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# How Do Libraries Use Social Networking Sites to Interact with Users

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## ABSTRACT

Social networking sites (SNS) are helpful for stirring up interactions among users. The number of libraries which adopt SNSs is increasing. However, user engagement is low on many libraries' SNSs. Existing research mainly focuses on the ways SNSs used in libraries and the librarians or users' attitudes towards libraries using SNSs. Little research has been done on how to use SNSs to interact with library users effectively. This study focuses on the interactions between libraries and users on libraries' Facebook, Twitter and Weibo. Four types of interactions are examined, including knowledge sharing, information dissemination, communication and knowledge gathering. A mixed method is applied in this study: quantitative results, generated from the analysis on around 1700 posts sampled from 40 libraries' SNSs, are incorporated with qualitative results concluded from the interviews with 10 librarians. The study finds that among the four types of interactions, knowledge sharing attracts the largest volume of user responses on libraries' SNSs. The study's investigation on the differences of Facebook-like and Twitter-like SNSs and those between academic and public libraries on using SNSs suggests that in order to improve the efficiency of interacting with users on SNSs, there are necessities for libraries to coordinate different types of SNSs and take the properties of their communities under consideration.

## Keywords

Library, SNS, user engagement, interaction.

## INTRODUCTION

Social networking sites (SNS) provide an innovative and effective way of connecting users (O'Dell, 2010). Features of SNS enable users to generate interpersonal connections based on common grounds (Greenhow & Robelia, 2009). SNSs, such as Friendster, LinkedIn, MySpace and Facebook, set up personal communities, allow users to

make persistent comments on the profiles of their friends and send private messages (Hoffman, 2009). These features make SNSs excellent in initiating interaction among users (Burkhardt, 2010). The number of libraries which adopt SNSs is increasing. In a 2009 survey, researchers found that SNS was only adopted by a few academic libraries (Xu, Ouyang, & Chu, 2009). After no more than 2 years, another survey revealed that Facebook and Twitter have become the most popular Web 2.0 applications in libraries (Mahmood & Richardson, Jr, 2011).

However, users' attitudes towards using SNS to enhance and encourage interaction for educational purposes are not very supportive. Students still deem that SNSs are used mainly for communicating with friends (Coyle & Vaughn, 2008). Students do not use Facebook to contact university personnel (Pempek, Yermolayeva, & Calvert, 2009); and do not expect to interact with faculty through SNSs (Chu, Meulemans, & Nalani, 2008; Joinson, 2008; Lampe, Ellison, & Steinfield, 2008). User engagement is low on libraries' SNSs. Researchers observed that there were only few responses from users on a number of libraries' fan pages (Jacobson, 2011). Libraries' Twitter accounts only got a few followers (Stuart, 2010). To address the challenge of engaging users on libraries' SNS and to provide well-informed suggestions, this study focuses on the interactions between librarians and users on SNS.

## LITERATURE REVIEW

### The use of SNS in libraries

SNS provides libraries with an innovative and effective way of connecting with their users (O'Dell, 2010). Librarians make use of SNS with the purpose of "being part of their communities" (De Rosa et al., 2007), or promoting libraries' services and events (Charnigo & Barnett-Ellis, 2007; Hendrix, Chiarella, Hasman, Murphy, & Zafron, 2009). There are libraries which use Twitter to connect themselves with important information sources (Milstein, 2009). Research found that Facebook are engaging to college students when applied in libraries (Mack, Behler, Roberts, & Rimland, 2007). According to Graham (2009), Facebook had facilitated the development of professional relationships in and beyond libraries. Despite the increasing adoption of SNSs by libraries, user engagement on libraries' SNS is low. Libraries' Twitter accounts only got a

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few followers (Stuart, 2010), and users' input is very low on libraries' Facebook fan pages (Jacobson, 2011).

There are several factors that may hinder libraries' SNS from interacting with their users. Researchers suggested that the concerns of privacy from users (Chu et al., 2008; De Rosa et al., 2007), and updating information in low frequency (Stuart, 2010) have negative impact on the effectiveness of SNS in facilitating interactions. Besides, Ram's study (2011) on a university showed that both students and faculty displayed a high awareness of Facebook and Twitter, but users had a low awareness of the university library's presence on Facebook. Ram's study suggests that low user engagement could be attributed to inadequate promotion. Existing studies that involve user engagement just examine the total number of followers or the total number of user responses (Jacobson, 2011; Stuart, 2010), which are too conclusive to reveal how libraries can use SNS to engage users.

