Can learning be virtually boosted? An investigation of online social networking impacts

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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 two socialization processes, social acceptance and acculturation, bridge individual online social networking engagement with three domains of social learning outcomes. Results from a survey accompanied by focus group discussions demonstrate the substantial impacts of university student online social networking engagement on social learning processes and outcomes. Online social networking not only directly influences university students’ learning outcomes, but also helps the students attain social acceptance from others and adapt to university culture, both of which play prominent roles in improving their learning outcomes.

Keywords:

Social network

Socialization

Learning outcomes

e-Learning
1. Introduction

With the inception of Web 2.0 technology, a new mode of social networking, i.e., online social networking, has emerged and become popular. People are increasingly inclined to cultivate their virtual social relationships and virtual life on existing prevalent social networking websites such as Facebook, Xanga and MySpace. These websites provide favorable platforms for individuals to express themselves. More importantly, by using social networking technologies, individuals can establish new relationships with acquaintances, as well as maintain close relationships with friends, colleagues, and family members. The active engagement in these websites to establish virtual relationships provides individuals with access to a diversified set of information from multiple sources (Wasko & Faraj, 2005).

From an educational perspective, online social networking is also a learning practice for university students, since the learning environment of the university itself is a social system of individuals’ interacting within a shared academic context (Hwang, Kessler, & Francesco, 2004). We observe that online social networking has been deeply embedded in the lifestyle of young people, especially since university students occupy a large proportion of the total population of online social networking websites (Madge, Meek, Wellens, & Hooley, 2009; Subrahmanyam, Reich, Waechter, & Espinoza, 2008). Students’ social networking, especially when the networking increasingly shifts to online, is more likely to be self-initiated learning, in which individuals create a system of information and support by building and nurturing
personal links. Recent research conducted in a Northern Taiwan research university shows that, in a web-based learning, undergraduates with certain self-regulation capacity intend to interact with their peers to get feedback and thus improve their performance (Wang & Wu, 2008). Further, students can develop commitment to their university and begin to better articulate their role as well as engage in peer-supported communities on aspects of academic life (Selwyn, 2009).

However, the pedagogical impacts on university students of the social networking in general and the emerging online social networking behavior in particular have obtained scant attention in the literature. Most prior studies have investigated the values of personal social networks in the business world, e.g., facilitating individuals to achieve higher mobility, better job performance and other career-related success (Podolny & Baron, 1997; Seibert, Kraimer, & Liden, 2001). Although several studies have investigated the social network relationships in computer-supported collaborative learning (Cho, Gay, Davidson, & Ingraffea, 2007; Kreijns, Kirschner, Wim, & van Buuren, 2007; Ryymin, Palonen, & Hakkarainen, 2008), the network investigated was constrained to a small and controlled group, in which the networking behavior is largely different from that in contemporary online social network websites. In practice, students intend to generate creative activities and learning in the online social networking context. It has been found that “net generation” learners have different styles of information processing and learning expectations, which behooves educational
institutions to reconsider pedagogical approaches (Williams & Chinn, 2009). We therefore raise two fundamental questions from a pedagogical standpoint: What are the impacts of online social networking on university students’ learning? and What are the implications?

According to social learning theory (Bandura, 1977), individuals often self initiate and regulate their learning to achieve desirable learning outcomes. Through interacting with peers and the situated environment, individuals’ cognition, affection and behavior are influenced. Intuitively, the social aspect of learning should be one foci of our investigation on university students’ online social networking behavior and its consequences. Recent research illustrates that young people’s online social networking behavior can bring them physical and psychological well-being (Ellison, Steinfield, & Lampe, 2007; Steinfield, Ellison, & Lampe, 2008). Although the findings are encouraging, the mere demonstration of potential correlations among variables in such research while ignoring the underlying mechanism how online social networking influences university students’ learning process and the consequent outcomes lends us a promising opportunity to revisit the pedagogical impacts of online social networking on university students’ learning. Also, it is notable that most universities increasingly emphasize student-centered learning practices, and their educational goals are not only to equip students with expertise or skills, but also to provide an environment for students for their psychological well-being conducive to lifelong learning. Thus, our attempt in researching the social impacts of university students’ online social networking on learning
entails important pedagogical implications for both individual learning and educational administration.

