

An Empirical Study of Online Social Networking for Enhancing University Students' Learning

Raymond Y. K. Lau

Abstract—In recent years, social technologies have been widely used by teenagers on a daily basis. More specifically, online social networks are becoming increasingly more popular in societies in general and university campuses in particular. Previous research shows that online social networking may have impact on students' learning. However, it is not clear how online social networking affect student learning and to what extent it affects learning outcomes. Based on social presence and social learning theories, we carry out an empirical study to examine how online social networking affect student learning. Our survey results indicate that online social networking activities promote students' perceived social presence, and hence positively influence the intensity of online knowledge sharing and knowledge discovery. As a result, both students' perceived learning satisfaction and learning outcomes have been improved. To the best of our knowledge, this is the first study which tries to explain how online social networking enhance student learning through the lens of social learning and knowledge management theories.

Index Terms—Online Social Networks, Social Learning, Social Presence, Learning Effectiveness.

I. INTRODUCTION

Social technologies, such as online social networks, Web logs (blogs), wikis, micro blogs, and virtual worlds, have been widely used in our daily life, and more recently being explored in learning and teaching contexts. Social technology is defined as any type of “computing application that serves as an intermediary or a focus for a social relationship” [1]. Although it was originally perceived as a type of technology mainly for socialization and entertainment, it has gradually been adopted across the boundary between purely socialization and business applications. With the advance of Web 2.0 technology, online social networks have penetrated into our daily life and university campuses around the world. From a pedagogical standpoint, social technologies in general and online social networking in particular can be applied to boost teaching and learning processes through learners' self-initiated interactions and knowledge exchange both inside and outside the classrooms [2]. These regular and intensive online interactions and knowledge exchanges can be seen as a kind of active reflexive learning that promotes deeper self-motivated knowledge discovery process. Moreover, individuals' active engagement in online social networking websites can help

them establish the virtual relationships and widen their access to a diversified set of information from multiple sources [3]. As a result, both learners' learning satisfaction and learning performance are improved.

From a teaching and learning perspective, online social networking can be seen as a kind of learning activity because the learning environment of a university is a social system consisting of individual students who interact and exchange knowledge in the academic context [4]. In fact, university students share a large percentage of the total number of users who engage in online social networking activities [5]. Accordingly, it makes sense to study how the utilization of social networks influences the study life and learning effectiveness of university students. In general, students' online social networking is a kind of self-initiated learning activity in which individuals develop their knowledge bases via extensive communications and knowledge sharing according to their personal or public links on the social network sites.

Moreover, students can develop commitment to their university life and engage in peer-supported communities on various aspects of academic life. However, the pedagogical implications of online social networking on university students have not received sufficient attention in the literature. Most of the previous studies examined the values of personal social networks in the business world [6]. Although some studies have investigated the impact of social networking on computer-supported collaborative learning [7], the scale of those networks was relatively constrained to small controlled groups in which the networking behavior may be quite different from nowadays online social networking.

To encourage students to engage in intensive knowledge sharing and knowledge discovery activities both inside and outside the classrooms, we propose to adopt one social technology, online social networking, as one of our instructional methods. With such technology, students can discuss the study tips among themselves and with the instructors. Moreover, they can communicate and extensively share knowledge among the peers. We believe that the proposed course Facebook group is able to stimulate students' self-initiative for pre-class preparation and post-class revision [8]. Instructors can stimulate students' thinking by posting messages or launching dialogs with specific students even after the normal class time. Through this kind of intensive communications and knowledge sharing between instructors and students, and among the peer group, students' knowledge acquisition processes are improved.

This paper described a pilot project to help students improve both knowledge sharing and knowledge discovery

Manuscript received September 5, 2012; revised October 8, 2012.

Raymond Y. K. Lau is with the Department of Information Systems, City University of Hong Kong, Hong Kong SAR, China (e-mail: raylau@cityu.edu.hk).

through the uses of online social networking. We had chosen students taking an introductory course of Management Information Systems at City University of Hong Kong as our subjects. In the following section, we provide a background on the theoretical foundation and the proposed structural model. In the next section, we give a detail description of our research design and methodology, then, followed by the findings and discussion. Finally, we discuss the implications of this study.

II. THEORETICAL FOUNDATIONS

Short et al.'s social presence theory [9] serves as the theoretical foundation of this study that investigates the impacts of online social networking on university student learning. Social presence refers to "the degree of warm and personal relations among the interacted parties in a mediated interaction environment. Both student-to-student and student-to-instructor communications and networking is an effective way of promoting students' social presence, and hence encourage them to engage in online knowledge sharing and knowledge discovery processes. Although other social technologies, such as online chatting and blogging, may also improve students' social presence, online social networking support intensive two-way instant communications which tend to maximize individuals' social presences. As a whole, online social networking among students, and between students and instructors become the stimuli to further trigger students to share and discover knowledge outside classrooms. This becomes a main factor to influence students' learning satisfaction and learning outcomes.

