Article

JIS

Journal of Information Science
37(2) 120–136

DOI: 10.1177/0165551510396975
jis.sagepub.com
SAGE

Classifying ecommerce information sharing behaviour by youths on social networking sites

Bernard J. Jansen
College of Information Sciences and Technology, The Pennsylvania State University, Pennsylvania, PA, USA

Kate Sobel
The Smeal College of Business, The Pennsylvania State University, Pennsylvania, PA, USA

Geoff Cook
CEO, myYearbook.com

Abstract
Teenagers and young adults form an economically critical demographic group and are confronted with an array of internet social networking services just as they are forming online information seeking and sharing habits. Using a survey of 34,514 respondents from myYearbook.com, the research reported in this paper is an inferential analysis of information seeking and sharing behaviours in the ecommerce domain on four social networking sites (Facebook, MySpace, myYearbook and Twitter). Using *k*-means clustering analysis, we find clusters within this demographic based on levels of *being connected* on and *being engaged* with social networking services. Research results show that the majority of this demographic have accounts on multiple social networking sites, with more than 40% having profiles on three social networking sites and an additional 20% having four social networking accounts. We also investigate the motivations for using different social media sites, showing that the reasons for engaging differ among sites. Companies and organizations interested in marketing to this demographic cannot cluster social networking users for more personalized targeting of advertisements and other information.

Keywords
information collaboration; information production; information seeking; information sharing; information use; online human information behaviour

1. Introduction

On the internet, social networking sites (SNSs) are among the fastest growing segment representing a valuable information source for a variety of domains, especially ecommerce. Information sharing within SNSs (e.g. Facebook, MySpace and Twitter) is not well understood with limited research relative to information sharing in other social media platforms (e.g. blogs). With these particular social networking services, the investigations have primarily focused on the social network connections and reach. There has been less research into the use of these SNSs (including social media platforms or social media technologies) for information sharing, especially in the ecommerce area. Although there are certainly data privacy concerns [1], an understanding of information sharing on SNSs can be a significant aid to companies and other organizations as they develop marketing, advertising and other information disseminating strategies.

Corresponding author:
Bernard J. Jansen, College of Information Sciences and Technology, The Pennsylvania State University, University Park, PA 16802, USA.
Email: jjansen@acm.org

Focusing on teens and young adults on SNSs, this research investigates the relationship between *being connected* on and *being engaged* with online information sharing on these platforms. Born approximately between 1981 and 2000, this demographic is the first generation raised with readily available online SNSs. As such, they may be the harbingers of generalized SNS information sharing behaviour. Facebook, MySpace, myYearbook and Twitter will be investigated in this research.

In order to reach this important youth group, companies and other organizations are creating a presence on SNSs. Organizations can use SNSs to reach specific groups of people, as well as use these sites for customer relationship management. In these SNSs, companies can create profiles and fan pages, stage events, and follow or fan potential consumers. Moreover, users of SNSs can also purchase gifts to send to friends or business associates. These gifts can be virtual and free (or with a virtual currency), while other gifts can be real and purchased with actual money. Rutledge [2] reports that younger internet users desire low-cost and convenient online methods to purchase products like music, books and apparel. Concerning shopping, Tapscott [3] states that teenagers are turning to their friends for online shopping advice, making it challenging for marketers who are trying to become 'friends' with members of this demographic. Obviously, businesses must consider the youth market to be a crucial demographic; therefore, it is worthwhile to investigate their online information behaviours in a way that will assist marketers and others interested in information dissemination.

In this emerging domain of information sharing on SNSs, there are numerous unanswered questions. What are the relationship variables in social networking and information sharing? Are there information sharing differences among types of users with different SNSs accounts? If so, what are these differences with regards to information sharing? Does information sharing in SNSs have an effect on user behaviours? These are some of the questions that motivate our research.

In this research, we create clusters of this demographic based on their information sharing behaviours on SNSs, specifically on Facebook, MySpace, myYearbook and Twitter. These four SNSs are very popular in the online marketplace and provide a cross-platform picture of youth activities on SNSs.

2. Review of the literature

Beginning in the late 1990s, the availability of internet-based SNSs truly exploded, with the creation of sites such as MySpace, Facebook, LinkedIn, Twitter, myYearbook, etc. The number of sites has not only expanded but their use has become a nearly daily exercise for millions of people. Media has focused a great deal of attention towards the different SNSs in general and how they affect marketing and advertising online specifically. With this increased media interest, the explosion in the number of users, and the proliferation of SNSs, academics have begun to research SNSs, especially with regards to their use as marketing and branding platforms.

However, some SNSs are considered by users to be personal spaces used to enhance and develop friendships and relationships [4], as well as providing an outlet for personal creativity and self-expression [5]. As personal spaces, there may be questions on whether or not they are viable marketing platforms. Conversely, Morrison and Weaver [6] add that SNSs are about a bottom-up creation of information and interaction, which has significant potential for marketers. Many SNSs allow users to create their own applications for the social networking, making personalization of information possible. SNSs also tend to reflect the user's identity, and they can affect social relationships or self-esteem [7].

Motivations for using SNSs are interesting from various information behaviour perspectives. Some SNSs are a continuation of outside friendships and are used to assist in solidifying the relationship [5]. These SNSs are used to connect with friends that one has in real life (IRL) outside of the internet, as well as relatively weaker ties such as acquaintances, friends from long ago and friends of friends [8]. Often, the desire to socialize with pre-existing friends was one of the main motivations for using some of the early SNSs [9, 10]. Unfortunately, whether these findings are true across various SNSs with a more mature user population is still open to debate. The use of different SNSs may be due to different motivations and may vary among different populations. Therefore, the impact on ecommerce information sharing may also differ.

In fact, motivations and behaviours are a major area of SNS study. Vogt and Knapman [4] found five key motivations that lead people to use sites: the need for personal achievement or recognition, the need to be individual or creative, the need for friendship or belonging, the need to discover, explore or have new experiences, and finally the need for sex and relationships. Kelly [7] modified Vogt and Knapman's [4] motivations saying that mood enhancement was also a reason to use SNSs, as a way to relieve boredom. Kelly [7] also found that the need for recognition and attention from friends was an important factor, as well as information seeking regarding their interests. Grant [11] found similar motivations specific to the teenage demographic in that teens like to use SNSs to enhance their mood, learn by experience, as a form of passive escapism, as social interaction, and to find or give information and advice. These motivations reflect directly on how teenagers use and behave on SNSs. Cook [12] took note of the differing motivations between specific SNSs, which we expand upon in this research.

