Embedded Social Learning in Online Social Networking.

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EMBEDDED SOCIAL LEARNING IN ONLINE SOCIAL NETWORKING

Completed Research Paper

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Abstract

Online social networking has deeply penetrated university campuses, influencing multiple aspects of student life. We investigate the impacts of individual online social networking engagement (e.g., on Facebook) from a pedagogical standpoint. Based on social learning theory, we argue that online social networking engagement leads university students to attain positive learning outcomes (self-esteem development, satisfaction with university life, and performance). We further argue that three attributions of social learning (self-efficacy belief, social acceptance and acculturation) bridge individual online social networking engagement with desired learning outcomes. Results from a survey accompanied by focus group discussions demonstrate the substantial impact of university student online social networking on social learning processes and outcomes.

Keywords: Social networking, Learning outcomes, e-Learning, Facebook

Introduction

Online social networking has deeply penetrated people's lifestyle. Facebook, the largest service provider, has announced having over 400 million active users, in which half log onto Facebook in any given day. People are amazed by their rapidly snowballed social networks on the online social networking sites such as Facebook. On Facebook, people enjoy a virtual life via interacting with various connected friends, ranging from being simply acquainted to established close friendships. Individuals can present themselves to these friends through a formatted web page profile, and express feelings on the "Wall" on which the friends can comment. They are also responsive to their friends' activities by observing and commenting. The self-expression and information sharing constitute a socialization process, regardless the media is online or offline. Active engagement in online social networking to establish a large scope of virtual relationships provides individuals with access to more diversified information (Wasko and Faraj, 2005). Although the original motive of online social networking may be for entertainment, it is still possible to learn while having some degree of fun. Two straightforward questions are asked: "What are the learning impacts of online social networking?" and "How are the impacts exerted?"

We attempt to address the above questions from an educational perspective since online social networking is influencing university students' behavior. As Bandura (2002) purports, the revolutionary advances in information technologies are fundamentally changing the world and human life, in particular, they are altering the educational systems. Thus, we focus on university students who are a typical group of Facebook users, in order to investigate the learning impacts of online social networking on them. Indeed, social networking constitutes an important element of university students' learning because the learning environment of the university itself is a social system of individuals' interacting within a shared academic context (Hwang et al., 2004). In a web-based learning context, recent research demonstrates that university students tend to self-regulate their learning and are apt to interact with peers for feedback, thus improving their performance (Wang and Wu, 2008). Likewise, several studies show that young people's online social networking behavior can bring them physical and psychological well-being (Ellison et al., 2007; Steinfield et al., 2008). Prior research provides a positive perspective for us to consider the pedagogical impacts of online social networking such as on Facebook. However, there is a lack of systematic framework to explain the learning outcomes that university students' online social networking engagement would result in and how such engagement leads students to the desired outcomes.

We rely on social learning theory (Bandura, 1977), which points to the significance of individuals' self-regulation, peers and the external situation on one's learning, to develop a comprehensive research framework. Individuals often self initiate and regulate their learning to achieve desirable learning outcomes, including improved cognition, affection, and skills. Given the self-regulation capacity, students generate creative learning activities via online social networking. They disclose their opinions online to attract others' attention (Walther et al., 2008). They expand their network scope through which they receive diversified information and support. Through such self-recognition, disclosure, and peer interactions, university students experience a socialization process in which they establish efficacy beliefs, gain social acceptance from others, and learn the university culture. Therefore, they can better articulate their role, attain better performance, and develop commitment to the university. These aspects are important for students to develop as a "whole person," having acquired both skills and psychological well-being that are conducive to lifelong learning.

Our attempt in researching the learning impacts of online social networking on university students entails important pedagogical implications for both individual learning and educational administration. From the individual perspective, it has been found that "net generation" learners have different styles of information processing and learning expectations (Williams and Chinn, 2009). Our research results are expected to inform individual students of the impact that their engagement in online social networks can have on them. From the institutional perspective, since most universities increasingly emphasize student-centered learning practices, it is necessary for universities to be aware of the learning impacts of online social networking that has been ubiquitous among students and has intangibly changed their behavior. These technology-driven behavioral changes behoove educational institutions to reconsider pedagogical approaches.

The remainder of the paper is organized as follows. We first develop a research model based on the literature and propose hypotheses. We then detail our research method, followed by the results and discussion. We conclude the paper with implications, limitations and future directions for this research.

Theoretical development and hypotheses

In this section, we begin with a general consideration of learning outcomes followed by a focus on social learning theory and our research mode. We then look more specifically at online social network engagement and the resultant learning outcomes, and develop our first set of hypotheses. We finish the section by exploring the mediation role of socialization and develop our remaining hypotheses.
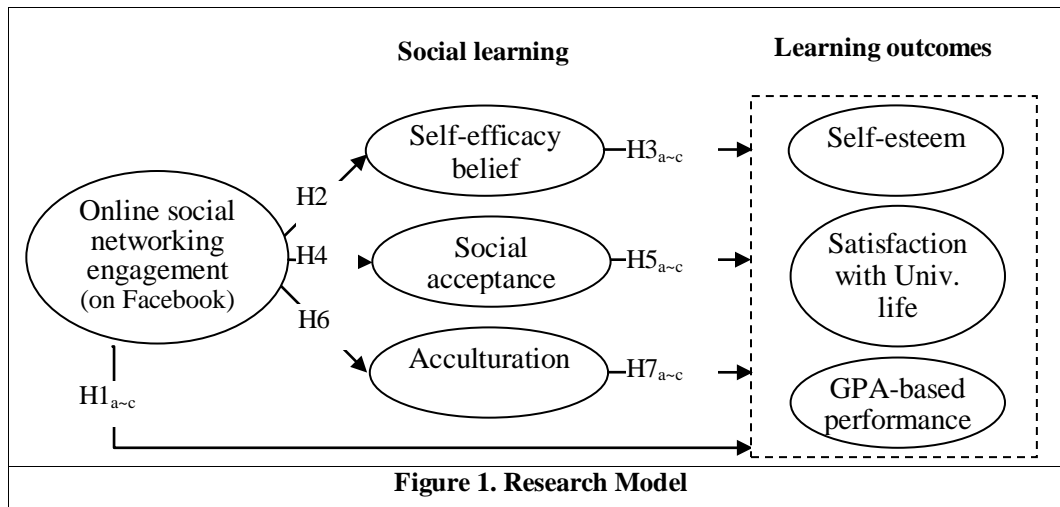
Learning Outcomes

