

Assessing the effects of interactive blogging on student attitudes towards peer interaction, learning motivation, and academic achievements

C. Yang* & Y.-S. Chang*†

*Institute of Business and Management, National Chiao Tung University, Taiwan

†Department of Business Administration, Chung Chou Institute of Technology, Taiwan

Abstract

Blogs have been increasingly used to supplement traditional classroom lectures in higher education. This paper explores the use of blogs, and how student attitudes towards online peer interaction and peer learning, as well as motivation to learn from peers, may differ when using the blog comments feature, and when students are encouraged to read and comment on each other's work. We contrast two ways blogs affect learning engagement: (1) solitary blogs as personal digital portfolios for writers; or (2) blogs used interactively to facilitate peer interaction by exposing blogging content and comments to peers. A quasi-experiment was conducted across two semesters, involving 154 graduate and undergraduate students. The result suggests that interactive blogs, compared with isolated blogs, are associated with positive attitudes towards academic achievement in course subjects and in online peer interaction. Students showed positive motivation to learn from peer work, regardless of whether blogs were interactive or solitary.

Keywords

blogs, hybrid learning environment, peer learning, Web-based learning.

Introduction

Blog use in educational sectors has grown extensively in the last decade, and considerable research has focused on the educational use of blogs (Oravec 2002; Williams & Jacobs 2004; Dailey 2006; Richardson 2006; Churchill 2009; Kerawalla *et al.* 2009; Yang 2009). A blog is a type of website, typically maintained by an individual with regular entries of commentary, descriptions of events, or other material such as graphics or videos. A blog can assume the form of a diary, journal, 'what's new' page, or links to other websites. Because

of their easy creation, blog pages have become the web-authoring tool for the novice, as well as the expert. Blogs create a context for dialogues between bloggers and readers. Through blogger-initiated conversations, blog platforms build a solid base of shared experiences and mutual relationships (Bausch *et al.* 2002).

Although blogs did not originate in education sectors, they have become useful in various educational levels and settings, and as an authoring tool. For example, blogs often serve as a digital portfolio of student assignments and achievements (Liu & Chang 2010). Most blog platforms provide a personal writing space, which is easy to publish, sharable, and automatically archived, empowering users to form learning communities through inter-linkages. Therefore, blogs can combine solitary reflection and peer interaction in learning

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Correspondence: Chyan Yang, No. 118, Sec. 1, Jhongsiao W. Rd., Jhongjheng District, Taipei City 100, Taiwan. Email: nsc.professor.yang@gmail.com

processes (Richardson 2006; Yang 2009). Williams and Jacobs (2004) suggest that students learn as much from each other as they do from an instructor or a textbook – what matters is finding an appropriate vehicle for facilitating this learning. They considered blogging as potential transformational technology for teaching and learning. Oravec (2002) observed the many blog dimensions suited to the individual voices of students, empowering them, and encouraging them to become more critically analytical in their thinking. The typical scenario when a teacher poses a question in a classroom is that a few dominate the discussion. Students also express their opinions without solid support from content they are studying, perhaps because there is not enough time to prepare or reflect. Disengaged students frequently remain silent, and others who might have something truly relevant to contribute are too shy to do so. Dailey (2006) considered time as the biggest advantage of blogs. Blogging gives students the time to think. This motivates us to investigate ways of using blogs to engage students in learning when they are not in class.

Critical reflection is the process of thinking back on prior learning to determine whether what one has learned is justified under present circumstances (Mezirow & Associates 1990). The process of creating comments involves reflecting on prior readings of original posts authored by a peer and on other prior knowledge acquired to date. Hall and Davison (2007) investigated hundreds of blog comments in an interactive learning environment and observed a significant number of reflective comments, posting messages, and noteworthy comments, leading to an inquiry that accentuated critical reflection. In particular, composing blog comments involves stepping back, reflecting, and analysing, which enables individuals to become more thoughtful and mindful of their work. Yu *et al.* (2010) indicated that sharing culture is strongly linked to member knowledge sharing behaviour via weblogs. Participants appreciated the opportunity to use technology to communicate with peers.