Focusing on detailed behaviours on SNSs, Li [13] reports on the activities of young SNS users. The most popular activities for this demographic on SNSs are looking at profiles, updating personal profiles, searching for someone, emailing someone, writing on someone else's profile, reading blogs, listening to music, requesting someone's friendship, and looking up someone's status. Most of these activities deal with managing friendships, connecting or reconnecting with friends or acquaintances and participating in interest-oriented activities. However, it would be beneficial for marketers to determine what specific ecommerce activities SNS users are engaging in on these platforms.

The potential for ecommerce information sharing makes these SNSs of interest to marketers, advertisers and others in the commercial arena, although certainly the information sharing potential of SNSs is of interest to many domains. However, much of the prior work in information sharing has investigated factors that motivate people to exchange information [14], highlighting elements such as trust. While this research is valuable, SNSs such as Facebook, MySpace, Twitter, myYearbook and others are introducing new affordances for information sharing on a scope and scale not previously examined [15].

There has been limited research into opinion sharing aspects on these social media technologies. Popular press articles provide interesting commentary about youth utilization of SNSs for ecommerce. For example, Rutledge [2] indicates that younger internet users desire low-cost and convenient ways to purchase products like music, books and apparel online. In fact, Rutledge [2] notes that, in 2000, teenagers spent $153 billion on themselves and contributed to another $33 billion from input into their family's grocery shopping. Similarly, Tapscott [3] comments that, while teenagers do not directly spend a lot of money online yet, as many of them do not have credit cards, they spend a lot of time on the internet consulting about products. Tapscott [3] also believes teenagers are a crucial part of online buying, with students (in 2006) earning almost $200 billion a year and purchasing $190 billion worth of goods. In fact, people aged 21 and under influence 81% of their families' apparel purchases and 52% of their car choices [3]. In discussing how teenagers are turning to their friends for shopping advice online, Tapscott [3] comments that this makes it challenging for marketers who are trying to become 'friends' with potential consumers in this market.

Since it is obvious that businesses consider the youth market a crucial demographic, it is worthwhile to investigate the online information behaviours of this demographic in a way that assists marketers in understanding youth behaviours on SNSs.

In the academic literature, Java, Song, Finin and Tseng [16] analysed Twitter's social network, reporting that people use their status updates to seek or share information; however, the researchers did not comment on the specifics of the information sought or shared. Yang and Sageman [17] explored the visualization of social networks by focusing on a fractal view. Burkey, Marlow and Lento examined information sharing by Facebook users [18], again without reporting on the specific information aspects. Nov, Naaman and Ye [19] examined motivations for information sharing on Flickr, although they did not comment on the nature of the information content. Examining Twitter usage for brand sentiment, Jansen, Zhang, Sobel and Chowdhury [20] report information sharing among 20% of status updates by Twitter participants, specifically noting that people share generally positive opinions about brands.

Using groups of adult users of SNSs, Li and Bernoff [13] created a ladder of user classification. The bottom of the ladder is the *Inactives*, who do not do much. The next rung up, and also the largest group, is the *Spectators*. They read blogs, listen to podcasts, watch videos, read customer reviews and read tweets, but they do not create or partake in activities. *Joiners* are next. This group maintains profiles on SNSs and visits other social networking sites. *Collectors*, the next step up on the ladder, use RSS feeds, and add 'tags' to webpages or photos. Then, there are the *Critics*, who follow up and post ratings or reviews, comment on someone else's blog, contribute to online forums and edit articles on wikis. *Conversationalists* (a growing group) actually update their statuses on SNSs and post updates on Twitter. Finally, the highest level on the ladder is the *Creators*. They publish blogs, publish webpages, upload personally made videos or music, and write articles.

Summarizing prior work, SNSs are among the fastest growing segment on the web, and they hold potential as valuable information sources in commercial, as well as other, domains. While there has been research on information sharing in some social media platforms (e.g. blogs), information sharing in other SNSs (e.g. Facebook, MySpace and Twitter) is not as well understood, with little prior research. To date, investigations of these particular social media platforms have primarily focused on the social network connections and activities. There has been less research into the use of these SNSs for information sharing for ecommerce purposes, which requires a multidisciplinary approach [21].

In this emerging online social networking domain, there are several unanswered questions concerning the subject of information sharing on social network platforms. What is the relationship between social media and information sharing? Businesses and other organizations are looking to social media as a way to connect with potential customers and stakeholders in order to share information. However, are there differences among types of users of different SNSs? If so, what are these differences with regards to information sharing? Does information sharing in SNSs have an effect on user

behaviours, which is the ultimate measure of impact in the ecommerce area? These are some of the questions that underlie our research questions.

The research reported in this paper provides a cross-platform analysis of respondents of a myYearbook survey in the teenage and young adult demographic. We survey users on their behaviours on Twitter, Facebook, MySpace and myYearbook and then compare and contrast these behaviours. Prior research investigating behaviours and motivations for using SNSs has been mainly either qualitative or descriptive quantitative statistics, which makes it more difficult to present testable evidence from which one can develop actionable items for organizations. This article presents a quantitative exploration on the subject with the use of inferential statistics to provide testable evidence. Initial results were presented in a conference poster [22] and paper [23], which we expand upon in the research presented here.

3. Research questions

3.1. Research questions 01

Our first research question is: are there unique clusters of social networking users based on their level of *being connected* and level of *being engaged*?

We define levels of *being connected* based on the number of profiles a person has on various SNSs. Specifically for this research, those SNSs are myYearbook, MySpace, Facebook and Twitter. We define levels of *being engaged* as the frequency of updates on a given social networking platform.

This research will be a basis for future work examining more nuanced aspects of *being connected* and *engaged*. However, the theoretical foundation of this research in human information processing is quite complex. Human information processing is the process of acquiring, interpreting, manipulating, storing, retrieving and classifying recorded information [24]. A component of human information processing is information sharing, which is the act of providing information one possesses to, and/or seeking information one desires from, others. Generally, there are four primary information sharing patterns: one-to-one, one-to-many, many-to-many, and many-to-one [25]. While there are a variety of social media technologies to meet these information sharing patterns, we are specifically interested in this research on the sharing of ecommerce opinions on SNSs.

From this perspective, we investigate five information behaviour hypotheses:

a. Sharing opinions via polls

H01a: A person *more connected* with social networking sites will be more willing to share opinion via sponsored polls (i.e. polls placed on social media sites by individuals or organizations).

H01b: A person *more engaged* with social networking sites will be more willing to share opinion via sponsored polls.

SNSs provide the opportunity for organizations to rather quickly gather snapshot opinions from current and potential consumers, primarily via the use of sponsored polls on these SNSs. An understanding of who is responding (and who is not responding) to these sponsored polls can ensure the external validity of poll results.

b. Seeking opinions of others via status messages

H02a: A person *more connected* with social networking sites will be more willing to seek the opinions of others via status messages (i.e. a typically short message about the length of an average English sentence).

