BULLETIN

of the American Society for Information Science and Technology Vol. 28, No. 6 August / September 2002

Process of Knowledge Building in Educational Departments

by Abhijit Rao

Abhijit Rao is with the department of Computer Science and Engineering, Manipal Institute of Technology, Manipal, Karnataka-576119, India; abhijit_rao2@rediffmail.com

In an educational department members are both drowning in information and craving knowledge. The department's information base is either scattered or unclassified. The business world understood this scenario and has brought a change to their knowledge infrastructure by including knowledge management (KM) systems. Educational departments, too, need to rethink their knowledge organization strategies. Therefore, a conversion from information to knowledge becomes imperative.

Implementation of a knowledge management system is an expensive responsibility. The cardinal advantage in academic departments is the strength of its student community. The proficiency, skills and enthusiasm present in such departments are assets, especially, in computer science departments where students are qualified enough to develop components of knowledge management systems. These components are capable of being integrated into one fully functional system. Under the guidance and mentoring of the teaching staff a self-sufficient system customized for the department could be built.

In this paper, the term e*ducational departments* applies to the small academic units that constitute a college/university, for example, the departments of mechanical engineering or physics. The members of a department include teachers, non-teaching administrative staff and the student community.

KM: Pedagogical Perspective

Knowledge management is the formalization of access to knowledge, proficiency and expertise that creates new capabilities, enables superior academic performance, encourages innovative ideas and enhances educational value.

In an educational department knowledge can be organized around domains – specialized areas of knowledge, subject areas, disciplines, frequently used information and similar characteristic knowledge. Knowledge can be divided into theoretical knowledge and practical knowledge. Such a system would provide a bridge between the two. Theoretical knowledge is shared in the classroom, but a larger portion of intellectual knowledge is gained outside it. This capture is an important ingredient of a successful knowledge system. Practical knowledge could be seen as execution of ideological learning to realize initiatives. To summarize it all, practical knowledge

is essential for high performance; theoretical knowledge is essential for expert understanding and progress in analytical endeavors and adaptability.

The Department of Computer Science at the Manipal Institute of Technoloyg, Manipal, India (CSE/MIT), is proposing such an effort to design and implement a KM system

Knowledge Building Process

Beckman (Beckman, T. (1997). A methodology for knowledge management. *IASTED International Conference on AI and Soft Computing, Banff, Canada*) has proposed a seven-stage process for knowledge management:

Identify -> Collect -> Select -> Store -> Share -> Apply -> Create

I. The *identify* stage determines which core competencies are important to academic success. Every department needs robust knowledge about its pedagogical needs and expectations from its members, services and administration. An understanding needs to be developed to settle its place in the pedagogical world and in other organizational and environmental aspects such as research endeavors and consulting services offered by the department.

II. The *collect* stage deals with acquiring the internal and external knowledge, educational skills, fundamental theories and human experience needed to create the selected core responsibilities and knowledge domains.

III. The *select* stage takes the continuous stream of collected, formalized knowledge and assesses its value. Initially, one framework should be selected as the basis for organizing and classifying knowledge to be stored in the Knowledge Bank.

IV. Departmental memory resides in three different forms: in human minds, on paper and electronically. The *store* stage takes the nuggets of knowledge and classifies them and adds them to the departmental memory. Much of this knowledge can be represented in electronic form as expert systems. This is where even tacit, intangible knowledge assets are transformed to tangible one.

V. The *share* stage retrieves knowledge from the departmental memory and makes it accessible to the users. Individuals, teams and departments often share ideas, opinions, gossip, knowledge & expertise in meetings held in person or through groupware.

VI. The *apply* stage reclaims and uses the needed knowledge in performing tasks, solving problems, making decisions, researching ideas and learning. To reclaim just the knowledge, requires that the system understand the user's purpose and context. To receive the knowledge at the right time requires a proactive system that monitors the user's actions and behavior and determines his/her purpose.

VII. The *create* stage uncovers new knowledge through many avenues, such as observing students, student feedback and analysis, research, experimentation, creative thinking and automated knowledge discovery and data mining.

Applying Information Technology

Information technology (IT) becomes the key player when knowledge transformation is to be done. The CSE department's effort would be to transform input data to knowledge and finally expert knowledge. In order to apply information an IT assessment of the department is completed. The IT assessment measures the availability and capability of computing and communication resources existing in the department. This assessment also helps to determine the relative maturity of the department's technical position. Now let's discuss what's desired from this system:

A. Infrastructure: a setting which helps organize and structure the learning environment.

B. Controller: a mechanism that will monitor, coordinate and control this system.

C. Navigation: human-computer interaction concepts to enable easy information access.

D. Presentation: ability for the pedagogical community to tailor and customize data.

E. Acquisition: a simplified environment for capturing knowledge, cases, opinions, learning and sensory data.

F. Advisory: a communication pathway for instructors to provide advice, reminders, assistance to the student community.

G. Instruction: an interface for providing training, tutorial, job aids and off-line classroom sessions.

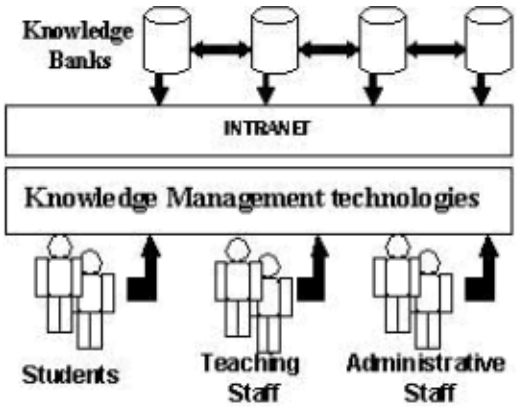
H. Evaluation: a mode to assess and grade the students' performance over the knowledge network.

I. Search: efficient searching tools to make possible the acquisition of the desired knowledge.

An intranet is the networking medium and it provides a stable messaging and collaboration platform. Some of the essential IT tools and technologies required are databases, expert systems, intranet, Internet, storage media and decision-making agents.

Case Study: KM at CSE/MIT

We are developing a framework at CSE/MIT. The strength of this research endeavor lies in the fact that all the components of the system should be developed in the department. Students would be aptly guided by their teachers. The framework is shown below:



Conclusion

The paper introduces the concept of deployment of a KM system in educational institutions. The important aspects of KM involved in educational departments were touched upon in this discussion. The case study at CSE/MIT reflects the thought that knowledge management is more realistic where proficient skilled members exist.