Classroom discussion is often teacher–student centred, rather than a student–student dialogue. The blog is a vehicle to ensure that everyone has a voice and is a valued member of the learning community. The instructor has previously been the only person to access student work. Students turn in their work to instructors and have no way to learn how their peers scored on the same assignments, thereby losing the potential of appre-

ciating student work. In contrast, peer learning is a form of cooperative learning that enhances the value of student–student interaction. Students using interactive blogs can read peer postings and leave comments, which enable them to learn from peers by creating dialogues with each other (Kay 2006). Students enhance their analytical thinking, while engaged in such meaningful dialogues. In this sense, blogs may have the potential to transform personal learning to collaborative learning. This motivates us to compare and contrast the individual use of student blogs for personal e-portfolios/learning diaries with their collaborative use in the context of a wider social network.

A general awareness of blogs exists in higher education, and some students and faculty may even have maintained personal blogs for years in noneducational settings (Makri & Kynigos 2007). However, blogs in educational environments have not generated a comparable level of momentum as those in noneducational use. Some researchers (Hall & Davison 2007) argue that our understanding of how to use social software such as discussion forums and blogs in an effective and meaningful way is minimal at best. The problem partially rests in the absence of more cohesive information to assess quality and effectiveness. Enthusiastic claims for blogging in educational settings need to focus on a comprehensive research base broadly supported by vigorous empirical studies conducted in the framework of educational theory.

Research methods such as the user survey (Williams & Jacobs 2004) and ethnography (Dailey 2006; Hall & Davison 2007; Makri & Kynigos 2007; Yang 2009) have been used to assess blogging quality and effectiveness, but the perspective differences in surveys and methodologies make it difficult to combine the results into a cohesive knowledge base that can guide practice and education (Hall & Davison 2007). This study will provide substantial insights beyond enthusiasm for educators who consider the use of blogs to improve the quality of student learning experiences. This paper investigates blog technology for encouraging interactions between students, as well as its consequences in terms of attitude changes towards learning motivation, peer learning, and academic achievement.

We proposed a hypothesis testing approach to assess the effects of blogs on student attitudes towards peer learning, academic achievements, and community interaction. The hypotheses to contrast solitary and

interactive use of blogs were tested through a quasi-experiment using a repeated-measures design (Rosenthal & Rosnow 1991), where the 'control group' was comprised of students participating in the solitary use of blogs, and where the 'experimental group' was comprised of students participating in the interactive use of blogs. Participants were electronics majors who enrolled in two courses for two consecutive semesters from 2006 to 2007. Students used blogs when not in class. Questionnaires were used as an instrument to collect data for quantitative analysis.

Theoretical background and hypothesis development

The traditional classroom-learning environment includes only an instructor and learners. The instructor is responsible for delivering content, answering questions, and testing learning, while learners play a passive role. Communication of course content is mostly one-way, from the instructor to the learner. In a hybrid-learning environment, the instructor designs the classroom instruction and becomes more of a facilitator to engage learners through computer-mediated communication. Technology has created opportunities for learning to become a more interactive process between instructors and learners, as well as among learners.

We used the expectancy theory of Vroom (Rao 2000) as a framework to explore factors, which motivate one to contribute and collaborate in online learning environments: blogs as compared with other social tools such as discussion forums. The expectancy theory includes the three dimensions of valence, instrumentality, and expectancy when investigating choices people make. Motivation is produced by individual expectancy that a certain effort will lead to an intended performance, the instrumentality of this performance achieving a certain result, and the desirability of this result for the individual, known as valence (Condrey 1998). Blogs provide more control in configuration, content sharing, and customization than discussion forums. Diverse expectancy levels involve the efforts required that lead to the intended results in peer learning. In other words, what matters is whether the efforts will eventually lead to the end-results. Findings in the work of Kay (2006) suggest that idea sharing and online interaction in discussion forums are significant in learning environments. Hall and Davison (2007) also provide evidence

of learning effectiveness in terms of peer support, propositional stances, and group affective tones. However, blogs might be a better instrument to achieve idea sharing and collaborative learning, without sacrificing too much on customizing blogging space, tuning its look and feel, and the sense of ownership (Hall & Davison 2007). In contrast, members jointly own discussion forums; administrators design their look and feel; and member-specific customization is hardly possible. With regard to valence, blogs compared to discussion forums leave more room for students to present their results in multiple forms of media other than text, a major form of media seen in discussion forums.

