

Learning by Blogging: Warm-Up and Review Lessons to Facilitate Knowledge Building in Classrooms

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Abstract: In a knowledge-building classroom, students and their teacher make a collective inquiry into each topic of the course. All students in the class aim to discover knowledge and create further knowledge. However, efficient discussion is hard to initiate in a knowledge-building classroom where the teacher is not aware of the background knowledge of students, or the students have not prepared for deep dialogue. The portfolios of building personal knowledge are not systematically accumulated for further extension. This study proposes a new strategy to enhance the performance of a knowledge-building classroom. By blogging the warm-up of a lesson before class, students are prepared for discussion. The teacher can preview the students' blogs to prepare the discussion, thus enhancing the performance of knowledge-building activities. This article presents the design of the learning strategy and the blog system, and discusses the results of a preliminary experiment.

Keywords: Learning by Blogging, Knowledge Building

Introduction

In a knowledge-building classroom, students set their own goals and collaboratively pursue them with their teachers. Students openly share what they have not understood, and work to advance the collective knowledge of their class (Scardamalia & Bereiter, 1994). Each member of the class is expected to contribute to the advancement of their collective understanding, motivating the students to participate actively in the learning activities. However, students in a university classroom have diverse educational backgrounds and different understandings of the same discipline. A teacher has difficulty in mastering a diversified discussion with no comparatively equal cognition about the discussion issues. While some students are inspired to contribute their comments actively, other students cannot catch what the teacher is discussing, and gradually reduce their willingness to participate the knowledge-building activities.

This study asserts that students can be motivated and actively participate in the knowledge-building activities if the teacher can accurately guide the students to identify their current knowledge, and then to evolve or to integrate it into new knowledge. The instructional strategy of *Learning by Blogging* prepares students and teachers for classroom activities, especially the knowledge building, to extend learning after class, and to accumulate knowledge that have learned in the course of learning activities. The teacher know how to organize learning activities to motivate students easily, since most students have initially read the materials, and the teacher can appropriately manage the knowledge-building activities according to students' previous knowledge.

1. Obstacles in performing knowledge-building activities

The success of using knowledge building theory in classroom heavily depends on the teacher's guidance. The instructors should provide an opportunity for learners to integrate previous knowledge with the new knowledge obtained from current lessons (Duffy & Jonassen, 1992; Tobin & Tippins, 1993). Learners engaged in knowledge-building activities should have a deep

understanding of what they are trying to learn, and why (Scardamalia, 2002) However, most teachers encounter difficulties in initiating a knowledge-building activity about a specific topic when they do not know what students know already and the misconception about the topic. For instance, the teacher in a class teaching ‘Algorithms’ may be in a predicament in discussing the topic ‘algorithm analysis’ when s/he does not know whether the students have had the basic concepts and skills of algebra and mathematical induction. Teachers’ estimations of students’ background knowledge may be too high or too low for guiding them to contribute their ideas. Perhaps only a few students have much confidence to participate in discussion, while other students keep quiet to avoid embarrassment.

According to the cognitive load theory (Sweller, 1988), the limited capacity of working memory must be effectively employed in constructing cognitive schemas and storing them into long-term memory. Through extensive practices, cognitive schemas become automated with minimal working memory (Sweller, Van Merriënboer, & Paas, 1998). Therefore, the instructional design should provide opportunities for students in organizing what they have learned and, at personal pace, digesting the knowledge that have not changed into automatic processing stage. The employment of technology in knowledge-building activities also needs to take account of the support for each student accumulating portfolios in building personal knowledge.

2. Learning by blogging

This study presents a blog-based learning tool, called *Learning Blogs*, which can be adopted by students to summarize the materials and ask questions after the warm-up, and review a lesson after class. Teachers can efficiently organize the knowledge-building activities after reading students’ blogs and provide an appropriate guidance for students thinking about the discussion issues according to the misconceptions and questions the students posted in the *Learning Blogs*. Students can revise or answer the previous entries for warm-up on the blog after class in order to clarify and refine their knowledge. In contrast to Knowledge Forum (Scardamalia, 2004), the Learning Blogs can be an assistant tool for preparing knowledge-building activities. Furthermore, Learning Blogs system keeps a personal track of knowledge evolution and refinement which are more significant to individuals than collective knowledge evolution. The basic idea of *Learning by Blogging* is to prepare students and teachers for classroom activities, especially the knowledge building, to extend learning after class, and to accumulate knowledge that have learned in the course of learning activities. The instructional design is divided into three stages (See Figure 1).

