

Learning with Weblogs: An Empirical Investigation

Helen S Du

Christian Wagner

Department of Information Systems
City University of Hong Kong
83 Tat Chee Avenue, Kowloon, Hong Kong
{ishelen,iscw}@cityu.edu.hk

Abstract

The study investigates the impact of weblog use on individual learning in a university environment. Weblogs are a relatively new knowledge sharing technology, which enables people to record their thoughts in diary form and publish those diaries as web pages, without programming or HTML coding. The research sought to empirically determine whether the keeping of on-going (web based) learning logs throughout a semester would result in better overall student performance. This was hypothesized, because web based learning logs appear to promote constructivist learning, provide reinforcement, and increase accountability (non-anonymous idea sharing). Results from an information systems undergraduate course with 31 students indicate that weblog performance is a significant predictor for learning outcome, while traditional coursework is not. Weblogs appear to have high predictive power for high and low performing students, but much less predictive value for medium performers. Results also suggest that there is a learning effect for weblog authoring.

Keywords: *Weblog; Learning log; Constructivism; IT-supported learning.*

1. Introduction

Universities are facing increased pressures to demonstrate the effectiveness of their educational efforts. It is not sufficient anymore that course curricula are covering the right topics and students pass their courses. Instead, educators need to demonstrate that assessment and learning are aligned (“assessment for learning”), and that students have a more active role in the learning process (“student centered learning”). These ideas are certainly not new [10], but nevertheless not easily adopted [11]. After all, many “learners” appear to address the learning challenge “transactional”, with very targeted learning activities to master individual assignments, followed by rush learning (“cramming”) for the exam, together with reliance on instructors to provide all relevant learning materials. Unfortunately, this approach

appears to minimize continuity in the knowledge acquisition process, reduces reinforcement, and therefore reduces the lasting effect of learning. It therefore also contradicts Kimble’s [16] widely adopted definition of learning, as a lasting change in the potential to behave, brought about by practice and experience. Similarly, instructors who are predominantly worried about “covering the syllabus” (subject oriented learning), and “maintaining control” (teacher oriented learning) can also contribute to the lack of a lasting learning impact [11].

One approach to mitigate this situation is the use of learning logs, with which students document their learning experience and comprehension alongside their studies [3, 31]. Learning logs were traditionally kept in paper-based form, and shared only between student and instructor. The emergence of web based logs (“weblogs”), has the potential, however, to enhance the effectiveness of learning logs. Weblogs are designed to allow simple and fast creation of web content without much technical knowledge. In a learning environment, weblogs enable students to easily maintain online learning logs to report their learning activities in a reverse chronological order, and to link to ideas of others. Weblog popularity has surged over the last few years and, according to Blogcount (www.blogcount.com, June 2003), reached between 2.4 and 2.9 million active weblogs in 2003. Over 60% of these weblogs are hosted by three primary hosting sites, which provide the necessary software and hosting.

Despite the dramatic increase in weblog popularity, the adoption rate is still small [30], estimated at about 2% (Blogcount.com, July 2003). In the higher education sector, weblog adoption has been slow as well. For example, two leading course management software products (WebCT and Blackboard) are not including this technology. Consequently, reports by lead users of the technology have been more concerned with the technology implications and with the adoption of the technology than with the measurement of its impact on learning [21, 25]. At present, therefore, much of the discussion concerning weblog effectiveness is based on anecdotal evidence, qualitative data [32], or conceptual fit with the goal of cognitive learning theory [12].

The research presented in this article is a first step to provide quantitative empirical evidence for the usefulness of weblogs as a knowledge sharing medium and a cognitive learning tool. Specifically, it seeks to determine whether weblog performance is a significant predictor of individual students' learning and thus overall course performance. The research is based on the analysis of weblogs written by 31 students during a one-semester information system course.

The remainder of this article is organized as follows. The next section discusses learning logs, both traditional and web based. Section 3 reviews research on knowledge construction and learning, and explores the potential role of weblogs in learning based on constructivism as a learning theory. Section 4 introduces our empirical study. Section 5 presents the findings, which are further discussed in Section 6. We identify some limitations in Section 7 and draw conclusions in the last section.

