Social Networking Site Usage, Intensity and Online Social Capital: A Comparative Study of LinkedIn and Facebook Users with Implications on Technology-Assisted Learning

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Abstract—The social networking plays an important role on the internet in all spheres of activities including technology-assisted learning (TAL). Further the role of online social capital built upon social networking sites (SNS) adds significant value to the TAL. This study aims to compare the users' profile, behavior and online social capital in two contrasting SNS, namely LinkedIn and Facebook. It also discusses possible implications of online social capital on TAL. A total number of 329 valid responses were received from LinkedIn and Facebook users. The results based on statistical analysis show that on demographic factor, age is significantly different in the two SNS platforms. In terms of experience, network size and daily usage, no significant difference was observed. The comparison of the intensity of SNS usage and online-bonding social capital show that they differ significantly LinkedIn and Facebook. However, for online-bridging social capital, no significant difference was observed. The results throw new insights and extend the SNS research by adding an important comparative study. It also has significant implications for educational institutions, businesses and SNS.

Keywords—social networking sites, social capital theory, SNS usage, technology assisted learning, online social capital

1 Introduction

Human beings are by nature social and have always adopted innovative ways to socialize. The widespread adoption of internet based social networking platforms, called the social networking sites (SNS), proves this unique human trait. There are studies [1–3], that explore the role of SNS in the technology-assisted learning such as mobile-learning and e-learning. Further, there are studies such as [4] that identify the strong influence of social capital on student satisfaction in online learning and virtual group learning environment. Owing to this phenomenon, this study aims to compare the online social capital in different SNS.

The number of these SNS grew at a phenomenal rate in the past decade, gaining ubiquitous presence across the world, with 4.2 billion users currently [5]. Of the various social networking platforms, Facebook, Twitter, MySpace are some of the most popular

ones. These SNS also position themselves based on their target population. Some are professional SNS like LinkedIn, ResearchGate, Academia.edu, etc. Others like Twitter focus on short texts, Instagram for sharing pictures, and YouTube for sharing videos. In general, these SNS provide individuals across the world to; "acquire new friends/ties, maintain existing contacts, and find old friends/ties" [6,7].

A number of studies have proved that social networks result in tangible and intangible benefits in the form of social capital. Putnam [8] famously dichotomized this social capital into "bonding and bridging social capital". Later research into online social networking also revealed that social capital forms through SNS also [9]. The social capital formed through SNS was called "online social capital" and the two resulting types were called "online-bonding and online-bridging social capital".

The interactions occurring within online social networks result in the accumulation of "latent benefits" to the network members, known as the online social capital [9–11]. A majority of research on SNS has focused on Facebook [12], with relatively scarce studies on other SNS or comparing different SNS [11,13]. Considering this gap, the present study aims to compare two different types of SNS, a professional SNS (LinkedIn) and a non-professional SNS (Facebook) on the factors "SNS usage behavior, SNS intensity and the perceived online social capital". Further the study explores theoretical implications of online social capital on TAL. Following the introduction, Section 2 discusses theory and hypotheses, Section 3 discusses research methodology, Section 4 discusses the results and the last section includes conclusion, limitations and future directions.

2 Theory and hypotheses

2.1 SNS use and social capital

Hanifan is believed to be the proponent of social capital theory [14], that got attention from researchers in different fields [15,16]. Social capital comprises of, "both tangible/intangible and actual/virtual resources derived from network" [17]. Robert D Putnam's dichotomy of social capital into bonding and bridging, has gained wide acceptance [18]. The bonding social capital forms in, "closed networks that are inward looking and involve more intense relationship among members" [19] while the bridging social capital forms in the "open networks that are outward looking and involve less intense relationships, generally focusing on information sharing [20]. The networking tools offered by SNS result in the accrual of social capital, similar to that in offline networks [11,21]. The social capital formed in SNS is known as, "digital social capital" [22], "social media capital" [23], and more commonly "online social capital" [24]. Online social capital has been defined as, "the characteristics of an individual's social network and the potential resources that can be obtained from the network" [25]. Abbas and Mesch [26] attribute online social capital to, "all communications and resources available through the Internet". Considering the social capital formed in SNS, Braudt [27] classified social capital into, "online-bonding, online-bridging, offline-bonding and offline-bridging social capital".

