Knowledge Management Using Weblogs in Information Technology Education

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Abstract

One of the key functions of college teachers in an educational setting is knowledge management. Weblogs could be used as a knowledge base to efficiently support student learning. It can provide students access to relevant information that provides them guidance to resolve common issues that are likely to occur as they do their project assignments. In this research, a Weblog was used as an additional communication channel between students and instructor for an information systems course. Feedback from the students enrolled in the class and analysis of usage data collected from the Weblog provides evidence that it can be an effective tool for teaching information systems courses.

Keywords: Knowledge Management, Weblog, information technology education

1. INTRODUCTION

Mack et al. (2001) refers to knowledge management (KM) as the methods and tools for capturing, storing, organizing and making knowledge and expertise accessible within and across communities. Treating knowledge as an asset is not a new concept. Intellectual capital consists of the skills, tacit knowledge and experience a company possesses through the virtue of its employees (Coakes & Bradburn, 2005). An experienced employee is worth more than a new employee because of the experience he or she possesses. Job experience has historically been an intangible asset. In the past twenty years, corporations worldwide have begun to

see the potential competitive advantage in managing their intellectual capital (Mitchell, 2000). The ability to leverage intellectual capital and human experience drives funding of many organizations' KM programs (Rowley, 2000).

A university represents the ultimate knowledge organization (Jones et al., 2006). In addition to support research and development, in a university environment the KM systems may also serve as a problem-solving aid for non-experts and a tool for learning (Alic, 2008). To implement KM systems, Web emerged as the dominant technology (Alavi, 1999). Many Web-based KM systems have been developed for industry,

medicine, science and government (Lau & Mak, 2004; Hulse et al., 2005; Voisard et al., 2007; Liao and Jeng, 2005). One major advantage of the Web-based system is its high level of system interactivity for the users to link and find the knowledge effectively without real-time conversation among them. Moreover, Web has gradually established as a global infrastructure in which knowledge can be easily created and shared by experts.

This research studies knowledge management in an educational setting for the students to learn information technology skills. In particular, a knowledge base (Weblog) is created to facilitate the knowledge transformation from instructors to students. To test the usefulness and potential of such knowledge base, the traffic to the Weblog posts is analyzed and discussed.

2. BACKGROUND

Knowledge Transformation

A KM system is an information technology system that stores information and makes it available as knowledge (Alavi & Leidner, 2001). When the need to store information arises in an organization, the KM system is the solution. There are different types of knowledge that are described as follows.

- Tacit knowledge is the generally unspoken knowledge gained from experience, which distinguishes more and less expert individuals in a particular domain (Wagner & Sternberg, 1985; Cianciolo et al., 2006).
- Declarative knowledge is explicit knowledge of how to perform intellectually oriented tasks such as arithmetic, puzzle solving, elementary geometry, and computer programming (Sun et al., 2001).
- Procedural knowledge consists of how to do things or the strategies which can be used to carry out the tasks (Lang et al., 1991; Hamade et al., 2007)

Knowledge sharing in general involves transforming the tacit knowledge. Marwick (2001) categorizes the ways in which knowledge transformation takes place in a business setting. Tacit knowledge transforms into explicit knowledge through a process called externalization. Socialization spreads tacit knowledge. Meetings, classes, and impromptu discussions all provide an opportunity for people to share their experiences. During socialization, meetings and discussions elicited tacit knowledge transfer may occur. Tacit knowledge transforms to externalized explicit knowledge through written documents.

We believe that this transformation exists in the educational setting as well. In a similar fashion, instructors that teach information technology skills and possess tacit knowledge meet with students in classrooms or offices. Through lecture, discussion and software demonstration, declarative (explicit) knowledge is created in many formats. Students share this declarative knowledge, where it transforms into procedural knowledge upon application in assignments.