Before illustrating our theoretical development, we first define the domains of learning outcomes that we pursue. Learning outcomes span three domains: cognitive, affective and skill-based (Kraiger et al., 1993; Schmidt and Ford, 2003). The knowledge-based cognitive domain is associated with intellectual learning, and thus cognitive learning outcomes include knowledge, comprehension, and application. The attitudinal-based affective domain is related to emotional learning, feelings, being, relationships, and the ability to deal with situations. Affective learning outcomes include students' attitudes, satisfaction, and appreciation of the learning experience. The skill-based domain of learning outcomes concerns the development of critical thinking and the technical skills to solve problems or perform tasks. Different from the discipline/course-based learning outcomes, this study is focused on the social aspect of learning. University students mainly experience social learning outside of the classroom, which contributes to "whole person" development. We specify university students' self-esteem, satisfaction with university life, and GPA-based performance to represent the cognitive, affective, and skill-based domains of learning outcomes, respectively. These are regarded as typical criteria of learning outcomes for assessing the impact of non-traditional learning environments in prior studies (e.g., Abdous and Yoshimura, 2010; Carswell and Venkatesh, 2002; Hwang et al., 2004; Thomas and Gadbois, 2007).

Self-esteem is a personal judgment of worthiness that is expressed in the attitudes individuals hold (Burns, 1982, p6). This implies that individuals feel worthy, that is, they respect themselves for what they are and do not condemn themselves for what they are or are not. The development of self-esteem in university involves the kind of cognitive building that allows university students to recognize who they are, what abilities they have or desire, and thereby value themselves. As an affective outcome of learning, satisfaction with life represents university students' attitudes about their learning experiences in the university. GPA-based performance is viewed as a good measure for students' knowledge and skills gained while at university. GPA, representing ongoing academic performance, not only reflects students' ability to perform tasks and solve problems but also their responsibilities for initiating and maintaining a range of self-regulatory behavior (Rode et al., 2005).

Social Learning Theory and Research Model

Bandura's social learning theory (1977) serves as the underpinning of this study to investigate the impacts of online social networking on learning. According to social learning theory, three elements, including individual learners, peers, and situations, potentially affect individuals' learning outcomes. This theory is rooted in a perspective in which people function as anticipative, purposive, and self-evaluating proactive regulators of their motivation and actions (Bandura and Locke, 2003). Social learning is a self-regulated learning process in which individuals' efficacy beliefs play a central role in motivating and guiding their learning. Further, social learning theory emphasizes learning's social genesis, and views learning as a social process in which individuals interact with peers or models, as well as situations. Peers and the situated environment exert prominent influences on individuals' cognition and behavior by their own vicarious (observational) learning from peers (e.g., observations, acquire information, etc.) and the situations (e.g., learning the environmental norms, cultures, policies). In the computer-mediated learning context, Alavi (1994) identifies similar gradients that attribute to the learning outcomes, including individuals' active engagement in constructing knowledge, interpersonal interactions in corporative context, and problem-solving situations. This theoretical perspective suggests that individual engagement, perception of self-efficacy, interaction with peers and situations are important factors that lead individuals to achieve desirable learning outcomes. Accordingly, we propose a research model in the online social networking context, Facebook in particular, as shown in Figure 1.

Figure 1. Research Model

We regard online social networking behavior (on Facebook) as one sort of self-directed and regulated learning behavior. Individuals' engagement in online social networking has a direct impact on their learning outcomes, such as the development of self-esteem, satisfaction with life and performance. More importantly, we argue that the individuals' social learning processes composed of self-efficacy beliefs, social acceptance through peer interactions, and acculturation through interactions with the situated environment are prominent mediators between online social networking engagement and the designated learning outcomes This is because such engagement emphasizes the time and energy put into the social network websites while ignoring the potential psychological processes that exist but implicitly influence individuals' cognition and behavior. Moreover, it is worthwhile noticing that the achieved learning outcomes may reinforce individuals' engagement in online social networking because human behavior, from the social learning viewpoint, is a continuous reciprocal interaction between learners themselves and the externalities. However, such reciprocity is not a focus of this current study.

Online Social Networking Engagement and Learning Outcomes

Bandura's social learning theory (1977) first stresses the self-regulation of learning, suggesting that individuals' self-directed active engagement functions as an initial motive for achieving desirable learning outcomes. In most cases, individuals will self-initiate, regulate learning and actively construct knowledge by acquiring, generating, and structuring information. They can use symbols to represent events, analyze their conscious experience, communicate with others, and create and engage in insightful actions.

Online social networking sites, such as Facebook, provide a new platform for university students' learning. In these sites, individuals are equipped with an extraordinary capacity to express themselves, establish various relationships, and interact with others at any distance in time and space, thus addressing their self-expressive, networking and informational needs. To activate such learning and fulfill these needs, online social networking engagement is required, meaning that time and psychological energy are devoted to these sites. Individuals can present themselves in an online viewable profile and articulate their social networks. Also, they can establish and maintain extensive relationships with peers and selectively develop further interactions. These advanced social networking applications greatly expand their learning objectives (i.e., connected friends) and their information seeking scope. They can mimic the targeted models/peers by viewing the profiles and exploring the hobbies, interests, or specific knowledge of others, and they can also learn more about the university environment by joining a university network, thus finding the information that discloses real life at university.