2. Learning logs and weblogs

What is a learning log? According to the *American Heritage Dictionary*, a log is "a regularly kept record; journal", and a journal is "a personal record of experiences and reflections; diary". People keep logs for various reasons. Learning logs are written responses to learning, where students documented their learning frequently (e.g., weekly or bi-weekly) reflecting on understanding, thoughts, and ideas about their study. Similar to other common practice, such as a personal diary, a laboratory notebook, or notes of interviews and observations for social study, etc., a learning log reveals a personal learning experience with insights and reflections. Traditionally, learning logs are paper based. They can also be kept electronically for sharing (e.g., softcopy of learning logs send via email, or keeping a log of "conversation" on a discussion board).

Following up on Baker's [3] learning log teaching technique for IS courses, whereby students document their learning experiences and learning results in a concurrent journal, Wagner [28] proposed a method for turning learning logs into "weblogs" that are published on the web any-time and any-where. Other educators have also started applying weblogs to teaching and learning [21, 25, 32], largely focusing on journalism and humanistic studies, rather than on technology or business education.

What is a weblog? The term weblog [4] refers to a personalized web page, kept by the author in reverse chronological diary form. As a "log on the web", it is kept first and foremost on the web, either on a static web page, or via a database-backed website, enabled through "blogging" software. As a "log of the web", it easily refers to other Internet locations via hyperlinks. According to Dave Winer, a "weblogging" pioneer

(www.scripting.com), weblogs have the following characteristics:

- **Personalized.** Designed to be used by a single person, expressing individual personality, (but may also be used for multi-person through collaboration).
- **Web-based.** They can be updated frequently, are easy to maintain and accessible via a web browser.
- **Automated.** Weblogging publishing tools help the author present his/her words in an attractive format, and may even syndicate them.
- **Communities-supported.** Weblogs can link to other weblogs and sites, enabling the linkage of ideas, and hence stimulating knowledge generation and sharing.

Moreover, the features of weblogs, including *archival* of past weblogs by date-posted, *hyper linking* to other webloggers, *instant publishing* of web content with little technical skill required, and ways for others to *comment/feedback*, provide new opportunities for people to present and express themselves online. Hence, individuals and groups communicate in a way that is simpler and easier to follow than emails or discussion forums (www.blogger.com). Huffaker [14] pointed out that these features of weblog further distinguish itself from other forms of computer-mediated communication.

3. Theoretical development

The key question motivating this study is whether or not keeping of a continuous weblog as a diary of learning, enhances the effectiveness of learning, and therefore leads to better learning outcomes. Constructivism as a cognitive learning theory [8, 19, 27] provides a theoretical foundation in support of this assumption, as the following subsections explain.

3.1. Constructivism

Based on the work of Bruner [8], Piaget [19], Vygotsky [27], and other educational psychologists, Leidner and Jarvenpaa provided a theoretical link between cognitive learning theory and the IS context. According to Leidner and Jarvenpaa, constructivism focuses on learning as a process of constructing knowledge by an individual [17]. Rather than being transmitted through instruction, knowledge is constructed or created by learners as they build their own cognitive structures or mental models [15]. Individuals learn better when they are forced to discover concepts themselves rather than when they are told [17]. Therefore, learning is best accomplished by engaging students in constructing knowledge through acquiring, generating, analyzing, manipulating, and structuring information [1]. The constructivist learning model shifts from instruction-focused learning to a learner-centered learning and teaching style, where the educator's role is to support

rather than to direct. This learning model implies that the curriculum should be organized in a continuous and incremental manner, where students actively engage in learning activities, allowing them to repeatedly construct new knowledge and improve their understanding by building upon prior knowledge.

One extension of the constructivist model of learning is *cognitive* constructivism, which focuses on the cognitive aspects of learning, and posits that learning is a process which develops, tests, and refines mental models, and transfers new knowledge into long-term memory [17, 23]. Hence, to improve learning, the frequency and intensity of a students' cognitive processing is crucial and needs to be stimulated [17]. According to Bovy [6] and Brunning [9], one important implication of the cognitive constructivist model is the need for individualized instructional support and prompt feedback, since learners differ in terms of their learning style and prior knowledge.

Collaborative constructivism adds another dimension to the constructivism learning theory. Extending beyond the constructivist's individualistic learning focus, the collaborative learning model emphasizes sharing and interaction [24]. Learning emerges through shared understanding, and the construction of shared understanding through interaction with others [17]. As suggested by Alavi [1] and others, collaborative activities enhance learning by allowing individuals to exercise, verify, solidify, and improve their mental models through interacting with others and sharing their thoughts, ideas, and information.