H02b: A person *more engaged* with social networking sites will be more willing to seek the opinions of others via status messages.

The status message is a potentially important information channel and source, currently the basis for a variety of internet search technologies [26]. Therefore, it is beneficial to understand the prevalence of information seeking via status messages and the demographics of who is searching information in this manner.

c. Acting on opinions of others via status messages

H03a: A person *more connected* with social networking sites will be more willing to act on the opinions of others via status messages.

H03b: A person *more engaged* with social networking sites will be more willing to act on the opinions of others via status messages.

Seeking opinions is certainly interesting from an information sharing point of view; however, a true test of influence of an information channel is the value and influence of that information. Suh and Shin [27] report that the frequency of interaction online does not affect knowledge sharing but plays a critical role as the motivational factor affecting knowledge sharing. Therefore, we investigate with this hypothesis whether or not a person acted upon the opinions they received from others on their SNSs.

d. Receiving the opinions of others via status messages

H04a: A person *more connected* with social networking sites will receive more opinions of others via status messages.

H04b: A person *more engaged* with social networking sites will receive more opinions of others via status messages.

With these hypotheses, we are interested in the availability of information, specifically how a person's access (via one or more SNSs and their engagement on these sites) affects their flow of information in response to an information request.

e. Providing information to companies

H05a: A person *more connected* with social networking sites will be more willing to friend or fan a company in order to receive special offers from a company.

H05b: A person *more engaged* with social networking sites will sites will be more willing to friend or fan a company in order to receive special offers from a company.

Finally, we investigate the 'fanning' or 'friending' of a company. Next to perhaps actually purchasing a product, a fan or friend on a SNS is important to a company as an indication of a potentially interested customer.

For all of these hypotheses, our reasoning is that a person *more connected* and/or *more engaged* with SNSs is indicative of being more willing to seek, share and act, on opinions of others; receive the feedback from their information requests; and express their commercial brand affiliations. We based this belief on the expectation that there would be a positive correlation between the willingness to access and use these services and the willingness to reap benefits from these services in the information sharing area. We focus on sponsored polls, status messages, and friending/fanning as the information sharing mechanisms in these services.

3.2. Research questions 02

Our second research question is: why are users establishing profiles on multiple social networking sites?

With this research question, we take a more qualitative approach, compared to the quantitative approach for Research question 01. Given that the functionality of many social networking sites is similar, we are interested in why users would maintain accounts on multiple sites. Such an understanding of the motivational aspects could shed light on the information sharing activities of users across these multiple sites, helping to explain why some actions occur.

We examined these information behaviours on multiple SNSs using survey data from users of myYearbook (see http://www.myyearbook.com/).

4. Methodology

4.1. Data collection from myYearbook

myYearbook is a social networking platform founded in 2005 and designed as a virtual place to meet people. Although open to people of all ages, it is primarily aimed at the youth market, which reflects its beginnings with its two teenage founders. The site features various widgets including Owned (an app to buy and sell your friends), Battles (an app to battle over photos and videos), Match (an app to create secret admirers), and Pimp (an app to decorate and design profile pages), with some of these features shown in Figure 1.

In 2009, myYearbook was the fastest growing online social network site in the USA, the 14th largest site in the USA measured by page views, and the 19th largest site in the USA measured by total online minutes. Its 2009 user base

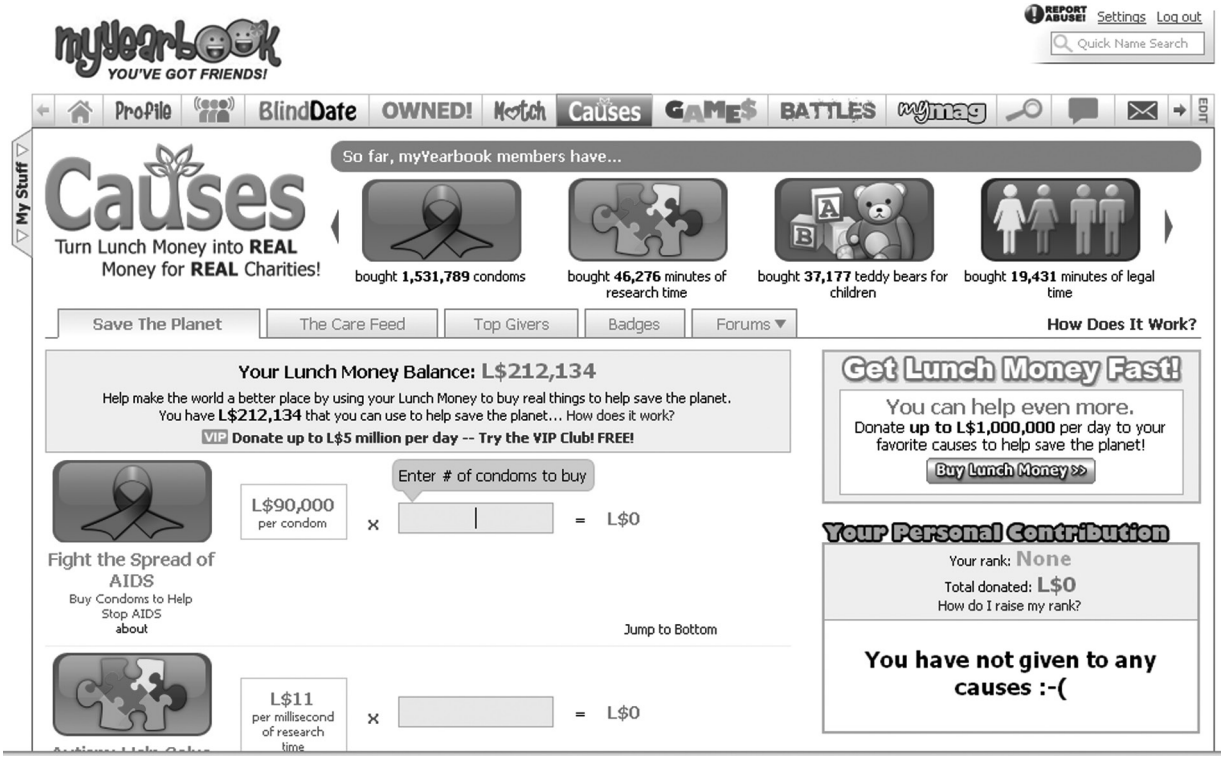

Figure 1. The Causes application from myYearbook, one of the most popular teen SNSs

was 20 million members, with approximately 40,000 new members being added per day. myYearbook also has one of the most active user bases, with members logging in an average of nine times per month and spending an average of 20 minutes on the site per visit (www.myyearbook.com press release). myYearbook attracts 6 million monthly unique visitors with just over 1 billion monthly page views. It is also one of the highest ranked sites in the comScore Teens category as measured by visits, minutes and page views (www.comscore.com). Therefore, myYearbook is an excellent data collection site for our research questions concerning the youth demographic.