Online social networking engagement not only enables students to expand their network scope by connecting with various relationships, but also allows them to maintain close relationships with a small group of people. The typical structure of individuals' online social networking, such as on Facebook, is often in a core-periphery mode: an individual establishes various relationships with a large group of people, while cultivating closer relationships with core friends through close interactions. According to classic social network research, individuals can gain instrumental value from having a large-ranged network of non-redundant weak ties to attain task-related outcomes (Granovetter, 1973), and they can also receive reliable and consistent knowledge from the smaller, tighter group of

strong ties (Coleman, 1990). Thus, individuals take advantage of their large spectrum of relationships and the small group of close relationships by engaging in online social networking.

In educational contexts, social networking behavior is related to learning and academic success by creating systems of information, contacts and support. Online social networking on Facebook also helps students form their own communities or groups based on shared interests or other shared characteristics. A living learning community can increase students' development and achievement because it encourages the integration of the social and academic lives in the university (Tinto 1993; Stassen 2003). Several studies have illustrated that university students with more engagement in social networking are more likely to have better mental health and affective development (Morrow, 1999; Steinfield et al., 2008). Self-directed online social networking offers the students intellectual autonomy, enhances their information literacy, and promotes creative communication skills. These attributes are prominent contributors of academic success (Kraiger et al., 1993). Treisman's (1992) study shows that the time college students spend with their peers is a critical factor in determining their performance. Hwang et al. (2004) also demonstrate that college students' social networking with peers and professors can be a vehicle for gaining information and knowledge, thereby giving them higher performance. Thus, we hypothesize that:

H1: University students' online social networking engagement (on Facebook) is positively related to their self-esteem development ($H1_a$), satisfaction with university life ($H1_b$), and performance ($H1_c$).

Mediation Role of Socialization

The hidden complexity and dynamism of social networking behavior necessitates exploration of the underlying linkage mechanism between students' online social networking engagement and the aroused learning outcomes. Through social networking, individuals can acquire attitudes, behavior and knowledge for assuming a role in situated environments, such as organizations, universities (Chao et al., 1994; Morrison, 1993, 2002), etc. The value of various relationships by online social networking is to fulfill individuals' specific learning purposes and information needs differently (Morrison, 2002).

According to social learning theory (Bandura, 1977), the information searching and feedback receiving (especially from similar others) in self-initiated and regulated social networking will largely facilitate the individuals' socialization and adaptation to the situated environment in which they learn to value their own capabilities, interact with peers and become accepted by peers, and learn the university's culture. Thus, university students are building their own self-efficacy beliefs, social acceptance and acculturation (Bauer et al., 2007; Morrison, 1993,2002). Accordingly, we argue that these are three important constructs that translate students' initial social networking engagement into the desired outcomes.

Self-efficacy refers to personal beliefs about one's capabilities to learn or perform skills at designated levels (Bandura, 1986). Learners acquire information to appraise their self-efficacy from their performance accomplishments, vicarious (observational) experiences, and forms of persuasion. Despite students' own performance that offers reliable guides for generating efficacy beliefs, we also notice that information from social interaction will influence the students' perception of self-efficacy. As Schunk (1994) observed, learners acquire efficacy information by socially comparing themselves with similar others. When students observe peers performing a task, they are apt to believe that they also have the capability to accomplish it. Learners also often receive the valuable persuasive information from peers, professors, and family members that they are capable of performing tasks (e.g., "You can do this"). It is worthy to point out that the acquired information does not influence self-efficacy automatically, but rather is cognitively appraised (Bandura, 1986). Thus, it is the self-efficacy belief enhanced by positive information.

Online social networking sites provide a new channel for individuals to observe others and receive information. On Facebook, people establish friendships ranging from intimate relationships to simply being acquainted. University students tend to review their friends' activities listed on their own homepages, and then may compare and mimic their friends' actions, especially those of intimate friends, thus attaining efficacy beliefs after accomplishing the achievable activities. Students also receive messages from their intimate friends, which often express positive sentiments and encouragements. This feedback helps students to relieve psychological pressure, and even academic anxiety, thereby developing efficacy beliefs of university life. Thus, we hypothesize that:

H2: University students' online social networking engagement (on Facebook) is positively related to their development of self-efficacy belief.

Individuals' self-efficacy beliefs influence their thoughts, emotional reactions and behavior (Bandura, 1986). People do not seek out or enjoy doing things that they believe they cannot do well. People with high efficacy beliefs are more willing to persist in tasks, reduce fear and anxiety, have positive emotions, focus on problem-solving strategies, and thus achieve a higher level of outcomes (Zimmerman, 1995). First, individuals self-esteem is internally promoted (Burns, 1982). Self-efficacy beliefs make individual students feel confident of their capabilities of performing tasks. This indicates important evaluative information for students to positively appraise themselves, develop self-esteem and be satisfied with life in the university. Second, university students' self-efficacy beliefs play a positive influential role on their performance. A number of studies have shown the significant contribution of self-efficacy beliefs to individuals' performance attainment, including academic achievement and work-related performance (Bandura et al., 2003). Accordingly, we hypothesize that:

H3: University students' self-efficacy belief is positively related to their self-esteem development (H3$_a$), satisfaction with university life (H3$_b$), and performance (H3$_c$).

