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Evaluating Open Source Applications to Support Online Learning

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ABSTRACT

Many online learners are facing challenges despite the reported growth in enrollment, and research shows that self-discipline and management of learning activities are key characteristics to succeed. The ability to self-direct learning activities can lead to improved learning experiences. In an effort to improve self-directed learning, various open source applications are evaluated for their functional attributes and capabilities. The applications being assessed include a course management system, wiki, and weblog. The goals of this study are to identify a set of open source applications that are suitable for a collaborative environment, and to evaluate the strengths and weaknesses of each application towards proactive learning. Based on the outcomes of this planned study, an assessment will be made as to how each application enables and facilitates self-directed learning activities. Additionally, a set of criteria will be established for empowering learners as self-directed individuals. Based on this study, instructors and administrators can be better informed to make appropriate decisions amongst the many open source applications available for learners.

Keywords

Online learning, self-directed learning, social software, course management systems, wiki, weblog

INTRODUCTION

Due to its convenience of learning any time and any place, online learning has gained popularity with many students. Availability of the Internet and accessibility to online courses have led to a substantial growth in enrollment of online courses. According to recent surveys published by Sloan-C (Allen and Seaman, 2007), over 3.9 million students took at least one online course during the fall of 2007. While significant growth has been recognized, many studies have also identified challenges to online learning. For example, attrition rates are estimated to be 10-20 percent higher than that of traditional on-site learning environment (Carr, 2000). While reasons for attrition are many and complex, findings cited include lack of self-discipline, inadequate initiative, ineffective time management and organization skills, inability to self-manage learning, lack of cognitive strategies, and difficulty building rapport and maintaining interaction with peers and the instructor (Bouhnik and Marcus, 2006; Roblyer, 1999; Tyler-Smith, 2005).

In order to overcome such challenges of web-based learning, this study proposes identifying and evaluating various open source applications, assessing their functional attributes towards managing learning activities, and establishing a set of criteria that can facilitate proactive and self-directing learning process. It is stated that the ability to conduct self-directed learning exists in all learners and the competency level can change accordingly (Guglielmino, 1977; Knowles, 1975).

According to Naidu (2003), "[s]tudents in e-learning and other flexible learning environments, who often work independently with self-instructional study materials, need help with organization and management of resources, as well as the skills to critically reflect on information they may have gathered" (p. 362). It is further stated that very limited tools exist to support the cognitive processes for e-learning and other technology-enhanced learning environments, whereas conventional face-to-face educational settings have benefitted from a considerable amount of cognitive tools and strategies.

APPLICATIONS FOR E-LEARNING

Web 1.0 allowed wide deployment of various course management systems (CMS); however, the advent of Web 2.0 has further empowered the academic environment with capabilities to offer social networking tools including wikis, weblogs, and enhanced discussion boards (Bryant, 2006). This section describes various tools that are used in online educational settings and information from recent research regarding the various tools as means in supporting the learning environment.

Course Management Systems

CMS, also known as Learning Management Systems (LMS) or Virtual Learning Environments (VLE), is a software application that facilitates the delivery and management of learning materials to students in a web-based environment, thus making course information accessible anytime and anywhere (Lamb, 2006). The technological features of CMS include accessing course information, submitting course work, taking quizzes, checking grades, holding threaded discussions, and communicating with use of email, announcements and chat (Uzunboylu, Ozdamlı, and Ozçınar, 2006). As an alternative to commercially licensed software, there are various open source systems including ATutor, Online Learning and Training (OLAT), Sakai, and Moodle.

While CMS have various features available to provide convenience in accessibility of course information for students (Harrington, Gordon, Schibik al., 2004; Uzunboylu et al., 2006), the effect on quality of student learning is yet to be established based on various researchers. According to a survey of 350 academic departments in 2004, perceived gains were minimal (Harrington et al., 2004). Similarly, the challenges of CMS is discussed yet in another research, which states that CMS were helpful for administrative purposes, but that it had a limited impact on pedagogy (Dalsgaard, 2006).

An evaluation of various CMS by Uzunboylu et al. (2006) resulted in the following recommendations as features that should be available in all LMS to better facilitate learning:

- Notifying by email when replies are posted in the discussion forum, as this feature will allow timely access of feedback.
- File sharing features to allow convenience in exchange of information.
- Bookmarking capabilities to maintain record and share valuable resources on the Web.
- Providing calendar features for teacher and students, to show deadline and important dates.
- Having some form of a collaborative learning tool to facilitate group work.

