



Designing an IT Course Website: A Case Study

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ABSTRACT

This paper describes the application of knowledge management principles to the design of a postgraduate IT course website at UNSW. The main goal of the website was to satisfy teaching and learning objectives of the course. A two-by-two matrix comprising explicit and tacit, what and how types of knowledge, was used as the underlying theoretical framework for the web design. Main web features support the finding, storing and sharing of knowledge as well as learning by doing. Together, they deliver important benefits to both educators and students of the course.

INTRODUCTION

Organisations place increasing demands for new skills and capabilities for future professionals and managerial knowledge workers. New-age knowledge workers are expected to be skilled at creating, acquiring and transferring knowledge and modifying their behaviour accordingly (Garvin, 1998). They are expected to continually expand their capacity to create desired results, nurture new thinking patterns, set free collective aspirations and "learn how to learn" together (Senge, 1990). It is also suggested that inventing new knowledge should be a modern worker's way of behaving or being (Nonaka, 1998). These demands necessitate a corresponding response from the Education sector.

We argue that the changing nature and increasing demands can be potentially met by a web-based learning system designed on the fundamental principles of knowledge management. Such a system may provide necessary knowledge space to exchange, share, capture, discover and obtain knowledge resources for a learner. It may also be a valuable virtual learning community for educators and students alike, to share and discuss matters relating to the course. In short, it can enable or facilitate knowledge processes and enhance learning performance in a flexible and learner-centred environment.

Prior research indicates that the effectiveness of web-based teaching is a controversial and unsettled issue. Some scholars praise its merits in outgrowing the efficiency and performance of traditional teaching (Leonard & Guha, 2001), while others warn of misplaced favouritism and widespread misconceptions regarding students' preferences (Dyrud, 2000), reduction in expenses or income increase (Hanna et al., 2000). Some argue that effective transformation from off-line to on-line teaching requires a major revision in pedagogies, as well as addressing the issues of communication, scarcity of learning objects, and protection of intellectual property (Ngui, 2002). In summary, web-based teaching and learning presents many challenges.

The main purpose of this case study is to describe one possible theoretical approach (ie. knowledge management framework), design features and to discuss the expected benefits of a specific web-based system (or website) intended to support teaching and learning of a post-graduate course at the University of New South Wales.

THEORETICAL FRAMEWORK

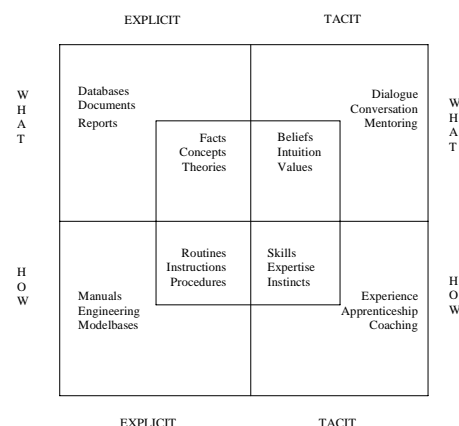
The knowledge management framework by Handzic and Jamieson (2001) presented in Figure 1 was used as the underlying theoretical model by the website designers (Chong et al. 2001). The framework is

essentially a two-by-two matrix with 'explicit' and 'tacit' knowledge as columns and 'what' and 'how' types of knowledge as rows of the matrix. Individual cells denote instances and sources of specific knowledge types. For example, 'explicit-what' comprises theories and concepts that may be found in databases, documents or reports. 'Explicit-how' includes rules and patterns discovered by individual students while searching various resources. 'Tacit-what' consists of shared ideas and beliefs of students and educators of the course, while 'tacit how' represents their instincts and expertise gained through personal experience. The model suggests that students' course knowledge may be enhanced by enabling and facilitating availability, finding and sharing of relevant knowledge, as well as learning by doing.

In particular, the framework suggests that wider availability of relevant knowledge captured in knowledge repositories such as lecture notes and databases will enhance students' learning of concepts, ideas and theories concerning the subject matter. Our preliminary empirical research also suggests that relevant knowledge repositories may be helpful in enhancing students' performance. More specifically, our findings indicate that the availability of contextual information in a database increased management students' forecasting knowledge and improved their performance over that of nominal naives who had no such information (Handzic, 2001).

However, most past research also warns that people have difficulties in extracting knowledge due to the abundance, diversity and ambiguity of information often found in the available repositories (Handzic and Aurum, 2001). In order to minimise the detrimental effects of information complexity, the framework suggests that students should be supported by intelligent search and mining facilities. It is argued that such tools should help students extract and better understand and inter-

Figure 1. Knowledge Management Framework



pret knowledge from various repositories, as well as enable them to discover systematic patterns and rules of the profession.

The framework also recognises the importance of tacit knowledge of both educators and students. Postgraduate students often bring to class valuable and unique experiences from their work environments. The traditional class sessions provide only limited opportunity for sharing this knowledge with others. Yet, past research shows that students may benefit from interaction with their peers, particularly when faced with complex tasks (Handzic and Tolhurst, 2002; Handzic and Low, 2002). The proposed knowledge management framework addresses the need to devote more learning time to interaction and collaborative learning by suggesting a variety of knowledge sharing support facilities.

