

Enhancing Teaching and Learning through Content Management

Godwin Adu-Boateng

*Jackson Heart Study
Jackson State University
Jackson, MS 39213, USA*

godwin.adu-boateng@jsums.edu

Tzusheng Pei

*Department of Computer Science
Jackson State University
Jackson, MS 39217, USA*

tzusheng.pei@jsums.edu

Abstract

The last few decades have witnessed development in new Web technologies and tools. The current iteration of the Web: Web 2.0 offers several components that facilitate the learning process. Online teaching and learning tools among others, is one such component. This new technology as manifested in wikis and blogs has gained recognition for their potential use in colleges and academic institutions. Wikis and blogs are Web tools that can facilitate professor-student collaboration as well as student-student interaction and collaboration. They also provide a means of constructing and building knowledge, and facilitate collaborative learning. This article discusses the use of wikis and blogs as tools for teaching and learning. It also reports on the implementation of these technologies in an academic institution.

Keywords: Online Learning Environment, Collaboration, Blog, Wiki, Pedagogy, Knowledge Building, Tools, Constructivism.

1. INTRODUCTION

In recent years colleges and universities have adopted and continue to adopt new and emerging technologies to facilitate the teaching and learning process. It has now become common for a professor to have a course Web site where course resources are provided for students enrolled in a particular course. Materials such as course syllabi, published papers, announcements and reading assignments are often posted for students to access at any time. Studies have shown that in recent years the number of students working full-time and part-time has continued on an upward trend. In a *New York Times* article by David Koepfel on October 26, 2003, students provide numerous reasons as to why they seek employment [1]. Emily Brandon in an article published in the U.S. News & World Report magazine reports that "...75 percent of all undergraduates under the age of 22 work [2]." This information was attributed to the analysis of the American Council on Education. Working full-time or part-time is not limited to college and university students only. High school students have after school part-time jobs as well. More often than not this trend continues when the student goes to college, thus it has become the "new normal."

As this trend continues, course Web sites have proven to be a valuable resource for students who have to juggle work and school. In response to the "new normal" colleges and universities have had to find ways of accommodating the current day student. A majority of universities have incorporated online teaching into their academic curriculum to address the needs of those students who are unable to attend brick and mortar classes on a regular basis. It can also very useful for those who are able to attend the traditional class sessions. For instance, those who miss classes are able to visit course Web sites to review the information that was presented during the class period. Also, they are able to access announcements that might have been made

during the class period. Additionally, class assignments can be accessed at the students' convenience.

The potential use of internet technologies as pedagogical tools was envisioned more than two decades ago. In his book *Understanding Technology*, Susskind [3] argues that the ability to provide certain information and learning materials through technology meant teachers would be less occupied. As a result, teachers and instructors have more time to provide one on one interaction with students. In essence each student has his/her own private professor [3]. McMullin [4] concurs with this view when he states "... to the extent that it streamlines or reduces the administrative burden on teachers, it correspondingly increases their ability to invest more time in teaching."

The interaction between professors and students in an academic setting cannot be over emphasized [5]. Recent studies have shown this interaction to be quite beneficial to both students and professors. A 2006 report which surveyed 2400 law school students in 64 law schools revealed that frequent interactions between professors and students was related to very beneficial outcomes [6].

2. BACKGROUND & MOTIVATION

Online Learning Environment (OLE) continues to be used as a tool for providing instruction to students. There are many published articles on the usefulness and importance of online teaching methods [7, 8, 9, 10, 11, 12, 13]. WebCT is one such learning environment providing various modules to enhance teaching and learning. Currently, it is used by millions of faculty and students in universities and colleges all over the world [9]. In recent years, other online technologies have emerged to increase the number that is already in use. One such technology is a Wiki. Web logs or blogs have also become quite a popular online tool which has found its way into academia.

2.1 Current System in Use & Limitations

WebCT/Blackboard is currently the OLE of choice for many colleges and universities. These non-traditional teaching tools or courseware provide facilities that enable faculty without any Web development training and knowledge of Web programming languages to easily use these tools. Consequently, its popularity has soared [14]. The ability to customize online courseware is a cogent reason for their widespread usage in universities. Institutions that use this non-traditional teaching tool can configure it using strategies that best fit with their academic needs and vision.