While CMS have made it possible to easily and efficiently distribute course information and facilitate communication and interaction, there are ways in which the system can further improve to better support the student learning process.

Communication Tools

Many CMS provide the following tools for communication:

Email

Electronic mail (email) is a means of communicating in text-based form with use of networked communication technology (Crocker, 1998). Email, which has been in use since 1960's (Lamb, 2006), is one of the initial uses of the Internet as an after thought to the beginnings of the ARPANET, and it still represents a large amount of the Web traffic (Alverno College, 2003). Approximately 53% of American adults use email on an average day (Lamb, 2006). Lamb (2006) also notes that despite its challenges with spam and viruses, email continues to be the choice of communication among learners as they enjoy the ability to exchange attachments of audio, video, and graphics. Examples of email applications include Mac Mail (Apple), and Outlook (Microsoft). Additionally, popular Web-based email services include Gmail (Google), Hotmail (Microsoft), and Yahoo Mail (Yahoo).

Chat

A chat tool, which is a synchronous application, is effective for activities that can greatly benefit from spontaneity; some common activities may include brainstorming, decision-making, and other conversations that may require quick turnaround time (Hlapanis, Kordaki, and Dimitrakopoulou, 2006). One difficulty in using this method of communication is that all members must find a mutually available time to chat; the larger the group, the greater the conflicting times. The synchronous tool is ideal when used in small groups so that conversations can be followed, and when specific protocols are established so that participants stay focused on the topic (Brandon and Essex, 2001).

Group discussion

A group discussion tool, which facilitates threaded discussions, is a common feature for online learning courseware. This application is particularly suitable for one-way dialog where students can post their thoughts (Wagner, 2005). A study showed that a benefit of online discussions is that students feel it is more of an equitable method where everyone can voice their thoughts (Levin, 1990). In addition, this type of asynchronous communication allows students the opportunity to reflect on what others have posted, and then compose a well thought out response, thus creating a certain degree of mindfulness (Garrison, 2003; Poole, 2001).

Some concerns about group discussion tools include:

- While interaction and collaboration are possible, staying abreast of various conversations and tracking the multiple replies get disorganized and difficult to follow (Wang, 2004).
- Posted discussion messages are time-indexed, and as a result, old conversations get pushed down; this poses a problem for postings that may have valuable longevity. Topic-based indexing, which is usually available a secondary mechanism, may better serve groups that want to capitalized on knowledge sharing (Wagner, 2005).

Social Software

It is suggested that e-learning needs to move beyond CMS to a more dynamic and socially engaging experience, where there are opportunities to collaborate with others and construct knowledge with use of social networking applications (Dalsgaard, 2006). For example, Wikis and blogs are valuable applications to provide learners opportunities to collaborate, interact, and exchange information in academia (Bryant, 2006). According to Dalsgaard (2006), it is further argued that social software tools enable a different way of using the web, and that it can support self-governed, problem-based and collaborative activities (OECD, 2005).

Weblog

Weblog is a medium for publication of online entries that are dated and chronologically maintained in an individualized journal-writing format. According to Dalsgaard (2006), weblogs serve as a collaborative and social tool in that others readers of the weblog can make comments on the entries and build a form of discussion and dialogue, creating a basis for socialization on the Web. Weblog software are described by some as the killer application that has the ability to bring many individuals together to collaborate, share knowledge, reflect, and debate (Williams and Jacobs, 2004). The social networking process is further enabled by the Really Simple Syndication (RSS) feeds and use of blogroll, which keep the weblog subscribers current on the latest information as well as links to other related weblogs (Dalsgaard, 2006).

Some issues related to the use of weblogs according to Wagner (2005) are:

- Readership can be vastly unevenly distributed, with few weblogs attracting the majority of the readers and the majority of the weblogs being read by a few people.
- It is difficult to digest information of all bloggers, and they may not all be heard for purposes of collaborating. Weblogs may work particularly well either in small groups or when a limited number of members want to broadcast information to a larger group.
- The mode of conversation is less conducive to a two-way dialog. It mirrors more of a one-to-many communication mode in which the information is broadcasted to many others.
- Contents posted are time-indexed and older postings that have valuable longevity get buried. Topic-based indexing, which is usually available a secondary mechanism, may better serve groups that want to capitalized on knowledge sharing.

Weblogs can be a great tool for purposes of sharing information and exchanging feedback; however, it may be challenging in the presence of larger groups who all need equal readership.