To allow a student to learn continuously from on-going experience, both procedural and declarative knowledge should be acquired in a gradual, on-going and concurrent way (Sun et al., 2001). The declarative knowledge can be stored; thus, the instructor can facilitate the knowledge acquisition and transformation by maintaining a repository of declarative knowledge. Students' expectation for assistance from faculty members in completing their assignments, and learning in general seems to have increased. This requires faculty to spend more time with students to ensure student learning in courses they are teaching. However, this takes time from research, which is becoming more important even at universities with teaching as the main focus. At universities where teaching and research are equally important for tenure and promotion, it is necessary for faculty to find alternative ways to assist students in their learning process, i.e., use a multi-channel service approach to deal with increased research pressure. Weblog is one of the tools that can be used by faculty members to store and share declarative knowledge, which can assist students in completing assignments and learning the course material, while decreasing the amount of time faculty members have to spend assisting students on their assignments and/or answering questions regarding course material. Weblogs can be efficiently used to answer frequently asked student questions. Once answer to a particular question is posted to the Weblog, students can reference it for current and future assignments and exams. This could potentially reduce the amount of time faculty

will have to spend answering similar questions from different students in the class. Thus, use of Weblogs by faculty for teaching could be an effective strategy to cope with the increased pressure to produce more research.

Weblog

Weblogs are also referred to as blogs. Weblog is an effective channel of communication to share specific type of information to targeted audience. It can contain text, images, videos and links to other sources. Content in Weblogs is easy to read as the content is posted in reverse-chronological order, and most of the Weblogs have efficient search capabilities to search content.

Weblogs have been used by journalists to disseminate news since 1998 (Wikipedia, 2009). It seems that Weblogs can be used as a teaching tool at universities. It can be an effective channel of communication for teaching as it supports text, graphics, video, and links to external sources, and it provides two-way communication between students and instructor that is visible to all users of the Weblog. The latter feature eliminates the limitation of an e-mail system in which content can be read only by a specific user(s). Weblog is especially useful for targeted discussion related to assignment projects. Instructor can post suggestions and solutions to specific issues commonly encountered by students when completing their project assignments. All students can read these posts, and also provide their comments and feedback regarding these posts and rate them. A major benefit of such student feedback is that the instructor can make appropriate changes to a post.

3. BUILDING A KNOWLEDGE BASE

In this study, the focus is on the use of Weblog to foster learning of information systems technologies. A Weblog-based knowledge repository was created and used to teach an information systems course. During the spring 2007 semester, a Weblog was created to teach an advanced application development class using Microsoft Studio .Net and SQL Server. In the Weblog instructor mainly posted information related to how to resolve common problems encountered by students in doing their project assignments.

These postings contained text instructions and screen shots. Students entering this class had taken introductory application development courses. During the semester as students progressed through the course, they encountered typical problems that any junior information technology professional might experience. Students wanted answers to specific questions when completing their assignments and the instructor might not be available to answer them. This is a typical problem as many students wait until the evening before the assignment is due to complete it. Waiting until the next working day to meet with the instructor to solve a problem could put the student in a bind.

Based on some common problems encountered by the students, the instructor initially created several posts on WordPress.com.
- MS Visual Studio .Net 2005
  - o How to change the startup Windows form.
  - o How to define dynamic ports in Web projects.
  - o How to debug Web projects.
- MS SQL Server Express 2005 (a single-user SQL server)
  - o Starting with SQL Server Express 2005.
  - o How to define auto numbers in SQL Server 2005.
  - o How to define connection strings for SQL Server Express 2005.

The Weblog address (cistx.wordpress.com) was given to all students enrolled in the class to access information that was not available in textbooks used for class. These posts were written to assist students working on project assignments. Content of the Weblog was regularly updated by the instructor during the semester. New content relevant to the assigned assignment projects was posted to the Weblog at about the dates on which projects were assigned to students. Most of these Weblog postings by the instructor were based on questions that students had asked the instructor during office hours. The main purpose of these Weblog postings was to assist other students in the class by providing a centralized resource containing common issues encountered by students as they worked on their assignment project, and solution to resolve these issues. As students could access the content of the Weblog while they were working on their

project assignment, it provided them with an excellent reference resource that contained chronologically ordered content relevant to the project they were working on. Such on-line access to reference material that could be used by students to resolve common problems associated with project assignments was expected to benefit them. Use of Weblog allowed the instructor to serve students through multiple channels. Students could choose the channel(s) they want to use to resolve their questions regarding assignments and course material covered in class.

