___ yes
    ___ no
14. Do you subscribe to other people’s lists?
   ___ yes
   ___ no
   Yes branch: Please explain why you subscribe to other people’s lists.

15. How would you characterize the nature of the tweets you follow?
   ___ personal
   ___ professional
   ___ mix of both

16. Why did you join Twitter?

17. Why do you continue to use Twitter?

18. How do you locate Twitterers and tweets of interest to you?

19. How often do you search for specific topics on Twitter?
   ___ Often
   ___ Sometimes
   ___ Rarely
   ___ Never
   Often/Sometimes/Rarely branch: How do you search for specific topics?

20. If you type queries into the search box, how often do you refine these search queries?
   ___ Often
   ___ Sometimes
   ___ Rarely
21. How often do you use hashtags to follow topics?
   ___ Often
   ___ Sometimes
   ___ Rarely
   ___ Never
   Often/Sometimes/Rarely branch: Please explain why you use hashtags to follow topics.

22. How often do you “bookmark” items to locate them again in the future?
   ___ Often
   ___ Sometimes
   ___ Rarely
   ___ Never
   Often/Sometimes/Rarely branch: How do you “bookmark” items?

23. What do you like about information seeking on Twitter?

24. What do you dislike about information seeking on Twitter?

25. Is there anything you would change about Twitter to make it easier to find information?

26. Describe an experience where you applied information you found on Twitter in your daily life.
27. Gender:
   ___ female    ___ male

28. Age:
   ___ 18-24
   ___ 25-30
   ___ 31-39
   ___ 40-49
   ___ 50-64
   ___ 65+

29. What is your affiliation with SILS?
   ___ SILS undergraduate student
   ___ SILS master’s student
   ___ SILS Ph.D. student
   ___ SILS faculty
   ___ SILS staff/employee
   ___ SILS alumni

30. Are you currently:
   ___ Employed full time
   ___ Employed part time
   ___ A full time student
   ___ A part time student
   ___ Retired
   ___ Not Employed

   Employed branch: Please describe the nature of your job.
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Email: ______________________________________________________

THANK YOU FOR PARTICIPATING IN THIS STUDY!