In addition, Bandura's social learning theory [10] also serves to explain the impacts of online social networking on student learning. According to social learning theory, individual learners, peers, and learning contexts have the impacts on individuals' learning outcomes. Alavi [11] also suggests that learners' active participation in constructing knowledge (knowledge discovery), interpersonal interactions and knowledge sharing in collaborative problem-solving situations are the main drivers for effective computer-mediated learning. Social learning theory posits that individuals can self-initiate, regulate learning and actively construct knowledge by acquiring, generating, and structuring information via intensive social interactions.

Moreover, social learning theory attempts to explain learning processes as a kind of socialization process among individuals. Individuals observe and interact with peers (e.g., by exchanging information) to achieve shared goals. Accordingly, obtaining desirable learning outcomes requires social support from others. From the social learning viewpoint, human behavior is a continuous interaction between learners themselves and the learning context. Knowledge management is seen as consisting of four sub-processes, namely, knowledge discovery, knowledge capture, knowledge sharing, and knowledge application [16]. Knowledge discovery refers to the development of new tacit or explicit knowledge from data, whereas knowledge sharing refers to the process through which explicit or tacit knowledge is communicated to others [16]. Both processes are considered the key elements in both organizational and

individual learning.

III. THE RESEARCH MODEL

According to Short et al.'s social presence theory [9] and Bandura's social learning theory [10], individuals' self-initiatives provide the initial motive for them to achieve desirable learning outcomes and learning satisfaction. For online social networking, individuals are provided with sufficient capacities to articulate themselves, establish close relationships, and intensively interact with others without time and space constraints. To engage in self-initiated learning, and fulfill knowledge sharing and knowledge discovery needs, online social networking is required. Individuals can present themselves in online viewable profiles and articulate their social networks. Also, they can build and maintain extensive relationships with peers and selectively develop further relationships with others via indirect links among the peers. As a whole, both social presence and social acceptance are promoted by the utilization of online social networking. Social presence and social acceptance are seen as the driver for intensive knowledge sharing and knowledge discovery, which in turn leads to learning satisfaction and learning outcomes (i.e. perceived acquisition of domain knowledge). The structural model which guides our research is depicted in Fig. 1.

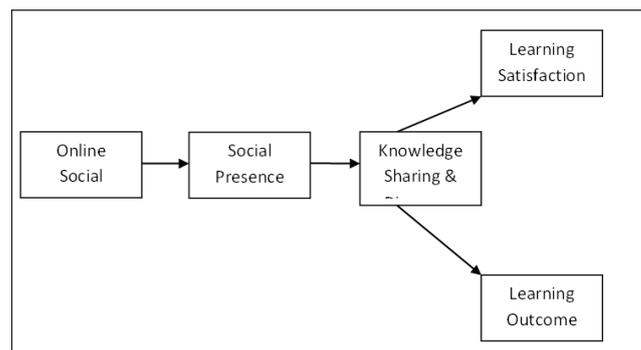


Fig. 1. The research model

IV. THE HYPOTHESES

Through the utilization of online social networking, students' social presence and social acceptance are enhanced, which in turn promotes intensive knowledge sharing and discovery. Eventually, both perceived learning satisfaction and learning outcomes are improved. Accordingly, we posit the following hypotheses:

H1: Online social networking positively influences social presence.

H2: Social presence positively influences knowledge sharing and discovery.

H3: Knowledge sharing and discovery positively influences learning satisfaction.

H4: Knowledge sharing and discovery positively influences learning outcomes.

V. RESEARCH METHODOLOGY

This study was conducted in the introductory course of

Management Information Systems at City University of Hong Kong in 2010. A pilot online survey was conducted at the beginning of the semester to understand online social networking behavior among contemporary youngsters. 58 responses were collected from subjects who attended the aforementioned course and they were supported by the course Facebook group page. Most of the respondents aged from 19 to 22 years old. From this pilot study and survey, it was revealed that online social networking through the course Facebook group was prevalent during the semester, and students were mostly engaging in the Facebook group to gain study tips and share knowledge about the topics taught by this course. The survey also indicated that 92 percent of the respondents were interested in participating in course related online social networking in the future.