4.2. Survey as a data collection method

The data used in this research were compiled based on survey responses from 34,514 myYearbook members in the 13–24 age range. This roughly corresponds to the age groups known as Generation Y or the Millennials (born between 1981 and 2000). This youth grouping is an important demographic for commercial and technologic factors, due to their economic purchasing power and trends as first adopters. As such, this demographic represents harbingers of future social, cultural and technological movements, which adds longevity to these research findings.

The survey was a 55 question instrument, with all questions being multiple items. Two were validity check questions (i.e. pick the colour 'green' and a duplicate question). We discarded all surveys that did not pass the validity checks. We pilot tested the survey, resulting in minor wording changes. The survey was administrated on myYearbook.com from 14–17 August 2009. Participants in the survey were offered Lunch Money (i.e. the myYearbook virtual currency) for successfully completing the survey. After eliminating incomplete surveys, those participants that did not pass the validity checks and those who were outside the target age range, 34,514 complete survey responses were available for data analysis.

4.3. Cluster data analysis using k-means

We conducted three rounds of data analysis: descriptive frequencies, cluster analysis and statistical analysis. Descriptive counts and frequencies are important ways to understand the data and start making it ready for further statistical analysis. We then performed cluster analysis, which is a statistical method to find different groups among responses that

have similar characteristics within the clusters but high variability across clusters. Clustering is a method to segment demographics in order to understand the different groupings within that set. We used the *k*-means cluster technique because it uses as few clusters as possible and captures statistically and commercially important cluster characteristics.

The *k*-means cluster analysis creates a cluster based on a fixed number of groups with unknown characteristics based on defined variables. We used the level of *being connected* and the level of *being engaged*. *k*-Means clustering starts by calculating the initial cluster centres and then assigns cases to clusters based on the distance from the cluster centre. The initial cluster centres are then adjusted with the mean value of the cases within the cluster for the entire data set. This process is repeated in *iterations*. Once the means of the clusters reach stability, the final cluster centres are presented [28]. *k*-Means clustering has the additional benefit of also being a classifying technique, so once characteristics of clusters are known, these characteristics can then be used for classification of existing or future data.

After we had identified our groupings, we conducted ANOVA and cross tab analysis to investigate our research hypotheses in order to determine what effect *being connected* and *being engaged* had on specific information sharing behaviours.

5. Results

5.1. Descriptive results

Before addressing our research questions, aggregate results from the sample population are provided. The four most frequently mentioned motivational activities reported for the use of each of SNS are:

- MySpace: 28% keep up with friends, 15% meet new people, 9% keep up with musicians/celebrities and 9% express self.
- Facebook: 27% keep up with friends, 12% meet new people, 10% share photos and 9% discover music.
- Twitter: 18% update my status, 15% keep up with celebrities/musicians, 14% stay current with world and 11% keep up with friends.
- myYearbook: 24% meet new people, 14% flirting/dating, 13% play games/have fun and 11% keep up with friends.

From Table 1, it can be seen that most of the respondents (approximately 80%) were aged between 13 and 19, with the remaining 20% of respondents in the 20–24 age range. Therefore, our survey sample is weighted towards teens, generally US high school and two years post-high school (the target demographic).

Examining Table 2, most respondents have MySpace profiles (nearly 84%), in addition to a profile on myYearbook. In Table 3, we see that most respondents also have Facebook accounts (65%), although the percentages are lower relative to those with MySpace accounts. The figures in Table 4 show the distribution of respondents with Twitter accounts (approximately 25%). The percentages were much lower relative to MySpace and Facebook.

Table 1. Age of respondents from myYearbook

Age	Occurrences	%
13	1,419	4.1
14	3,412	9.9
15	5,036	14.6
16	5,375	15.6
17	4,713	13.7
18	4,749	13.8
19	3,101	9.0
20	2,010	5.8
21	1,462	4.2
22	1,151	3.3
23	1,059	3.1
24	1,027	3.0
Total	34,514	100.0

Table 2. Respondents with MySpace accounts

Age	Yes MySpace	%
13	941	66.31
14	2,591	75.94
15	4,140	82.21
16	4,577	85.15
17	4,110	87.21
18	4,204	88.52
19	2,686	86.62
20	1,775	88.31
21	1,250	85.50
22	948	82.36
23	861	81.30
24	834	81.21
Total	28,917	83.78

Table 3. Respondents with Facebook accounts

Age	Yes Facebook	%
13	699	49.3
14	1,920	56.3
15	3,161	62.8
16	3,427	63.8
17	3,121	66.2
18	3,293	69.3
19	2,173	70.1
20	1,452	72.2
21	1,021	69.8
22	759	65.9
23	734	69.3
24	707	68.8
Total	22,467	65.1

Table 4. Respondents with Twitter accounts

Age	Yes Twitter	%
13	370	1.07
14	839	2.43
15	1,264	3.66
16	1,406	4.07
17	1,163	3.37
18	1,143	3.31
19	748	2.17
20	492	1.43
21	363	1.05
22	271	0.79
23	249	0.72
24	228	0.66
Total	8,536	24.73

Shown in Figure 2 is the distribution of the number of profiles among respondents. The number of SNS profiles of a respondent determines which *being connected* level they are assigned. Of the respondents, 7% had only a myYearbook account. However, most respondents had profiles on multiple SNSs (typically myYearbook, MySpace and Facebook, with a smaller number on Twitter). As a result, we expect these research results to provide insights into users of these other social services.

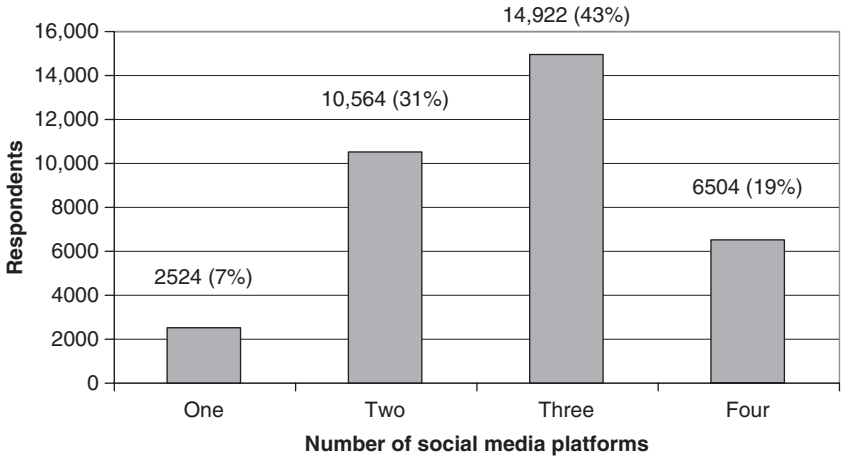

Figure 2. Respondents across social media platforms.