3.2. Weblog support for active learning

Keeping a "log" of learning experience, insights, and reflections is accepted by educators as an effective pedagogical practice to enhance students' learning. Maryellen Weimer [31], a recognized education researcher, in her book: "Learner-centered teaching: five key changes to practice", demonstrated how she used learning logs to encourage students' exploration of course content and association with individual experiences.

Similar to the use of traditional learning logs, the continuous application of online learning logs potentially increases students' learning involvement in a number of ways. Ferdig et al. [12] provided a conceptual overview of how weblogs fit with cognitive learning theory, and argued that weblogs are a useful medium for students to reflect and publish their thoughts and understanding. New ideas or knowledge that is unique to the individual student is created in the process of knowledge construction and meaning making. Therefore, weblogs may facilitate active learning in the following ways:

- **Active knowledge construction.** Keeping weblogs requires students to actively construct meaning and organize their thoughts. Students gain an overall

understanding through analysis and interpretation of knowledge and information.

- **Incremental improvement.** The on-going use of weblogs promotes continuous learning instead of exam-focused. Students build their own understanding and knowledge over time.
- **Self-directed learning.** "Weblogging" exercises help students identify what they have learned and the areas in which they need to improve through self-reflection.

Given the constructivist view of learning, both weblogs and the traditional learning logs enhance the lasting and incremental effect of learning by increasing students' involvement in knowledge construction and sense-making.

3.3. Weblog support for collaborative learning

Based on the collaborative constructivist model, learning is achieved more effectively through interaction and cooperation with others, than through individual work. Hawkins [13] has suggested that performance-based assessment should be used to track student development; and that students need to learn cooperatively. Several studies have shown that collaborative learning results in better learning outcomes, compared with individual-oriented learning [2, 20, 33]. Weblogs, with their collaboration-supporting features, such as hyper linking, web publishing, and instant feedback, can be a convenient and effective medium for sustained, specific, informal, and comparative "conversation" among students. Communities can also offer a more interesting learning environment, as students learn from the ideas of others and may also feel some competition. According to Wagner et al. [29], weblogs as a relatively new knowledge sharing technology create a useful medium for knowledge sharing and interaction at web speed. Moreover, weblogs provide opportunities for diverse perspectives, and enrich the student's learning experience [12].

Better than the traditional learning logs, online weblogs offer students the opportunity to actively participate in collaborative learning in a number of ways:

- **Knowledge sharing.** Students can easily post their thoughts, ideas, and opinions, and interact with other students right from the start of the exercise.
- **Collaboration and group work.** Students have the opportunity to comment/respond, and possibly write a log jointly as a group.

Given the collaborative constructivist view of learning, weblogs enhance learning by serving as a convenient "conversational" medium for students to interact and share their learning experience.

3.4. Weblogs reinforce individual accountability

Consistent with the cognitive constructivist view of learning, weblogs should support personalized learning processes. In addition, weblogs should also enhance learning by reinforcing both collaboration and individual accountability in the following ways:

- **Non-anonymity.** Students take ownership of their individual weblogs and publish the logs with their authenticated identity. Published weblogs are immediately visible to the online community, and authors are known to all weblog visitors. Authors are aware of this. Since each student is responsible for his or her own “log” keeping, and assessment is graded based on individual output, the weblog’s personal nature avoids *direct* “free riding” that often occurs in other forms of collaborative learning and knowledge creation [18]. Participants *directly* free ride when they contribute less than their fair share to a common good (group assignment), relying on the added effort of others and a shared grade. Furthermore, non-anonymous weblogs paired with individual evaluation, potentially counteract *indirect* free-riding, where students give a reasonable effort instead of a best effort, assuming most other students will do the same (and thus receive similar reasonable grades). The result of this indirect free-riding is a lowering of standards.
- **Individualized feedback.** Instructors’ personalized diagnosis or feedback, as well as other students’ comments or responses can also be published instantly, allowing subsequent revision, and viewing by all participants. Personalized feedback is similarly possible for traditional learning logs, but the anytime/anyplace availability of weblogs makes the evaluation more convenient. Comments and feedback can even become an integral part of the weblog (many blogging softwares offer this capability).
- **Benchmarking and self-assessment.** Students can compare their work against others, can determine the general performance level of their peers, can easily adopt good practices of others, and become more aware of bad practices through comparison and evaluation of the work of others.