2.2 SNS usage behavior

SNS usage behavior included in this study are the ones used by the author in his earlier study [11], "experience with the SNS, network size and the daily use of the SNS". Studies show that usage patterns affect the strength of online social capital [28]. This research aims to compare the usage behavior of the two group of SNS users on factors namely experience with SNS, number of connections [29] and daily time spent on SNS [24].

Experience with the SNS. In SNS research, the experience of the user with the respective SNS is an important factor affecting SNS use and outcomes. The variable experience is generally measured as number of years for which they are subscribed to the SNS.

Comparing the two samples on the variable experience, the hypothesis thus stated is:

H1: LinkedIn and Facebook users differ significantly on the factor experience with SNS.

Network size. The network size is the total first connections a user has. This actually depicts the size of the social network of the users. The number of connections of the user is the first connection of the user.

Comparing the two samples on the variable experience, the hypothesis thus stated is:

H2: LinkedIn and Facebook users differ significantly on the factor network size.

Daily use of SNS use. The amount of time a user spends on his/her SNS is one of the most important variables of the users' SNS usage behavior. It is generally measured by the average number of hours a user spends daily on the particular SNS.

Comparing the two samples on the variable experience, the hypothesis thus stated is:

H3: LinkedIn and Facebook users differ significantly on the factor daily usage.

2.3 SNS Intensity

Among the various behavioral variables related to SNS use, the intensity of SNS plays a significant role in the formation of online social capital [24]. Ellison [30] is credited with creating a scale to, "measure the intensity of Facebook use". Research on SNS exploring the online social capital have adapted this scale to suit their research objectives [28].

Since the scope and positioning of SNS vary, it is possible that users might have different levels of intensity towards their SNS.

The hypothesis related to this research proposition is stated below.

H4: SNS Type and SNS Intensity are significantly related.

2.4 Online-bonding and online-bridging social capital

One of the earliest studies on online social capital was conducted by Ellison et al [9]. There has been many research investigating the creation of "online-bonding and online-

bridging social capital" [31–35]. In the earlier studies, it was generally focused on online bridging social capital [36,37]. Later studies also confirmed the formation online bonding social capital [11,36,38–41]. Though comparison of different SNS platforms have been done in recent studies, they are still rare.

Except a few contradictory studies, previous research has generally supported the formation of social capital through SNS use [42,43]. This research aims to explore if there is significant difference in the perceived "online-bonding and online-bridging social capital" among the users of LinkedIn and Facebook, thereby indicating that there is a relationship between the SNS type and the "online social capital".

The hypotheses thus stated are.

H5: SNS Type and online-bonding social capital are significantly related.

H6: SNS Type and online-bridging social capital are significantly related.

2.5 Online social capital and technology assisted learning

The benefits of online social capital for both online and physical learning have been highlighted in several studies [44]. Hoda [45] listed the various benefits online social capital bring to students enrolled in both online and offline system. These benefits may be in the form of better grades, higher graduation rate, students' motivation, cohesion, collaborative learning, etc. Venter [46] highlight the beneficial role of online social capital in information sharing among students. Kasperski and Blau [44] pointed out that the facilitating role of SNS and online social capital can be attributed to the "Social-Constructivist Theory by Vygotsky [47] which states that all learning processes involve social interactions". The positive role of online social capital in knowledge integration among professionals also has been reported in a study [48].

A summary of such benefits is summarized in Figure 1.