The content analysis of blogs (Hall & Davison 2007) reveals that interactive use of blogs with students composing comments in educational settings results in a substantial degree of online peer interaction among learners. This leads us to the following hypothesis:

H1: The use of the comments feature in blogs is associated with positive attitudes towards online peer interaction.

Studies have supported that 'good conversations' in blogs as social media are beneficial to peer learning. Makri and Kynigos (2007) conducted a study on 48 university students assigned to publish their answers to open-ended questions and problems on the blog; make their ideas explicit and 'readable' by others; and comment on the work of their peers. They analysed excerpts of written transcripts from participant blog entries, observation notes, informal interview transcripts, and a final evaluation questionnaire. Their ethnography method identified most students in their experiments as 'blog frequent visitors', who visited blogs quite often, but did not comment or contribute to a discussion; rather, they merely observed ongoing activities or debates. Hall and Davison (2007) conducted content analysis of 79 student blogs in a university class setting and provided an evidence base for peer support through reflective learning activities facilitated by student blogs. The students were free to interpret the instruction to be 'reflective' to mean that they should challenge statements posted on peer blogs as much as possible. Based on the role model theory of Merton (Holton 2004), individuals compare themselves with reference groups of people who occupy the social role to which the individual aspires. Similarly, exposing oneself to good postings, which translate postings with

reflection and insight, identifies role models in the learning context among many peers.

A behaviour pattern in the blogging context involves some motivated students who perceive differences among themselves, to some students who deepen their thinking, and finally, to some accomplished students who successfully compose feedback in their comments (Chang & Chang, in press). From the perspective of Piaget (1926), students interacting with their peers in learning situations will cause disequilibrium, expose inconsistent knowledge, explore opposing perceptions and ideas, and challenge inadequate logical reasoning and strategies, resulting in higher-quality comprehension by learners. This leads us to hypothesis H2.

H2: The use of the comments feature in blogs is associated with significantly more motivation to learn from peers than not using the comments feature.

From the social modelling perspective (Bandura 1986), student–student interaction presents opportunities for observing and imitating successful behaviours and achievements, which essentially results in changes in peer levels of competence in a task. Peer learning is a form of cooperative learning that enhances the value of student–student interaction and results in various advantageous learning outcomes. By opening opportunities for peers to view blogs created by others and encouraging comments and suggestions after examining their viewpoints, exemplars are exhibited for observations and modelling, which, in the light of social modelling by Bandura (1986), should enhance observer knowledge levels in a task. Consequently, course subjects reflected in interactive blog conversation, dialogues, and comments may enhance academic achievements. Therefore, we propose our third hypothesis:

H3: The use of the comments feature in blogs is associated with positive attitudes towards academic achievements in course subjects.

Methods

Participants

Students aged 20 to 26 from two classes, namely, Electronic Commerce and Design of Internet Applications, were surveyed during the fall semester of 2006 ($N = 71$) and the spring semester of 2007 ($N = 83$), as to the use of blogs as a supplement to traditional class-

room lectures. The students were all electronics majors with a male to female ratio greater than 5:1. All the participants had used computers and the Internet on a day-to-day basis for at least 10 years. Viewed in the cultural context, the users, similar to typical college students in Taiwan, were mostly hesitant to raise questions in classroom settings and preferred to study alone rather than sit in study groups. They also tended to consider asking questions in classrooms as an interruption to the ongoing lecture of the professor, and therefore impolite.