Due to its world-wide ubiquity, Facebook (www.facebook.com) is the selection of our research platform, a special online social networking context for investigation. Facebook has increasing influences on university students’ lives with usage rates of over 90% per year at most campuses (Lampe, Ellison, & Steinfield, 2006; Stutzman, 2006). This is also confirmed by students we interviewed at our university who noted that: “Being on Facebook becomes a daily activity and we log on Facebook multiple times per day”.

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 results and discussion. We conclude the paper with implications, limitations and future directions of this research.

2. Theoretical development and hypotheses

2.1. 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, Ford, & Salas, 1993; Schmidt & 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. Since this study is focused on the social aspect of learning, we specify university students’ self-esteem, satisfaction with life at the university, and performance proficiency (students’ ability to perform tasks and solve problems) to reflect the cognitive, affective, and skill-based domains of learning outcomes, respectively.

2.2. Social learning theory

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. Alavi (1994) also identifies individuals’ active engagement in constructing knowledge, interpersonal interactions in corporative context, and problem-solving situations as distinguished attributes of effective computer-mediated learning. Social learning theory emphasizes the self-regulation of individual learning. 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, to analyze their conscious experience, to communicate with others, to create and to engage in
insightful actions.

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. Individuals’ learning, although self-initiated, often relies on the social context. Individuals’ observations and interactions with peers (e.g., learning from each other by exchanging knowledge to achieve shared commonality) and situations (e.g., learning the environmental norms, cultures, policies) influence their cognition and behavior. Thus, obtaining desirable learning outcomes requires social support from others and their understanding of situations. Moreover, the achieved learning outcomes will reinforce individuals’ engagement in certain actions. From the social learning viewpoint, human behavior is a continuous reciprocal interaction between learners themselves and the external environment.

2.3. Research model

According to Bandura’s social learning theory (1977), individuals’ self-directed active engagement functions as an initial motive for achieving desirable learning outcomes. In the online social networking 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, addressing their self-expressive, networking and informational needs. To activate such learning and fulfill these needs, online social networking engagement is required, i.e., devoting time and psychological energy 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. Those advanced social networking applications greatly expand the number of individuals’ learning objects (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, as well as learn more about the university environment by joining a university network and thus finding the information that discloses real life in the university.

Second, it is individuals’ interactions with peers and the situated environment that actually achieve learning outcomes (Bandura, 1977), functioning as carriers of their initial learning engagement to desirable outcomes. These interactions have been characterized as social acceptance and acculturation in the socialization literature (Bauer, Bodner, Erdogan, Truxillo, & Tucker, 2007; Morrison, 1993; Morrison, 2002). Taken together, we propose a model shown in Fig.1. to explain how individuals’ online social networking, such as on Facebook, exerts an impact on their social learning outcomes. In addition to proposing the direct effect of online social networking engagement on learning outcomes, we view social acceptance and acculturation as being important socialization processes that can transform individual online social networking behavior into learning outcomes.

insert Fig. 1.
2.4. Online social networking and learning outcomes

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 network, such as in 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. Presumably, individuals take advantage of their large range of relationships and the inline small group of close relationships by engaging in online social networking.

In educational contexts, online social networking behavior is related to learning and academic success by creating systems of information, contacts and support. Despite co-located interactions (e.g., in the classes), students need other channels to express their feelings informally and freely, establish specific friendships that may not be realized by offline interactions, and capture more information. These are important to students’ mental health and performance improvement. Several studies have illustrated that university students with more engagement in online social networking are more likely to have better health, affective development and academic success (Morrow, 1999; Steinfield et al., 2008). Treisman’s (1992) study shows that the time college students spend with their peers is a critical factor in determining their performance. Huang 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:

Hypothesis 1a: University students’ online social networking engagement (on Facebook) is positively related to their self-esteem development.

Hypothesis 1b: University students’ online social networking engagement (on Facebook) is positively related to their satisfaction with university life.

Hypothesis 1c: University students’ online social networking engagement (on Facebook) is positively related to their performance proficiency.

2.5. Mediation role of socialization

The hidden complexity and dynamism of social networking behavior necessitates exploration of the underlying linkage mechanism between online social networking and desirable learning outcomes. As a sort of self-regulated learning, individuals’ search of information and feedback through social networking is critical to their socialization and adaptation in a situated environment.