For technology assisted learning (TAL), the online social capital may result in better acquaintance with instructors, access to information and learning resources, and overall improved performance. Lu [4] highlight the positive influences of social capital in online learning by the inclusion of online networking tools. They mention that many research confirmed a significant relationship between online social capital and "educational outcomes". Further, they classified the interaction among individuals in online learning into, "learner-learner and learner-instructor". They point out two important features on online networking, first that interactions in online networking depend upon the selected mode and second that larger networks result in higher social capital. Venter [46] describe the influence of personal learning environment of online learners in the formation of bonding and bridging social capital. The bonding capital supports better relationships whereas the bridging social capital helps in information sharing among unknown individuals in the network. A study by Mays [49] describe the significance of online social capital in online courses for K-12 students. They explored the benefits of Facebook in online learning and suggested that it facilitates students to connect with each other to form a "cohesive group". This view has been supported by Oztok et al. [50]. They mention that online social capital results in sense of belongingness, trust and collaboration in online learning.

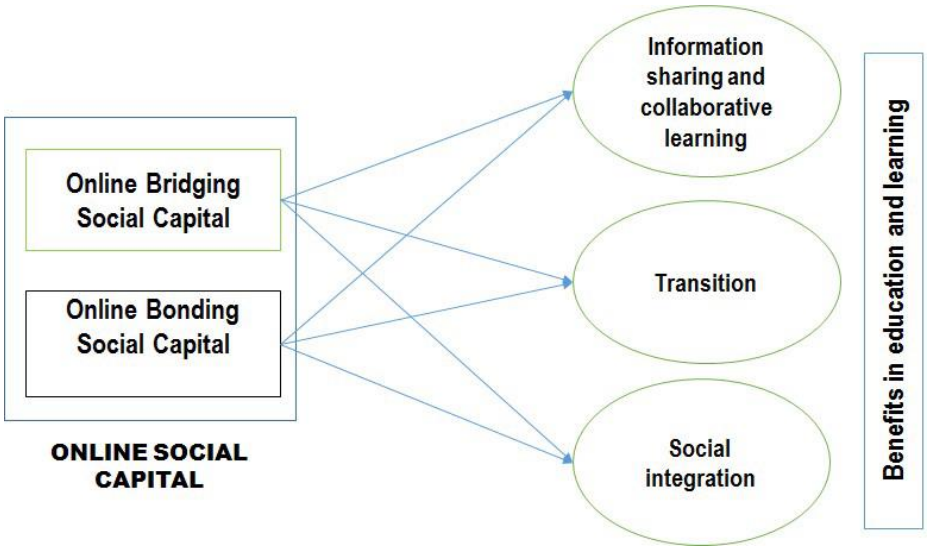

Fig. 1. Benefits of online social capital in education and learning (Source: Hoda [45])

3 Research methodology

3.1 Sampling procedure

The study population included LinkedIn and Facebook users. Google form was used to create a structured questionnaire that included several items like details on demographic profile, SNS usage behavior and the perceived online-bonding and online-bridging social capital. The form was shared with 2450 author's connections (network) on LinkedIn and 120 connections on Facebook. The author's connections then shared it with their connections, thereby resembling the "snowball sampling method". 355 responses were registered from October 2019 to January 2020. Upon screening the entries, it was found that the responses fit for analysis were 329 (LinkedIn = 162 and Facebook = 167). The statistical analysis was performed in the statistical software SPSS Version 28.0.

3.2 Measures

The SNS usage was measured on three factors namely user's experience of using that particular SNS, network size and the daily use of SNS (Table 1). For measuring the SNS intensity, the six attitudinal items of Ellison's "Facebook Intensity Scale" [30] were used. Users' perceptions regarding the online-bonding and online-bridging social capital were measured using the "internet social capital scale" developed by Williams [51]. All the values were found to be within the acceptable range, alpha > 0.7 [52].