Setting

Students were required to create their own blogs as part of a regular face-to-face course that met once a week for 3 h. After each class meeting, participants were required to go online and write essays on ICT subjects such as IT offshoring and globalization, software business models in the third world, and the future of nonprofit computing. Two classes participated in the experiments. Class members enrolled in Electronic Commerce participated in the solitary use of blogs, and members in the Design of Internet Applications class participated in the interactive use of blogs. The former was called the ‘solitary’ group or S-group, and the latter was called the ‘interactive’ group or I-group. The graduate class was assigned to the I-group that performed interactive blogging, while the undergraduate class was assigned to the S-group that performed solitary blogging. The graduate class consisted of first-year graduates and undergraduate seniors, while the undergraduate class consisted of only undergraduate seniors. The ratio of the class size was about 1:2. Participants in the I-group were required to electively make comments or express thoughts about their peer blog postings, while participants in the S-group were not required to do so. Blog comments were intended to be student-led, and the teacher would only intervene if there were problems that students could not resolve, such as severe controversies and emotional disputes. Individuals who were willing to report abuse of the system to the lecturer used a reporting tool. In the orientation session, students received legal and ethical advice against plagiarism and language abuse, since they would be making comments in written form.

The I-group was expected to browse blog postings of their peers, and then select three of them to make

verbal comments weekly. However, students were not expected to look at the work of other students. Commenting participation was worth 1/30 of the final grade, to minimize the negative impact of being graded, and yet provide incentives for making comments. The grading was based on the quality of comments, efforts made to compose the comments, and practical contextuality. Students in the S-group could read blogs of their peers, but that was not expressly required. However, the blog system we used was able to track the viewing history for each post in terms of page views, times pages were visited, and visitor addresses. Students in the S-group were also assigned to summarize in their own blogs what they read on the blogs of others, to further ensure they read the blogs of others.

The instructor also created a blog as a central hub for the students of both groups to be able to communicate with each other. The instructor blog was for posting course materials in the curriculum, categorizing descriptions of resources, and making announcements to class members. Students of both groups were encouraged to read the instructor blog before the class met to better prepare themselves for class activities.

Platform

The blog in our study is based on the platform of Blogger at <http://www.blogger.com>, which is now a property of Google. Although it is a commercial operation, there are no mandatory advertisements that may pop up. This quiet atmosphere is one of the reasons for its selection, because we do not like to see students distracted in the middle of a lab simply because of eye-catching advertising media. The search engine along with Blogger is Google, with which most students already feel familiar. Blogger provides a set of ready-to-use templates to choose from, and allows users to make a change later on. This personalization function increases sense of ownership. Due to vandalism arising in blogs, we adopted a built-in challenge mechanism to fight with crawler-based vandal programs to filter unwanted posts and comments.

Measures and data collection

With the use of the blog as a learning environment during class, the learning engagement and social networking of students enrolled in the class were of inter-

est. Thus, at the end of each semester, a questionnaire was used to understand student attitudes for the two groups. Based on the suggestions of Hinkin (1998) regarding development measures for use in survey questionnaires, we invited education experts to participate in item generation. According to the three factors that we defined for the purpose of our study, online peer interaction, motivation to learn from peers, and academic achievements, a set of five items were designed for each individual factor. The questionnaire was poised by a score on a 5-point Likert scale, where 5 (Strongly agree) represents the maximum score of the scale, and 1 (Strongly disagree) represents the minimum score. The original questionnaire included 15 questions. For each set of data collected in the survey, we checked its factor loading individually. We kept questions with loadings 0.7 or higher to confirm that independent variables identified *a priori* are represented by a single appropriate factor. For each of the three factors, there were five questions at the beginning, but only three remained after checking factor loadings. Confirmatory factor analysis also indicated reasonable goodness-of-fit (CFI > 0.9, GFI > 0.9, NNFI > 0.9, RMSEA < 0.05). Factor loading of each remaining item showed convergent validity in the empirical data. A chi-square different test on each factor further confirmed discriminant validity of the results collected from the questionnaire. Finally, reliability analysis was used to check the dependability, consistency, and homogeneity of each item in a given factor. Cronbach's α for all factors were all higher than 0.80 for the two consecutive semesters, satisfying the general requirement of reliability for research instruments (Hatcher 1994). See Appendix for the questionnaire.

To check the difference in samples from the two groups, multivariate analysis of variance (MANOVA) was used to detect the questionnaire to probe background data, including years of computer experiences to date, daily usage of computer, and experiences in web authoring. The result of the MANOVA showed that the two groups had no statistical significance ($F = 2.03$, $P = 0.14$). Both groups were electronics majors with more than 10 years of computer experiences. Although the two groups were studying separate subjects, the two subjects were both technical in the electronics context; their instructor was the same; and the instruction format was similar.