### **Interaction types on SNS**

In online social networks, information-flow is n-ways (Xu et al., 2009), generating different types of interactions (Dalkir, 2011). Relevant researches have been done on four types of interactions: one-to-many knowledge sharing (Harinarayana & Raju, 2010), one-to-many information dissemination (Ram et al., 2011), one-to-one communication (Romero, 2011) and many-to-one knowledge gathering (O'Dell, 2010).

First, by exploiting their information resources and professionals, libraries create knowledge and share it with communities (MacAdam, 1998). Knowledge sharing is an important aspect for libraries in utilizing SNSs, since libraries play an important role in knowledge sharing (MacAdam, 1998). To achieve knowledge sharing, technical and systematic infrastructure is needed, "making knowledge available to others who need it" (Seonghee & Boryung, 2008). Libraries act as the backend of their media, provide organized resources on social networking platforms, stimulate user's participation, and fulfill the dynamics of knowledge sharing (Harinarayana & Raju, 2010). Facebook and Twitter are applied by libraries to build up academic networks, "catalyzing the exchange of knowledge" (Ayu & Abrizah, 2011; Nicholas, Watkinson, Rowlands, & Jubb, 2011).

Secondly, disseminating information to users is a critical function of Web 2.0 technology. Its weight in measuring the effectiveness of libraries' SNSs is comparable with knowledge sharing (Ram et al., 2011). Most information being disseminated through SNSs are about business in the libraries. Kim and Abbas (2010) reported that 55 libraries in Massachusetts Institute of Technology made announcements on Twitter, including those about resources, workshops, courses, etc. Compared with other Web 2.0 technologies, Facebook and Twitter are more capable in syndicating and disseminating information (Cahill, 2009). The concise style of text mitigates the impact of

information overload, making SNS excellent for information dissemination (Kim & Abbas, 2010).

Thirdly, communication, including dialogues and comments, is one of the most important areas in measuring the effectiveness of SNS (Romero, 2011). SNS is efficient for communication. Research finds that low self-disclosure on SNS make it easier for users to launch conversations with acquaintances (McElvain & Smyth, 2006). Besides, due to the concise format and informal tones, SNS is more likely to stir up interactions between users than the other non-social networking Web 2.0 technologies, such as blogs and wikis (Romero, 2011). Scholars concluded that SNS can advance communication in quantity and may improve in quality (Boyd & Ellison, 2007; Ito et al., 2008). However, it has been observed that extracting responses from users in public networks does not seem as easy as in personal social circles (Burton & Soboleva, 2011; Chen, Maxwell, Chu, Li, & Tang, 2011).

Fourthly, SNSs are good at knowledge gathering that they have been utilized in research of social sciences to gather professional knowledge and the responses from research objects (Poynter, 2010). With millions of users, SNS offers opportunities for libraries to reach out to communities and gather knowledge from the interaction between librarians and users (O'Dell, 2010). Users can help create new library services by contributing their knowledge through online network (Casey & Savastinuk, 2006).

To find out how libraries can facilitate the interactions with users on their SNSs, this study examined user engagement under the four types of interaction. The posts on SNS are grouped under the four interaction types (see Table 2), formulating a scheme to classify the interaction activities on libraries' SNSs.

### **Research gap**

Extant research mainly focuses on the ways of SNS used in libraries and the attitudes of librarians or users towards libraries using SNS. Little research has focused on the interaction between libraries and users. This study focused on interaction on libraries' SNSs and explores different types of interactions. In addition, existing studies are restricted to either Facebook or Twitter. To expand the scope of study, this research includes Facebook, Twitter and Sina Weibo, the three most popular SNSs<sup>1</sup>. The differences of interactions between libraries and users on the three SNSs were compared. Comparisons were also conducted between academic and public libraries in using

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<sup>1</sup> Facebook had over 750 million active users by 2011 (Facebook, 2011). Twitter just released that it has garnered 100 million active users who "actually say something" (McMillan, 2011). Sina Weibo, so-called China's Twitter, is a leading SNS in China, which has surpassed any others and garnered 57% of China's microblog users (Loretta, 2011).