Table 1. Reliability of scales

		Mean	Std. Dev	Cronbach's Alpha
SNS Intensity Scale				***.880***
SNSI1	LinkedIn is part of my everyday activity	3.75	1.992	.896
SNSI2	I am proud to tell people I am on LinkedIn	4.09	1.926	.851
SNSI3	LinkedIn has become part of my daily routine	3.74	1.971	.837
SNSI4	I feel out of touch when I haven't logged onto LinkedIn for a day	3.07	1.874	.845
SNSI5	I feel I am part of the LinkedIn community at the campus	3.93	1.920	.855
SNSI6	I would be sorry if LinkedIn shut down	3.91	2.080	.865
Online Bonding Social Capital Scale				***.871***
OBSC1	There are several people online/offline I trust to help solve my problems.	3.84	1.738	.859
OBSC2	There is someone online/offline I can turn to for advice about making very important decisions.	3.52	1.723	.849
OBSC3	There is no one online/offline that I feel comfortable talking to about intimate personal problems.	4.14	1.847	.879
OBSC4	When I feel lonely, there are several people online/offline I can talk to.	3.36	1.761	.849
OBSC5	If I needed an emergency loan of $500, I know someone online/offline I can turn to.	2.67	1.704	.851
OBSC6	The people I interact with online/offline would put their reputation on the line for me.	3.25	1.786	.851
OBSC7	The people I interact with online/offline would be good job references for me.	3.97	1.754	.854
OBSC8	The people I interact with online/offline would share their last dollar with me.	2.86	1.723	.851
OBSC9	I do not know people online/offline well enough to get them to do anything important.	4.12	1.805	.878
OBSC10	The people I interact with online/offline would help me fight an injustice.	3.53	1.682	.856
Online Bridging Social Capital Scale				***.953***
OBrSC1	Interacting with people online/offline makes me interested in things that happen outside of my town.	4.28	1.712	.949
OBrSC2	Interacting with people online/offline makes me want to try new things.	4.46	1.751	.949
OBrSC3	Interacting with people online/offline makes me interested in what people unlike me are thinking.	4.23	1.689	.948
OBrSC4	Talking with people online/offline makes me curious about other places in the world.	4.47	1.678	.947
OBrSC5	Interacting with people online/offline makes me feel like part of a larger community.	4.47	1.739	.946
OBrSC6	Interacting with people online/offline makes me feel connected to the bigger picture.	4.52	1.722	.946
OBrSC7	Interacting with people online/offline reminds me that everyone in the world is connected.	4.53	1.756	.947
OBrSC8	I am willing to spend time to support general online/offline community activities.	4.27	1.700	.949
OBrSC9	Interacting with people online/offline gives me new people to talk to.	4.38	1.763	.947
OBrSC10	I come in contact with new people all the time.	4.03	1.857	.952

4 Results

4.1 Profile of respondents

The profile of respondents included two main components (Table 2). One was the demographic profile and the second was the SNS usage profile. Age, gender, employment status, and education were included in demographic profile. The two samples were compared to check if they differ significantly on any of the demographic factor. It was found that there was a significant difference only in the users' age of the two samples ($F = 3.245$, $p = 0.040$). Majority of the users in both samples were males, with no significant difference in the two samples in terms of gender ($\chi 2 = 3.399$ $p = 0.065$). Majority of the users were employed (N=252) and were graduate/post graduate (N=262). These demographic traits might be a result of the sampling that was collected from the author's network. The SNS usage profile included details such as their experience with the SNS (LinkedIn or Facebook) and the number of connections they have.

Table 2. Respondents' profile

Characteristics	Measures	Frequency (N=329)	Percentage (%)
Type of SNS	LinkedIn	162	49.2
	Facebook	167	50.8
SNS Experience	Less than 1 year	87	26.4
	More than 1 year	242	73.6
Number of connections	Below 200	124	37.7
	201-500	80	24.3
	Above 501	125	38.0
Daily use	Less than 1 hour	225	68.3
	More than 1 hour	105	31.9
Gender	Male	243	73.9
	Female	86	26.1
Age in years	Less than 25	127	38.6
	25-40	141	42.9
	More than 40	61	18.5
Education	Graduate or below	131	39.8
	Post-graduate	131	39.8
	Doctorate	67	20.4
	Business	232	70.5
Employment Status	Not employed/ currently not working	77	23.4
	Employed	252	76.6
	Non-Asian	32	9.7

4.2 SNS membership

The percentage of total sample using different SNS is presented in Figure 2. Of the total sample of 329 SNS users, the majority use YouTube (25%), followed by Instagram (21%), Twitter (20%) and Facebook (15%). When compared with a research conducted by Pew Internet Research Center [53] in USA, they found that Facebook is the most used followed by Pinterest, Instagram and LinkedIn. It was also reported that most of the SNS users access these sites with their mobile phones. Another important finding regarding the usage and subscription of SNS is that most of the users subscribe to more than one sites [54].

