Using a scaffolding-based blogging approach to improve IT and CS undergraduate students' disciplinary writing skills

Emergent Research Forum Paper

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Abstract

Writing has been recognized as an important skill in the technology field. To engage students in writing, we designed and experimented a scaffolding-based blogging strategy for disciplinary writing in our Information Technology (IT) and Computer Science (CS) upper-division undergraduate courses. Specifically, we scaffolded the blogging process and designed course-specific writing tasks for students to blog. Student feedback in end-of-semester survey indicated that scaffolding-based blogging approach is beneficial in improving students' writing quality and motivating students to write. Student feedback also revealed a need for more guidance regarding the process of reviewing and critiquing the work of peers. Lessons learned and suggestions for instructors wishing to incorporate blog writing into their classroom activities are discussed.

Keywords

Scaffolding, blog writing. disciplinary writing

Introduction

There is a strong need for students in the Information Technology (IT) and Computer Science (CS) programs to improve their disciplinary writing skills. IT and CS undergraduate students typically spend a lot of time studying a variety of technologies and programming languages in their upper-level courses. They are usually competent at writing programs in programming languages, creating databases, configuring networks, and designing websites. However, our past teaching experience reveals that many IT and CS students lack sufficient technical writing skills and often have difficulty in preparing written technical materials and writing user manuals. For example, they often abuse jargons or use technical terms improperly in their written reports. Due to a lack of practice in writing, we found that many IT and CS students also had difficulty expressing technology concepts properly through their written assignments.

On the other hand, writing has been recognized as an important skill in the technology field. IT and CS students and professionals often need to use technologies to solve the problem. They often need to write a report to explain what problems they encountered, what they did, and how the problems were or weren't solved. Furthermore, documentation is one of the key deliverables during each phase of the system development life cycle. IT professionals often need to create documentation, write reports and develop proposals to communicate their ideas and introduce their work to others. Poor documentation has caused many issues with the use, installation, maintenance and upgrade of computer programs, information

systems as well as websites. In short, good writing skills have been increasingly valued by IT employers nowadays. To improve IT and CS students' technical writing skills and help them succeed in future careers, we believe that IT and CS students must practice disciplinary writing on a regular basis. Disciplinary writing as an educational tool in IT and CS will help improve STEM (Science, Technology, Engineering and Mathematics) education.

Our vision: a blogging strategy

Our overall vision is to use a scaffolding-based blogging strategy to engage IT and CS upper-division undergraduate students in 300 and 400-level courses to improve their disciplinary writing skills. As IT and CS students tend to have strong interest in working with technologies, using a technology-based environment like blog can further foster their interest in writing and sustain engagement. We conducted an extensive literature review and found that the blogging strategy had been recognized as an effective and beneficial way in improving students' writing skills, enhancing learners' motivation to write, and engaging students in learning (Drexler, Dawson, & Ferdig, 2007; Quintero, 2008; Sun, 2010; Arslan & Şahin-Kızıl, 2010). As an emerging technology, blog enables students to structure their thoughts, to share their writing with peers easily and to receive feedback from peers and instructors over the Internet. Blogging also provides students with an opportunity to practice writing outside the traditional classroom setting and to become autonomous and motivated learners (Sun, 2010). Blogs enable students to share their thoughts and progress in writing on the Web with a wider audience, which could lead to higher levels of motivation for writing (Sun, 2010). So far, blogs have been successfully used in many subjects such as English (Arslan & Şahin-Kızıl, 2010), foreign language (Sun, 2010), Physics (Duda & Garrett, 2008) and Computer Science (Safran, 2008) to strengthen students' writing skills, increase their interest in course content, enhance collaboration between students, and improve their learning performance.

We performed a literature review in the information technology and computing education area and found that a few IT and CS instructors have successfully used blogs in their course teaching (Zhang & Olfman, 2010; Hsu & Lin, 2008). In particular, IT students have been asked to create technology blogs which are a major category of blogs. Technology blogs are widely used within enterprises and across organizations for collaboration, knowledge sharing, reputation management, idea development (Zhang & Olfman, 2010; Hsu) and can be important for IT and CS students to succeed in finding jobs and their future career. Technology blogs also have unique value and provide challenges to IT and CS students. Many of IT and CS courses are project-oriented, and these technology-related project activities are intrinsically complex. Thus, we believe that blogging is particularly suitable, practical and feasible as a disciplinary writing improvement method for information technology students, especially when it correlates with other formal writing assignments such as term papers. As a result, we decided to scaffold the blogging process and use the blogging approach to complement other formal writing assignments such as term papers for engaging students in writing and learning.