Through social networking, individuals can acquire attitudes, behavior and knowledge for assuming a role in situated environments, such as organizations and universities. (Chao, O'Leary-Kelly, Wolf, Klein, & Gardner, 1994; Morrison, 1993; Morrison, 2002) Thus, university students’ online social networking behavior has great potential for nurturing and
promoting their socialization in the university, including the processes of social acceptance and acculturation. The value of various relationships will fulfill individuals’ specific learning purposes and information needs differently (Morrison, 2002). University students’ social acceptance and acculturation, which shape individuals interaction with peers and the situated university, respectively, require learning different objects and need differentiated information. Further, students’ socialization and adjustment in a university largely influence how well they perform in the university. Thus, the two socialization processes potentially bridge the gap between their online social networking engagement and the learning outcomes.

Social acceptance concerns individuals developing satisfying relationship 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 & Baron, 1997). In a tight-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, e.g., on Facebook, 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:

Hypothesis 2: University students’ online social networking engagement (on Facebook) is positively related to their social acceptance by peers in the university.

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 network 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:

Hypothesis 3: University students’ online social networking engagement (on Facebook) is positively related to their acculturation in the university.

Social acceptance and learning outcomes. Peer interaction is a crucial source of learning. Cognitively, peers can assist in drawing insight into personal style and self-concept development. As Walsh et al. (1998) purport, “forming mutual and meaningful connections with others, individuals gain a greater sense of energy, purpose, vision and ultimate self-understanding.” Affectively, 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 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 & Green, 1994). Further, 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:
Hypothesis 4a: University students’ social acceptance by peers is positively related to their self-esteem development.

Hypothesis 4b: University students’ social acceptance by peers is positively related to their satisfaction with university life.

Hypothesis 4c: University students’ social acceptance by peers is positively related to their performance proficiency.

Acculturation and learning outcomes. 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 while cannot inevitably impinge upon individuals. It is individuals’ interaction 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, 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 in the university.
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:

Hypothesis 5a: University students’ acculturation to the university is positively related to their self-esteem development.

Hypothesis 5b: University students’ acculturation to the university is positively related to their satisfaction with university life.

Hypothesis 5c: University students’ acculturation to the university is positively related to their performance proficiency.

3. Research method

We adopted a survey approach to test our research model. However, before implementing the main survey, we conducted 4 rounds of focus group discussions involving 14 undergraduates. These participants with different nationalities (Hong Kong, Mainland China, and US) came from different cohorts (foundation year and year 1-3). All of them had
Facebook experience and had established hundreds of connections on Facebook. 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. This mixed method approach can help to improve the validity of our judgments.

3.1. Data collection in survey

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 our survey. After 2 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 old, 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 (Table 1) reflected their varied intensity on Facebook. On average, they logged on Facebook 4 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 college students and previous
high school friends. This information partly confirmed the appropriation of our selection of Facebook as a specific online social networking context for investigation.

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, MacKenzie, Lee, & Podsakoff, 2003). First, we used different scales to measure predicting variables (5-point Likert scale for Facebook intensity, social acceptance, and acculturation) and criterion variables (7-point Likert scale for learning outcomes). 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 our variables. As shown in Table 2, the correlations between the marker variable and 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 the 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.
3.2. Measures

We used 5- and 7-point Likert scales to measure the predicting variables and the specified learning outcomes, respectively. 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 5 items related to the intensity of Facebook usage from recent studies (Ellison et al., 2007; Steinfield et al., 2008). Social acceptance was measured with 5 items, in which 3 were adapted from Morrison (2002) and 2 were adopted from Pascarella and Terenzini (1983). As for acculturation, we created 3 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 5 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 4 items that were adapted from Rode et al. (2005). Performance proficiency was measured on 4 items adapted from Chao et al. (1994). 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.

4. Results and discussion

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

4.1. 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, Anderson, Tatham, & Black, 1998). As shown in Table 3, the composite reliability scores ($\rho$) 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, Thompson, & Higgins, 1995).

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insert Table 3
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Discriminant validity was tested by comparing the square roots of 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) (see Table 4).