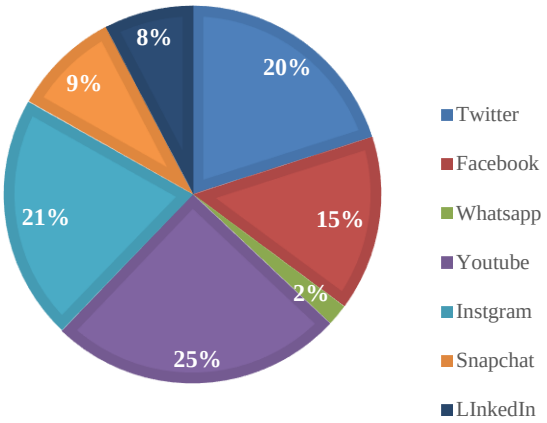

Fig. 2. SNS membership

4.3 Comparison of SNS users on the factor – SNS usage behavior

Experience. The comparison of two samples on experience is shown in Table 3. Applying chi-square test to compare the two samples, it was found that no significant difference exists in the two samples on the factor considered ($\chi 2 = 0.084$, 1, $p = 0.772$). Therefore, the hypothesis (H1) that there exists a significant difference in LinkedIn and Facebook users on the factor SNS experience is rejected.

Table 3. Comparison of SNS users on the factor SNS experience

Comparison	$\chi 2$	df	Sig.
SNS Type * SNS Experience	0.084	1	0.772

Network size. A one-way ANOVA was applied to compare the two samples on the variable – network size measured by number of connection (ties). The results are presented in Table 4. The two samples do not differ significantly on this variable (F =

2.358, p = 0.096). Therefore, the hypothesis (H2) that there exists a significant difference in LinkedIn and Facebook users on the factor number of connections is rejected.

Table 4. Comparison of SNS users on the factor Number of connections

	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	1.173	2	.586	2.358	.096
Within Groups	81.058	326	.249		

Daily usage. The third factor considered for comparing the two samples of SNS users was daily usage (in number of hours). The results of chi-square analysis is presented in Table 5. The two samples do not differ significantly on this variable ($\chi 2$ = 2.169, 1, p = 0.141). Therefore, the hypothesis (H2) that there exists a significant difference in LinkedIn and Facebook users on the factor number of connections is rejected.

Table 5. Comparison of SNS Users on the factor daily usage

Comparison	**$\chi 2$**	**df**	**Sig.**	**Result**
SNS Type * Daily usage	2.169	1	0.141	Hypothesis rejected

SNS type and SNS intensity. The result of independent sample t-test is summarized in Table 6. Significant difference (p = 0.01) was found in the two samples namely LinkedIn (M = 4.03; SD = 1.39) and Facebook (M = 3.48; SD = 1.65), thereby implying that there might exist a relationship between SNS Type and SNS intensity.

Table 6. Relationship between SNS type and SNS Intensity

	Levene's Test for Equality of Variances		**t-test for Equality of Means**		
	F	Sig.	t	df	Sig.
Equal variances assumed	12.461	<.001	3.245	327	.001
Equal variances not assumed			3.253	320.5	.001

Type of SNS and online-bonding social capital. The result of the independent sample t-test is summarized in Table 7. It was found that significant different exist in the two samples on the variable online-bonding social capital, thereby implying the possibility of a relationship between the two variables (p = 0.02) in the two samples namely LinkedIn (M = 3.68; SD = 1.12) and Facebook (M = 3.38; SD = 1.25).