Consequently, weblogs are likely to facilitate both the cognitive and collaborative constructivist goals better than paper-based learning logs. Furthermore, Briggs et al. [7] indicated that the immediacy and frequency of feedback, together with well-structured exposition, enhance the learning process. Analogous to Thorndike’s *Law of Intensity* [26], which postulates that vivid learning teaches more than routine experience, the interactive and engaging features of weblogs can make publishing and organizing people’s thoughts a more interesting task, and hence make weblog based learning more vivid.

3.5. Hypotheses

Drawing on the constructivist model of learning with its two dimensions—collaborative constructivism and cognitive constructivism—we can assume that individuals must be actively engaged in constructing or creating knowledge, and socially involved in the learning process to be effective learners. Drawing further on prior evidence from GDSS research, we can also expect that students must be individually responsible for their learning results, to avoid process losses and obtain best results. Based on these insights, we formulated the following **proposition**:

The continuous use of weblogs as online learning logs enhances the effectiveness of learning, by increasing students’ on-going involvement in knowledge construction and sense-making, by providing opportunities for students to interact and share learning experiences, and by making students individually accountable for their learning.

This broad proposition was further detailed to more specifically predict learning outcomes, based on the assumptions drawn from the above cognitive learning theory that (1) effective learning leads to better overall learning outcome, (2) learning is a continuous and incremental process, and (3) learners differ in terms of their learning style and prior knowledge. Three explicit hypotheses were formulated as follows:

H₁: Use (authoring) of weblogs leads to better overall learning outcome.

H₂: Use (authoring) of weblogs leads to continuous improvement in the learning process.

H₃: Use (authoring) of weblogs has different levels of impact on performance for different learner levels, with the best students benefiting most.

4. Empirical study

To investigate the impact of weblogs on the overall learning outcome, to explore the continuous effect of weblogs on cognitive learning, and to gain a good understanding of its impact on the performance of different learner levels, we conducted a study in a senior undergraduate elective course for information systems majors, during the 2003-2004 academic year.

4.1. Design

During the semester, all students were asked to maintain weekly online learning logs, describing their past learning, articles read, own reflections, as well as opinions on learning logs kept by other course participants. Thus, students needed to frequently revisit and revise their learning log contents, read and even comment on others’ work. The learning log exercise also

challenged students to search for materials in addition to those provided by the instructor. The student’s learning logs were kept as weblogs to allow personalized publishing, and promote sharing and comparing among students. The appendix provides an example of a student participant’s weblog.

Students used the “Blogger” software (www.blogger.com) and maintained learning logs in their own web directories. The university provided each student with space to store files, and a shared weblog directory that listed all student weblogs for easy access. Students were instructed in the use of the Blogger software during the first week of instruction. They all had experience in the development of web pages since their first year at the university, as well as programming experience in various languages. Hence, use of the weblog software was well within their capabilities.

The weblog was only one of several coursework activities students had to complete during the semester. Coursework overall counted for 65% of the final grade (24% for the weblog, 41% for other activities), while the exam counted for the remaining 35%.

4.2. Operationalization of Variables

The study considered four variables to measure learning effects: (1) BLOG, the weblog performance; (2) EXAM, final exam performance, (3) COURSE, all coursework performance other than the weblog; and (4) PERF, overall performance in the course, excluding weblog performance (Figure 1).

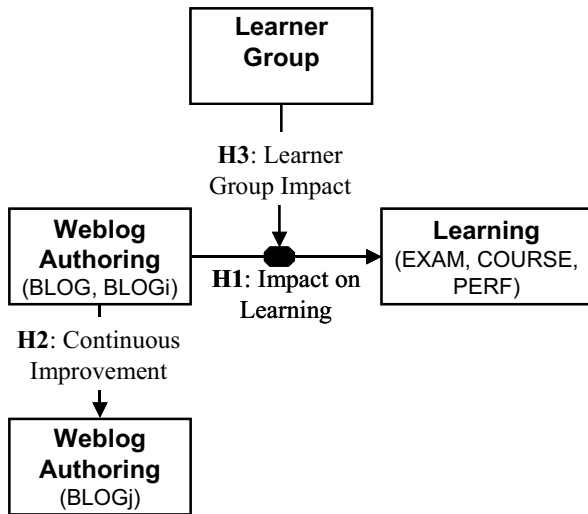


Figure 1: Research Model and Operationalization

4.3. Measurement and data collection

Students had to write 9 weblogs (“BLOG1” to “BLOG9”) during the 13-week semester, excluding the

first and last week, as well as two other weeks which coincided with other deliverables to be due. All online learning logs were graded by one instructor with considerable experience in coursework evaluation (*neither of the researchers*). Grades ranged between 4.0 and 0, with the value of 4.0 representing an “A” grade and a 0 representing a “fail”. The assessment criteria were similar to Weimar’s [31]. The 9 individual weblog grades were aggregated to a single value for the “BLOG” variable.