5.2. Cluster analysis results

Addressing Research question 01, we performed a *k*-means cluster analysis, experimenting with clusters ranging from four to 12 and iterations up to 40. Based on our analysis, eight clusters emerge, which are:

- *High Connected (HC)–High Engagement (HE).* Members in this cluster have profiles on all SNSs (Facebook, MySpace, Twitter and myYearbook) and they are very active in updating their statuses on each of these platforms.
- *High Connected (HC)–Skewed Engagement (SE) (F)*. Users in this cluster have profiles on all of the major SNSs, in addition to myYearbook. However, their status update frequency varies based on the SNS. Those in this group have Facebook and update it very often. However, these users update their MySpace and Twitter status messages less frequently.
- *Medium Connected (MC)–High Engagement (HE)*. Members of this group have profiles on two other SNSs, besides myYearbook, and update their MySpace and Facebook account multiple times a day.
- *Medium Connected (MC)–Skewed Engagement (SE) (M).* The users in this cluster have two other SNS profiles, on MySpace and Twitter, but they have a preference for one (in this case MySpace) with very frequent updates, with far fewer updates on Twitter.
- *Low Connected (LC) (F)–High Engagement (HE) (F).* This cluster has a profile on one other SNS than myYearbook, specifically Facebook, and they update the status messages frequently.
- *Low Connected (LC) (M)–High Engagement (HE) (M).* In addition to myYearbook, these users have MySpace profiles, updating their MySpace status frequently. However, they do not have profiles on either Facebook or Twitter.
- *Low Connected (LC) (M)–Low Engagement (LE).* This group has a profile on one other SNS, namely MySpace, but they do not update it. These users are the least connected and least engaged of any cluster.
- *Low Connected (LC) (T)–Low Engagement (LE).* Users in this cluster had only one additional SNS profile (in the case of this cluster, Twitter), and the users update it infrequently. This cluster was by far the smallest and, again, one of the least connected and least engaged.

The overall results of our clustering research analysis are shown in Table 5. From the cluster analysis, three points emerge. The first is that *being connected,* characterized by the number of SNS profiles that one has, is a defining characteristic for clustering of this demographic. Second, the level of *being engaged*, defined as the frequency of updates, is also a defining clustering characteristic. Finally, the actual SNS to which a person belongs is also an important attribute, which highlights sub-clusters of the *connected–engaged* dimension.

We next examine if there are differences among these eight clusters in terms of their information behaviours, specifically addressing our research hypotheses.

Table 5. Social engagement cluster characteristics and descriptions

	Eight clusters – *k*-means cluster analysis (16 iterations)							
	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7	Cluster 8
Cluster members (%)	3878 (11)	1023 (3)	8980 (26)	1509 (4)	3592 (10)	8983 (26)	6117 (18)	432 (1)
MySpace	Yes	Yes	Yes	Yes		Yes	Yes	
Facebook	Yes	Yes	Yes		Yes			
Twitter	Yes	Yes		Yes				Yes
MySpace updates	4	1	3	4		3	0	
Facebook updates	3	3	3		3			
Twitter updates	3	2		2				2
Description	High Connected High Engagement	High Connected Skewed Engagement	Medium Connected (MySpace and Facebook) High Engagement	Medium Connected (MySpace and Twitter) Skewed Engagement	Low Connected (Facebook) High Engagement	Low Connected (MySpace) High Engagement	Low Connected (MySpace) Low Engagement	Low Connected (Twitter Only) Low Engagement

Table 6. Tamhane's significance tests (*p* values) for the eight clusters (ns = no significant difference)

	HC HE	HC SE	MC HE	MC SE	LC (F) HE	LC (M) HE	LC (M) LE
HC HE	–						
HC SE	ns	–					
MC HE	0.01	0.01	–				
MC SE	0.01	ns	0.01	–			
LC(F) HE	0.01	0.01	ns		–		
LC(M) HE	0.01	0.01	0.01	0.01	ns	–	
LC(M) LE	0.01	0.01	0.01	0.01	ns	ns	–
LC(T) LE	ns	ns	0.01	ns	0.01	0.01	0.01

5.3. Sharing opinions via sponsored polls

To compare clusters concerning participation in sponsored polls, we employed a multiple ANOVA (MANOVA) statistical analysis to compare means and variances among the clusters and test whether the eight clusters are significantly different. By default, MANOVA produces a model with all factorial interactions, which means that each combination of factor levels can have a different linear effect on the dependent variable. The two factors in this analysis were *being connected* and *being engaged*. The Tamhane's T2 test, which does not assume equal variance among clusters, was used as the post hoc test.

The overall model was significant ($F(7) = 45.6$, $p < 0.01$) indicating that not only were *being connected* and *being engaged* were significant but the interaction between the two impacted information behaviours. Table 6 shows the clusters that were significantly different, with the associated *p* values (either 0.01 or not significant).

For some of the clusters, the results were expected. High Connected (HC) clusters are usually significantly different than Low Connected (LC) clusters. High Engagement (HE) clusters are significantly different than Low Engagement (LE) clusters. However, this does not always hold. For example, the two LC-LE clusters are significantly different. It appears that this can be explained by the interaction effect of the individual factors, most notably the specific SNS to which the members of this cluster belong.

H01a: A person *more connected* with social networking sites will be more willing to share opinion via sponsored polls.

Examining *being connected,* a test of between subjects effects showed that significant fixed factors were MySpace ($F(1) = 39.4$, $p < 0.01$), and Twitter ($F(1) = 179.4$, $p < 0.01$), while Facebook was not a significant factor in sharing opinions via sponsored polls. Also, the interaction of MySpace * Twitter ($F(3) = 21.3$, $p < 0.01$) was significant, while MySpace * Facebook, Facebook * Twitter, and MySpace * Facebook * Twitter were not significant. So, if a respondent had a MySpace or a Twitter account, they were more likely to share their opinion via sponsored poll. Also, if the respondent had both a MySpace and Twitter account, this was even more likely. Finally, an account on Facebook had no effect on openness to sharing opinion via a poll. For all clusters, though, the more SNSs indicated a higher degree of willingness to share opinions.

H01b: A person *more engaged* with social networking sites will be more willing to share opinion via sponsored polls.