Social acceptance concerns individuals developing satisfying relationships with peers and becoming integrated (Bauer et al., 2007). Interacting with peers is an important facet of socialization (Chao et al., 1994; Schein, 1968). Meaningful peer interaction usually takes place in a small dense network of strong ties that provide social support and a sense of belonging (Coleman, 1990; Podolny and Baron, 1997). In a tightly-knit network, individuals are likely to convey reliable and consistent information and social cues with one another that enable their understanding of peers' interests, expertise, and development of commonality. Such a network that nurtures close peer-interactions allows individuals to learn more about their peers and gain social acceptance from them. During online social networking, individuals tend to cultivate strong relationships with a relatively small group of people, even though their friendship scope has been significantly expanded. Following the rationale of a close social network view, online social networking is expected to promote university socialization. Thus, we hypothesize that:

H4: University students' online social networking engagement (on Facebook) is positively related to their social acceptance by peers in the university.

Peers play an important role in one's learning. First, peers can assist in drawing insights into their personal style and self-concept development. According to Burns (1982), self-concept is forged out of the influences exerted on the individual from outside, particularly from people who are the significant others. As social people, individuals also find themselves judged by the criteria of the society or relevant subgroups, apart from the criteria of their own making. These "other" people influence how the individuals interpret themselves. Walsh et al. (1998) purport that "forming mutual and meaningful connections with others, individuals gain a greater sense of energy, purpose, vision and ultimate self-understanding." Thus, the formation of self-esteem involves the internationalization of society or the related subgroup's judgment, although it is primarily internally promoted. Being accepted by peers and integrating a self into the connected peers influence the individuals' sense of esteem and worthiness. Gaining information from others that someone is liked and respected produces satisfaction for the individuals' self-esteem need.

Further, peers can provide emotional and psychological support that facilitates individual learning and academic satisfaction. Sanchez et al.'s (2006) 4-year longitudinal study demonstrates that college students with peer mentoring and support are more satisfied with their university life. Individuals who are socially accepted by peers may also achieve higher performance proficiency because the relationships they form with peers are social capital that potentially facilitates their skill development and performance enhancement (Bauer et al., 2007; Bauer and Green, 1994). Furthermore, Ginsburg-Block et al.'s (2006) meta-analysis of the related literature illuminates peers' influence on the social dimension of individual learning, such as on self-concept, affection and behavioral learning. The above justifies the following hypotheses:

H5: University students' social acceptance by peers is positively related to their self-esteem development (H5$_a$), satisfaction with university life (H5$_b$) and performance (H5$_c$).

Acculturation refers to individuals gaining an understanding of the environmental norms and cultures (Morrison, 1993; Schein, 1968). The interaction between individuals and situated environments constitutes the other facet of socialization. In the educational context, acculturation specifically refers to college students' understanding of the university culture, norms, policies and educational goals.

To complete the process of such acculturation, students need to seek normative information about the university (Morrison, 1993). Such information seeking is usually through various channels. Social network research suggests that a network with diverse members greatly facilitates access to useful information, as such diversity enables

individuals to tap multiple pockets of information and knowledge (Burt, 2001; Coleman, 1990), thereby providing more comprehensive views for individuals to understand multi-faceted environments. As Morrison (1993) observes, a large range of networks with broader information is beneficial for individuals' learning about an environment's attributes (e.g., norms, policies and culture). Allen et al. (2008) also demonstrate that college students' social connectedness significantly affects their college commitment and retention. As aforementioned, online social networking enables individuals to expand their network range, thus potentially providing more diverse information access channels due to their large number of connected friends. The above leads to the following hypothesis:

H6: University students' online social networking engagement (on Facebook) is positively related to their acculturation in the university.

A supportive environment is also key to individuals attaining desirable learning outcomes. Bandura's social learning theory (1977) states that the environment is only a potentiality until mobilized by appropriate interactions which cannot inevitably impinge upon individuals. It is individuals' interactions with the environment that causes their behavioral consequences. Thus, acculturation shaped by individual students' understanding and assimilation of the environmental attributes, such as culture, norms, values and goals of the university, can exert influences on the students' cognition, affection, and skill development.

From the cognitive learning perspective, self-esteem is also influenced by the embedded environment that generates broader values and norms, other than internally promoted. The learning of general educational goals and values of universities helps students to clarify or reinforce the goals of self-regulated learning embedded in online social networking. Given the goodness of the goal claimed by the universities, the students' buy-in of the university culture, values and goals facilitates their self-concept development and enhances their self-esteem when studying. From the affective learning aspect, acculturation that represents a certain degree of congruence between the value advocated by the university and the internal value believed by students themselves, nurtures and maintains individual students' integrity and commitment to the university. Such integrity and commitment largely leads students to greater satisfaction with university life, and promotes retention (Thomas, 2000; Tinto, 1993). Instrumentally, individual students' knowledge of situated universities with value congruence will motivate them to make more effort to achieve better performance. The above leads to the following hypotheses:

H7: University students' acculturation to the university is positively related to their self-esteem development ($H7_a$), satisfaction with university life ($H7_b$) and performance ($H7_c$).

Research method

We adopted a survey approach to test our research model. However, before implementing the main survey, we conducted four rounds of focus group discussions involving 14 undergraduates. The focus group discussions, complementary to the survey approach, explored the university students' online social networking behavior and their comments on the impact of the online social networking of their university life.

Survey Data Collection

To validate our research model, we conducted an anonymous online survey among our university business major undergraduates in information systems. All 474 were invited via an email message to participate in the survey. After two weeks a second email was sent as follow-up to increase the response rate. We collected a total of 187 valid individual responses, a response rate of 39.5%. Typical users were young people with a mean age of 21.4 years, of which nearly half were male. Following Armstrong and Overton (1977), we conducted a series of Chi-square tests on the scores of the included constructs, for which no significant response bias was found between the early responses (first round, N=143) and late responses (follow-up, N=44).