WebCT/Blackboard is the current system in use in most universities. The current customization grants privileges to only faculty to upload and post course materials. In any given semester, a professor can post announcements and comments about courses he/she is teaching. Provision is also made for the instructor to post scores and grades for students in a class. Students have the ability to only view grades and access other course materials such as presentation slides and information posted by the professor.

Quite often students lose their log in credentials such as passwords, and the system does not provide a mechanism for students who have lost or forgotten their login credentials to reset them. Consequently, students have to go through a cumbersome process to reset their password, which may further delay their work.

3. WIKIS & BLOGS AS PEDAGOGICAL TOOLS

Most online learning takes place in an asynchronous environment where 24 hour access may be guaranteed. Wiki and blog technologies fall under this type of communication and cooperation. For instance, a professor may post course materials and students are able to access and download these materials at their own convenience. Parker and Chao [15] assert this form of communication is conducive for cooperation and collaboration, that is, the professor and the student do not have to be logged into the online environment for learning to occur. Wiki usage can also be found in the corporate world. Such organizations as Wall Street Journal, Gartner and Business Week acknowledge its usefulness in collaboration. A survey conducted by Majchrzak et

al. [16] on the corporate use of wikis revealed great potential in the areas of collaboration, work flow process and knowledge accumulation for future use.

Since this technology became available, it remains fairly new in academia. However, in recent times, it has begun to emerge as a relatively new teaching tool to complement or possibly replace other non-traditional course management systems like WebCT, Blackboard, etc., as a tool for information sharing and dissemination. As a practical example, for any given course a professor or student can create a page in the wiki about a topic that is relevant to the course for further research and input. The professor can then provide students with a general research direction for the topic. Content can then be provided and edited by 'adders' and 'synthesizers' as categorized by Majchrzak et al. [16]. As the iterations of providing and editing content occurs, students would have the ability to process the information that is already in the wiki; in so-doing they add to their knowledge base [17]. Cress and Kimmerle [17] and Aharony [18] further argue that knowledge can also be developed from prior internalized knowledge. They contend that the interaction of prior knowledge with those acquired from using wikis creates new knowledge. Thus, a wiki is viewed as a tool that facilitates the sharing and shaping of knowledge [19]. Parker and Chao [15] list possible uses of educational wikis as presented by Duffy and Burns as follows:

- Students can use a wiki to develop research projects, with the wiki serving as ongoing documentation of their work.
- Students can add summaries of thought from the prescribed readings, building a collaborative annotated bibliography on a wiki.
- A wiki can be used for publishing resources like syllabi and handouts, and students can edit and comment on it for all to see.
- Teachers can use wikis as a knowledge base, enabling them to share reflections and thought regarding teaching practices, and allowing for versioning and documentation.
- Wikis can be used to map concepts. They are useful for brainstorming, and editing a given wiki can produce a linked network of resources.
- A wiki can be used as a presentation tool in place of conventional software, and students are able to directly comment and revise the presentation content.
- Wikis are tools for group authoring. Often group members collaborate on a document by emailing to each member a file that each member edits on their computer, and some attempt is then made to coordinate the edits so that everyone's work is equally represented; using a wiki pulls the group members together and enables them to build and edit the document on a single, central wiki page.

Blogs, like wikis have also witnessed a significant increase in its usage. Today, blogs have become part and parcel of social life. In politics for example, it has become an effective tool for organizing people at the grass root level and also enhance contributions. Scholarly papers on blogs do acknowledge its potential use in pedagogy [20]. Richardson [20] in *Blog, Wikis, Podcasts, and Other Powerful Web Tools for Classrooms* cites learning specialists Fernette and Brooks on the potential benefits of this technology:

- Can promote critical and analytical thinking
- Can promote creative, intuitive and associational thinking
- Can promote analogical thinking
- Potential for increased access and exposure to quality information
- Combination of solitary and social interaction

In institutions where it is already being used, it allows the teacher and students to begin conversations that spur deeper thinking [21]. Any student seeking to make a contribution or post a comment to a blog implicitly ought to have read the posting before making comments accordingly. Two independent surveys on the use of blogs in pedagogy conducted at two different institutions produced similar results.