Next focusing on *being engaged*, a test of between subjects effects showed that the significant fixed factors were again MySpace Updates ($F(6) = 6.4$, $p < 0.01$), and Twitter Updates ($F(6) = 16.8$, $p < 0.01$), while Facebook Updates were not a significant factor in sharing opinions via sponsored polls. Moreover, the interaction of MySpace Updates * Twitter Updates ($F(36) = 2.9$, $p < 0.01$), Facebook Updates * Twitter Updates ($F(36) = 2.3$, $p < 0.01$), and MySpace Updates * Facebook Updates * Twitter Updates ($F(36) = 1.5$, $p < 0.01$) was significant. However, MySpace Updates * Facebook Updates was not significant. So, a respondent that was being more engaged on a MySpace or a Twitter account was more likely to share their opinion via sponsored poll. A respondent whose level of being engaged on a Facebook, MySpace and Twitter account was high was even more likely to share information via polls. The level of engagement on just Facebook had no effect on openness to sharing opinion via a poll.

Generally, the more engaged a person is with SNSs, the greater their willingness to share opinions. However, specific SNSs, specifically MySpace and Twitter, do impact on this willingness.

5.4. Seeking advice in status messages

H02a: A person *more connected* with social networking sites will be more willing to seek the opinions of others via status messages.

H02b: A person *more engaged* with social networking sites will be more willing to seek the opinions of others via status messages.

The results of a chi-square test show a statistical difference on seeking opinions of others on SNSs (chi-square (6) = 1226.6, $p < 0.01$) among the eight clusters. Investigating layering factors for *being connected* (i.e. MySpace, Facebook and Twitter) all platforms were significant but the symmetric measure evaluating the strength of each was low. This indicates that the difference among each platform was small and the key factor was just that the respondent had profiles on multiple platforms.

Investigating layering factors for *being engaged* (i.e. frequency of updates on MySpace, Facebook and Twitter) all levels of engagements were significant but the symmetric measure evaluating the strength of each was again low.

This would indicate that there is an interaction effect between *being connected* and *being engaged* that impacts a respondent's willingness to seek the advice of others via status messages, even though the impact of each individual factor is low.

5.5. Influence of advice in status messages

H03a: A person *more connected* with social networking sites will be more willing to act on the opinions of others via status messages.

H03b: A person *more engaged* with social networking sites will be more willing to act on the opinions of others via status messages.

The chi-square test results show a statistical difference on seeking opinions on potential product purchases (chi-square (7) = 132.4, $p < 0.01$). Again, in investigating layering factors for *being connected,* all SNSs were significant but the symmetric measure of each was again low. The key factor appears to be the level of *being connected* on multiple SNSs. Investigating layering factors for *being engaged*, all SNSs were significant, but again, the symmetric measure of each was low. So, these findings would indicate that there is an interaction effect occurring between *being connected* and *being engaged* on a person's willingness to accept advice via SNSs.

5.6. Receiving advice in status messages

H04a: A person *more connected* with social networking sites will receive more opinions of others via status messages.

H04b A person *more engaged* with social networking sites will receive more opinions of others via status messages.

A chi-square test shows a statistical difference on receiving opinions of others on SNSs (chi-square (6) = 154.4, $p < 0.01$) among the eight clusters. The layering factors for *being connected* (i.e. profiles on MySpace, Facebook and Twitter) show that all platforms were again significant, but the symmetric measure that evaluates the strength of each was low. This finding shows that the difference among each platform is small and the key factor was just that the respondent had profiles on multiple platforms. Similarly, the layering factors for *being engaged* (i.e. frequency of updates on MySpace, Facebook and Twitter) show that all levels of engagements were significant, but that the symmetric measure evaluating the strength of each was also low. This would indicate again that there is an interaction effect between *being connected* and *being engaged* that impacts on a respondent's ability to get advice from others via status messages.

5.7. Explicit support of brands

H05a: A person *more connected* with social networking sites will be more willing to friend or fan a company in order to receive special offers from a company.

H05b: A person *more engaged* with social networking sites will sites will be more willing to friend or fan a company in order to receive special offers from a company.

A chi-square test shows a statistical difference on willingness to friend/fan a company on SNSs (chi-square (6) = 672.0, $p < 0.01$) among the eight clusters. Considering the layering factors for both *being connected* and *being engaged*, all

platforms and frequents were significant, but the symmetric measure evaluating the strength of each was also low. This indicates that the differences among each platform and engagement level were small and that the key factor was just that the respondent had profiles on multiple platforms and was engaged. However, given that the overall model was significant, this again indicates that there is an interaction effect between *being connected* and *being engaged*.

5.8. Motivations for use of SNSs

Addressing Research question 02, we performed a qualitative analysis of the survey results. A majority of the youth demographic will have more than one social network. But why? We note also that there is a division among teenagers based on which SNSs they choose and how engaged they are with that social network. This may result from their differing motivations for using those social networks.

Since most of the respondents have multiple accounts, we were interested to see what types of motivations drive them to use these diverse SNSs. We know that the four SNSs do have different sets of activities that drive users to choose one over the other. For example, myYearbook is the only site where a large majority of respondents were interested in flirting with or dating other users. Sharing photographs is a large motivation for using Facebook over the other social networks. A motivation mainly present for Twitter is keeping up with the world. Yet there is one motivation to use SNSs that stayed constant throughout – 'to keep up with friends I know'.

Our survey identifies 14 different responses to the question 'Why do you use MySpace (or myYearbook, Facebook or Twitter)?' We categorized the 14 responses into Kelly's seven motivation categories. Table 7 details those responses that fit into the seven motivation categories.

We then applied these categories to each of the SNSs. This better shows the differences in motivations for choosing one SNS over another. Based on our survey (Table 8), respondents use myYearbook for meeting people for the first time online, flirting and possibly dating, as well as playing games. In other words, they use it to seek new experiences. Twitter is distinctly different since it is mainly used to update one's status, keep up with celebrities and stay current with the world. It is used to satisfy a need to seek information as well as a creative outlet to express oneself. Facebook and MySpace are used mainly to keep up with friends already known. Also, Facebook is distinctly used for sharing photos, while MySpace is used to express one's self. These two sites are used to create relationships and as self-expression.

6. Discussion

6.1. Major findings and implications

From our aggregate findings, we see that MySpace and Facebook are used primarily to keep up with friends. Twitter is used to inform other people of one's doings and myYearbook is primarily to meet new people. A majority (53%) of our sample was in the 15–18 age range, with clear majorities having MySpace (84%) and Facebook (65%) accounts, and 25% of the respondents having Twitter accounts. A clear plurality of respondents (43%) had accounts on three platforms, so we had a robust sample for our survey.