SNS and in their interactions with users on SNS. With these comparisons, this study is expected to provide insights for different libraries about users' preferences on using different libraries' SNSs. Based on the research gap, this paper tries to answer four research questions:

- Q1: How do libraries interact with users on SNSs?
- Q2: Which type of interaction is most engaging to library users?
- Q3: What are the differences among Facebook, Twitter and Weibo regarding the interactions between libraries and users?
- Q4: What are the differences between academic and public libraries when using SNS to interact with users?

## RESEARCH METHOD

This study used a mixed method, in which quantitative and qualitative data were incorporated to answer the research questions (Creswell, 2003).

### Sampling

The samples in this study were a total of 40 libraries from English-speaking countries (Canada, United Kingdom, and United States) and Greater China (mainland China, Hong Kong and Taiwan), including both academic and public ones. In order to capture diverse contents and observe various user responses on SNSs, the participating libraries were required to have a substantial amount of existing resources and library users. Therefore, libraries in universities that had higher rankings were selected; public libraries recognized as large libraries were selected. For academic libraries in English-speaking countries, libraries were selected based on 2010 QS World University Rankings top 100 ("QS World University Rankings 2010," 2010). For academic libraries in Greater China, libraries were selected based on 2010 QS Asian University Rankings top 100 ("Asian University Rankings 2010," 2010). For public libraries in English-speaking countries, those recognized as national, state or municipal libraries were selected. For public libraries in Greater China, all the libraries in Taiwan<sup>2</sup> sampled for the study were municipal; libraries in mainland China were selected based on the last published list of first-tier national libraries in P.R.C ("The list of first, second and third-tier libraries by Ministry of Culture," 2005). The SNSs studied in this paper, covered Facebook, Twitter and Sina Weibo. Table 1 summarizes the constitution of our sample. Among 40 libraries, ten libraries agreed to participate in interviews: three academic libraries and two public libraries from Greater China; two academic libraries and three public libraries from English-speaking countries.

<sup>2</sup>.During sampling, it was found that no public library was using SNS in Hong Kong; and other than Twitter, Facebook is commonly used among libraries from Hong Kong and Taiwan, while Weibo is commonly used among libraries in mainland China.

Region	SNS	Public libraries	Academic libraries	Total
English-speaking countries	Facebook	5	5	10
	Twitter	5	6	11
<b>Subtotal</b>		<b>10</b>	<b>11</b>	<b>21</b>
Greater China	Facebook <sup>a</sup>	3 <sup>b</sup>	5	8
	Weibo	5	6	11
<b>Subtotal</b>		<b>8</b>	<b>11</b>	<b>19</b>
<b>Total</b>		<b>18</b>	<b>22</b>	<b>40</b>

**Note:** <sup>a</sup>all the samples are from Hong Kong and Taiwan. <sup>b</sup>Only three public libraries were found using Facebook in Taiwan when sampling was carried out.

**Table 1. The sampled libraries in the study**

### Data collection and analysis

Posts were sampled from the 40 libraries' SNSs, including contents posted by libraries or users. Considering the calendars of universities, the time of sampled posts ranged from January 2011 to May 2011. And 10 posts were sampled in each month randomly. The number of user responses to each sampled post was registered which contained two parts: the number of comments from users and the number of sharings (that is the number of 'like' on Facebook, 'retweet' on Twitter or 'forward' on Weibo). Totally, 1753 posts were harvested. The sampled posts were coded, according to their interaction types (see Table 2). The four interaction types are not exclusive to one another, which means one post could contain more than one types of interactions. There were two coders involved in coding the sampled posts, conducting the coding independently. Before and during the coding, coders discussed the definitions and meanings of the terms in Table 2, in order to reconcile the differences in understanding. The intercoder reliability is measured in Cohen's Kappa and the minimum acceptable level is set at 0.90 (Lombard, Snyder-Duch, & Bracken, 2002). Among the studied libraries, 10 have participated in semi-structured interviews through telephone, in which the librarians were asked to share their experience and perceptions on using SNSs. The dialogues in interviews were audio-taped and transcribed. The interview schedule was designed and revised based on the one used in Chu's study (Chu & Du, 2012).