We further checked Facebook usage among our respondents. The self-reported information in Table 1 reflected their varied intensity on Facebook. On average, they logged onto Facebook four times per day and spent one hour and a half on it per day. These young people established over 200 relationships on Facebook in which most were their university friends or previous high school friends. In the focus group discussions, the students expressed that "*Being on Facebook becomes a daily activity and we log on Facebook multiple times per day.*" They even showed an excitement about their number of online friends. These provide justification for our selection of Facebook as a specific online social networking context for investigation.

Table 1. Information of Respondents and Facebook Usage						
Respondent (N=187)			Facebook usage	Mean	Std.	Min-Max
Age (years old)	Mean	Min-Max	Times per day log in	4.26	2.82	1-12
	21.4	18-27	Hours per day spent on	1.45	1.11	0.08-6
Gender	Number	Percent	Total number of friends	212.66	161.00	13-1000
Male	95	50.9%	Distribution of friends			
Female	92	49.2%	College students	64.26	60.34	0-350
Study level			Other college students	48.55	69.80	0-500
Year 1	76	40.9%	High school friends	70.10	72.18	0-600
Year 2	73	39.2%	College staff	2.32	3.56	0-20
Year 3	37	19.9%	Family Members	2.95	4.30	0-26

Recognizing the limitations of the cross-sectional survey design, we took several precautions to minimize the common method bias that could threaten the validity of the conclusions on the relationships between measures (Podsakoff et al., 2003). First, we used multiple scales to measure these variables. Second, following the guidance of Lindell and Whitney (2001), we designed a marker variable to assess the common method bias. We asked the respondents to indicate the extent to which they liked sporting, which was assumed to be irrelevant to other variables. As shown in Table 2, the correlations between the marker variable and most other variables are insignificant, and the partial correlations between the criterion and prediction variables remain high and significant after controlling for the common method variance, indicating that common method variance could not account for their relationships. Finally, we relied on Harman's single-factor to further check for common method bias (Podsakoff et al., 2003). No dominant factor emerging from the factor analyses was found, implying a low level of common method bias in our research design.

Table 2. Correlations and Common Method Bias Assessment									
Variables	1	2	3	4	5	6	7	8	9
1. Online social networking engagement	**0.816**								
2. Self-efficacy belief	0.247[**]	**0.860**							
3. Social acceptance	0.254[**]	0.423[***]	**0.748**						
4. Acculturation	0.218[**]	0.413[**]	0.530[**]	**0.756**					
5. PE (Marker variable)	0.103	0.191[**]	0.045	0.091	--				
6. Self-esteem	0.239[**]	0.654[**]	0.580[**]	0.481[**]	0.147[*]	**0.825**			
7. Satisfaction	0.264[**]	0.596[**]	0.447[**]	0.480[**]	0.051	0.538[**]	**0.845**		
8. GPA	-0.022	0.314[***]	0.185[**]	0.116	-0.050	0.228[***]	0.169[**]	--	
9. Gender	-0.044	0.138	0.003	-0.040	0.277[**]	0.035	-0.017	-0.015	--
10.Study level	0.037	0.062	-0.087	-0.080	0.043	-0.030	0.134	0.103	-0.116
Self-esteem r_{Yi-M}	0.107	0.594	0.507	0.392	0				
Self-esteem t-value	1.460	10.026	7.982	5.775	0				
Satisfaction with Univ. life r_{Yi-M}	0.225	0.574	0.418	0.452	0				
Satisfaction with Univ. life t-value	3.134	9.516	6.235	6.872	0				

a. N=187. Correlation is significant at the 0.01 level: ***, at the 0.05 level: **, 2-tailed.

b. According to Lindell and Whitney (2001), $r_{Yi-M} = \dfrac{r_{Yi} - r_S}{1 - r_S}$; $t_{\alpha/2, N-3} = \dfrac{r_{Yi-M}}{\sqrt{(1 - r_{Yi-M}^2)/(N-3)}}$

c. Values on the diagonal are square roots of AVE of constructs.

Measures

We used 5-and 7-point Likert scales to measure the variables to reduce the possibility of common method bias in our survey. Using Facebook as the particular context for online social networking, we treated Facebook intensity as a surrogate measure for individuals' online social networking engagement. We adopted five items related to the intensity of Facebook usage from recent studies (Ellison et al., 2007; Steinfield et al., 2008). Self-efficacy, shaped by individuals' perceived performance proficiency, was measured on four items adapted from Chao et al. (1994). Social acceptance was measured with five items, in which three were adapted from Morrison (2002) and two were adopted from Pascarella and Terenzini (1983). As for acculturation, we created three items that were related to our university culture, based on the interviews of the situated university students. It is common to generate measures for a specific culture (Morrison, 1993).

Self-esteem was measured with five items which were developed by Rosenberg (1989), and further validated by Steinfield et al. (2008) in a university context. Satisfaction with university life was measured with four items that were adapted from Rode et al. (2005). Performance was measured by students' self-reported cumulative GPA, ranging from 0 to 4. We also included study level (from year 1 to year 3) and gender (1 = male; 0 = female) as control variables because the inherent personal characters could affect students' learning outcomes.

Results and discussion

The analysis of the survey data was done in a holistic manner using the Partial Least Squares (PLS) with the bootstrap re-sampling procedure (Cotteman and Senn, 1992). Following the recommended two-stage analytical procedure (Anderson and Gerbing, 1988), we tested the structural relationships after assessing the measurement model.