After 7 weeks of study in the semester, subjects were asked to fill in a survey questionnaire. The survey was done outside class time. Participants were reminded to read the heading notes of the questionnaire, which explained the purpose of course related online social networking. Students' perceived learning satisfaction was measured by asking if the respondents are satisfied with their learning processes or not. Students' perceived learning outcomes were measured by asking if the respondents felt that they had acquired the domain knowledge taught by the course. All the items were measured in a 7-point Likert-scale with 1 as Extremely Disagree and 7 as Extremely Agree.

VI. RESULTS AND ANALYSIS

The research model was tested using Partial Least Square (PLS), a variance based structural equation modeling technique that accesses the relationship between items and constructs (the measurement model) and analyzes the strengths and directions of the relationships among constructs (the structural model) [12]. It is well fit for this study because of its strengths in handling formative constructs and its validity in handling a small sample size [13]. Three tests were used to assess convergent validity: composite reliability of constructs, average variance extracted (AVE) by constructs, and reliability of questions. Convergent validity is adequate when composite reliability of constructs above 0.8; constructs have an AVE of at least 0.5; and item loadings above 0.7 [14]. For the proposed model, all constructs appeared to have an adequate convergent validity.

Table 1 provides a summary of the validity test results. For satisfactory discriminant validity, the AVE from the construct should be greater than the variance shared between the construct and other constructs [15]. Our test showed good discriminant validity on the model because all the square roots of the AVE for a particular construct is larger than the correlations between it and other constructs, and the correlations between all pairs of constructs were below the suggested cutoff of 0.90 level [13].

With adequate measurement model, the hypotheses were tested by examining the structural model. The test of the structural model includes estimating the path coefficients (the strengths of the relationships between the dependent and independent variables), and R2 value (the amount of variance explained by the independent variables). A significance level

of 0.05 was adopted. All path coefficients were significant, providing strong support for the structural model (Please refer to Fig. 2).

The path weights were examined for assessment of relative importance of online social networking engagement. In particular, utilization of online social networking significantly induces positive social presence (path coefficient = .562, t = 16.15). In addition, positive effect on knowledge sharing and discovery is found (path coefficient = .513, t = 9.62). Finally, positive effect on learning satisfaction (path coefficient = .572, t = 9.88) and learning outcomes (path coefficient = .487, t = 8.27) is found. Forty eight percent of learning satisfaction (R2 = 48.5%) can be explained by enhanced knowledge sharing and discovery, and forty one percent of learning outcomes (R2 = 47.4%) can be explained by enhanced knowledge sharing and discovery. According to our empirical verification, all the hypotheses are supported.

TABLE I: VALIDITY TESTS OF STRUCTURAL MODEL

Structural Model				
Construct	Composite Reliability	Average Variance Extracted	Item	Loading
NETWORK-UTIL	0.853	0.766	UTIL1	0.8735
			UTIL2	0.8668
SOCIAL-PRESENCE	0.827	0.679	PRESENCE1	0.8216
			PRESENCE2	0.8449
			PRESENCE3	0.8519
			PRESENCE4	0.8813
KNOWLEDGE E-SHARING	0.855	0.732	SHARING1	0.8429
			SHARING2	0.8794
			SHARING3	0.8611
			SHARING4	0.8532
LEARNING-OUTCOMES	0.851	0.736	OUTCOME1	0.8655
			OUTCOME2	0.8502
LEARNING-SATISFACTION	0.932	0.695	SATISFACTION1	0.8547
			SATISFACTION2	0.8206
			SATISFACTION3	0.8425
			SATISFACTION4	0.8159

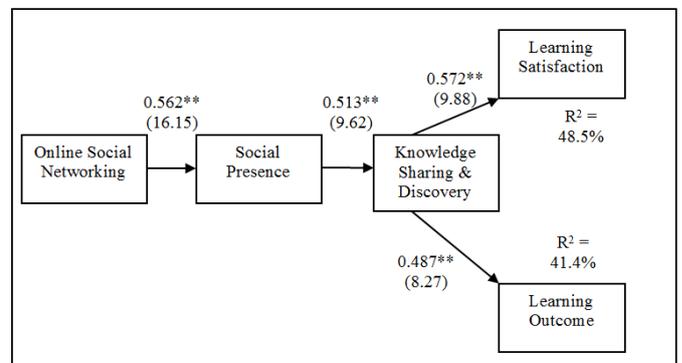


Fig. 2. The Results of PLS

VII. CONCLUSIONS AND FUTURE WORK

The contributions of this study are two-fold. In this paper,

we have shown the evidences of how the utilization of online social networking contributes to learning – students found greater satisfaction in learning and perceived to achieve the desired learning outcomes. Social technology, which is originally designed for personal socialization and entertainments, is able to be applied to learning environment. This finding is beneficial to both students and instructors. Instructors should be able to design and develop course related online social networking websites to enhance student learning.