4. VALIDATION

Student Feedback

Students used the content of the Weblog during the semester for their project assignments. Student feedback regarding the content of the Weblog and its use was positive. Several positive feedback comments were received from students enrolled in the class. One student pointed out that "Blogs are useful to me because you have a lot of important information in one place instead of searching through pages and pages to get what you want. It saves time and effort as well." Another student said that "Some of the things that I really liked were the fact that you were able to post screen shots giving a clear idea of what the steps were. I also loved the fact that it was possible to add comments in case a question arose." In addition to the use of these useful posts for assignments, it was interesting that the students still requested more information and tips from the instructor regarding the project assignments.

Global Usage

This Weblog is also available to any Internet users globally. It has not been used by the instructor since the class was finished on May 2007 as the elective for which the Weblog was created and used is not regularly offered. However, many people in the world have consistently accessed this Weblog to acquire knowledge during the years 2008 and 2009. Figure 1 shows the map of visitors to the Weblog. An Internet user posted the comment: "thanks, I was finding it difficult for having autonumber in SQL Express. Previously I was using MS Access with the

data type Autonumber but it was not present in SQL Express. Now I have done it." Thus, it is evident that this Weblog effectively provides answers to frequently asked questions (FAQs) for people all over the world.

Figure 1. Map of visitors to the Weblog.

Traffic Analysis

We further analyzed the page (post) traffic to understand what kind of declarative knowledge elicited using Weblogs is likely to be more useful to students. For this purpose, data was collected for a 12 months period from June 2008 to May 2009. This data is displayed in Figure 2. The numbers of viewings of the posts available in the Weblog are shown in two categories: Visual Studio .Net 2005 and SQL Server Express 2005.

To analyze the numbers of viewings for the two categories, first we conducted a Chi-Square Test for Independence of two variables: categories and months of the year. We concluded that, over the 12-month period, there was no significant change in the frequency distribution of page visits in the two categories (Chi-Square = 16.18, Degree of Freedom = 11, and p-value = 0.13).
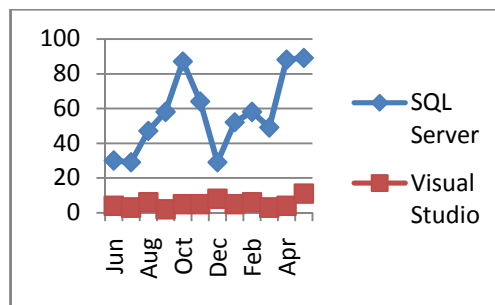

Figure 2. Monthly statistics of the Weblog posts that are viewed by global users.

Next, we ran the two-sample t-test. The result indicated that the posts in the SQL Server category were more frequently visited than those in the Visual Studio .Net category (t $\cong$ 7.99, Degree of Freedom $\cong$ 11.27, and p value < 0.0005).

On March 2009, we were encouraged by the number of visits to this Weblog and felt that more knowledge related to SQL Server administration could be valuable to users of this Weblog. The most visited blog topic is "How to define auto numbers in SQL Server 2005." Thus, an additional post that described how to define foreign-key relationships in SQL Server was added to the Weblog. The effect seemed to be positive; the new post had been viewed 16 times by the end of June 2009.

5. CONCLUSION

A Weblog may be perceived as an effective media for transforming tacit knowledge in information technology. To test the validity of the usefulness of using a Weblog to teach information systems course was investigated in this research. Feedback from students and analyses of the data regarding the use of the Weblog postings suggest that Weblog can be an excellent tool that could be effectively used by instructors when teaching technology related to database systems. It provides an additional online two-way communication channel that is accessible to all students at any time they need to reference the contents of the Weblog.

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