The sampled posts were analyzed quantitatively. And the interviews with librarians were analyzed qualitatively. To achieve more robust answers to the research questions, the quantitative results generated from the analysis on sampled posts were supplemented by librarians' perceptions and experience in using SNSs that were concluded from interviews. When coding was finished, the codes and posts were exported from NVivo 8.0 into PASW Statistics 18.0 for quantitative analysis. ANOVA analysis and t-test were conducted on the data. Statistical significance was set at  $p < 0.05$ . Dialogues in the interviews were coded according to the questions in the interview schedule (see Appendix) on Nvivo 8.0.

Themes	Definition	Sample references <sup>a</sup>
Knowledge sharing	Librarians or users share information resources with others	Library: Learning to Read and Write at the Library: XXX's Story XXX, faced up to a number of personal challenges before he enrolled in the XXX Center for Reading and Writing.
Information dissemination	Updating the news and announcements from libraries	Library: Calling all teachers! Free CPD events (15 June and 16 June) linked to Out of this World: Science Fiction but not as you know it Conferences and CPD www.xxx.xxx Find out more about conferences and other events for students and teachers.
Communication	Aimed at individuals, conversations that happen between librarians and users or among users	User: Where could I find our school enrollment in recent years and the employment situation? @Library: Use internal search engine on our school home page, enter the advanced search interface and search employment or enrollment information
Knowledge gathering	Harvesting information from individual users for improving library services, academic research, etc.	Library: Tell us why you've used the Library. Your stories - What does the XXX Library mean to you? www.xxx.xxx DESCRIPTION HERE

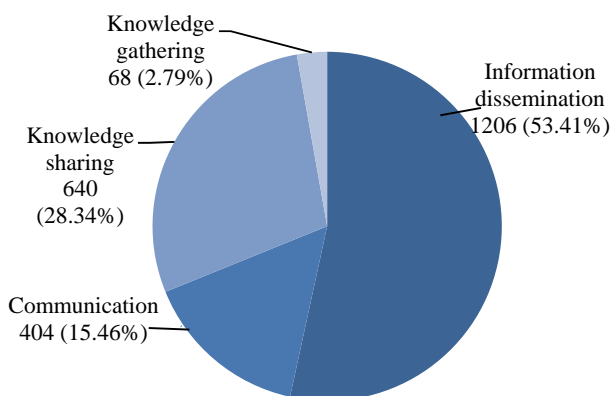
**Note:** <sup>a</sup>All the words that involve the identities of research participants are changed as XXX; The four interaction types were not exclusive to one another, which mean one post could contained more than one types of interactions.

**Table 2: Four interaction types on libraries' SNSs**

## FINDINGS

### Interactions on libraries' SNSs

To find out how libraries interact with users on SNSs, the sampled posts were summarized in percentage based on their interaction types (see Figure 1). The figure showed that more than half of the sampled posts were information dissemination. Knowledge sharing, accounting for 28.34% in the sample, was carried out substantially by libraries, though it was not as outstanding as information dissemination. In comparison, the communication between libraries and users was not conducted as frequently as knowledge sharing and information dissemination (accounting for 15.46%). Finally, knowledge gathering was executed most rarely on libraries' SNSs, only accounting



for **Figure 1: The interactions on libraries' SNSs**

User engagement under the different types of interaction was explored by comparing the means of user responses among posts of different interaction types. The null hypothesis is that "the means of user responses are not different between posts carrying certain type of interaction and those not carrying that type of interaction." The result reveals that the mean of users responses to posts of knowledge sharing was the highest (see Table 3) ( $p < 0.001$ ). Secondly, the means of user responses were comparable between information dissemination and communication. No statistical significance was identified on these two means. Thirdly, user responses to the posts of knowledge gathering were very fluctuating. Hence, at this moment, the data were unable to tell whether this type of interaction could get more user responses than the others.

Interaction	Mean $\pm$ Std. Error	T	Sig.
Knowledge sharing	15.39 $\pm$ 1.30	18.74	.000*
Information dissemination	8.44 $\pm$ 1.05	0.02	.88
Communication	9.90 $\pm$ 1.91	2.79	.095
Knowledge gathering	15.17 $\pm$ 7.84 <sup>a</sup>	1.43	.232

**Note:** <sup>a</sup>Though the mean value seems high, the analysis fails to identify statistical significance, due to its relatively large standard error; \* $p < 0.001$ .