Table 1. Coding scheme for reflection.

Dimension	Code	Interpretation	Evidence
Reflection	C	Context-free	Comments made out of the context of the original entry
	U	Nonreflective	Comments made without demonstrating perceivable reflection on the original entry
	R	Reflective	Comments made with substantial reflection

In addition to investigating student attitudes toward interactive blogging through the questionnaire, we were interested in the content of their comments. Using the same method as in Hall and Davison (2007), we performed content analysis by digging into student comments on the posts. As suggested by Oravec (2002) and Yu *et al.* (2010) in their study of educational blog, reflection is a useful indicator to the learning effectiveness of blogs. Therefore, we read the comments, classified them, and determined the percentage of comments, which could be regarded as 'reflective' in nature.

The classification was based on a coding scheme for reflection shown in Table 1. The boundary between reflection and nonreflection, as well as between relevance and irrelevance, is somewhat blurred for some comments. Some comments show no reflection at all; some comments demonstrate sufficient reflection, while others possess marginal reflection. Basic rules of good practice in coding (Fielding 2008) were adhered to. When problems or ambiguity arose, the context of the original entry was checked, and a comparison of other similar cases was made to resolve the coding issue. Two researchers conducted independent analysis on the same dataset and cross-examined the results. In the presence of any inconsistency, the individual items were retrieved for discussion and recoded by consensus of the two researchers. The degree of care enhanced the reliability of the coded output and confidence in the statistical analysis process towards research findings.

The first semester produced 242 coded comments, and the second semester produced 247 coded comments, both in the I-groups.

Findings

For each semester, we conducted an unpaired samples *t*-test to assess whether the outcomes of the two groups were statistically distinct from each other. Table 2 summarizes the results. The mean values for all the question statements in both groups were above the midrange

point (i.e. 3), which suggested that the use of blogs in both groups generally led to positive perceptions regarding levels of interaction by the use of blogs, motivation to learn from peers, and academic achievements in course subjects. The *t*-test yielded statistically significant results for items 1–3 regarding H1 (Fall 2006: $t = 2.503$, $P = 0.015$; Spring 2007: $t = 2.634$, $P = 0.010$), and items 7–9 regarding H3 (Fall 2006: $t = 3.807$, $P < 0.001$; Spring 2007: $t = 3.717$, $P < 0.001$). The means for items related to H1 and H3 were higher in the interactive use of blogs than in the solitary use. These combined results provide general support for hypotheses H1 and H3. The *t*-test yielded statistically insignificant results for items 4–6 in connection with H2 (Fall 2006: $t = -0.466$, $P = 0.643$; Spring 2007: $t = -0.458$, $P = 0.648$). Therefore, the statistical analysis does not support hypothesis H2. The statistical agreement of the two data sets from fall 2006 to spring 2007, evidenced reliability and consistency with regard to the three hypotheses tested. Table 3 summarizes the results in connection with the hypotheses.

This study suggests that the interactive use of blogs in higher education, when compared with the option of using blogs in isolation, was associated with more positive attitudes towards online peer interaction among learners by at least 9% (which was found to be statistically significant), and academic achievements in course subjects by at least 13% (which was found to be statistically significant). However, interactive use of blogging was not associated with significantly more motivation to learn from peers than solitary use of blogging – even though, as indicated by the results in connection with items 4–6 in Table 2, students of both groups showed above the midrange point (i.e. 3) motivation to learn from peers (with mean values of 4.17 and 4.26 in the first semester; 4.15 and 4.22 in the second semester, respectively, on a scale of 1 to 5), regardless of the individual groups they belonged to.