Online social networking facilitates university students to develop richer relationships with peers, and fosters commitment to their university life. Accordingly, online social networking can improve students' learning satisfaction and skill development. This research also makes theoretical contribution in the sense that the model of social learning is integrated into a knowledge management framework to explain the impact of online social networking on student learning. Our study implies that it is effective to utilize online networking sites, such as Facebook, to design collaborative learning activities, e.g., exchange of project information, to increase interactivity and satisfaction among individual students, and develop a rich environment for socialization. Future work involves the empirical study with a larger scale and testing alternative structural models.

ACKNOWLEDGMENT

This research was financially supported by the City University of Hong Kong's TEA Research Grant (Project#: 6989012).

REFERENCES

- [1] D. Schuler, "Social computing," *Communications of the ACM*, vol. 37, no. 1, pp. 28-29, 1994.
- [2] R. Y. K. Lau, R. K. F. Ip, M. T. Chan, R. C. W. Kwok, Y. W. Wong, W. M. Wong, and C. F. So, "Podcasting: An Internet-Based Social Technology for Blended Learning," *IEEE Internet Computing*, vol. 14, no. 3, pp. 33-41, 2010
- [3] M. M. Wasko and S. Faraj, "Why should I share? Examining social capital and knowledge contribution in electronic networks of practice," *MIS Quarterly*, vol. 29, no. 1, pp. 35-57, 2005.
- [4] A. Hwang, E. H. Kessler, and A. M. Francesco, "Student networking behavior, culture, and grade performance: an empirical study and pedagogical recommendations," *Academy of Management Learning and Education*, vol. 3, no. 2, pp. 139-150, 2004.

- [5] C. Madge, J. Meek, J. Wellens, and T. Hooley, "Facebook, social integration and informal learning at university: it is more for socialising and talking to friends about work than for actually doing work," *Learning, Media and Technology*, vol. 34, no. 2, pp. 141-155, 2009.
- [6] S. E. Seibert, M. L. Kraimer, and R. C. Liden, "A social capital theory of career success," *Academy of Management Journal*, vol. 44, no. 2, pp. 219-237, 2001.
- [7] E. Ryymin, T. Palonen, and K. Hakkarainen, "Networking relations of using ICT within a teacher community," *Computers & Education*, vol. 51, no. 3, pp. 1264-1282, 2008.
- [8] M. Parikh and S. Verma, "Utilizing Internet technologies to support learning: an empirical analysis," *International Journal of Information Management*, vol. 22, pp. 27-46, 2002.
- [9] J. Short, E. Williams, and B. Christie, *The Social Psychology of Communication*, John Wiley, 1976.
- [10] A. Bandura, *Social learning theory*, Englewood Cliffs, NJ: Prentice-Hall, 1977.
- [11] M. Alavi, "Computer-mediated collaborative learning: an empirical evaluation," *MIS Quarterly*, vol. 18, no. 2, pp. 159-174, 1994.
- [12] J. B. Lohmoller, *Predictive vs structural modeling: PLS vs ML. Latent Variable Path Modeling with Partial Least Squares*, Heideberg, Physica-Verlag, 212-255, 1989.
- [13] C. Fornell and F. L. Bookstein, "Two structural equation models: LISREL and PLS applied to consumer Exit-Voice theory," *Journal of Marketing Research*, vol. 19, no. 4, pp. 440-452, 1982.
- [14] C. Fornell and D. F. Larcker, "Evaluating structural equation models with unobservable variables and measurement error," *Journal of Marketing Research*, vol. 18, no. 1, pp. 39-50, 1981.
- [15] W. W. Chin, *The partial least squares approach for structural equation modeling. Modern Methods for Business Research*, G. A. Marcoulides, N. J. Mahwah, Lawrence Erlbaum, pp. 295-336, 1998.
- [16] I. Becerra-Fernandez, A. Gonzalez, and R. Sabherwal, *Knowledge Management: Challenges, Solutions, and Technologies*, Pearson Prentice Hall, 2004.



Raymond Y. K. LAU is an Assistant Professor in the Department of Information Systems at City University of Hong Kong. He has worked at the academia and the ICT industry for over twenty years. He is the author of more than 100 refereed international journals and conference papers. His research work has been published in renowned journals such as *ACM Transactions on Information Systems*, *IEEE Transactions on Knowledge and Data Engineering*, *IEEE Internet Computing*, *MIS Quarterly*, *Journal of MIS*, *Decision Support Systems*, etc. His research interests include Information Retrieval, Text Mining, Social Media, and e-Learning. He is the associate editor of the *International Journal of Systems and Service-Oriented Engineering*. He is a senior member of the IEEE and the ACM respectively.