Online Knowledge Sharing: Who, What and Where to Share

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Abstract. Online knowledge sharing has been getting popular. People browse Internet websites to get a wide range learning resources online, from purely academic to all sorts of life tips. Furthermore, recent empirical studies confirm the importance of online knowledge sharing through various forms of social interaction, such as interactive and multimedia websites, discussion forum, and online social networks. However, there is always a need to understand what actually users do online, in order to more accurately assess if those tasks are effective to knowledge sharing. Thus, the present study captures what online tasks Internet users will do and explore if there are differences among individual Internet users. Through an online survey, this study collected 1607 completed questionnaires. It was found that, from a scale between 1 (never use) and 10 (frequent and everyday use), browsing webpages (mean=9.339), receiving email (mean=9.100), browsing online news (mean=8.584), writing email (mean=7.793) and using instant messaging (mean=7.366) are among the top five online tasks reported. Significant gender differences existed: much higher in female are tasks on browsing online photo (female/male mean=6.951/6.544, $p<0.01$); browsing social media sites (female/male mean=6.587/6.401, $p<0.01$); photo upload (female/male mean=4.974/4.302, $p<0.001$) where much higher in male are tasks on browsing discussion forums (female/male mean=5.812/6.791, $p<0.001$); writing in discussion forums (female/male mean=3.400/4.372, $p<0.001$); playing online game (female/male mean=3.370/3.821, $p<0.01$); and audio upload (female/male mean=1.940/2.194, $p<0.01$). Explanations with respect to social sphere, formation and maintenance of interpersonal relationships are given in the discussion section..

Keywords: Online knowledge sharing, ANOVA, gender differences, interpersonal relationship

1 Introduction

In 2004, Tim O'Reilly defined Web2.0 [1]. The strategic positioning is that the Web as a platform where all applications are there on the Internet and all users meet and interact at these platforms on the Internet. The user positioning in Web2.0 is that users control their own data. That is, the contents are created, transformed and re-created by users who have the freehand to upload, edit and manage their data. It is no more the

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web administrators who create the content and broadcast to everyone. Under this Web2.0 paradigm, users interact with each other, share their knowledge and finally, every application or web platform harnesses collective intelligence – from a collective sense of knowledge of all individuals. We can see this promising future with respect to the great number of users in online platforms. For example, at the online encyclopedia site, Wikipedia, the number of named accounts is currently 14,763,250 with a relatively large number of unregistered Wikipedia users contribute to the site [2]. Another example is Facebook, which has more than 500 million active users and 50 per cent of the active users log on to Facebook in any given day [3]. The interaction in Facebook is tremendous in figures, for example, people spend over 700 billion minutes per month on Facebook, and there are over 900 million objects that people interact with, such as pages, groups, events and community pages.

However, what actually do people do online? Who they are interacting with? Where do they spend most of their time? There is always a need to answer all these questions in order to effectively evaluate users' online behavior and the interaction among online users. There is not just a need to one-off measurement, but also a need for regular evaluation of these figures in order to predict any changes and promising trends in the future. Only with more accurate measurement of online behaviors should we be able to explain the success of Web2.0 applications and to better design and to satisfy users' needs to interactions.

Thus, the objectives of this study are to capture the online behavior of users and to explore individual differences that provide better guidelines to design and implementation of Web applications and Web platforms. The structure of this study is as follows: the study starts with a literature review on online knowledge sharing and possible individual differences. It then reports the possible hypotheses for testing. The study designs to collect empirical data for analysis. A discussion, future studies and limitation on the data analysis will be presented in the last section.