In addition to the two other variables directly measured during the course, namely other coursework (COURSE), and final exam (EXAM), we generated an additional variable to capture the performance of students on all deliverables other than weblog (PERF), by adding up COURSE and EXAM grades. Grades (A to F) were translated into a 100-mark scale, using a linear transformation.

5. Data analysis and results

Our principal question for this analysis was whether course-accompanying, online learning logs could serve as a significant predictor for overall course performance. Hence we sought to determine the existence of a relationship between *weblog performance* (BLOG), *exam performance* (EXAM), and *overall course performance excluding weblog* (PERF). We also sought to compare this finding to the potential relationship between *coursework other than weblog* (COURSE) and exam performance, to determine whether weblogs are a better indicator than traditional coursework such as class participation and written assignments.

5.1 BLOG as a predictor of performance (H₁)

To determine the relationship between weblog results (BLOG) against exam results (EXAM), coursework excluding weblog (COURSE), and overall course performance excluding weblog (PERF), we carried out a series of regression analyses¹. The results are summarized in Table 1.

Table 1. Predictive value of BLOG and COURSE

Dependent variable \ Predictor	EXAM		PERF		COURSE		BLOG	
	R ²	P-value	R ²	P-value	R ²	P-value	R ²	P-value
BLOG	.168*	.022	.222**	.007	.072	.144		
COURSE	.007	.649	---	---			.072	.144

*. Regression is significant at the 0.05 level.

**.. Regression is significant at the 0.01 level.

¹ The impact of COURSE on PERF was not analyzed since PERF was created by combining COURSE and EXAM values, and therefore correlated “by design”.

According to the results shown in Table 1, BLOG is a significant predictor of exam variance ($p = 0.022$), and of overall course performance ($p = 0.007$). In other words, students who perform well on their weblogs will also generally demonstrate better exam performance, and overall course performance. BLOG was able to account for 16.8% of exam performance variance, and for 22.2% of overall course performance variance (excluding weblog performance).

In contrast, performance on coursework other than the weblog, i.e., class participation and written assignment, was NOT a significant predictor of exam performance ($p = 0.649$). This does not mean coursework *cannot* be a good predictor, but demonstrates that it cannot be automatically assumed to be a good predictor. This result suggests that weblog performance and other coursework performance did not have a common cause, and may serve as independent measures of overall course performance.

5.2. Weblog performance detail

5.2.1. Performance over time (H₂). To gain more insight into the continuous effect of weblog facilitated learning, we also tested the relationships between the weekly weblog performance using bivariate Correlations. As might be expected, weekly weblog results typically correlated with each other on a week-to-week basis (see diagonal in Table 2). This indicates a continuous effect of weblog learning as an on-going process of knowledge construction and cumulative learning. Table 2 also shows that correlations increased as students gained experience, growing from about 0.3 ... 0.4 (BLOG1 to BLOG 4) to about 0.6 ... 0.75 for later weblogs, with the exception of BLOG8. This suggests an experimentation and learning phase for the writing of online diaries during the first several weeks. Anecdotal evidence suggests that students had little difficulty in handling the technology, but were not used to writing an online diary whose inputs they were (relatively) free to determine.

Table 2. Correlation matrix of weekly weblog performance

	BLOG1	BLOG2	BLOG3	BLOG4	BLOG5	BLOG6	BLOG7	BLOG8	BLOG9
BLOG1 Coefficient									
P-value									
BLOG2 Coefficient	.382*								
P-value	.034								
BLOG3 Coefficient	.189	.336							
P-value	.308	.064							
BLOG4 Coefficient	.473**	.537**	.294						
P-value	.007	.002	.108						
BLOG5 Coefficient	.406*	.531**	.244	.684**					
P-value	.024	.002	.187	.000					
BLOG6 Coefficient	.560**	.567**	.297	.862**	.693**				
P-value	.001	.001	.111	.000	.000				
BLOG7 Coefficient	.404*	.540**	.587**	.667**	.604**	.657**			
P-value	.024	.002	.001	.000	.000	.000			
BLOG8 Coefficient	.346	.411*	.255	.611**	.663**	.653**	.468**		
P-value	.057	.022	.167	.000	.000	.000	.008		
BLOG9 Coefficient	.454*	.359*	.435*	.579**	.565**	.733**	.637**	.748**	
P-value	.010	.047	.014	.001	.001	.000	.000	.000	

*. Correlation at the 0.05 level.