The first survey conducted by the Brisbane Graduate School of Business on using blogs for particular courses in the Master of Business program yielded some promising results [21]. The responses as presented in Table 1, shows that support did exist for using the blog. This is also made evident in the comments that were posted:

'I spent time prior to each blog constructing an entry. To do that I did need to have a good understanding of what I wanted to blog about. I also spent time reading and considering the blogs of other students and found their comments and perspectives thought provoking.'

'Even though at first people were afraid to take the risk and blog, I found it a good way to discuss concepts and participate in further discussion. It also allowed the sharing of up-to-date information that would not have been possible in lecture time.'

'I particularly enjoyed seeing the almost daily observations of students of the applications of the 414 theory and [the] "thinking about things" technique.'

'I felt that it offered a method to give comment on a wide range of macroeconomic issues that started debate and interesting conversation.'

A total of 102 students were enrolled in the classes, out of which 51 responded to the survey. Sixty-six percent of the respondents agreed that the blog did assist them in their learning with only 12 percent disagreeing (see Table 1).

Question 2: If you did not participate in the MBA Blog you do not need to answer any further questions. Thank you for your input. If you did participate, please answer this question and questions 3-5. Do you think the MBA Blog assisted you with learning in GSN414/GSN451?	Score	%
A. Strongly agree	6	17
B. Agree	17	49
C. Neither agree nor disagree	8	23
D. Disagree	2	6
E. Strongly disagree	2	6
F. No answer	16	

TABLE 1: Survey Results of Blog as Medium for Facilitating Learning.

As earlier stated interaction is very much a part of the learning process. Professor-student interactivity as well as student-student interaction cannot be over emphasized. The survey also found that 77 percent of students either agreed or agreed strongly that intellectual exchange took place at an appreciable level as shown in Table 2. Similarly, another survey by Cobanoglu [22] of students in a hospitality technology class showed almost identical results on the use of blogs.

Question 3: Do you believe the MBA Blog increased the level of meaningful intellectual exchange between student more broadly?	Score	%
A. Strongly agree	6	17
B. Agree	21	60
C. Neither agree nor disagree	7	20
D. Disagree	1	3
E. Strongly disagree	0	0
F. No answer	16	

TABLE 2: Survey Results of Blogs a Medium for Interactivity.

It is important to state that as teaching and learning trends towards the constructivist paradigm, where pedagogy tends to focus on instructional scaffolding as oppose to information transmission, these tools can play a significant role moving forward [24].

4. PROJECT DESCRIPTION & IMPLEMENTATION

4.1 Understanding Wikis & Blogs

A wiki is defined by the Merriam-Webster's online dictionary as a Web site that allows visitors to make changes, contributions, or corrections. Wikipedia defines it as a collection of Web pages that is designed to enable anyone who accesses it to modify and contribute content. In essence any Web site that allows for modification and contribution of content by users, either registered or anonymous can be referred to as a wiki. The two common types currently in widespread use are categorized as restricted access and open-access wikis, where access is granted to authenticated and unauthenticated users respectively [23]. It is a Web site whose content can be created, edited and modified by a group of users collaboratively [25]. The technology emerged in the mid-1990s and gained prominence in the year 2000. Currently, Wikipedia is the most popular wiki with close to 3 million articles [26].

Prior knowledge of Web development tools are not required in order to use a wiki. Only a Web browser is needed to access a wiki. Any editing or additions to an existing page is recorded and reverting to a previous state can be easily accomplished [27]. Related wiki topics can be linked with hyperlinks, expanding it to create a body of knowledge. Research in any given area of interest can be done by searching for the topic [23].