2 Literature review

2.1 Online knowledge sharing

Social interaction and knowledge sharing are consistently proposed to be integral parts of knowledge creation and knowledge acquisition processes [4]. It is because of the Internet, social interaction becomes possible with anyone, at any time and in anywhere. For example, people keep in touch with their family and friends, share experiences and feelings of their daily lives; chat with people they do not know but of the same interest. People interact with each other with all sorts of online communication tools, for example, email, instant messaging, discussion forums, virtual communities , and more recently, in online social networks. As Howard Rheingold said, "People in virtual communities use words on screens to exchange pleasantries and argue, engage in intellectual discourse, conduct commerce, exchange knowledge..." [5]. Although it is possible for people in using Internet to communicate

at ease, do people really utilize the online communication tools for frequent and regular exchanges? It becomes important to capture such online activities to understand if communication takes place. Then, it is possible to explore further if social interactions are meaningful, either emotionally or intellectually. Recent studies explore knowledge sharing by means of different online activities, for example, to login a system; to read messages and to post messages [6]. It was found that high intention to use group is significantly higher than other groups in terms of number of login and read message. However, no significant difference was found for post message. It is possible that people do go online a lot but they stay in the comfort zone to passively share knowledge through only reading and browsing, but seldom involve in proactive knowledge sharing through comments, responses, and original work upload.

2.2 Gender differences in social interaction

It has been suggested that there are gender differences in belief, attitude and behavior in social interaction. Shaver and Buhrmester [7] argue that in general, men are less well suited to social life because of their tendency toward independency and their fear of social contact and relatedness. From that logic, we will expect that men will more hesitate to meet new friends and to involve in social interaction.

However, Cross and Madson [8] take another perspective to explain gender differences. They suggest that men and women form different individual structures of the self. Men are suggested to form independent self-construal which refers to representations of others who are separate from the self. On the other hand, women are suggested to form interdependent self-construal which refers to others who are considered part of the self. With respect to this explanation, we do not say that men are less sociable. Instead, men care more about themselves, independent from others. Just the opposite, women care more about others and think others as part of the self, caring others as part of the self. From this point of view, men do not have problem in meeting new friends though men care more about their own self while interacting with others. Women may not be better making new friends, however, women care more about their friends and probably be more popular among friends.

Further from that, Baumesiter and Sommer [9] explore gender differences from the social sphere of belonging perspective. They propose that male is directed toward the formation of relationships with others but in a broader social sphere. For example, men meet and make friends with strangers easier than their female counterparts. Men have always a tendency to expand their social sphere, in terms of power, recognition by others, and influence over others. On the other hand, women focus on dyadic close relationships. For example, women probably will spend more time to maintain the status quo social circle, instead of extending their social sphere. Recent studies show empirical support on these gender differences [10]. Men showed direct and significant causal effect between forming a relationship and online knowledge sharing but maintaining a relationship had only an indirect significant causal effect on online knowledge sharing through forming a relationship. At the same time, women were found that both forming a relationship and maintaining a relationship had direct and significant effect on online knowledge sharing.

3 Hypotheses development

On the one hand, it is reasonable to predict that online users spend more time to easy tasks, such as, browsing websites and reading material. On the other hand, from the theory of the emergence of Web2.0 and from the statistics of the very popular online social networks, users are actually very active to social interaction and exchanges. It is therefore reasonable to predict a more balanced picture to describe online users and their corresponding online activities. Thus,

H1: *Online users do not just passively browsing but also actively exchange with other online users.*

With reference to the social sphere argument, men have a stronger desire to expand his social network. Accordingly, men would spend more time and effort to meet new friends and strangers. Therefore, men will meet more people in order to expand and finally to result in a larger social sphere. Thus,

H2: *Men will spend more time and effort to online activities in which they can meet new friends than their female counterparts.*

On the other hand, in comparison, female care more about dyadic and close relationships. That is, they are more willing to spend time to the one they know in order to maintain a close and intimate relationship. Thus,

H3: *Female will spend more time and effort to online activities in which they can maintain their interpersonal relationship than their male counterparts.*