4.2. Structural model assessment

The results of structural model testing (Fig. 2.) provide strong evidence for the substantial impacts of online social networking engagement on students’ socialization in universities and social learning outcomes. As hypothesized, online social networking has direct impacts on the social dimension of university students’ learning, leading them to a higher level of self-esteem ($\beta = 0.174$, $t = 2.741$), satisfaction with university life ($\beta = 0.163$, $t = 2.802$), and performance proficiency ($\beta = 0.143$, $t = 2.423$). The online social networking site provides university students with a new mode for learning through which they foster psychological well-being and learn skills for academic or future career success.

Our results reveal the mediation effects of two socialization processes that can transform individuals’ online social networking engagement to learning outcomes. First, individuals’ engagement in online social networking is beneficial to their developing relationships with peers and gaining acceptance from peers ($\beta = 0.248$, $t = 2.568$). During the focus group discussion, 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.” Second, individuals’ integration with peers and gained social acceptance are shown to promote learning outcomes. Likewise, individuals’ social networking on Facebook is found to be significantly associated with their acculturation to the situated university ($\beta = 0.240$, $t = 3.186$), leading individuals to a higher level of social learning outcomes. More particularly, it is found that individuals’ increased social acceptance through peer interaction has a greater influence on their cognitive and skill-based learning with the magnitude of $0.493$ ($t = 6.053$) and $0.331$ ($t = 3.670$), respectively; whereas individuals’ acculturation shaped by the interaction with the situated environment has a greater effect on their satisfaction with life ($\beta = 0.358$, $t = 5.020$). This implies that the individuals’ interaction with different objects has different foci for self-development. Learning about peers is more cognition-based and pursues instrumental value (such as skill development), while learning about the university environment is an emotional cultivation.

5. 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 the 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 skills, illuminating the positive impacts of online social networking on the social dimension of individual 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. Such results imply the possibility of online social networking to integrate the values derived from both bridging social network and bonding social network, which were previously assumed irreconcilable.

Further, this study reveals the underlying mechanism that online social networking needs to go through to impact individuals’ learning outcomes. In addition to proposing the direct linkage between online social networking and social learning outcomes, we further postulate the mediation roles of two socialization processes, i.e., social acceptance and acculturation, which bridge online social networking and the learning outcomes. The two socialization processes shape students’ interactions with their peers as well as the university environment. Such interactions take importance for students, especially first year students, in articulating and transmitting their role at universities.
The socialization and adaptation largely determines how well students can perform and the extent to which they will commit to the situated universities. Without the problem of “fear of embarrassment” in face-to-face interaction (Leary & 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 centre. 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 prove that social acceptance and acculturation link individuals’ online social networking behavior to positive social learning outcomes, thus enriching both social network and social learning research and extending 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, Gil, Hernandez, Giro, & Bosco, 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 (based on the Web 2.0 technology) with some
students consciously separating their time spent on social network sites from traditionally defined learning. Our findings help to mitigate this superficial gap between networking for leisure and networking for learning. Indeed, we find that university students’ online social networking, although it may originally be for fun, can promote their learning about peers and universities, and thus be beneficial for their self-esteem development, nurturing satisfaction with the university, and performance proficiency. 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. As one coin has two sides, we should also pay attention to the possible negative impact of using Facebook such as distraction. Some of our interviewed students commented that “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).

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 how the power of 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, Hall, & Kram, 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. The educational practitioners can also consider appropriately designing educational practices on the social networking sites, e.g., the university orientation practice, allowing students to learn more about the university, and promoting their commitment and satisfaction to the university.

6. 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 pure social networking activities to the ultimate learning outcomes in which rich psychological and sociological processes are hidden. We identify only socialization as the foremost and straightforward process. Thus, future research could continue to investigate other potential intervention factors linking the online social networking to the 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 observe individuals’ online social networking behavior in a continuous time series. It would help to tease out the
dynamism of the individuals’ online social networking behavior.

7. 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 develop satisfying relationships with peers, as well as fosters integrity and commitment to their universities, key facets of students’ life in universities. Ultimately, online social networking can improve students’ psychological well-being and skill development. These are not only desired for the individual learners but also expected by educational institutions. Our study implies that it is appropriate to utilize online networking sites, such as Facebook, to design some learning activities, e.g., orientation practices, to increase interactivity among individual students and build a sound environment for socialization. These practices will help fulfill students’ ever growing networking needs and, therefore, improve their social learning effectiveness.
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Figures and Tables

Note: Hypotheses 2-5 (H2-5) constitute the mediation process of socialization between online social networking engagement and learning outcomes.