Suggested by question no. 9 on the questionnaire, it is interesting that students improved their academic per-

Fall 2006	I-group (N = 23)		S-group (N = 48)		t-value	Cronbach's α
	Mean	SD	Mean	SD		
1-3	4.437	0.496	4.105	0.720	2.503*	0.945
	4.465	0.483	4.021	0.681		
	4.225	0.531	3.862	0.598		
4-6	4.070	0.604	4.181	0.740	-0.466	0.936
	4.324	0.689	4.453	0.776		
	4.282	0.781	4.393	0.817		
7-9	4.545	0.366	4.211	0.747	3.807**	0.823
	4.577	0.339	4.020	0.651		
	4.453	0.320	3.798	0.648		

Spring 2007	I-group (N = 25)		S-group (N = 58)		t-value	Cronbach's α
	Mean	SD	Mean	SD		
1-3	4.370	0.395	3.932	0.559	2.634*	0.892
	4.481	0.401	4.019	0.690		
	4.534	0.443	4.126	0.723		
4-6	4.222	0.709	4.331	0.811	-0.458	0.921
	4.144	0.624	4.103	0.717		
	4.129	0.630	4.212	0.767		
7-9	4.661	0.442	3.959	0.787	3.717**	0.824
	4.502	0.339	3.872	0.654		
	4.474	0.287	3.744	0.640		

Table 2. *t*-Test results of I-group and S-group in two consecutive semesters.

Notes: I-group = interactive group; S-group = solitary group.
* $P < 0.05$; ** $P < 0.01$.

formance though the use of blogs. At the end of the first semester grading, we examined student academic achievements and perceived attitudes towards blogs in educational settings. The academic achievements were divided into five groups (A, B, C, D, and F) according to the grades students received, where F stood for the failing grade. Table 4 summarizes the results.

A chi-square test for independence evaluates statistically significant differences between proportions for five groups in the data set of Table 4. Based on the data analysis, the academic performance positively relates

with perceived attitudes towards blogs ($\chi^2 = 9.57$, d.f. = 4, $P = 0.048$; Fisher's exact test $P = 0.047$). This yields a statistically significant difference in student academic achievement versus perceived attitudes towards educational blogs.

Discussions and implications

Both groups showed remarkable motivation to learn from peers through blogs. The data did not confirm that making blogs available to students in a hybrid-learning

Table 3. Summary of the results in connection with hypotheses.

Hypotheses	Results
H1: Use of the comments feature in blogs is associated with positive attitudes towards online peer interaction.	Supported
H2: Use of the comments feature in blogs is associated with significantly more motivation to learn from peers than use of the comments feature is disabled.	Not supported
H3: Use of the comments feature in blogs is associated with positive attitudes towards academic achievements in the course subjects.	Supported

Table 4. Level of academic achievements versus perceived attitudes towards educational blogs.

Achievement	Like blogs (%)	Do not like blogs/neutral (%)	No. of students (%)
A	4 (5.63%)	0 (0.00%)	4 (5.63%)
B	12 (16.90%)	6 (8.45%)	18 (25.35%)
C	19 (26.76%)	15 (21.13%)	34 (47.89%)
D	5 (7.04%)	6 (8.45%)	11 (15.49%)
F	0 (0.00%)	4 (5.63%)	4 (5.63%)
Total	40 (56.34%)	31 (43.66%)	71 (100%)

Notes: Question no. 9 on the questionnaire is poised by a score on a 5-point Likert scale with anchors 5 (Strongly agree) to 1 (Strongly disagree). Like blogs = 4, 5; neutral = 3; do not like blogs = 1, 2.

environment, using the comments feature in blogs, was associated with significantly more motivation to learn from peers. However, the data suggested that dialogues in the form of blog comments were associated with positive attitudes towards academic achievements in course subjects and online peer interaction, compared with no such engagement.

Critical reflection not only imparts meaning to what has been described, but also adds depth and breadth to the meanings by asking questions about, and relating meanings to, a spectrum of learning issues. In our study, we found that 61% of the comments were reflective. Based on content analysis, Chang and Chang (in press) reported that reflective comments in their hybrid-learning environments for electronics majors ranged from 34% to 79%, depending on classes. Yang (2009) reported that 375 of 977 blog postings, i.e. 38%, were reflective by 43 English as a foreign language student teachers in a practice community during the fall semester of 2005.