IT and CS students are known for their preference in working with emerging technologies (Zhang & Olfman, 2010). Since technology can have a positive impact on students' performance, attitudes and motivation (Jones, 2006; Ellison & Wu, 2008; Sun, 2010), we feel that using blogs as an approach to help IT and CS students improve writing skills would be fun, engaging and beneficial. So far, our literature review shows that few articles discuss how IT and CS programs in particular use the blogging approach systemically to improve students' disciplinary writing skills. Thus, we would like to experiment the scaffolding-based blogging strategy for disciplinary writing in our upper-division undergraduate courses first, collect student feedback and suggestions, summarize experience and then promote our blogging strategy and approaches in IT and CS programs and beyond.

Scaffolding-based blogging strategy

Scaffolding is support that helps students engage in and gain skill at tasks that are beyond their unassisted capabilities. Bruner (1978) describes scaffolding as:

> … the steps taken to reduce the degrees of freedom taken in carrying out some task so that the child can concentrate on the difficult skill she is in the process of acquiring.

Scaffolding is typically expressed in the form of a step-by-step procedure and provides students hints through a stepwise process of how to solve problems, complete a task or develop new understandings. Scaffolding can help average students transfer elements of their pre-existing knowledge structures to solve a new and different problem (Jonassen, 2003; Vygotsky, 1978). Davis et al. (1993) suggest that novices need more scaffolded instruction to construct mental models and enhance understanding. Providing sufficient scaffolding enable students to relieve cognitive resources from the task of simply solving the problem correctly and focus instead on reflecting on the problems thereby facilitating the development of deeper conceptual schema and allows learners to develop more advanced understanding (Kirschner et al., 2006).

A typical writing process consists of a few steps such as brainstorming, outline, initial draft, evaluation and final draft. Scaffolding can be used as a structured method to help teachers organize a writing activity and help students to develop skills for writing a cohesive paper. As far as scaffolding-based blogging strategy is concerned, students will use their blogs for writing assignments and get feedback to refine their writing step by step. They are expected to use blog features to post and publish their writing, use the commenting feature to provide feedback on their peers' writing, read their peer feedback, reflect on their own writing from the comments, and use the editing tool to make changes on their drafts.

A Case Study

A case study was conducted as a preliminary attempt to gather data and information on the role of scaffolding-based blogging strategy for student writing. The study sought to examine IT students' perceptions and experience regarding the implementation of blog writing. The research questions are:

- What aspects/characteristics of blogging are useful for the writing process approach?

- What are IT students' perceptions and experiences using blogs for writing tasks?

Procedure:

This case study was implemented in an IT 300 level course with 24 students. At the beginning of the course, students were asked to fill out a survey about their previous blogging experience and general perceptions about writing. Next, each student in the class was asked to set up a personal blog using either the blogging tool on blogger.com or wordpress.com. Each student needed to maintain ownership of their blogs and posted their writings on the blogs.

In terms of writing tasks, students were asked to select a technology from the following list, develop interesting research questions to explore about the selected technology, and then to write a paper.

- Data mining or text mining
- Data warehouse
- Decision support systems or Expert systems
- Social Media or Web 2.0
- Knowledge Management systems
- Supply Chain Management Systems
- Customer Relationship Management (CRM) Systems
- Business Intelligence
- Other emerging technologies (need approval from the instructor)

Students were asked to search the Web and university library's online databases to do literature review for their selected technology and to develop research questions. Their research paper needs to include background, literature review, research questions, research method, findings, issues, conclusion and future research.

To scaffold the writing process, students were asked to post their initial idea and research questions on their blog, get feedback from peers and instructor, and then post the paper outline, introduction, initial draft, final draft, and final paper in a logical sequence as listed in Figure 1. For each major step in the writing process, students were expected to get feedback from peers and also give their peers feedback too. The instructor can choose to leave feedback on their blogs as needed. After the semester was over, students were asked to fill out an online survey anonymously to share their perceptions and experiences using blogs for paper writing.
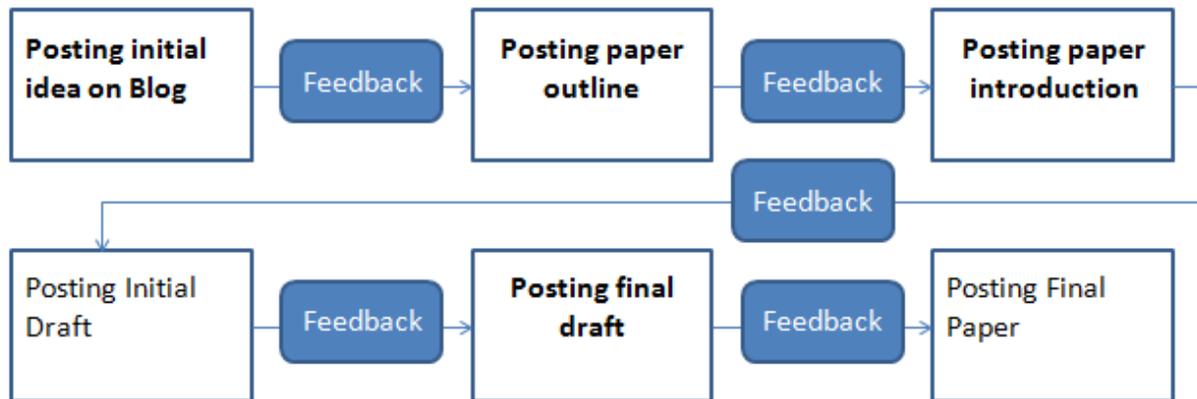
Figure 1. Scaffolding-based blogging strategy for paper writing