Measurement Model Assessment

The measurement model for reflective constructs was assessed by examining convergent validity and discriminant validity (Hulland, 1999). The convergent validity was assessed by examining composite reliability and average variance extracted (AVE) from the measures (Hair et al., 1998). As shown in Table 3, the composite reliability scores (ρ) of the reflective constructs exceed the threshold of 0.70, indicating that our measures are reliable (Nunnally, 1978). The AVE values range from 0.559 to 0.740, exceeding the recommended cut-off of 0.5. Further, all reflective items are significant on their path loadings at the 0.01 level (most above 0.70), providing evidence for convergent validity (Barclay et al., 1995).

| Table 3. Assessment of Convergent Validity of Constructs							
Constructs	Original Sample	Standard Error	T Statistics	Constructs	Original Sample	Standard Error	T Statistics
Online social networking engagement (ρ = 0.909; AVE = 0.666)	0.849	0.055	15.444	Social acceptance (ρ = 0.862; AVE = 0.559)	0.819	0.038	21.356
	0.773	0.060	12.897		0.839	0.034	24.954
	0.860	0.061	14.141		0.741	0.055	13.508
	0.826	0.041	19.98		0.661	0.077	8.586
	0.769	0.072	10.637		0.658	0.078	8.468
Self-efficacy belief (ρ = 0.919; AVE = 0.740)	0.884	0.023	39.268	Acculturation (ρ = 0.799; AVE = 0.571)	0.714	0.058	12.346
	0.905	0.017	54.691		0.736	0.050	14.792
	0.872	0.027	31.743		0.814	0.045	18.195
	0.775	0.061	12.647				
Self-esteem (ρ = 0.914; AVE = 0.681)	0.827	0.038	21.486	Satisfaction with Univ. life (ρ = 0.909; AVE = 0.714)	0.893	0.020	43.997
	0.862	0.026	33.753		0.892	0.017	51.07
	0.843	0.032	26.189		0.750	0.063	11.814
	0.821	0.030	27.006		0.838	0.029	28.737
	0.769	0.048	16.106				

Discriminant validity was tested by comparing the square roots of the AVE value of each construct to the correlation of the respective construct and other constructs. Table 2 presents the discriminant validity statistics. The square roots of the AVE scores are all higher than the correlations among the constructs, demonstrating discriminant validity

(Fornell, 1987). Further, all items load higher on their respective constructs than on others, providing additional support for discriminant validity (Chin, 1998).

Structural Model Assessment

The results of structural model testing (Figure 2) provide strong evidence for the substantial impacts of online social networking engagement on students' social learning and the subsequent outcomes. As hypothesized in $H1_{a\sim c}$, online social networking has direct impacts on our university students' learning, leading them to a higher level of self-esteem ($\beta = 0..231$, t = 3.246), satisfaction with university life ($\beta = 0.211$, t = 3.247), and GPA-based performance ($\beta = 0.089$, t = 2.165). Online social networking offers a new channel for the university students to learn in which they present themselves openly, as well as share information with others. In this way, they foster psychological well-being and gain skills for academic or future career success.

Our results illustrate the mediation effects of the three attributions of social learning that take different roles in transforming individuals' online social networking engagement into the learning outcomes. First, university students' online social networking engagement significantly promotes their self-efficacy beliefs ($\beta = 0.264$, t = 2.948). Such beliefs substantially lead students to achieve the learning outcomes with the highest magnitudes of effects ($\beta = 483$, t = 7.707; $\beta = 0.418$, t = 6.029; $\beta = 0.297$, t = 3.730), compared with the other two attributions. Such results confirm the central role of self-regulation in social learning. The results strongly support H2 and $H3_{a\sim c}$.

Figure 2. Results of Structural Model
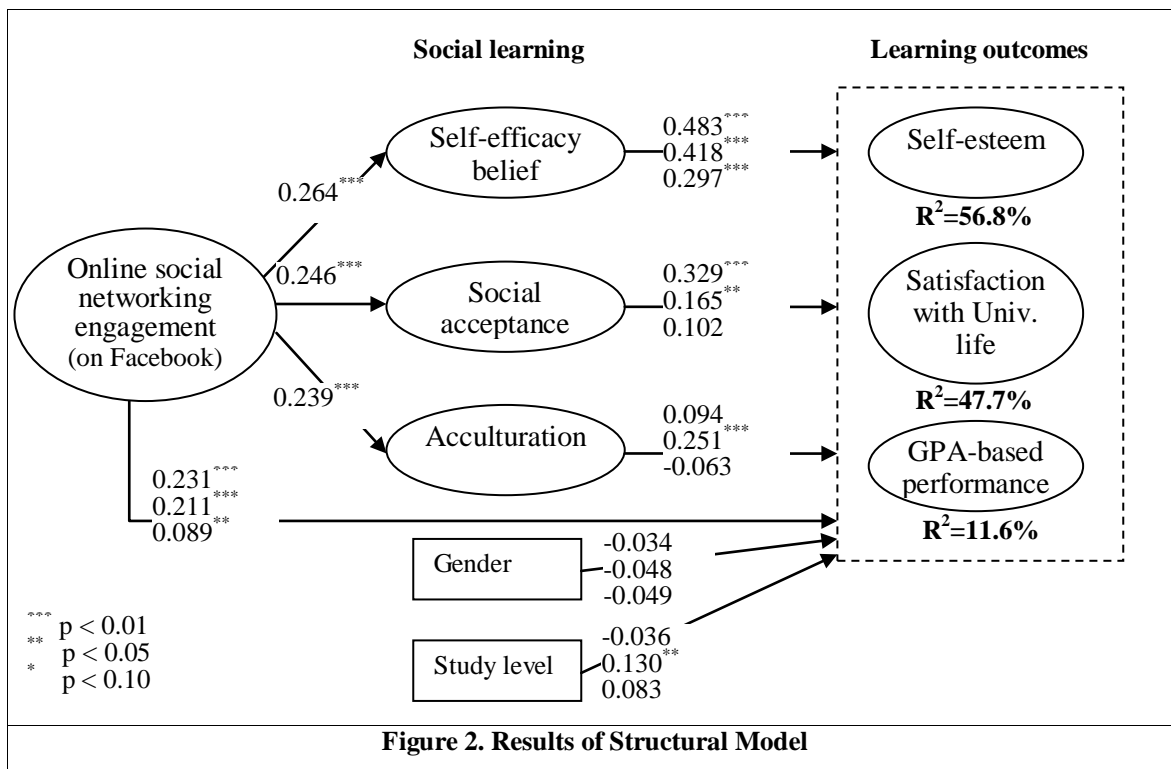
Second, individuals' online social networking is also beneficial to their developing relationships with peers and gaining acceptance from peers ($\beta = 0.246$, t = 2.389), supporting H4. During the focus group discussions, the students commented that "*Facebook helps to establish and maintain my social network and friendship with others,*" and that "*Facebook encourages people to share feelings. I know more about friends as their activities and status are visible and traceable. I sometimes comment on their profiles. I also feel pleased when they comment on my profile.*" The social acceptance is found significantly related to individuals' self-esteem development ($\beta = 0.329$, t = 4.024) and satisfaction with life in university ($\beta = 0.165$, t = 2.315), but insignificantly related to their GPA ($\beta = 0.102$, t = 0.940) (refer to Figure 2). We further checked the independent mediation effect of social acceptance by including this construct as the only mediator. The results show that social acceptance by itself can bridge online social networking engagement and all learning outcomes. This comparison indicates that social acceptance has an