The findings also suggest that dialoguing by making comments reinforced the interaction atmosphere. Some students responded more to other student comments. We observed threaded discussions that typically involved multiple users replying to particular postings within a topic thread. Although blog postings without comments do not necessarily mean they were unread, comments are a trace for blog authors to recognize that they have gotten their messages across to those who already made comments and perhaps to many more who only read. Therefore, comments seem to help foster online peer discussion, enhance interaction, and sharing culture.

We observed that a significant number of students made clever efforts to decorate their blogs to look more personal and stylish. These we viewed as signs to

engage in online interaction with peers. Some students even selected special fonts to distinguish their blogs from others. From a teacher's point of view, we felt students had been motivated to pay more attention to online work on their blogs than to 'offline work' that was only to be graded by instructors. One significant factor that made the difference is the peer who can view the work of others quite easily online, but can hardly do so in an offline environment.

The study results reported for student attitudes towards peer interaction, learning motivation, and academic achievements are limited for several reasons. In the future, we will extend our study in five major directions to address some limitations of the current study. First, the learning context was narrowly defined, focusing on learning a technical, procedure-based subject, namely, Electronic Commerce and Design of Internet Applications. A plan that includes investigations of blog use in other disciplines such as Business Administration and Women's Studies would be more comprehensive. Second, blogging acted as a supplement to a traditional face-to-face course, both inside and outside of school. The value of the blog for reflective learning and peer support in distance learning settings should be investigated in a separate study. Third, although student attitudes towards peer interaction, learning motivation, and academic achievements have been investigated, in-depth content analysis with more dimensions (such as subjective perceptions of reflection, stances, and tones to contrast the empirical findings) would be interesting. Fourth, the current study was designed to last for two semesters. Our future research will emphasize a longitudinal semester-by-semester study using the same methodology to indicate the overall quality of the learning experience and outcome. Fifth, this study did not

address a general concern about shared learning platforms as plagiarism. The dark side of social learning could be its openness to potential plagiarism under the disguise of peer learning. If this is a serious issue in blogs, what strategies can tackle it? The implication of using blogs to address plagiarism can be complicated and require further research.

The primary data in the study were collected between autumn 2006 and spring 2007. Since then, Web 2.0 includes several new applications that enable arbitrary subsets of users to communicate with each other. Such communication increasingly occurs, not just on Facebook, but also on several smaller network applications such as Twitter. While the blog includes a solitary mode, Twitter and Facebook are intrinsically collective and social. Research has found that college students who accessed the Facebook website of a teacher with high self-disclosure anticipated higher levels of motivation and affective learning and a more positive classroom climate (Mazer *et al.* 2007). Twitter also shows similar potential in the educational context, and can be appropriated for conversational interaction. Twitter users with similar intentions connect and collaborate with each other while seeking or sharing information (Java *et al.* 2007). Our results, combined with the prolifera-

tion of social networking software, suggest that future development of educational tools should pay more attention to social networks.

Conclusions

This paper describes a study involving undergraduate and graduate students, majoring in electronics, from a large university in Taiwan. Of those students, approximately 68% participated in solitary use of blogs as a supplement to traditional classroom lectures, and the remainder in interactive use of blogs that were designed to enhance peer learning experiences. In this study, student feedback was collected to conduct a quantitative survey study. Our main conclusion is that engaging in dialogues in the form of blog comments is associated with positive attitudes towards online peer interaction and academic achievements, and both groups show positive motivation to learn from peers.

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Appendix: Measures

Questionnaire

Variables and Items

Online peer interaction (1 – Strongly disagree; 5 – Strongly agree)

1. The use of blogs increases the frequency of interaction with my classmates.
2. The use of blogs improves my understanding of classmates' communication style.
3. With blogs, I am more willing to offer my opinion regarding how a course topic differs from other topics.

Motivation (1 – Strongly disagree; 5 – Strongly agree)

4. Learning the course materials from my classmates is interesting along with the use of blogs.
5. I am eager to check out what is new on classmates' blogs.
6. It is interesting to browse postings on classmates' blogs.

Learning effectiveness (1 – Strongly disagree; 5 – Strongly agree)

7. Blogs are an effective tool for peer learning.
8. The use of blogs improves my understanding of course materials.
9. I would recommend the course to my friends, because the use of blogs improves my academic performance.

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