**Table 3. Mean values of user responses to posts of different interaction types.**

Region	SNS	Interaction Mean ± Std			
		Knowledge sharing	Information dissemination	Communication	Knowledge gathering
Greater China	Weibo	5.26±2.55	7.90±2.90	<b>10.73±2.29</b>	16.89±9.70 <sup>a</sup>
	Facebook	<b>12.63±5.71</b>	4.49±0.67	2.56±0.64	1.67±1.67
English-speaking countries	Twitter	0.49±0.11	2.32±0.23	<b>3.59±0.47</b>	2.56±1.19
	Facebook	<b>21.24±1.96</b>	14.69±1.47	20.00± 2.36	15.89±3.72

**Note:** The highest means in bold; <sup>a</sup>Though the mean value seems high, the analysis fails to identify statistical significance, due to its relatively large standard error.

**Table 4. Mean values of user responses to posts of different interactions on different SNSs**

#### Differences between Facebook and Twitter/Weibo

The statistical analysis on sampled posts reveals that the capabilities of the four types of interaction in engaging users varied across Facebook, Twitter and Weibo (see Table 4). The null hypothesis is that “under one interaction type, the means of user responses have no difference among different SNSs.” As shown in the table, on libraries’ Facebook, knowledge sharing was the most excellent type of interaction in attracting user responses both in English-speaking countries and Greater China ( $p<0.05$ ). Communication attained higher user engagement than information dissemination and knowledge gathering on libraries’ Facebook in English-speaking countries ( $p<0.05$ ). However, in Greater China, communication just got few responses on libraries’ Facebook. On Twitter and Weibo, Table 4 showed that communication attained the highest user responses on average ( $p<0.05$ ). In comparison, information dissemination was moderate in engaging users across all the three SNSs, so does knowledge gathering.

Interviewees’ comments on the differences between Facebook and Twitter/Weibo were mainly in two aspects<sup>3</sup>: audience and user engagement (see Table 5). All the interviewees from English-speaking countries, who are both using Facebook and Twitter, stated that the audience is different between Facebook and Twitter. The main audience of Facebook was the youth while Twitter garnered a wider audience-range, including professionals. They commented that the differences were caused by the different features between Facebook and Twitter, regarding the richness of contents on SNSs, and the designs of their interfaces. However, except one interviewee, the other four interviewees from English-speaking countries reported that their libraries did not treat Twitter and Facebook differently. R7 stated out that basically, the contents they published on Twitter were the same as those published on Facebook. Interviewees from Greater China are using only one SNS. R1, R3 and R5 from Greater China, who use Facebook, got

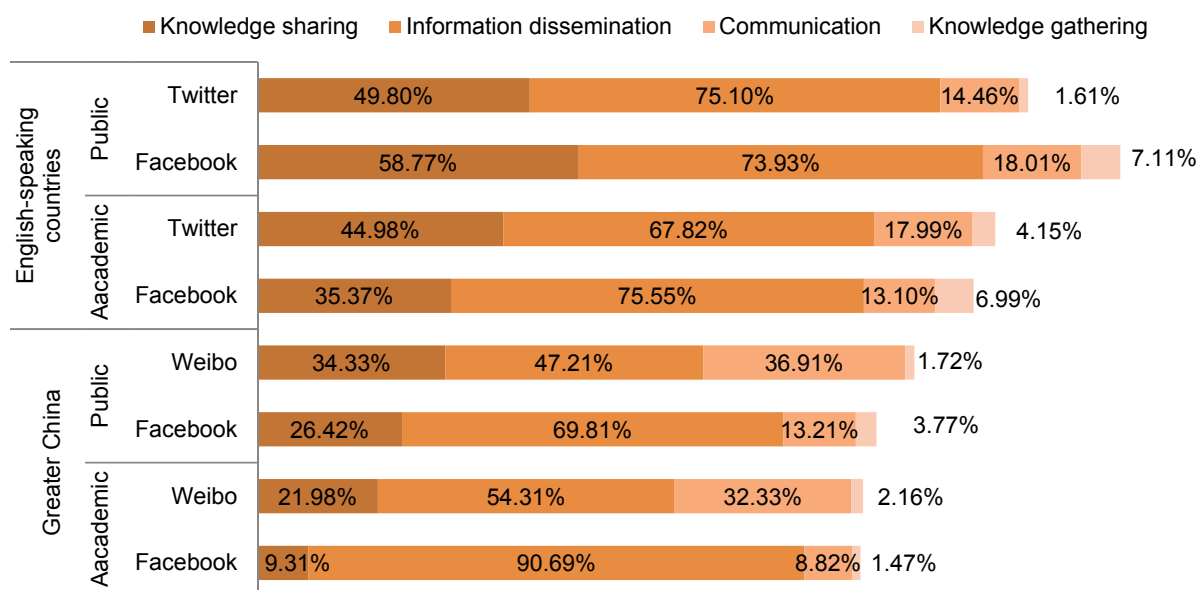
an impression that users rarely commented on Facebook, but was more likely to click the “like” button. R2 and R4, who used Weibo, did not stress that it was used more in connecting professionals. Rather, like Facebook, it was deemed as a tool used to get close to the youth. And Both R2 and R4 commented that Weibo worked out well in terms of inquiries and comments from users.