independent mediating effect, but such an effect (e.g., between online social networking engagement and GPA) will be ruled out by individuals' efficacy beliefs. The comparison gives full support for $H5_a$ and $H5_b$ while partial support for $H5_c$. The results shed light on the importance of peers who largely influence individual students' self-image formation and psychological well-being. The results also highlight the prominent role of individuals themselves in social networking for learning.

Third, individuals' social networking on Facebook is found to be significantly associated with their acculturation to the situated university ($\beta = 0.239$, $t = 3.172$), supporting H6. Learning university culture leads individuals to a higher level of satisfaction with life in the university ($\beta = 0.251$, $t = 3.453$), supporting $H7_b$. Figure 2 indicates insignificant relationships between acculturation and self-esteem ($\beta = 0.094$, $t = 1.532$) and GPA ($\beta = -0.063$, $t = 0.621$). We also checked the independent mediation effect. The results show a significant relationship between acculturation and self-esteem, offering partial support for $H7_a$. However, the relationship between acculturation and GPA remains insignificant, thus no evidence is found to support $H7_c$. This comparison demonstrates that acculturation and adaptation to the university influence students' emotions, and greatly improve the satisfaction with university life. Acculturation also has potential to improve the students' recognition of themselves in a positive way, but it is not the most important factor of self-esteem development. Furthermore, learning only university culture cannot improve students' academic skills.

As for the control variables, significantly different learning outcomes between male students and female students are not found. But there is a significant learning effect regarding to study level, that is, senior students indicate a higher level of life satisfaction at university than do junior students. We summarize all hypotheses tested in Table 4.

Table 4. A Summary of the Hypotheses Testing							
Direct effect of online social networking engagement on learning outcomes		Medication effects of self-efficacy belief, social acceptance, and acculturation between online social networking engagement and learning outcomes					
Hypotheses	Results	Hypotheses	Results	Hypotheses	Results	Hypotheses	Results
H1	--	H2	Supported	H4	Supported	H6	Supported
$H1_a$	Supported	$H3_a$	Supported	$H5_a$	Supported	$H7_a$	Partially supported [*]
$H1_b$	Supported	$H3_b$	Supported	$H5_b$	Supported	$H7_b$	Supported
$H1_c$	Supported	$H3_c$	Supported	$H5_c$	Partially supported [*]	$H7_c$	Not supported

*see the discussions of the comparisons

Implications

This study presents several implications for the extant literature, education practices, and future research. The research model development on the impacts of online social networking on learning accompanied by empirical validation contributes to the literature of social networking and social learning. We observe that university students show zeal for online social networking, but there is a lack of knowledge of what the impacts are of emerging social networking, and how it influences individuals' learning from a pedagogical perspective.

Our results demonstrate that online social networking leads university students to whole person development with better psychological well-being and improved performance, illuminating positive impacts of online social networking on learning. Online social networking not only expands individuals' large-scale networking capacity but also enables individuals to maintain close relationships with a small group of friends. It provides a new channel for students to fulfill the needs of self-expression, social comparison and information sharing, Without the problem of "fear of embarrassment" in face-to-face interaction (Leary and Kowalski, 1990), online social networking allows university students to feel more comfortable in expressing themselves and interacting with peers and professors. This is helpful for students moving from a broader edge of a community, e.g., university, to its center. Online social networking is able to promote individuals' development of cognition, emotions and skills for academic success. It influences not just what students are learning but how they are learning.

Further, this study reveals the underlying mechanism of the emergency of online social networking that has significant impacts on individuals' learning outcomes. Evolving technologies are intricately woven into the fabric of social systems (Bandura, 2002). Prior social network research primarily focuses on describing the structure or typology of a network, while ignoring the potential transformation processes. We explicitly propose and empirically demonstrate that self-efficacy belief, social acceptance and acculturation link individuals' online social networking engagement to positive learning outcomes. On the one hand, our results show the central place that individuals' efficacy beliefs take in the social learning process. Online social networking is self-initiated and self-regulated in the spirit of student centered learning. As Bandura (2002, p3) purports, "Among the mechanisms of self-regulation none is more central or pervasive than beliefs of personal efficacy." On the other hand, we cannot ignore the effects of social acceptance and acculturation that shape students' interactions with peers and the university environment, respectively. Students are really concerned about the feedback from peers. In the online context, most feedback is sentimental, largely influencing students' cognition and affection. These interactions take importance for students, especially first year students, in articulating and transmitting their role at universities. All in all, our results enrich both social network and social learning research and extend their applicability to web-based education.