**Fig. 1. Research model**

**Fig. 2. Results of structural model**
Table 1
Information of respondents and Facebook usage

<table>
<thead>
<tr>
<th>Respondent (N=187)</th>
<th>Mean</th>
<th>Min-Max</th>
<th>Facebook usage</th>
<th>Mean</th>
<th>Std.</th>
<th>Min-Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years old)</td>
<td></td>
<td></td>
<td>Times per day log in</td>
<td>4.26</td>
<td>2.82</td>
<td>1-12</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td>Hours per day spent on</td>
<td>1.45</td>
<td>1.11</td>
<td>0.0-6</td>
</tr>
<tr>
<td>Male</td>
<td>21.4</td>
<td>18-27</td>
<td>Total number of friends</td>
<td>212.66</td>
<td>161.00</td>
<td>13-1000</td>
</tr>
<tr>
<td>Female</td>
<td>21.4</td>
<td>18-27</td>
<td>College students</td>
<td>64.26</td>
<td>60.34</td>
<td>0-350</td>
</tr>
<tr>
<td>Study level</td>
<td></td>
<td></td>
<td>Other college students</td>
<td>48.55</td>
<td>69.80</td>
<td>0-500</td>
</tr>
<tr>
<td>Year 1</td>
<td>76</td>
<td>40.9%</td>
<td>High school friends</td>
<td>70.10</td>
<td>72.18</td>
<td>0-600</td>
</tr>
<tr>
<td>Year 2</td>
<td>73</td>
<td>39.2%</td>
<td>College staff</td>
<td>2.32</td>
<td>3.56</td>
<td>0-20</td>
</tr>
<tr>
<td>Year 3</td>
<td>37</td>
<td>19.9%</td>
<td>Family Members</td>
<td>2.95</td>
<td>4.30</td>
<td>0-26</td>
</tr>
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</table>

Table 2
Correlations and common method bias assessment

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Online social networking engagement</td>
<td>0.816</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Social acceptance</td>
<td>0.254**</td>
<td>0.748</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Acculturation</td>
<td>0.218**</td>
<td>0.530**</td>
<td>0.756</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>4. PE (Marker variable)</td>
<td>0.103</td>
<td>0.045</td>
<td>0.091</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Self-esteem</td>
<td>0.239**</td>
<td>0.580**</td>
<td>0.481**</td>
<td>0.147</td>
<td>0.825</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Satisfaction with Univ. life</td>
<td>0.264**</td>
<td>0.447**</td>
<td>0.480**</td>
<td>0.051</td>
<td>0.538**</td>
<td>0.845</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>7. Performance proficiency</td>
<td>0.247**</td>
<td>0.423</td>
<td>0.413**</td>
<td>0.191**</td>
<td>0.654**</td>
<td>0.596**</td>
<td>0.860</td>
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<td></td>
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<tr>
<td>8. Gender</td>
<td>-0.044</td>
<td>0.003</td>
<td>-0.040</td>
<td>0.277**</td>
<td>0.035</td>
<td>-0.017</td>
<td>0.138</td>
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<td></td>
</tr>
<tr>
<td>9. Study level</td>
<td>0.037</td>
<td>-0.087</td>
<td>-0.080</td>
<td>0.043</td>
<td>-0.030</td>
<td>0.134</td>
<td>0.062</td>
<td>-0.116</td>
<td>-</td>
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</table>

Self-esteem

<table>
<thead>
<tr>
<th>rY-M</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.107</td>
<td>1.460</td>
</tr>
<tr>
<td>0.507</td>
<td>7.982</td>
</tr>
<tr>
<td>0.392</td>
<td>5.775</td>
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</tbody>
</table>

Satisfaction with Univ. life

<table>
<thead>
<tr>
<th>rY-M</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.225</td>
<td>3.134</td>
</tr>
<tr>
<td>0.418</td>
<td>6.235</td>
</tr>
<tr>
<td>0.452</td>
<td>6.872</td>
</tr>
</tbody>
</table>