Table 7. Relationship between SNS type and online-bonding social capital

	Levene's Test for Equality of Variances		**t-test for Equality of Means**		
	F	Sig.	T	df	Sig.
Equal variances assumed	2.472	.12	2.340	327	.020
Equal variances not assumed			2.344	324	.020

SNS type and online bridging social capital. The result of independent sample t-test is summarized in Table 8. No significant difference was found between SNS type and perceived online-bridging social capital (p = 0.671) in the two samples.

Table 8. Relationship between SNS Type and online-bridging social capital

	Levene's Test for Equality of Variances		**t-test for Equality of Means**		
	F	Sig.	t	df	Sig.
Equal variances assumed	.002	.965	-.425	327	.671
Equal variances not assumed			-.424	198	.671

5 Discussions

The first objective of the study entailed a comparison of LinkedIn and Facebook users on demographic factors. An interesting finding of this comparison was that the age group differed significantly in the two samples (F = 3.245, p = 0.040). This result confirms the extant research findings. Facebook being a purely social networking platform attracts younger population, whereas LinkedIn is a professional networking site. The rest of the demographic variables namely gender, educational level or employment status did not differ significantly in the two samples. The differences of SNS usage and behavior based on gender have been discussed earlier [55]. Hoda [45] has described the role of SNS for students. The educational level of the user might be affecting the SNS use. Li and Chen [56] found differences in the educational level and the type of SNS users. Employment status has been found to be different among different users [57]. In this study however these factors were not found to be different among the LinkedIn and Facebook users. An important finding of this study was that almost all the users are subscribed to more than one networking site, as mentioned earlier by Fori [54].

The second objective was to compare the usage profile of the users. This included the variables experience with SNS, network size and daily use of SNS. It was found that the two samples do not differ significantly on any of these factors. Therefore, all the hypotheses were rejected.

The third objective was to compare the SNS intensity, online-bonding and online-bridging social capital in the two samples. On the factor SNS intensity, it was found that there is a significant difference in the usage intensity (p=0.01), with LinkedIn users reporting more intensity towards the SNS. SNS intensity reflects how deeply a user is connected with the SNS platform. They found that the users differ significantly. The comparison of perceived online social capital showed that LinkedIn users' perceived online-bonding social capital significantly more than the Facebook users (p = 0.02). On the other hand, there was no significant difference on the perceived online-bridging social capital. Still, the LinkedIn users reported a higher level of this capital. Huang and Li [58] discussed, "the role of professional networking sites in the formation of social capital". Bonding social capital represents strong ties and results from intense relationship among users. It is quite apparent that LinkedIn users are more serious and objective in their use. Williams [59] describe this process in more detail. On the other

hand, Facebook users generally access it for general networking activities that result in online-bridging social capital. Online-bridging social capital results from weak ties but plays an important role for the users. Since both the SNS considered for this study offer basic networking features, users in both samples do not differ significantly in their perceived online bridging social capital. The study by Phua [60] is an important reference to understand the differences or similarities in the various SNS.

The formation of online social capital positively influences all forms of TAL. This may be in the form of educational achievement like better grades, higher graduation rate, students' motivation, cohesion, collaborative learning, etc. It may also result in creation of professional social capital that would help students in their career. The overall online learning environment gets supported by the online social capital, by networking among student-student and student-instructors. Both in online and offline learning environment, online social capital offers psychological benefits to students too. These may accrue in the form of enhanced professional identity, well-being and confidence.

6 Conclusion

This study holds the distinction of being one of the few comparative researches done in this area. Considering LinkedIn for comparing with Facebook adds immense value to the SNS research, as both of them are positioned and perceived very differently. A comparison of the two SNS reveal the similarities and differences existing among their users on demographic as well as behavioral factors. The manifestation of SNS use in the formation of online social capital is well established in literature. This paper therefore contributes significantly by comparing the perceived "online social capital" among LinkedIn and Facebook users. The results should be beneficial in adding a new strand to the extant research. Further, the educational institutions would also gain an insight on online bonding and bridging social capital built through different SNS. And guide them to develop appropriate strategy to incorporate features of SNS in the TEL environment to capitalize on online social capital for effective learning and student satisfaction. The future research may focus more on to statically test the significance of online social capital in technology assisted learning.

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