Aspect		Eng		Chi	
		FB	Twi	FB	WB
Audience	Connect community members	√		√	
	Reach beyond the community		√		√
	Enable libraries to get close to young users	√		√	√
	Enable libraries to connect with professionals		√		
User engagement	High in the volume of users’ responses	√		*	*
	Users like asking questions on it		√		√
	Users like making comments on it	√			√
	Users like sharing content with friends	√	√	√	√

**Note:** Eng=English-speaking countries; Chi=Greater China; FB=Facebook; Twi=Twitter; WB=Weibo; \*Since the librarians from Greater China mainly used one SNS, they were not able to compare the volume of users’ responses on different SNSs justly.

**Table 5. Librarians’ perceptions on the differences among Facebook, Twitter and Weibo in the ways of engaging users**

<sup>3</sup> For interviewees from mainland China, they were asked to compare Weibo with Renren, a Facebook-like tool in mainland China.



**Note:** The percentages mean the proportions of posts that carry a specific functionality. And since the functionalities are not mutually exclusive, the stacked bars here are not necessarily up to 100%.

**Figure 2. The differences between academic and public libraries in using SNSs**

#### Differences of between academic and public libraries

To find out how academic and public libraries work out with SNS respectively, MANOVA was applied on the sampled posts to explore the differences of user engagement on SNS between academic and public libraries. The variables included “library type”, “region”, and “SNS”. The result revealed public libraries in English-speaking countries were better than its counterparts from Greater China in engaging users on their SNSs, while academic libraries from Greater China were a little better than those from English-speaking countries. When looking into different SNSs, for academic libraries, the mean of user responses was the highest on Weibo. For public libraries, Facebook got highest means of user responses for public libraries than the other two SNSs<sup>4</sup> ( $p < 0.001$ ) (see Table 6).

To see a fuller picture of how academic and public libraries use SNSs respectively, the sampled posts were grouped by different attributes: regions, SNSs together with library types. Then the percentages of the four types of interactions were calculated for each group (see Figure 2). It could be observed from Figure 2 that public libraries from Greater

China did not carry out knowledge sharing as much as the counterparts from English-speaking countries (49.80% compared with 34.33% on Twitter-like tools, and 58.77% compared with 26.42% on Facebook). This gap in knowledge sharing could explain why public libraries from English speaking countries had higher user engagement than those from Greater China on their SNSs. Also, the figure showed that that the percentage of communication was noticeable on Weibo, compared with Facebook and Twitter. Its proportion was comparable with that of knowledge sharing, accounting for more than 30%.

Library type	Reg	SNS	Mean ± Std. Error	F	Sig.
<b>Academic</b>	Chi	FB	2.60 ± 1.47	35.70	.000*
		<b>WB</b>	<b>6.72 ± 1.38</b>		
	Eng	FB	1.69 ± 1.39		
		Twi	0.90 ± 1.24		
<b>Public</b>	Chi	FB	11.30 ± 2.04	56.14	.000*
		WB	8.34 ± 1.38		
	Eng	<b>FB</b>	<b>23.37 ± 1.45</b>		
		Twi	4.08 ± 1.33		

**Note:** Reg=Region; Eng=English-speaking countries; Chi=Greater China; FB=Facebook; Twi=Twitter; WB=Weibo; The highest means are in bold; \*  $p < 0.001$

**Table 6. The differences of user engagement on SNSs between public and academic libraries**

<sup>4</sup> Although the statistics indicates that public libraries attain more user responses than academic libraries on average, it is not necessary that public libraries are more successful in using social networking. The reason is that in our sample, public libraries are national, state or municipal ones, which serve larger communities than academic libraries. And this fact can impact on the amounts of user responses. Hence, we do not compare academic and public libraries in this direct way.