Performance proficiency

<table>
<thead>
<tr>
<th>rY-M</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.069</td>
<td>0.941</td>
</tr>
<tr>
<td>0.288</td>
<td>4.072</td>
</tr>
<tr>
<td>0.274</td>
<td>3.872</td>
</tr>
</tbody>
</table>

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), \( r_{Y-M} = \frac{r_Y - r_S}{1-r_S} \); \( t_{\alpha/2,N-3} = \frac{r_{Y-M}}{\sqrt{(1-r_{Y-M}^2) / (N-3)}} \)

c. Values on the diagonal are square roots of AVE of constructs.
### Table 3
Assessment of convergent validity of constructs

<table>
<thead>
<tr>
<th>Construct</th>
<th>Items</th>
<th>Original Sample</th>
<th>Standard Error</th>
<th>T Statistics</th>
</tr>
</thead>
</table>
| **Online social networking engagement**  
(p = 0.909; AVE = 0.666) | OSNE1  | 0.849           | 0.055          | 15.444       |
|                                  | OSNE2  | 0.773           | 0.060          | 12.897       |
|                                  | OSNE3  | 0.860           | 0.061          | 14.141       |
|                                  | OSNE4  | 0.826           | 0.041          | 19.98        |
|                                  | OSNE5  | 0.769           | 0.072          | 10.637       |
| **Social acceptance**  
(p = 0.862; AVE = 0.559) | SOAC1  | 0.819           | 0.038          | 21.356       |
|                                  | SOAC2  | 0.839           | 0.034          | 24.954       |
|                                  | SOAC3  | 0.741           | 0.055          | 13.508       |
|                                  | SOAC4  | 0.661           | 0.077          | 8.586        |
|                                  | SOAC5  | 0.658           | 0.078          | 8.468        |
| **Acculturation**  
(p = 0.799; AVE = 0.571) | ACCU1  | 0.714           | 0.058          | 12.346       |
|                                  | ACCU2  | 0.736           | 0.050          | 14.792       |
|                                  | ACCU4  | 0.814           | 0.045          | 18.195       |
| **Self-esteem**  
(p = 0.914; AVE = 0.681) | SELF1  | 0.827           | 0.038          | 21.486       |
|                                  | SELF2  | 0.862           | 0.026          | 33.753       |
|                                  | SELF3  | 0.843           | 0.032          | 26.189       |
|                                  | SELF4  | 0.821           | 0.030          | 27.006       |
|                                  | SELF5  | 0.769           | 0.048          | 16.106       |
| **Satisfaction with Univ. life**  
(p = 0.909; AVE = 0.714) | SATI1  | 0.893           | 0.020          | 43.997       |
|                                  | SATI2  | 0.892           | 0.017          | 51.07        |
|                                  | SATI3  | 0.750           | 0.063          | 11.814       |
|                                  | SATI5  | 0.838           | 0.029          | 28.737       |
| **Performance proficiency**  
(p = 0.919; AVE = 0.740) | PERF1  | 0.884           | 0.023          | 39.268       |
<p>|                                  | PERF2  | 0.905           | 0.017          | 54.691       |
|                                  | PERF3  | 0.872           | 0.027          | 31.743       |
|                                  | PERF4  | 0.775           | 0.061          | 12.647       |</p>
<table>
<thead>
<tr>
<th>Item</th>
<th>Online social networking engagement</th>
<th>Social acceptance</th>
<th>Acculturation</th>
<th>Self-esteem</th>
<th>Satisfaction with Univ. life</th>
<th>Performance proficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSNE1</td>
<td>0.849</td>
<td>0.197</td>
<td>0.16</td>
<td>0.197</td>
<td>0.229</td>
<td>0.252</td>
</tr>
<tr>
<td>OSNE2</td>
<td>0.773</td>
<td>0.222</td>
<td>0.254</td>
<td>0.207</td>
<td>0.279</td>
<td>0.268</td>
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<tr>
<td>OSNE3</td>
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<td>0.187</td>
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<tr>
<td>OSNE4</td>
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<tr>
<td>OSNE5</td>
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<td>0.163</td>
<td>0.231</td>
<td>0.129</td>
<td>0.125</td>
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<tr>
<td>ACCU2</td>
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<tr>
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<tr>
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