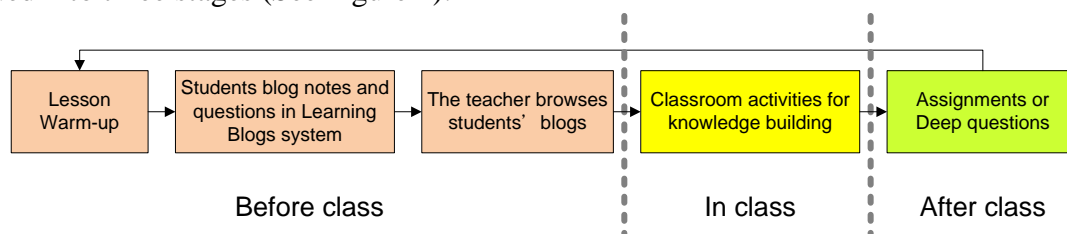


Figure 1. Cyclic procedure of *Learning by Blogging*

Before class, students are asked to warm-up the lesson, such as the reading of subject matters, and blog the notes and questions in the *Learning Blogs* system. Then, the teachers can browse the articles posted by students in the blogs or charge the teaching assistant with this job by abstracting the students’ prior knowledge, misconception, and questions. In class, teachers are well aware of organizing the classroom activities for knowledge building because the possible interaction and reflection of students will be carefully considered and predicted in the plans of knowledge-building activities. After class, students can compare what s/he has learned in the class with what s/he has blogged before the class, and then reflect, revise, or refine them in the

blogs. Also, teachers can give an assignment or deep questions for further practices or the inspiration of the forthcoming lessons. The three stages then can form a cyclic procedure to be adopted around each lesson or learning issue.

The first version of *Learning Blogs* (URL: <http://myweb1.just.edu.tw/~yrjuang/lblog/>, using guest/guest to logon old version for test) has the following major functions :

- Browse your articles: Each member can browse and adjust their own articles and the responses to them, but cannot delete them, since this would also delete the responses.
- Post new article: This version only allows users to post text-based articles, but accepts html-based codes.
- Browse other blogs: Each member can browse articles written by other users, including the members who are taking other courses, and response to those articles.
- Recent articles: Since many articles are posted daily, and distributed among various blogs, this function provides a list of articles posted in the past seven days.
- Searching articles: Members can use this function to search their favorite articles by keywords.

3. Preliminary Experiment

The pedagogical strategy and the supporting system *Learning Blogs* have been experimented on the course Data Structures and Algorithms in a university. A group of 80 students participated in this experiment for 18 weeks, including a week for terminal exam. The participants, registered for the program of Information Management at the School of Further Education, had divergent education backgrounds and a large differential scale of computer literacy. Therefore, it is a big challenge for instructor to organize the subject matters and learning activities, but is a good opportunity to take an experiment on them by the proposed pedagogical strategy. This experiment was designed to answer following two questions.

1. *Can leaning by blogging help teachers efficiently manage the classroom activities for knowledge building?*
2. *Can learning by blogging help enhance the learning performance and facilitate collaborative learning among students?*

The learning content comprises nine units which instructional sequence of each learning unit is arranged in the following steps.

1. Before the first day of each learning unit, all students read the assigned materials and post articles for the summary and questions of the materials on *Learning Blogs*.
2. The instructor browses each student's blog before entering the classroom, and adjusts the discussion content for classroom activities according to the blog content. In order to reduce the instructor's burden, a clever student was chosen, in the later period of whole experiment, as a teaching assistant to help the browse and arrangement of all blogs' content related to the learning unit.
3. In the classroom, the teacher manages the discussion by adopting the adapted materials, or by directly quoting the articles posted by students in *Learning Blogs*. This step may be performed for 2 or 3 weeks, depending on the learning performance.
4. Each student posts the revision and answers for the summary and questions of previous articles in her/his own blog.

The learning achievement was evaluated by giving six quizzes, one at the end of one or two learning units.

The number of logins was 5071, with 63.4 logins for each student and 7.0 logins for each unit per student on average, according to the statistics in the database. Users posted 1196 articles and 1715 responses during the experiment. The average length of an article was 576 characters, and the average length of a response was 93 characters. The statistical results indicate that the participators actively adopted the *Learning Blogs* under this experiment.

The number of articles (127.3 on average of 9 units) and responses posted for each unit was stable for all units except units 1, 5 and 9 (see Figure 2). Since the participants were not familiar with the blog system during unit 1, and had only one week for unit 5, they posted fewer articles and responses for these units than for the other units. Furthermore, many articles were posted during unit 9. Most of them stated in the interview with the focus group that they posted more articles during that period to ask questions and share knowledge with each other for the final exam.