Library type	Interaction	Mean ± Std. Error	T	Sig.
<b>Academic</b>	Knowledge sharing	3.41 ± 0.74	1.13	.288
	Information dissemination	3.54 ± 0.31	2.51	.114
	Communication	<b>6.60 ± 0.61</b>	9.95	.000*
	Knowledge gathering	4.21 ± 1.30	0.05	.825
<b>Public</b>	Knowledge sharing	<b>22.52 ± 1.96</b>	10.05	.000*
	Information dissemination	15.91 ± 1.69	1.59	.208
	Communication	11.70 ± 1.77	0.19	.662
	Knowledge gathering	18.10 ± 4.74	1.34	.300

**Note:** The highest means are in bold; \* p<0.001

**Table 7. The differences of user engagement between public and academic libraries under different types of interactions**

Means of the number of user responses were also compared between posts of a certain interaction types (see Table 7). The null hypothesis is that “the means of user responses are not different between posts carrying certain type of interaction and those not carrying that type of interaction.” The result showed that the capability of the different interactions in engaging users differs between academic and public libraries. Table 6 showed that for public libraries, the mean of user responses to the posts of knowledge sharing was the highest (p<0.001). But for academic libraries, knowledge sharing did not have the same effect. Rather, communication seems to have more leverage on engaging users on academic libraries’ SNSs. The mean of user responses to the posts of communication was the highest (p<0.001). This result explained why the academic libraries on Weibo, who conducted significantly more communication than their counterparts on Facebook or Twitter, work best in engaging users (see Table 6).

#### DISCUSSION

Our result indicates that users’ interest varies among different types of interactions. Knowledge sharing tends to be the most engaging. This result echoes the opinion about the important role of libraries in knowledge communities (MacAdam, 1998). Information dissemination is mediocre in engaging users, which is consistent with extant research (Jacobson, 2011). As for communication, overall, it is lower than knowledge sharing in the volume of user responses. But when it happens on Twitter or Weibo, the SNSs that seems not very friendly to knowledge sharing, communication even surpasses knowledge sharing in engaging users. This finding implies that, when information organizations use SNSs to connect their users, there is a delicate balance between social network and mass communication (Kivran-Swaine & Naaman, 2011). Moreover, according to our findings, knowledge gathering is very rare on libraries’ SNSs. This interaction is underused and underexplored at this stage. In our sample, most circumstances of knowledge gathering are online surveys, in which the freedom of expressions is limited. There are few cases in which librarians use SNSs to set up online forums where library users can express themselves

freely. Hence, it is worthwhile practicing more experiments or explorations on this type of interaction.

Second, Facebook-like sites work differently from Twitter-like sites, regarding interactions between libraries and users. The features of Facebook are supportive in connecting community (Heiberger & Harper, 2008), while the nature of Twitter or Weibo is more of a news-feeding tool, disseminating information from one to another, who do not need to be friends or acquaintances with each other (Kwak, Lee, Park, & Moon, 2010). As shown in our findings, Facebook is efficient in knowledge sharing, and Twitter and Twitter-like Weibo are effective in facilitating communication. To improve the efficiency of interactions on SNSs, librarians should make full use of these differences, and consider assigning or stressing different interactions to different SNSs. This coordination of different SNSs is also critical for solving the information-overload problem. Among the four types of interactions, libraries use SNSs to carry out information dissemination the most frequently. News and announcements from libraries have dominated libraries’ SNSs. Knowledge or communication could easily be buried. There is a risk that SNSs just act as libraries’ another information feeding machine, sending content in one-way other than interacting with users. By dividing different types of interactions among different SNSs and defining policies specific for different SNSs (Pember & Cowan, 2009), libraries can minimize risk exposure and alleviate the information overload problem on their SNSs.