Formally known as Weblog, a blog is a Web tool which is usually maintained by an individual or groups of individuals with regular writings or posts of comments. Hyperlinks, hypermedia and other resources can be embedded in blogs to enrich the content. It is a Web page with posts listed in reverse chronological order [25]. Its popularity has increased since its inception in the late 1990s and there has been a consistent growth in its usage since. As of the year 2007 there was an estimated number of over 75 million existing blogs [28, 29].

Like wikis, blog users do not require the knowledge of Web development or development tools. Access to a blog is easily accomplished through the use of a Web browser. Blog technology facilitates the instant publication of posts to the Web from computer systems with an internet portal [30]. A blog can have several links to other blogs and other resources, hence providing additional learning resources.

4.2 Project Description

The goal of this project is to implement a system that enhances teaching and learning. The aim is to build a CompSciWiki application that enhances interaction and collaboration between

professors, instructors and students. It affords students in a particular course the ability to access a central location for all information and resources regarding the course. The professor has the ability to readily post assignments and related course materials which students are able to access at all times. Additionally, a blog application is built to allow students and teachers to initiate conversations through posting blogs, comments and other resources. Published information will serve as an important source of knowledge. File upload and download capabilities are provided so that students and professors can upload materials that may be useful for the course.

4.3 System Functionality & Use

The CompSciWiki module developed has the following characteristics:

- Authenticate users
- Disallow anonymous content submissions and/or modifications
- Authenticated users have the privilege of creating new pages and modifying or editing existing pages
- Keep track of user modifications
- Hyperlink to other pages
- Text formatting

CompSciWiki Use Case

Only authenticated users have the ability to edit pages. Preventing unauthenticated users from editing the pages removes the threat of visitors to the site deleting otherwise useful content. Anonymous users are only able to view the published pages, but, do not have the privilege of editing/modifying. Once a student logs into the wiki module of the system, he/she has the ability to modify the content on any page, or submit new page content. They can also create new pages and proceed to add content. After adding content the page can then be published. Tracking submission and modification is relatively easy, as students are authenticated.

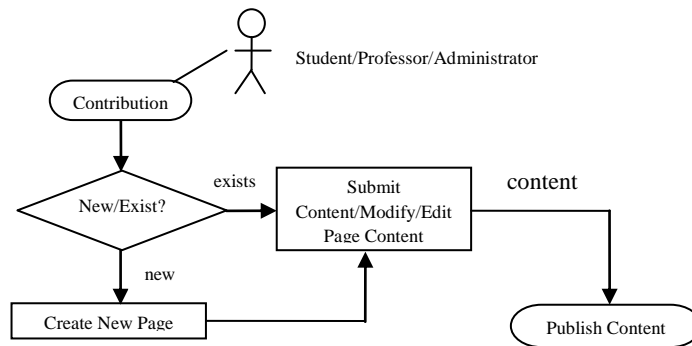


FIGURE 1: CompSciWiki Use Case diagram.

The CompSciBlog module implemented allows for the professor/administrator to publish blog entries. Similar to the wiki module, this module has features such as:

- Disallow unauthenticated users from posting comments or publishing blog entries
- Authenticate users
- Upload blogs to be published
- Post class materials and resources

CompSciBlog Use Case

The professor is solely responsible for publishing a blog. However, a blog file upload mechanism is provided for students to submit blog files for publishing. A mechanism is implemented that display the comments submitted, the date, and time it was submitted. This in turn, would provide an avenue to determine those who have participated for them to be credited accordingly.

Submitted blogs for publishing have to be Web publishable. Files with the following extensions are accepted: .htm, html, .doc, and .pdf. Consequently, a hard validation is performed on all blog files uploaded to ensure that this requirement is met. It is important to recognize that these files types can be displayed quite easily in a Web browser. At any given time an upper limit is placed on published blogs. The professor/administrator has the sole right as to which blogs are published after consultations with the students. For instance, the professor might ask the students to blog about a topic that was taught in class, and from the submitted entries decide on those that best capture the essence of the topic.