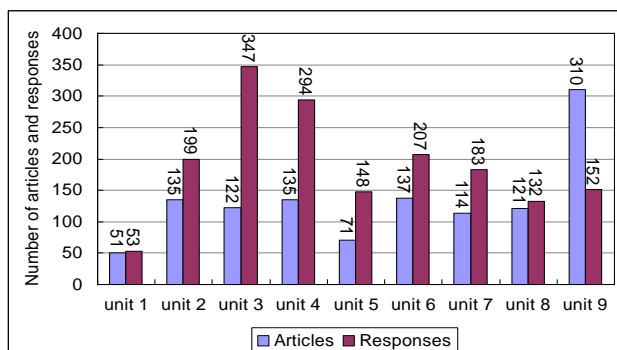


Figure 2. Numbers of articles and responses of each unit

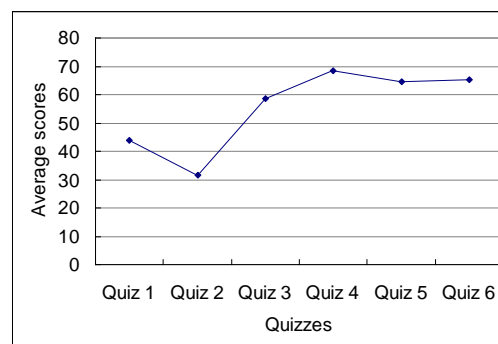


Figure 3. Average scores of the six quizzes

From the scores of the six quizzes (see Figure 3), the first two quizzes had lower average scores than the other four. The participants argued that the mathematical issues about algorithm analysis were difficult to them, so the teacher reduced the emphasis on algorithm analysis in the materials, and switched from an algorithm-oriented instructional design to a concept oriented design. Hence, the scores rose in the following four quizzes. This finding reflects that the blogs give teachers an opportunity to hear the real voices just in time, and thus adjust class content appropriately for student requirements.

Moreover, the instructor adjusted learning content and teaching methods many times to fit the demand of learning activities, so that, from the questionnaire, most students believe that the pedagogical strategy can help teachers efficiently manage the classroom activities for knowledge building (see Table 1). In contrast with other courses, most interviewees stated that they liked to attend the class that used the pedagogical strategy of learning by blogging more than other courses, although they found the need to blog caused time pressure. Some interviewees appreciated that the strategy made them properly acquire the knowledge in the classroom.

Table 1. Questionnaire results for question 1

| Questions (N=80) | Avg. |
|---|------|
| 1. The teacher understands students' learning status, and thus adjusts the knowledge-building activities. | 4.19 |
| 2. Learning by blogging can facilitate active learning in the classroom. | 3.77 |
| 3. Learning by blogging can enhance the discussion performance in the classroom. | 4.07 |
| 4. I understand what I am learning better than before. | 3.98 |
| 5. Learning by blogging can strengthen learning of the knowledge embedded in the materials. | 4.04 |

According to the questionnaire, the participants conveyed their opinions about the learning effect and learning assistance in the experience of learning by blogging (see Table 2). Questions 1-7 reflect the learning performance, while questions 8-10 reflect the facilitation of collaborative learning. Although most participants agreed that the strategy of learning by blogging can advance their learning performance, the first two questions had lower average scores than others. In the interview with the focus group, some interviewees stated that they

appreciated this new model, but were dissatisfied with the quiz scores. They felt they could not make enough progress reach scores of at least 70.

On the other hand, although the scores of the six quizzes (see Figure 4) cannot completely represent the learning performance, students can be motivated in learning and have confidence in their own abilities through making a little progress in the quizzes. Some interviewees stated that they did not pay much attention on the scores but really enjoyed in a classroom climate of concentrative and collaborative learning.

Table 2. Questionnaire results for question 2

| Questions (N=80) | Avg. |
|---|------|
| 1. The teacher's just-in-time responses to the blog articles improve the learning performance. | 3.66 |
| 2. Blogging the lesson warm-up helps students to organize their understanding of the materials. | 3.66 |
| 3. Blogging the lesson warm-up help students to discover the questions before class. | 3.79 |
| 4. Blogging the lesson review helps students to deepen their understanding of the learning content. | 3.90 |
| 5. Blogging the lesson review helps students to recall the classroom discussion. | 3.92 |
| 6. Blogging the lesson review helps students to resubmit questions that they have not understood. | 3.96 |
| 7. The Learning Blogs helps students to learn efficiently by accumulating the responses to their questions in their blogs. | 3.73 |
| 8. Learning by blogging provides students with an opportunity for collaborative learning with their classmates. | 4.01 |
| 9. Learning by blogging enables the high-achieving students to help the less well-performing classmates. | 3.71 |
| 10. The blogs can be used to find the objects for discussion by browsing the blogs of other students with the same questions. | 3.92 |

4. Concluding remark

Knowledge-building activity can advance the collective knowledge of a community. However, interactive discussion is hard to be initiated in a classroom where teachers and students are not prepared for deep dialogue. If the teachers can obtain more information about students' prior knowledge, then they can accurately manage the discussion for knowledge building. This study concludes that learning by blogging the warm-up and review of lessons can help teachers guide the classroom activities efficiently. Teachers can adjust and reorganize the content of classroom activities in response to the student warm-up blogs. Additionally, students also can accumulate their learning experiences and the knowledge acquired in their personal space. Hence, the learning performance can be enhanced, and the collaborative learning among students also improves.

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