4 Methodology

Subjects and Data Collection: In between the period 1st and 21st June, 2011, an online survey was posted online. A list of 16,000 individual email addresses was extracted in two batches. The first batch was targeted on individuals of several local active websites. Email aliases that people commonly used were input as keywords to search using Google, for example, "@gmail.com" under the website of Hong Kong Discussion Forum (discuss.com.hk) which is among the top ten website in Hong Kong. Another batch was gathered through local higher education institutions. The email addresses were then sorted, and removed with duplications. Invitation letters to request to complete the online questionnaire were then sent by these email addresses. At the same time, social networks, such as "Facebook" were used as a medium to promote the activity. To encourage the participation, it was announced that in completion of the survey, participants were automatically added in a pool for a weekly lucky draw. In total, three iPad2 were presented to lucky participants. Up till 17th, June 2011, there were 1607 completed questionnaires returned and captured in the online database for further analysis.

Instrument: A In February 2011, a pilot study was conducted. A number of 300 undergraduate journalism and communication students were asked what they did online. They were free to write the top ten online activities. The data were then recorded and summarized. Repeated items were discarded. There were also added items to make the list more complete. A list of total 18 online activities was prepared. Each online activity was presented as a statement, asking respondents to self-report their usage from the lowest 1 (Never) to the highest 10 (Always, everyday).

Data analysis: The collected data were analyzed with descriptive details in order to understand the respondents' profile, including gender, age, online skill level and online experience. The mean values of each online activity were calculated and were used to rank the activities. An one-way ANOVA was used to analyze possible gender differences of each online activity.

5 Findings

5.1 Descriptive summary and validity testing of the observed variables

From the Table 1 below, there are 689 male and 918 female, adding to a total of 1607 respondents completed the online survey. This sample is basically composed of three age groups, between 16 and 21 (N=430, 26.76%); between 21 and 26 (N=718, 44.68%) and 26 or over (N=459, 28.56%). The self-reported online skills are mainly from fair to expert while a large majority of the respondents have over 3 years of Internet experience. Details figures are listed below (see Table 1).

Table 1.Descriptive Analysis of Respondents (*N*=1607)

		Gender		Total
		Male (N=689)	Female (N=918)	N=1607
Age	16-<21	155	275	430
	21-<26	301	417	718
	26-<31	79	74	153
	31-<36	49	38	87
	36-<41	34	24	58
	41-<46	27	21	48
	46-<51	24	30	54
	=>51	20	39	59
Online Skill		1. Beginners (Male: 8; Female: 22); 2. Fair (Male: 111; Female: 238); 3. Good (Male: 412; Female: 552); 4. Expert (Male: 158; Female: 106)		
Online Experience		1. <1 year (Male: 7; Female: 6); 2. 1 – 2 years(Male: 6; Female: 3); 3. 2-3 years(Male: 2; Female: 9); 4. >3 years(Male: 674; Female: 900);		

The respondents are requested to report what they do online and how often they do so, utilizing a scale from the lowest 1 (Never) to the highest 10 (Always, Everyday). The mean values and the standard deviation figures are listed below (see Table 2), with the highest mean values on top. From the figures, it is found that most online activities are one-way communication. That is, users browse online. Among

the top ten online activities, eight of them are browsing activities, such as "Browse webpages" (mean=9.339), "Receive email" (mean=9.100), "Browse online news" (8.584), "Browse online video" (mean=6.812), "Browse photo" (mean=6.777), "Browse social media" (mean=6.661), "Browse blog" (mean=6.261), and "Browse forum" (mean=6.231). There are two active exchange online activities in the top ten list, including "Write email" (mean=7.793) and "Use instant messaging" (mean=7.366). Although "Write in social media" is ranked eleventh (mean=5.691) and not in the top ten list, it gains greater attention because of the tremendous number of active users in social media.