Results:

The end of semester survey results indicate that most students were positive with their blog writing experience and considered blogging as beneficial in improving their writing skills and motivating them to write. The majority of the students (75%) said that they enjoyed the blog writing process, found it easy to use the blog in the writing assignment and agreed that writing on the blog was an interesting learning activity. They also enjoyed reading and learning from other students' blogs. A few students indicated that they found the feedback from their classmates and instructor to be valuable for improving their paper writing. Below are some quotes of the peer feedback:

> *The paper is very informative and clear to understand. I think that there are some grammatical errors and there should be a conclusion paragraph to summarize what you talked about.*

> *The format of your paper is great as well as the information you have provided. The thing was there were many grammatical errors that should be fixed.*

> *Great use of outside sources and definition. The information is very clear. I was able to grasp the gist of your topic instantly. The only suggestion I would make is to add a bit more commentary in between your sources.*

Some students also felt that they improved their paper writing from reading other classmates' blog entries and the feedback they received. Reading other classmate's blogs allow students to monitor and compare their writing and get perspective from other students so that they can stay on the right track. Many of them expressed their interest in continuing to use blogs to write in the future in order to communicate with others. Below are some quotes from students:

> *I do like using the blog because it is simple and easy to use.*

> *While writing you tend to forget some of your thoughts but by blogging and typing the idea flows easily.*

> *Yes because it helps you get perspective from other students.*

Yes in a sense because I was able to see if I was heading in the right track or not

Yes, because it is easier to communicate.

On the other hand, there were some negative comments for using blogs for writing too. Some students felt feedback from their classmates was not so useful to improve their paper. Some students did not know how to give effective feedback and critique the work of peers. Comments as 'I like your introduction' or 'Your outline is well done' were not helpful. Some students were not motivated to engage in peer feedback since they either did not want to spend time or were not interested in some topics of the paper. A few students were not very enthusiastic about using blogs for their assignment and were not motivated to post comments for other classmates' blog entries. These students' lack of participation in the peer review process can lead to frustration of other students. A student did not like blog writing and felt uncomfortable to post writing on the blog because she feared public opinion and public criticism of her writing skills. The feedback from the peers can be confusing sometimes so that they don't know which suggestions to accept or reject. Students also had difficulty to incorporate the feedback since sometimes they got several either unclear or conflicting comments from other students. Late response was another issue in the blog writing assignment since some students tended to post their comments very late. Below are some quotes from students:

Absolutely not. I do not like my writing to be available to just anyone. If I do make a mistake it's out there for everyone to see rather than just my peer editor.

No, I do not like blogging. Had we used a private blog only our classmates could see that would have been better. I do not like people to read my writing especially those I do not know.

I wasn't too passionate about blogging.

Some students seem not that active.

This study reveals that peer review is valuable for improving writing, but students needed to be motivated and know how to provide effective peer review. Instructors need to find ways to motivate students to provide feedback and give more guidance and directions for students to learn how to give useful feedback in a timely and effective manner, how to set up blogs properly so that only people in a private group can access it, and how to analyze and incorporate the feedback they received to improve the paper writing.

Conclusion and Future Work

Writing is very important in undergraduate students' academic studies. Writing is important to help students improve higher-order thinking and enhance the understanding of the disciplinary knowledge (Smith, Campbell, & Brooker, 1999). In order to discover more effective ways to help students become better writers, faculty members have been exploring and experimenting with various instructional strategies in many curricula (Xiao & Lucking, 2008). Overall, the results of this study indicate that scaffolding-based blogging is beneficial in improving students' writing quality and motivating students to write. Blog writing also gives students an opportunity to learn from each other, and to develop themselves personally and professionally (Lave & Wenger 1991; Wenger, 1998). Student feedback revealed a need for more guidance regarding the process of blog writing including reviewing and critiquing the work of peers, and how to incorporate the feedback into the revision. In future semesters we will continue to focus on studying the effect of scaffolding-based blogging approach on writing quality, writing skill improvement and content learning with an emphasis on improving the quality of peer review and critiques.

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