Table 7. Survey responses categorized into seven motivations

Kelly motivations	Description	Survey responses categorized			
Mood enhancement/ relief of boredom	*When you are feeling bored, entertainment components, feel relax*	Listen to music		Play games/have fun	
To belong/social interaction	*Interacting with peers, developing friendships, communicating with friends*	Be a part of a community		Receive/share advice	
Recognition/ attention from friends	*The site provides attention to the teenagers*	Because it's cool			
Creative outlet/ represent self	*Updating and changing their profile, being creative*	Update my status		Express myself	Share photos
New experiences	*Receiving new comments, adding new friends, discussing with friends, learning about friends/self*	Meet new people		Flirting/dating	
Relationships	*Engaging in conversations with friends/ acquaintances, emotional connections*	Keep up with friends I know			
Information Seeking	*Information seeking regarding their interests, music, movies, causes etc.*	Discover music	Stay current with world	Keep up with favourite musicians/bands/celebs	

Table 8. Motivations broken down by social networking site (SNS)

SNS	Belonging/ interacting	Recognition/ attention	Information seeking	Mood enhancing	Relationships	Creative/self	New experiences
Facebook (%)	8.0	5.1	9.0	9.8	**26.3**	**26.4**	15.5
MySpace (%)	3.3	5.3	13.9	11.4	**26.2**	**21.5**	18.4
myYearbook (%)	7	7.7	3.4	16	11	15.5	**39.2**
Twitter (%)	12.4	5.5	**30.9**	2.2	10.5	**29.9**	8.6

Note: highest percentages in bold.

Using cluster analysis, we identified eight distinct groups within the 13–24 year old demographic regarding their ecommerce information sharing activities on SNSs in this research. Some of these clusters were due to the specific social media platform. If we focus on just *being networked* and *being engaged* we can collapse the clusters more. Specifically, we found the following clusters of users:

- *High Connected (HC)–High Engagement (HE)* cluster, with accounts on many platforms and very active on all of them.
- *High Connected (HC)–Skewed Engagement (SE)* cluster, with accounts on many platforms but a skewed engagement based on the particular platform, updating usually one social media platform much more frequently than the others.
- *Medium Connected (MC)–High Engagement (HE)* cluster, with accounts on some platforms but updating all of these frequently.
- *Medium Connected (MC)–Skewed Engagement (SE)* cluster, with accounts on some platforms and updating particular ones more than others.
- *Low Connected (LC)–High Engagement (HE)* cluster, with accounts on few platforms but updating them quite frequently.
- *Low Connected (LC)–Low Engagement (LE)* cluster, with accounts on few platforms and rarely updating them.

Overall, the youth market is not monolithic and, more importantly, it has definable characteristics that allow for market segmentation. For some clusters, members were highly connected, while they were considerably less so in other clusters. Members in some clusters were extremely engaged with their status updates across all social sites, but those in others tended to focus more on one SNS relative to others.

However, our results show that using the attributes of *being network*ed and *being engaged*, one can categorize social media users into a 3 × 3 framework, as shown in Table 9.

We can also examine this at more specific levels, based on our sample, finding that, for levels of connection:

- the majority of youth, 56%, are categorized in a low level of *being connected,* with only one SNS profile;
- only 14% are highly connected with four SNS accounts;
- 30% have multiple accounts but less than four.

Table 9. 3 × 3 framework to classify social media users by connection and engagement

	Highly connected	Moderately connected	Not connected (much)
Highly Engaged	• Accounts on multiple platforms • Updates all frequently	• Accounts on a few platform • Updates them generally frequently	• Account on generally one platform • Updates it quite frequently
Moderately Engaged	• Accounts on multiple platforms • Does some updating on all and perhaps more frequent updating on one	• Accounts on a few platform • Does some updating on all and perhaps more frequent updating on one	• Account on generally one platform • Does some updating on all and perhaps more frequent updating on one
Not Engaged (much)	• Accounts on multiple platforms • Rarely updates	• Accounts on a few platform • Rarely updates	• Account on generally one platform • Rarely updates

Concerning levels of engagement, we find that:

- a significant majority of this demographic (74%) is highly engaged, updating their status at least multiple times in a given week;
- nearly 7% of this demographic has a skewed level of engagement, meaning that they update their status frequently on at least one SNS but seldom or never update on other SNSs;
- only 19% of this overall youth grouping has a low engagement with SNSs. So, these users are very active, regardless of the number of SNS platforms, providing a rich data source for analytics and communication analysis.

The research findings show that *being connected* and *being engaged* with multiple or particular SNSs indicate a difference in information seeking and sharing behaviour. It also highlights the non-monolithic nature of this youth demographic, with a range of social networking services and commitment on these services. However, it also demonstrates that *being connected* and *being engaged* are workable characteristics for isolating specific segments of this demographic.

The clustering result analysis identifying eight clusters shows that this youthful demographic has fragmented ecommerce information behaviour in the social media realm. There are varied levels of soliciting information from social networks, as well as varied levels of acting on this information. We note that the more connected (i.e. the more SNS profiles that a person has) and the more engaged (i.e. the more frequent they update SNS statuses) the more willing people are to engage in commercial information sharing practices, including responding to sponsored polls, engaging (i.e. seeking, receiving and acting) with status messages, and fanning a company. There was also an interaction between the two, with those being more connected and more engaged exhibiting even more willingness to seek and share economic information on SNSs.

Concerning polls, there is a statistically significant difference among participants based on the SNS platform, while we do not see this difference with status messages (with a notable exception of Facebook-only users).

This would indicate that people might trust their social network more than sponsored information gathering practices on these social networking platforms themselves. This has implications for advertising and information dissemination via social networking. The standard web advertising model [29] might not work on most SNS platforms, as most users prefer to share ecommerce information, including recommendations, via status messages.

A notable exception to this rule is with Facebook, where a status message seems to serve a different purpose than on the other platforms. This may be why Facebook has been somewhat successful at adopting a model that is similar to sponsored search and content advertising, which are the traditional web revenue models.

The more connected and the more engaged people are with SNSs, the more willing they are to friend/fan a company or brand.

While one may expect a correlation between seeking–sharing ecommerce advice and being more active in the social media area, one important aspect of this is the concept of *acting* on this information. There has been a lingering question in the area of social media marketing on whether or not it is a fruitful endeavour and whether or not users are going to be receptive to any form of advertising. These results show that users of these platforms are not only receptive to viral modes of ecommerce information but that these people act upon this advice.

However, the motivations for using the various SNSs are varied, with some used to meet friends, others to share content and others to gather information. Therefore, given the different motivations, the marketing messages and communication on each SNS would have to be in line with the users' expectations of these platforms.