Table 2.Descriptive Statistics of Online Behaviors

	Overall		Male		Female	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Browse webpages	9.339	1.6283	9.273	1.8071	9.388	1.4790
Receive email	9.100	1.8406	9.041	1.9577	9.145	1.7473
Browse online news	8.584	2.0782	8.697	2.0866	8.500	2.0690
Write email	7.793	2.4723	7.765	2.6003	7.814	2.3729
Use instant messaging	7.366	2.9289	7.322	2.9537	7.399	2.9113
Browse online video	6.812	2.7931	6.717	2.8934	6.883	2.7148
Browse photo	6.777	2.9629	6.544	2.9944	6.951	2.9286
Browse social media	6.661	3.3454	6.401	3.3687	6.857	3.3162
Browse blog	6.261	3.0394	6.216	3.1049	6.294	2.9905
Browse forum	6.231	3.0616	6.791	3.0614	5.812	2.9955
Write in social media	5.691	3.3860	5.501	3.3581	5.833	3.4018
Upload photo	4.686	2.6243	4.302	2.6598	4.974	2.5612
Comment on blog	4.500	2.9622	4.507	2.9986	4.495	2.9362
Write in forum	3.816	2.7499	4.372	2.9107	3.400	2.5460
Write blog	3.743	2.6823	3.597	2.7055	3.853	2.6610
Play online game	3.564	2.8588	3.821	2.9661	3.370	2.7613
Upload video	2.609	2.1568	2.682	2.2346	2.553	2.0961
Upload audio	2.049	1.9045	2.194	2.0854	1.940	1.7498

To analyze if there exists gender differences among these online activities, an one-way ANOVA is conducted. Seven online activities were found significant differences between gender groups and were listed in the below table (see Table 3). The higher mean values between the gender groups are highlighted. In "Browse photo" ($p<0.01$), "Upload photo" ($p<0.01$) and "Browsing social media" ($p<0.001$), female is having significant higher means than male. In "Browse forum" ($p<0.001$), "Write in forum" ($p<0.001$), "Play online game" ($p<0.01$), and "Upload audio" ($p<0.01$), male has higher means than their female counterparts.

Table 3. One-way ANOVA Summary of Significant Gender Different Online Activities

	Means Overall	Male	Female	F	Sig.
Browse photo	6.777	6.544	6.951	7.446	.006
Browse social media	6.661	6.401	6.857	7.365	.007
Browse forum	6.231	6.791	5.812	41.293	.000
Upload photo	4.686	4.302	4.974	26.211	.000
Write in forum	3.816	4.372	3.400	50.671	.000
Play online game	3.564	3.821	3.370	9.855	.002
Upload audio	2.049	2.194	1.940	7.049	.008

A further analysis of these online activities, it could roughly divide them into three categories. Firstly, users could only build social networks in social media, for example, Facebook, that they have certain kind of relationships, such as the same affiliation of schools and residential districts, or the same interest groups. Facebook starts with photograph upload function and is also one of the largest online photograph sites. "Browse social media", "Upload photo", and "Browse photo" are included in this category. Secondly, users in discussion forums are anonymous. They come together because they have the same interest. However, they probably do not know each other and users do not need to reveal their physical identities. "Browse forum" and "Write in forum" are included in this category. "Play online game" and "Upload audio" are included in the third category. From this on, the online activities could be categorized as a larger social sphere and a dyadic close relationship. The hypotheses testing results refer to this categorization of online activities.

Table 4. Summary of Hypotheses Testing

Hypotheses	Examples	Findings	Results
H1: *Online users do not just passively browsing but also actively exchange with other online users.*	Browsing and writing online activities	Although eight out of the top ten list are browsing online activities, two active exchange online activities receive rather high usage means.	*Partially Supported*
H2: *Men will spend more time and effort to online activities in which they can meet new friends than their female counterparts.*	Forums	Male has a significant higher means to the use of discussion forum than female counterparts.	*Supported*
H3: *Female will spend more time and effort to online activities in which they can maintain their interpersonal relationship than their male counterparts.*	Social Media	Female has a significant higher means to the use of social media than male counterparts.	*Supported*