Finally, responding to the need for cultivation of qualities such as problem-solving, decision making and creativity through self-directed learning, the framework suggests the need for challenging assignments and self-paced on-line learning sessions with continuous guidance and feedback. However, one must not forget that learning through personal experience is a long and tedious process of trial and error (Klayman, 1988). Our own empirical research shows modest learning through experimentation (Handzic, 2000). Therefore, a word of caution against high expectations and in favour of tolerance for failure is necessary here.

DESCRIPTION OF WEBSITE DESIGN

The website described in this section has been designed as part of the project assignment by students attending the Knowledge Management Systems and Technology postgraduate course at UNSW (for details see Chong et al. 2001). In designing the course website, the students were required to apply knowledge management principles outlined in the previous section. The main objective of the website is to provide students with a one-stop point of interaction for all their study needs, a portal that students can go to obtain lecture notes, assignments, reference materials, discussions, surveys, search facilities, links and many other useful tools.

The site map presented in Figure 2 illustrates various sections of the website. *Home page* contains announcements, quotes and news, as well as evaluation forms, polls and results, and search facilities. *Course details* include recommended text, lecture notes, recommended readings, assignments and course outline. *Discussion forum* has assignment discussions, general discussions, useful knowledge websites, interesting readings, lecture comments, additional users' postings, and search/posting tools. *Resources* section contains university links, research papers, interesting websites and search engines. *Solution Finder* contains questions and answers. *Contact details* section incorporates contact person, consultation hours, class and lab venues, additional help and comments.

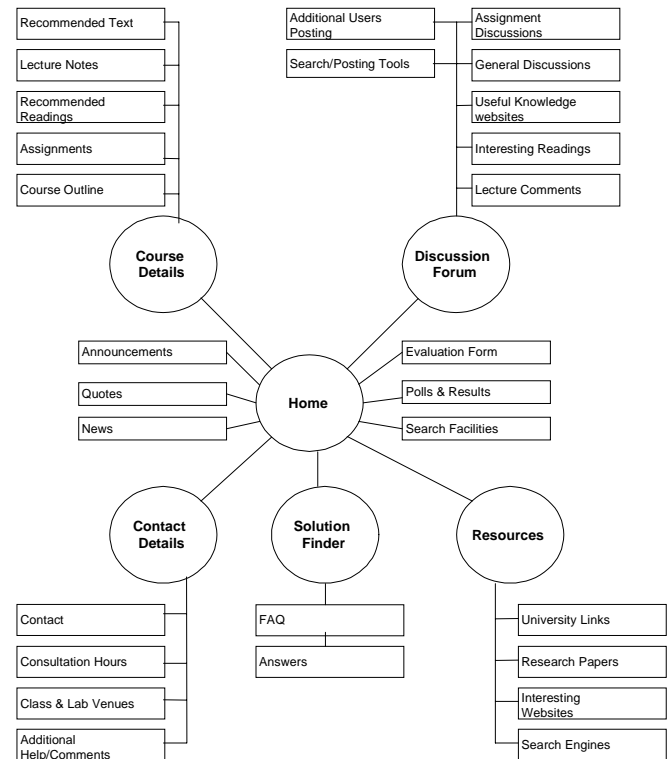
The idea of different sections in the website was to capture different quadrants of the knowledge matrix. For example, *Course details* supports the availability of 'explicit-what', the use of search engines in *Resources* facilitates the finding of 'explicit-how', *Discussion forum* aids the sharing of 'tacit-what', while *Assignments* enables 'tacit-how', learning by doing. It is assumed that students respond differently to certain types of teaching/learning methods, and if all sources are available, the productivity and enjoyment of the course will be increased.

EXPECTED BENEFITS

The website is expected to bring a number of benefits for both students and educators. For students, it enables *global access* to knowledge stored on the site from anywhere and at anytime, so they have a more convenient and comprehensive way of obtaining course materials. Due to *ease of use*, it is suitable for anyone who knows how to point and click a mouse through the website and use search functions to easily locate items or articles of interest. Furthermore, *self-service* enables students to directly access solutions to their problems. It also allows students to learn from other students, thus creating a market for knowledge sharing. It facilitates the development of a *collaborative culture*, one that promotes information exchange and collaboration.

For lecturers, there is *reduction in paper work*. Moving documents and processes online reduces the need for printing and distribution of

Figure 2. Website Map



materials, most printing occurs on demand, at the student end. Through *multimedia* there is also the possibility to publish audio and video of lectures and any other useful information for the course. It maintains *dynamic knowledge* with all the relevant documents easily located on the website and kept up to date. In summary, the website supports course teaching and learning by facilitating knowledge processes that foster the development of relevant knowledge.

CONCLUSIONS

The aim of this paper was to describe the application of knowledge management principles to the design of a postgraduate IT course website at UNSW. With the website, we have tried to satisfy teaching and learning objectives of a typical postgraduate course. A two-by-two knowledge matrix comprising explicit and tacit, what and how types of knowledge was used as the underlying theoretical framework for the web design. Website features provide support for the availability, finding and sharing of knowledge, as well as learning by doing. The main benefits for educators and students include reduction in paper-moving documents and processes, ease of use, self-service, dynamic knowledge, global access, choice of media and new culture. An important aspect of this study is the involvement of end-users (students) in the site design process, this ensured that their views and needs were fully met. Secondly, the implementation of all the required knowledge features on the website can be easily supported at the technical level.

In conclusion, it is believed that a course website, such as the one proposed in this case study, can enable or facilitate knowledge processes and enhance learning performance in a flexible and learner-centred environment.

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