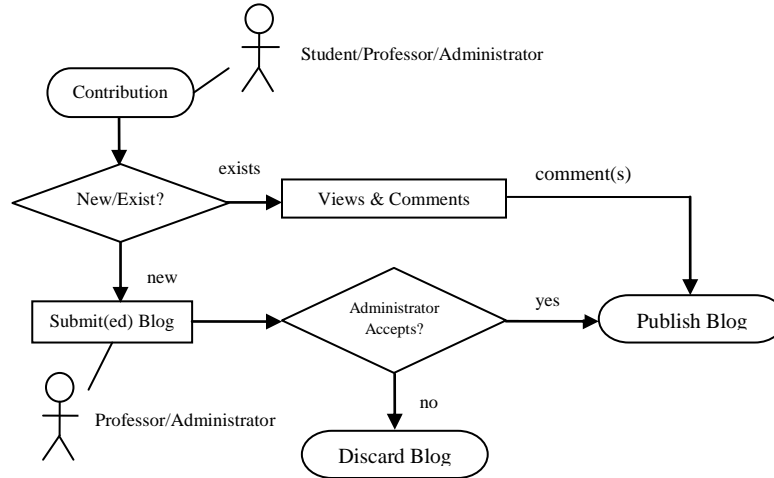


FIGURE 2: CompSciBlog Use Case diagram.

Provision is made for uploading documents and files to the system. Materials and resources that students have researched and found to be potentially helpful for other students can be uploaded to the application. The materials are kept in a directory where it can be accessed by all.

The instructor/administrator has the ability to execute certain tasks and perform certain functions that students are barred from doing. These are listed as follows:

- Provision is made to post course materials such as syllabi, slides, announcements, etc.
- Ability to remove posted items in any module
- Mechanism to assign privileged status to some users
- Monitor student participation

4.4 Development Tools

For this project the .NET development framework is used as the platform of choice for implementation with ADO.NET components, Visual Basic and JavaScript as the backend programming languages. The decision to use the above mentioned software and language stems from the fact that Visual Studio 2005 edition is widely used for Rapid Application Development (RAD). The package also comes with Microsoft SQL Server which as stated earlier is adequate for the purpose of this project. Visual Studio 2005 provides developers with three options in developing a Web application. File system, http, and ftp are the options available. The file system option is used for this implementation. This option organizes files that make up the entire Web site project in a file system structure. It also provides other administration tools for managing users, granting privileges to groups of users to perform certain actions, and maintaining user profiles in a relational database.

5. INTEGRATE WIKIS & BLOGS INTO DISTANCE EDUCATION

Significant changes have taken place in distance education from the days when instruction materials were sent through the mail. The mode of teaching and learning has equally evolved

over time. It has also gone through several name changes, from independent study to correspondence study, etc., during which period learning materials were next to impossible to obtain. Fast forward to present day, technology has made it possible for this method of instruction and learning to evolve and grow at a fairly rapid pace. However, an evaluation by Schwartz et al. [31] conducted in 24 universities around the world showed that there was only minimal use of these new technologies in distance learning. Hence, the impetus exists for designers to integrate wiki and blog technologies among others into this mode on education [32]. Jonassen et al. [33] proffer context, construction, collaboration and conversation as functional principles in the development of this emerging learning environment. Over the years, distance learning has adopted some technological innovation such as the use of recorded videos and audio, and more recently electronic mails and video conferencing. Wikis and blogs can be used to augment these adopted technologies in ways, such as:

- Generally, distance education takes several forms and involves the use of printed texts, published literature, study guides, video and audio, compact disc, etc. Electronic mails and video conferencing is the medium of communication. However, in recent times, other technologies have been incorporated, making it possible for interactions and active participation in distance education to occur through webinars, blogs and wikis [34].
- Collaborative authoring is part of the wiki design, where everyone can submit input on a given topic either in a synchronous or asynchronous environment. Wiki collaborative authoring can take many different forms, such as student-student collaboration as well as professor-student collaboration [35]. This comparatively provides a better means of collaboration in a distance learning setting. In two case studies by Exter et al. [36], they concluded that “the flexibility and relative ease of use, of many Web 2.0 tools, especially when used in an integrated way presents almost unlimited opportunities to facilitate collaboration with distance education students.”
- Information dissemination in a traditional distance education setting involves the sending of electronic mail blasts to all students. Blogs on the other hand, provide a communication tool for disseminating information to people (students), and for enabling feedback. They facilitate a shared space for information sharing and initiating dialog [37].