6 Discussions

6.1 Key findings

The study successfully captures the online activities of more than 1600 Internet users where:

1 The mean values clearly show a listing of online activities according to their frequency of usage. This provides us a clear picture on what online users are doing.
   1.1 By majority, it is still one-way communication of browsing activities reported by online users. Eight activities out of top ten list are browsing activities.
   1.2 Two of the active exchange activities receive rather high usage means, in the top ten list (over 7, out of 10).
2 Further analysis shows significant differences between gender groups in some of the online activities.
   2.1 Female has higher means in "Browse photo" (6.951 versus 6.544, $p<0.01$),"Browse social media" (6.857 versus 6.544, $p<0.01$) and "Upload photo" (4.974 versus 4.302, $p<0.001$).
   2.2 In contrast, male has higher means in both "Browse forum" (6.791 versus 5.812, $p<0.001$) and "Write in forum" (4.372 versus 3.400, $p<0.001$).
3 These findings support our hypotheses that male will spend more time and effort to meet new people to expand their social sphere (H1, supported); where female will spend more time and effort to maintain dyadic and close relationships (H2, supported).

Additional findings show that male has significant higher means in "Play online game" (3.821 versus 3.370, $p<0.01$) and "Upload audio" (2.194 versus 1.940, $p<0.01$)

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6.2 Gender differences in knowledge sharing

In "Browse photo" and "Upload photo", we may see that women have more engagement. In Facebook, women always upload the photos of their pets and cosmetics products. Sometimes, women will share and discuss what they eat and what they wear in social media with their friends. They are willing to share their daily lives to their friends in social media.

In "Browse social media", women have a higher mean. As mentioned, women tend to share daily lives with their friends. They may also want to know more about their friends and create topics to discuss with when they have face-to-face interaction. Browsing social media can be a means for women to get the latest news from their friends.

In "Browse forum" and "Write in forum", men have significant higher means. It may be attributed to the interest of the men. We can see that most of their interests are

hard to have a deep conversation in our daily lives such as Politics, Technology and Military Affairs. As the "global village" has a great variety and diversity, the men eventually can find a platform where they can discuss or interact with the others having the same interest. Forums become a perfect platform for men to discuss with people having the same interest even though they do not know each other.

These results are consistent to previous empirical findings in explaining our daily interaction with others. Cross and Madson [8] suggest that women engage in more socioemotional behavior, such as showing support and agreeing, than do men. Baumeister and Sommer [9] also point out that women's sociality is focused on dyadic close relationships whereas men's sociality is focused on large groups. This may explain why women love to use social media as well as photo sharing because these can fulfill their needs to maintain their present interpersonal relationships. Baumeister and Sommer [9] also suggest that boys and girls have different interaction pattern even they may spend equal time in social interaction. They propose that men's behaviors are directed toward forming relationships with others but in a broader social sphere. It is reflected in the findings that men engage more in forum than their counterparts.

6.3 Limitations and future research

In the study, we identify areas of gender differences in online activities, for example, in the use of discussion forum. However, we can go a step further to understand the types of forums if men and women would visit in different types. For the same token, some social media are more open, without the need to reveal one's identity, for example, MySpace. It is therefore interesting to also capture the types of social media users are going to in order to understand better the differences.

There are a few limitations in this study. Firstly, more than two third of the respondents in the study are between 16-26 years old. The study would have a limitation to reflect only those users. Secondly, the online questionnaire may attract only online users and is reflected from the profile of respondents with better online skill and more online experience. Thirdly, the questionnaire is in Chinese and has attracted mostly online users from Hong Kong. Further generalization of the findings requires a larger sample in other regions.

7 Conclusion

It is important to continuously collect data on online users' behavior in order to effectively understand the ever changing trends and needs of online users. This study successfully captures the online activities of a large number of online users and identifies the potential individual differences. The findings provide us useful information to guidelines in designing and to implement online platforms and systems.

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