**. Correlation is significant at the 0.01 level.

5.2.2. Weblog performance differences (H₃). We further analyzed the weblog data to determine any differences between different performance groups, i.e., students who performed highly, average, or low on their weblog exercises. Results of the analysis are summarized in Table 3.

Table 3 suggests that the students who perform well in their weblogs are also more likely to perform well in other

aspects of the course, and thus will demonstrate high results overall. The same relationship holds for students with low BLOG performance, although with a slightly weaker R^2 ($R^2 = 0.162$ for EXAM and $R^2 = 0.243$ for PERF for high performers versus $R^2 = 0.155$ for EXAM and $R^2 = 0.190$ for PERF for low performers). Interestingly, for “medium performers” (the middle third

in the course), result of the BLOG is not a meaningful predictor of either exam or overall course performance.

Table 3. Learner Group Comparison

Dependent variable Predictor	EXAM		PERF	
	R ²	P-value	R ²	P-value
HIGH BLOG	.162*	.025	.243**	.005
MEDIUM BLOG	.000	.962	.003	.766
LOW BLOG	.155*	.028	.190*	.014

*. Regression is significant at the 0.05 level.

**. Regression is significant at the 0.01 level.

6. Discussion and Implications

The results of our study confirmed our hypotheses, and indicated that a web based learning log can be a predictor of learning performance, and possibly a better predictor than traditional coursework measures.

Learner-centered environment. Weblogs let students become more active outside the classroom including activities such as review of course materials, explication of knowledge, and seeking of outside sources. Students appeared to need a few weeks to become accustomed to this practice.

Benchmarking and self-assessment. Weblogs are public, and hence all course participants can benchmark their work against that of others. It is noteworthy that instructor and student judgment of weblogs was highly consistent. After the first week, student teams were asked to rank the top 5 weblogs. Their assessment for the best weblog was the same as the instructors, and further, the six weblogs that received the most student votes were also the six weblogs rated highest by the instructor (although rankings were slightly different).

Average performers. Weblog performance was the least indicative of overall performance for average webloggers. This is a finding that will clearly require further analysis in the future. It appears that a number of students are “satisficers”, trying to achieve good enough scores in their course work, so as to allow them to lower their efforts for the exam and still pass the course overall. Hence, better course work would result in poorer exam scores, and vice versa (for students with less good course work), always leading to an averaging out of the two components. The authors’ department recently instituted new policies that require students to pass both course work and exam, so as to limit this behavior. Without corroborating empirical data, however, the presence of satisfying behavior is only anecdotal.

Differences in performance over time. Students did not perform uniformly over time. The first three weblogs appeared to be a learning period where students learned to master the process of learning log writing. This is not a

technology issue, but a process of learning to present knowledge, to get accustomed to a process that requires individual initiative, and a process of learning from best practices of others. Furthermore, there were some performance fluctuations over the last few weeks (see Table 2, BLOG8 posted in week 11). One reasonable explanation was that course participants during the last few weeks of the semester had many competing assignments and thus, some of them may have compromised on their weblog entries.

7. Limitations

The number of course participants evaluated here was relatively small, only 31 students. Future research with more participants will hopefully lead to even more robust results.

Control treatment. The study did not employ any control treatment. For example, we could have used other forms of learning logs (e.g., paper based, or electronic but not shared) to determine the impact of the different characteristics of the treatment. We could have also varied the other coursework activities so as to measure the predictive ability of other types of coursework. We did neither, so as to avoid any expectation of “experimentation” among course participants. The goal was to provide students with the best possible learning treatment congruent with the course objective, while also measuring the impact of the treatment. Furthermore, we were not able to compare students’ learning outcome with versus without the adoption of weblogs. Future studies may include a control group (e.g., another session of the course taught by the same instructor, but without the implementation of weblogs), and compare the two groups of students learning outcome.

Single rater. Weblog and course performance was determined by a single rater. However, the rater was an experienced instructor. In addition, instructor and students were consistent in their weblog assessments.

Variable operationalization. Assignment scores and exam grades are single-dimensional scores for complex constructs such as knowledge construction or learning. Future research may incorporate measures that are more directly identifiable, for instance social knowledge construction (e.g., frequency of references to the work of others).