6.2. Strengths and limitations

Concerning limitations and strengths, the data collection instrument was a survey from one social networking site, so we examined reported, rather than actual, behaviour. However, our sample is quite large, so we would expect good validity on the survey responses. Also, as a means of data collection for overall activities, surveys and associated reported activities have been widely employed in the study of information systems. Nevertheless, a worthwhile future research project would be to use a smaller sample of participants to conduct a user study employing client side tracking software to monitor user behaviours of multiple SNSs. Another limitation is the use of one SNS site for data collection, as this may skew the sample. However, with nearly 35,000 respondents, we believe our results are indicative of users of other SNSs. Finally, there is a possible limitation concerning the data collection period. In the time since we collected the data, user behaviours on these sites may have evolved. However, given the examined aspects of information sharing, the technological affordances have remained fairly stable. Therefore, we would not expect major shifts in behaviour, although a change in the distribution among SNSs would be expected as the fortunes of different SNSs wax and wane.

We employed a widely used methodology (i.e. survey) for data collection, had a significant number of respondents (34,514), and used robust methods for data analysis (i.e. descriptive analysis, ANOVA, crosstabs, and *k*-means clustering). Therefore, we believe that our results have validity in the use of SNSs for ecommerce information sharing by this demographic.

7. Conclusion

In the research reported in this paper, we employed an online survey to collect data on the level of *being connected* on and *being engaged* with social media sites from nearly 35,000 respondents of the youth demographic. We used *k*-means clustering analysis and associated statistical analysis on the resulting survey data, identifying eight clusters and showing a statistically significant difference in the ecommerce information sharing behaviours of people in these clusters. The implications of the findings are that organizations interested in marketing to this youth demographic must consider the variety of information behaviours inherent in this segment based on *being connected* and *being engaged* in SNSs. Organizations that really want to communicate with individuals in this demographic via social networking platforms, should segment the market by those who are willing to engage with others on their personal social networks in a commercial domain.

Acknowledgements

We thank the fans of myYearbook who took the time to participate in the survey used for this research.

References

[1] M. Zimmer, The externalities of search 2.0: The emerging privacy threats when the drive for the perfect search engine meets web 2.0, http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/viewArticle/2136/1944
[2] K. Rutledge, Wooing teens to buy online has e-tailers seeing green. In: *Discount Store News,* 39 (2000) (Lebhar-Friedman, Inc., New York), 1.
[3] D. Tapscott, Net gen transforms marketing, *Business Week (Online)* (2008).
[4] C. Vogt and S. Knapman, Personal web spaces and social networks, *Worldwide Multi Media Measurement* (2007).
[5] D. Boyd and N.B. Ellison, Social network sites: definition, history, and scholarship, *Journal of Computer-Mediated Communication* 13(1) (2007) 19.
[6] B.B. Morrison and A. Weaver, Social networking, *IEEE Computer Society* (2008).
[7] L. Kelly, Teenager's perceptions of advertising in the online social networking environment: an exploratory study, *School of Advertising Marketing and Public Relations*, Queensland University of Technology (2008) 169.
[8] N.B. Ellison, C. Steinfield and C. Lampe, The benefits of Facebook 'Friends': social capital and college students' use of online social network sites, http://jcmc.indiana.edu/vol12/issue4/ellison.html
[9] J.H. Choi, Living in cyworld: Contextualising cy-ties in South Korea, *Use of Blogs (Digital Formations)*, (2006) 13.
[10] D. Boyd, Taken out of context: American teen sociality in networked publics, *Philosophy*, University of California, Berkeley (2008) 406.
[11] I.C. Grant, Young peoples' relationships with online marketing practices: an intrusion too far? *Journal of Marketing Management* 21(5/6) (2005) 607–23.
[12] G. Cook, Building a social network in a Facebook and Twitter world, http://paidcontent.org/article/419-building-a-social-network-in-a-facebook-and-twitter-world
[13] C. Li, J. Bernoff, C. Pflaum and S. Glass, How consumers use social networks, *Forrester Research* (2007).
[14] M.M. Wasko and S. Faraj, It is what one does: Why people participate and help others in electronic communities of practice, *Journal of Strategic Information Systems* 9(2–3) (2000) 155–73.
[15] B. Wellman, Computer networks as social networks, *Science,* 293 (2001) 2031–34.
[16] A. Java, X. Song, T. Finin and B. Tseng, Why we Twitter: understanding microblogging usage and communities, *9th WebKDD and 1st SNA-KDD 2007 Workshop on Web Mining and Social Network Analysis (webKDD/SNA-KDD '07)* (San Jose, California, USA, 2007) 56–65.
[17] C.C. Yang and M. Sageman, Analysis of terrorist social networks with fractal views, *Journal of Information Science* 35(3) (2009) 299–320.
[18] M. Burke, C. Marlow and T. Lento, Feed me: Motivating newcomer contribution in social network sites, *27th International Conference on Human Factors in Computing Systems (CHI 2009)* (Boston, MA, USA, 2009) 945–54.
[19] O. Nov, M. Naaman and C. Ye, Analysis of participation in an online photo-sharing community: a multidimensional perspective, *Journal of the American Society for Information Sciences and Technology* 61(3) (2009) 555–66.
[20] B.J. Jansen, M. Zhang, K. Sobel and A. Chowdhury, Twitter power: Tweets as electronic word of mouth, *Journal of the American Society for Information Science and Technology* 60(11) (2009) 20.
[21] J. Hunsinger, Towards a transdisciplinary understanding of internet research, *Information Society* 21(4) (2005) 277–79.

[22] B.J. Jansen, K. Sobel, and G. Cook, Gen x and y's attitudes on using social media platforms for opinion sharing, *ACM Conference on Human Factors in Computing Systems (CHI2010)* (Atlanta, GA, 2010) 3853–58.
[23] B.J. Jansen, K. Sobel and G. Cook, Being networked and being engaged: the impact of social networking on ecommerce information behavior, *iConference 2011* (Seattle, WA, USA, 2011).
[24] T. D. Wilson, Human information behavior, *Informing Science* 3(2) (2000) 49–55.
[25] M.D. Laat, Network and content analysis in an online community discourse, *Conference on Computer Support for Collaborative Learning: Foundations for a CSCL Community (CSCL'02)* (Boulder, CO, 2002) 625–26.
[26] B.J. Jansen, G. Campbell and M. Gregg, Real time search user behavior, *ACM Conference on Human Factors in Computing Systems (CHI2010)* (Atlanta, GA, USA, 2010) 3961–66.
[27] A. Suh and K.-s. Shin, Exploring the effects of online social ties on knowledge sharing: a comparative analysis of collocated vs dispersed teams, *Journal of Information Science* 36(4) (2010) 443–63.
[28] SPSS Inc, *K-means cluster analysis* (2010), www.spss.com/software/statistics/statistics-base/ (accessed on 15 May 2010).
[29] B.J. Jansen and T. Mullen, Sponsored search: An overview of the concept, history, and technology, *International Journal of Electronic Business* 6(2) (2008) 114–31.