Third, there are differences between academic and public libraries when using SNS to interact with library users. As indicated in our findings, academic libraries’ users are more engaged with using SNSs to communicate with librarians, while public libraries’ users are most interested in knowledge sharing. This is possibly because universities are communities of knowledge professionals. One-to-many knowledge sharing is not needed by many users. Rather, one-to-one communication, in which pertinent information or knowledge is provided, is more fitting in academic communities. As suggested by Kivran-Swaine and Naaman’s study (2011), one-to-one communication, which



carries personal messages, would enhance user engagement, but when the network is dense, it becomes costly for libraries to execute communication through SNS. On the other hand, it also implies that libraries which provide services to small communities, could consider using SNSs to communicate with individual users. In this sense, compared with large public libraries, using SNSs to communicate with users is more effective for academic libraries, since they just serve the communities of universities. Hence, libraries can adjust their investment in different interactions, according to properties of their communities.

#### LIMITATIONS

This study measures user engagement in the number of user responses. The quality of user responses is not sufficiently studied. And the study relies heavily on the objective data from libraries' SNSs. Subjective data on how users expect libraries use SNSs is missing. Also, while the study focuses on the application of different SNSs, cultural factors are not delved into. And this would probably generate more meaningful theoretical results. Further studies can be improved by including user inputs on libraries' SNSs, surveying users' opinions and exploring cultural aspects of applying SNS. As to our sample, all the public libraries are municipal or national ones. Therefore, the findings may not be applicable to small public libraries. More studies especially for small libraries are still needed.

#### CONCLUSION

The findings of this study refine the knowledge of how libraries can use SNS to engage users efficiently (Jacobson, 2011; Milstein, 2009; Stuart, 2010), by exploring different interactions on libraries' SNSs, different SNSs and the differences between academic and public libraries in using those tools to engage users.

These explorations and comparisons have revealed that the four types of interactions engage library users differently. Knowledge sharing on Facebook can attract highest volume of user responses for libraries. In the meantime, communication is still the most engaging interaction on Twitter and Weibo. There are necessities that libraries coordinate SNSs, to provide quality services and interact with users efficiently. Finally, this study also finds out that users' interest in using SNS to interact with librarians is different between academic libraries and public libraries. The findings imply that by taking the properties of their communities under consideration, libraries can improve the efficiency of their SNSs.

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**APPENDIX: A SURVEY ON APPLICATION OF SNS IN LIBRARIES**

**Q1. Usefulness of Facebook, Twitter / Weibo**

Q1a. Please underline your choice regarding the level of usefulness of Facebook, Twitter / Weibo, bases on this scale below:

Scale: 1 – Not useful; 2 – A little bit useful; 3 – Somewhat useful; 4 – Useful; 5 – Very useful

SNS	Enhance reference services	Help promote library services	Facilitate knowledge sharing
Face-book	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Twitt-er	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Weibo	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

Q1b. For each response from the interviewee with a “4” or “5”, ask why. (e.g., Would you tell us why you think using Facebook for internal purpose is useful to facilitate information sharing?)

Q1c. Are there other kinds of benefits for using Facebook, Twitter / Weibo in your library?

Q2. Interactions (posts that attract lots of users' replies / comments)

Q2a. Would you tell me why this post attracts more replies / comments than the others?

Q2b. Between Facebook, Twitter or Weibo, in your opinion which is more effective in stirring up interaction between librarians and library users?

Q3a. Does your library have any guideline(s) to decide what is appropriate for the library to post on Facebook or Twitter / Weibo?

Q3b. For libraries using both Facebook and Twitter / Weibo, ask:

Does your library have different guidelines for the 2 tools?

Q3c. Does your library have any guideline(s) for responding to library users' questions / comments / complaints on Facebook, Twitter / Weibo? (In terms of how soon the library will respond; what to respond; what not to respond; etc.)

Q4. Audience

For library that has both Facebook & Twitter / Weibo profiles, ask:

Do you have different target audiences in mind?

Q5. Only Facebook, Twitter or Weibo

For library that uses only Facebook or Twitter / Weibo, ask:

Why does your library use only Facebook or Twitter / Weibo?

Q6. What are the challenges and difficulties for implementing Facebook or Twitter / Weibo in your library?

Q7. Do you have other comments about the use of Facebook, Twitter / Weibo in your library?