8. Summary and Conclusion

Although the principles of active and student centred learning have been recognized for decades, their application in the classroom has remained limited. Advances in IT-based knowledge acquisition and collaboration tools are now providing an opportunity to move beyond traditional learning. New technologies

enable new modes of learning and facilitate knowledge construction. One such technology is the weblog. Weblogs enhance the traditional learning log, which facilitates cognitive constructivism, with collaborative elements, which facilitate social constructivism. Weblogs furthermore allow students to express themselves creatively, to be visible (Google heavily spiders web engines, especially its own Blogger), and be accountable, thus combating free-riding.

As a performance predictor, weblogs appear to be more appropriate than traditional course work. Capturing breadth and depth of topic coverage, and requiring students to place their work under public scrutiny appears to better prepare them for a comprehensive final exam and overall course performance. We cannot at this time determine whether weblogs motivate (and therefore causally affect) comprehensive learning, or whether they are simply an effective measure of comprehensive learning. In fact, “constructive alignment” seeks to achieve both, namely measurement of learning and measurement for learning [5].

Much needs to be done. Course software companies will need to include blogging software into their suites, ideally with some diagnostic tools (e.g., to count and check hyperlinks or check for duplication of content). Also, additional empirical research will be needed to identify the best methods to use weblogs, such as best frequency of required weblog updates, or peer involvement. So far, research appears to have focused either on the technology (and how to operate it), or has provided only qualitative, anecdotal accounts of weblog use and its impact. Finally, and most importantly, both instructors and students will need to embrace this new form of learning, instead of using weblogs to perpetuate instructor or subject centered learning.

9. Acknowledgement

This research was supported in part by *City University of Hong Kong* grants No. 6980028 and 9030992. We thank Ms. Rachael Ip for her contribution in evaluating the weblogs.

10. References

- [1] Alavi, M. (1994). Computer-mediated collaborative learning: An empirical evaluation. *MIS Quarterly*, 18(2), 159-174.
- [2] Alavi, M., Wheeler, B.C., Valacich, J.S. (1995). Using IT to reengineer business education: An exploratory investigation of collaborative telelearning. *MIS Quarterly*, 19(3), 293-312.
- [3] Baker, J.H. (2003). The learning log. *Journal of Information Systems Education*, 14(1), 11-13.
- [4] Barger, J. (1997). Weblog resources FAQ, *Robot Wisdom Weblog*, Available at <http://www.robotwisdom.com/weblogs>.
- [5] Biggs, J. (1999). *Teaching for quality learning at university: what the student does*. Buckingham: Society for Research into Higher Education & Open University Press.
- [6] Bovy, R.C. (1981). Successful instructional methods: A cognitive information processing approach. *ECTJ*, 29(4), 203-217.
- [7] Briggs, R.O., Ramesh, V., Basu, K. and Carlisle, J.P. (1992). Exemplar: improving the college classroom with group support technology. Proceedings of the 13th International Conference on Information Systems.
- [8] Bruner, J. (1960). *The process of education*. Cambridge, MA: Harvard University Press.
- [9] Brunning, I.L. (1983). An information processing approach to a theory of instruction. *ECTJ*, 31(2), 91-101.
- [10] Clasen, R. E. and Bowman, W. E. (1974). Toward a student-centered learning focus inventory for junior high and middle school teachers. *Journal of Educational Research*, 68(1), 9-11.
- [11] Felder, R. M. and Brent, R. (1996). Navigating the bumpy road to student-centered instruction. *College Teaching*, 44(2), 43-47.
- [12] Ferdig, R.E. and Trammell, K.D. (2004). Content delivery in the 'Blogsphere'. *T:H:E Online Journal*, February. Available at <http://www.thejournal.com/magazine/vault/articleprintversion.cfm?aid=4677> (verified on June 9, 2004).
- [13] Hawkins, J. (1993). Technology and the organization of schooling. *Communications of the ACM*, 36(5), 30-35.
- [14] Huffaker, D. (2004). The educated blogger: Using weblogs to promote literacy in the classroom. *First Monday*, 9(6). Available at http://firstmonday.org/issues/issue9_6/huffaker/index.html (verified on June 9, 2004).
- [15] Jonassen, D.H. (1993). Thinking Technology, *Educational Technology*, 35-37.
- [16] Kimble, G.A. (1961). *Hilgard and Marquis' Conditioning and Learning*. New York: Appleton-Century-Crofts.
- [17] Leidner, D., and Jarvenpaa, S. (1995). The use of information technology to enhance management school education: a theoretical view. *MIS Quarterly*, 19(3), 265-291.
- [18] Nunamker, J. F., Dennis, A.R., Valacich, J.S., Volgel, D.R. and George, J.F. (1991). Electronic meeting systems to support group work, *Communication of the ACM*, 34(7), 40-60.
- [19] Piaget, J. (1928). *Judgment and reasoning in the child*. London: Routledge & Kegan Paul.
- [20] Piccoli, G, Ahmad, R. and Ives, B. (2001). Web-based virtual learning environments: a research framework and a preliminary assessment of effectiveness in basic IT skills training. *MIS Quarterly*, 25(4), 401-426.
- [21] Reagin, W.J. (2004). Theoretical and practical applications of emergent technology in ELT classrooms; How the ‘Blog’ can change English Language Teaching. *Proceedings of the Fourth International Symposium on ELT in China*. Available at <http://earth.prohosting.com/wjregain/eltblogs.htm> (verified on June 9, 2004).
- [22] Schein, E.H. (1992). The role of the CEO in the management of change: the case of information technology, in