On a practical level, the social dimension of learning has always been of great significance to both individual learners and educational institutions. In the Internet era, the social behavior of human agency is changing (Bandura, 2002). Most universities are also experiencing socio-economic changes driven by state-of-art information technologies (Muller et al., 2007). From a university student standpoint, our findings show positive impacts of individuals' online social networking on their socialization processes in the situated university and ultimate learning outcomes. University students have become immersed in this emerging networking mode. But some students are consciously separating their time spent on social network sites from academic learning. As one commented, "*I could enjoy[learning on Facebook], but I like to keep Facebook and school separate.*" Such a distinct divide between learning space and personal space may result in a disruptive impact in using online social networking (such as on Facebook) for learning. Fortunately, our findings help to mitigate this superficial gap between networking for leisure and networking for learning. Learning in university should be interpreted from the perspective of "whole person" development. Indeed, we find that university students' online social networking, although it may originally be for fun, can help them establish efficacy belief, facilitate their observational learning from peers and help them to adapt to the university, and thus be beneficial for their self-esteem development, nurturing satisfaction with life, and even academic performance. Although this can support students in their "whole person" development for their future success, this does not mean that we necessarily suggest university students should spend more time on online social networking. Positive impact is assumed to be attained by those who have a high level of self-regulation capacity. Jones et al. (2010) also suggest that learning be carefully designed so that it can address individual preferences to combine or separate social and personal space as well as leisure and studying.

As one coin has two sides, we should also pay attention to the possible negative impacts of using Facebook, such as distraction and addiction. Some of our interviewed students commented, "*I am not sure [whether I will enjoy academic learning in Facebook], since I am easy to get distracted and I cannot concentrate on the work I am doing*" and that "*I think it [Facebook] may have some passive impact on my studies, because I may not be able to concentration on what I want to learn.*" It is noteworthy that achieving desirable learning outcomes requires an appropriate social network configuration (Morrison, 2002). Thus, online social networking is only useful to those who choose to use it productively.

Seen from the viewpoint of an educational institution, self-initiated learning could be good practice for university students, and part of such learning practice could be embedded into their social networking activities. Our results illuminate that peers can greatly affect the social aspect of individuals' learning. Peer interactions can partially promote self-initiated networking towards individuals' psychological well-being development, such as in the formation of self-concept and self-esteem. Recognizing the peer influence on various types of learning, previous research has recommended some educational practices, for example, peer mentoring (Sanchez et al., 2006) and peer-coaching (Parker et al., 2008). This study offers a new approach for educational institutions to acknowledge peer influence, namely, providing a supportive infrastructure in which social networking activities can take place to increase interactions among students. Educational practitioners can also consider appropriately designing some generic educational practices on social networking sites, e.g., university orientation practices. Such practices would allow students to form their own community, allow them to learn more about the university from the community, and therefore promote their commitment and satisfaction to the university. We have attempted to use Facebook to add value to the first year students' orientation practices, which serves as a good start to apply social network sites into education. However, more research is warranted to explore the appropriateness of embedding Facebook in

curriculum design and explore how to design it. Some students psychologically differentiate studying from learning which has a broader meaning. This gap might be gradually mitigated by the trend of Facebook ubiquity in university students' social lives.

Limitations and Future Research

We acknowledge several limitations to our study that suggest the need for future research. First, our results demonstrate a partial mediation effect of socialization between online social networking and learning outcomes. We believe that there is a more complex and dynamic evolution from simple online social networking activities to ultimate learning outcomes in which rich psychological and sociological processes are hidden. Thus, future research could continue to investigate other potential intervention factors, linking online social networking to learning outcomes.

Second, we selected Facebook as the specific context and used Facebook intensity as a proxy measure to present the online social networking engagement. Although this treatment helps to reduce the complexity and variety of individuals' online social networking behavior that may also take place in many other social networking websites, such specificity might make the investigation of online social networking behavior superficial. Fortunately, Facebook intensity, together with the socialization factors, explains a good variance of all three domains of learning outcomes.

Finally, social learning theory interprets human behavior in terms of a continuous reciprocal interaction between cognitive, behavioral and environmental determinants. Regarding the focus of this study on the social impact of online social networking on learning, we have used a survey approach accompanied by focus group discussions. This design, although with data triangulation, still limits the conclusion of causality as well as the detection of the interrelationship among the included factors. For example, the achieved learning outcomes can reciprocally lead individuals to more active engagement in online social networking and more enthusiastic interactions with peers and the situations. A complete learning process is in a double loop rather than a single loop (Argyris, 1993). Hence, future research could investigate the reciprocity among social networking, socialization and learning outcomes, and could adopt an anthropological approach to observing individuals' online social networking behavior in a continuous time series. This would help to tease out the dynamism of individuals' online social networking behavior.

Conclusion

Online social networking has deeply penetrated our social life. Through the continuous innovation of web technologies, people are increasingly influenced by the virtual world. Our study investigating the learning impacts of online social networking on university students demonstrates the critical role that such an emerging creative networking approach plays in education. Online social networking facilitates university students to establish self-efficacy beliefs, helps them gain satisfying relationships with peers, as well as fosters their integrity and commitment to the university. These are key facets of students' social learning in university. By engaging in online social networking and social learning, students' psychological well-being and academic skills are improved. These are not only desired for individual learners, but are also expected by educational institutions. Our study implies that it is necessary and should be useful to appropriately utilize online networking sites, such as Facebook, by designing some learning activities, e.g., orientation practices, increasing interactivity among individual students and building a sound environment for socialization. These practices will help fulfill students' ever growing networking needs and thus improve their social learning effectiveness.

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