Wiki

A wiki is defined as a "a freely expandable collection of interlinked Web pages, a hypertext system for storing and modifying information – a database where each page is easily editable by any user with a form-capable Web browser client" (Leuf and Cunningham, 2001, p. 14). The application allows multiple users to edit, add, or delete documents and establish links to other pages, which are updated dynamically (Dalsgaard, 2006). As a collaborative technology incorporating the designs principles of the original wiki application, it is said that wikis encourage the editing of other users' pages, resulting in incremental improvements of each other's documents (Wagner, 2005). Wikis offer a simple editing and publishing interface, and prior skills on the Web is not required (Leuf and Cunningham, 2001). It is said that with the "Wiki's focus on incremental knowledge creation and enhancement, version management, and multiuser participation, wikis can effectively be an open source technology for knowledge content" (Wagner, 2005, p.5).

The major distinguishing character between wikis and regular Web sites is the ability of the users to easily edit all aspects of the wiki Web site; however, given the open nature of the technology, there are challenges (Wagner, 2005):

- The greatest challenge is the notion of trust, which is essential within a wiki community.
- The multiple updates and changes cause the posted information to be conflicting or disorganized. One way to overcome this issue is the use of a history log that notes all incremental changes, which can be rolled back.

As discussed above, there are various tools to support online learning environment. Social networking tools can compliment a course and enable greater interactivity, which is not adequate with use of CMS (Liaw, 2007).

SELF-DIRECTED LEARNING

The fundamental concepts of SDL is described by Guglielmino (1977) as follows: 1) individuals empower themselves and take on additional responsibility for various decisions related to their learning endeavor, 2) learning does not take place in isolation from others, 3) studying activities may include interacting with other learners by electronic dialogues, participating in study groups, and capturing learning through reflective writing, 4) learners are able to transfer learning, including knowledge and study skills, from one situation to another, and 5) self-direction is viewed as a continuum that exists to some level in learning situations for all individuals.

The importance of SDL is explained by Knowles (1975, p. 14-15), who states that:

1. There is compelling evidence that proactive students learn more and better than reactive learners, who stand passively waiting to be taught. Proactive students approach learning more purposefully with higher levels of motivation, and retain and apply what is learned better and longer than reactive learners.
2. SDL is more aligned with our natural tendencies and psychological development processes. As we mature and develop psychologically, an essential characteristic is the ability to accept increasing levels of responsibility for our own lives, and to become increasingly self-directed.
3. Many of the new developments in educational practices, including nontraditional study programs, universities-without-walls, and external degree programs, place a heavy responsibility on the learners to take initiative and develop abilities of self-directed inquiries. Participants involved in these programs without the ability to self-manage their learning will lead to anxiety, frustration and failure.

RESEARCH APPROACH

Participants

This study will involve three separate classes of undergraduate students enrolled in upper division business management courses taught online. Each course will have approximately 40 students enrolled, which represents a total of 120 participants for the study. The participants will have similar background in terms of having used the computer as an integral part of the course, holding a junior or senior status at the university, and having similar discipline of studies within the business college. The results of the study are expected to be generalizable to college students participating in online courses and majoring in business.

Research Design

Each of the three online classes will be assigned an open source based CMS, wiki, or weblog application for the duration of the course to complete their class work. Then, the students will take a survey to identify potential benefits and limitations that were experienced while using the application, towards supporting their learning activities and enabling self-directed learning. Based on the results, a set of criteria will be established to address the pertinent functional attributes that should be available to enable students to take a proactive role in managing their learning activities.

The survey will be a set of questions that measure how each feature of the application fostered proactive and self-directed learning abilities. The questions will be in the form of a Likert scale as well as open-ended questions.

In addition, a subsequent study will be conducted to determine the incremental change in self directed learning abilities as a result of deploying the established specifications.

Data Analysis

The data collected from the survey results will be analyzed with statistics appropriate for task and survey analyses. The quantitative data analysis plan will include using SPSS to assess descriptive statistics and correlation of technical features of the application with the ability to self-direct learning accordingly.

In addition, the open-ended questions will help to further understand the quantitative results and describe the findings in more detail.

RESEARCH IMPLICATIONS

In examining the strengths and weaknesses of each application and establishing a set of criteria, the information will serve as a means to address the functional attributes that are suitable for fostering self-directed learning in online environments, and alleviate the difficulties for online students who are facing challenges with self-managing their learning activities. This may be of particular value to instructors, administrators, and instructional designers, who are looking for ways to empower learners to achieve their goals.

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