Transforming Organizations, T.A. Kochen and M. Useen (eds.), 80-95, New York: Oxford University Press.

[23] Shuell, T.J. (1986). Cognitive conceptions of learning, *Review of Educational Research*, 411-436.

[24] Slavin, R.E. (1990). *Cooperative learning: theory, research, and practice*. Englewood Cliffs: Prentice Hall.

[25] Stanley, G., (2004). Introducing your students to Blogs. *IATEFL Issues*, April – May, 178.

[26] Thorndike, E.L. (1932). *Fundamentals of learning*. Teacher College, Columbia University, New York.

[27] Vygotsky, L. (1978). *Mind in society*. Cambridge, Mass: Harvard University Press.

[28] Wagner, C. (2003). Put another (B)log on the wire: publishing learning logs as weblogs. *Journal of Information Systems Education*, 14(2), 131-132.

[29] Wagner, C. and Bolloju, N. (2004). Knowledge management at webspeed with conversational technologies: discussion forums, weblogs, and wikis. *Working paper*.


[30] Weidlich, T. (2003). The corporate blog is catching on. *New York Times*, June 22.

[31] Weimer, M. (2002). *Learner-centered teaching: five key changes to practice*. San Francisco: Jossey-Bass.

[32] Wiltse, E.M. (2004). Blog, Blog, Blog: Experiences with web logs in journalism classes. *International Symposium on Online Journalism*. Available at <http://journalism.utexas.edu/onlinejournalism/blogs.pdf>

[33] Wu, D., Bieber, M., Hiltz, S. R. and Han, H. (2004). Constructivist learning with participatory examinations. *Proceedings of the 37th Hawaii International Conference on System Sciences*.

Appendix: Excerpt from Karine's Weblog



Learning from reading:

As globalization is now a common trend over the world, a lot of companies and businesses are expanding their global reach and preparing for |going global|. As a result, the transnational organizational model is widely adopted in a lot of multinational enterprise. Transnational enterprise may be contrasted with companies using global, multinational or international strategies:

- ◆ Companies using global strategy will have their headquarters in one country while its operations are performed in one or more other countries. Efficiency would be the key competitiveness issue.
- ◆ Companies using multinational strategy will have their national or regional operations to be autonomous and decentralized to increase the sensitivity to local market. Responsiveness would be the key competitiveness issue.
- ◆ Companies using international strategy will establish strategic linkages between countries and compete on a worldwide basis against other international companies. Learning would be the key competitiveness issue.
- ◆ Companies adapting transnational strategy, each organizational activity are performed in a location where it can be best accomplished. It requires the combination of global efficiency and local responsiveness and learning.

Obviously, the transnational enterprise strategy helps companies to increase their global competitiveness; however, the primary difficulty is to design an organizational form which is capable of being efficient and responsive and also enables the transfer of knowledge over locations. In order to tackle this difficulty, adopting a virtual organization design would be the best. It is because the three characteristics of virtual organization could help enhancing global competitiveness. The central feature of virtual organizations is their dependencies on a federation of alliances and partnerships with other organization. The seamless integration of local production, service and worldwide customer support could help increase the efficiency. Spatial and temporal dispersion is another feature. IT allows the virtual organization to be locally responsive yet centrally co-coordinated so that it could provide the sensitivity that global markets required. The last feature, flexibility, is an important asset for transnational companies because opportunities in global markets are constantly shifting.