It is our belief that the adoption of computer-mediated communication tools, like blogs and wikis can be effective in this mode of education. Therefore, going forward, the integration of these social Web technologies will be imperative, as in recent times there has been a pivot towards constructivism at various levels of educations, especially, in higher education [38].

6. DISCUSSION

Online teaching methods and tools can be considered as a resource that facilitates the learning process, and assist students to acquire the required knowledge to help in their academic activities. Boulos et al. [39] argue that the use of these technologies spur on learners' elevated engagement and focus with learning materials. They further argue that the shared working spaces provided by using these technologies, improve collaboration between learners and yield desirable outcomes [39].

Wikis are a useful tool for facilitating online learning groups [40, 41]. For group learning to occur, the exchange of ideas, information dissemination and group interaction must occur. Wikis can be used to support these activities. Also, they can be used as a repository of the shared knowledge representative of the learning group [40].

Creating new pages is perhaps what makes a wiki a powerful learning tool. For instance, a student can create a page about a topic, and other students can then provide their reflections and researched information on that topic, thereby negotiating meaning. As content is provided, and continuous editing occurs, the topic can develop into a complete article authored by several users. A professor may also initiate a discussion page on the wiki requiring all students in the

course to research information on the topic in question. Participation can then be monitored as each user entry is logged by the system. Therefore, those students that do not partake can be easily and appropriately identified. In essence students that do not take part would be graded accordingly [42].

In the case of a blog, submitting a post on any published piece would require the student to read and reflect on the posts. This is made evident by submitted comments by students in a survey [21]. It is anticipated that a knowledge resource will develop over time as entries and comments are made. Students are not created equal. Therefore, the pace of learning can vary from student to student. Being able to accommodate such students is a key part of teaching. Blogs can facilitate an environment where students can learn at their own pace [43].

As these technologies gain widespread use especially in academia, it will be in order for faculty in colleges and universities to acquaint themselves with the technology. Most importantly, training faculty to be conversant with these new technologies is of utmost importance. This will provide them a basis and the skills required to enable them incorporate wikis and blogs into their instruction. It will also create a situation where professors and instructors will not only be 'content consumers', but rather 'content creators' as characterized by Campio et al. [44]. It is envisaged that students would be both the former and the latter as they become more familiar and functionally adept in its usage.

7. SUMMARY & CONCLUSION

This paper discussed the emergence of wikis and blogs as tools for teaching and learning. It highlighted the overarching importance of these technologies as the education paradigm shifts toward the constructivist approach. Technological tools that make this trend a reality are bound to be widely embraced and adopted. For this reason, teachers' roles would need a re-alignment. Shieh et al. [45] cite Kochtanek and Hein who contend that professors/instructors must move away from being agents of knowledge transmission and become knowledge facilitators. Furthermore, to encourage and facilitate content consumption and more importantly, content creation by students, it is imperative for faculty to become more proficient in using these technologies. Hence, universities need to provide them with the requisite knowledge and expertise through training and workshops.

Currently, a good number universities and colleges have a mix of both the traditional face-to-face teaching and online learning methods. Faculties on college campuses continue to incorporate social Web components into teaching and instruction. Offering these technologies to students can be of great value to them in future as they would have become familiar with the collaborative practice. It is important today for students to learn the skills that will propel and drive the future. Also, for universities and colleges to remain competitive, they will have to embrace the changing dynamics of educating today's students.

The development of these technologies as applied in academia is still in its nascent stages. Therefore, further research is needed in ascertaining ways to leverage these emerging tools to enhance teaching and learning. It is envisaged that thinking critically about these tools, coupled with research by users and potential users will help to promote a more holistic form of learning.

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