

# INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT

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**KNOWLEDGE BANK: AN INITIATIVE FOR ACADEMIC EXCELLENCE**

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**ABSTRACT**

Knowledge sharing is an important process in the knowledge management. Education systems are the key sources of knowledge. The created knowledge in the educational organizations must be saved and accessed whenever required but currently there is no any platform for knowledge sharing. So knowledge may be lost and it is not transformed from one generation to other. To reduce this knowledge loss a framework for knowledge management in academics is created; outcome of which is knowledge bank. Knowledge bank is software created for knowledge sharing among staff members and students. The problem of implementing knowledge bank in college is studied and its effectiveness in the education is identified. This paper focuses on the concept of knowledge sharing in academics. In real life there is big research gap across the institution for knowledge sharing.

**KEYWORDS**

Knowledge, knowledge management, knowledge bank, knowledge elements.

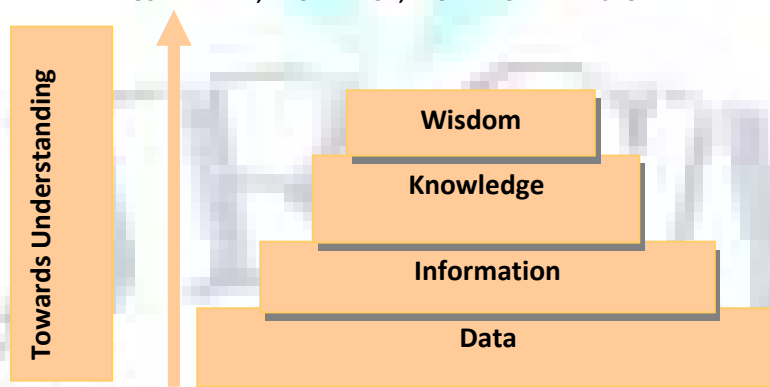
**INTRODUCTION**

Education systems are the key sources of knowledge generation. The generated knowledge will have importance if and only if it is shared. It has been observed that there are so many difficulties for knowledge sharing itself. But as innovations are going on different methods of knowledge sharing such as network technologies, search engines, portals, groupware and discussion forums are used. All these methods involve strong use of computers. But there are so many peoples in education industry they want to share knowledge and no any simple platform is available for it. Knowledge Bank provide simple platform for sharing knowledge in education industry. The knowledge can be deposited in bank and can be withdrawn whenever necessary. The effective use of knowledge bank increases in academic excellence. Basically success of knowledge management program depends on the right environment created by organization with a strong commitment of all members to sharing of knowledge.

**REVIEW OF LITERATURE**

Knowledge is our most valuable resource and knowledge management (KM) ensures that it is preserved and made available at the right time and in the right form. In general three things come into picture by the word knowledge. We are familiar with the state of knowing which is equated with recognizing of the facts, methods, principles, and techniques. This is commonly worded as "know what". Secondly we use the word knowledge for different techniques used for grasping of facts, methods principles and correspond to "know how". Third we use the term knowledge to refer to modified, codified, captured facts methods, principles and so on (i.e. in the form of books, papers, documents, formulas, computer code etc.) which will be used in the process of decision making and is "know why". (Nickols, F. W., 2000)

Describing the difference between information and knowledge is difficult because both terms are often used interchangeably. The sequence data → information → knowledge → wisdom represents an emergent continuum as shown in Figure 1.

**FIGURE 1: DATA, INFORMATION, KNOWLEDGE AND WISDOM**

There are two types of knowledge.

- 1) Tacit knowledge
- 2) Explicit knowledge.

- 1) **TACIT KNOWLEDGE** - The identifying attributes of tacit knowledge can be summarized as follows [wikipedia]
  - Subjective, cognitive, experiential learning
  - Hard to document
  - Hard to transfer / teach / learn
  - Involves a lot of human interpretation
  - Individual Expertise, Memories, Values, Beliefs and Viewpoints

An example of the problems of tacit knowledge is the Bessemer process – Bessemer sold a patent to his advanced steel making process and was sued by the purchasers who couldn't get it to work – in the end Bessemer set up his own steel company which became one of the largest in the world and changed the face of steel making.

- 2) **EXPLICIT KNOWLEDGE** - Explicit knowledge is increasingly being emphasized in both practice and literature. Groupware, intranets, list servers, knowledge repositories, database management and knowledge action networks allow the sharing of organizational knowledge (Scarborough et al, 1999). The identifying attributes of explicit knowledge and the ones that clearly distinguish it from tacit knowledge are summarized below.
- Objective, rational, technical.
  - Easily documented.
  - Easily transferred / taught / learned.
  - Process of communication from one place to another in a systematic way and is more formal and codified.

Knowledge management involves enhancing organizational knowledge through sound practices of information management and organizational learning. KM is aimed at achieving organizational goals as stated below. Knowledge management is a process for optimizing the effective application of intellectual capital to achieve objectives (Webizus consulting, 2003).

Knowledge Management System (KM System) refers to a (generally IT based) system for managing knowledge in organizations, supporting creation, capture, storage and dissemination of information.

Following table provides the evolution of knowledge Management over decades(studygalaxy,2012).

The 2000 → Knowledge Management Knowledge Sharing Culture Enterprise Integration Intellectual Capital Harnessing
The 90s → Learning Organization Market Valuation Information Systems Intranets/Extranets Re-engineering
The 80s → TQM Downsizing
The 70s → Strategic Planning Portfolio Management Automation
The 60s → Centralization And Decentralization Conglomeration
The 50s → Diversification EDP Quantitative Management Management By Objectives (MBO)

## CHALLENGES FACING KNOWLEDGE MANAGEMENT IN EDUCATION

The Knowledge Management in Education Summit, held in December 2002 in San Francisco, California, was the first professional gathering in the United States focusing on the role of knowledge management in education. The Summit addressed opportunities and challenges faced by organization's peoples to improve the use and sharing information in education through practices. Knowledge management brings together three core organizational resources- people, processes and technologies to enable the organization to use and share information more effectively. Organizations should promote policies and practices that help people to share and manage the knowledge. Technology is the vital contributor for the health and effectiveness of the organization. The most effective technology is the user groups for exchanges of information across departments. So practically for implementation of knowledge management in education there are seven suggestions.

- 1) **Build on the vocabulary and practices of the organizational context:** In many organizations most of the peoples don't use data, information in decision making processes. These peoples use experiences and their own methods for decision making. Rather than peoples using their own experiences, open ending discussion will be held while processing processes and the vocabulary and practices will be developed. Peoples have begun to use knowledge management practices without reference to the term knowledge management. Many practices such as collaboration, teamwork, and collegiality can be effectively used to build for the support of knowledge management.
- 2) **Focus on the people and their needs and go where the energy is:** There is no single practice or method used for managing knowledge in the organization. It is the role of the organization to promote policies and practices that help people who share and manage the knowledge effectively. When there is no collaboration, less capacity of the organization and no funding, then implementing knowledge management are difficult. So there must be desire in the peoples mind for helping the peoples in the organization. Information sharing norms should be created for the communities who share the knowledge.
- 3) **Make explicit the work processes and patterns of information flow:** Information and knowledge audits can be performed for examining work processes. For instance, the staffs who are burdened with different type of routine processes are examined according to organizational goals. Trigger points can be identified for information sharing in the organization.
- 4) **Make sure technology is on board but do not let it steer the ship:** Technologies plays important role in efficient and automated means to track data over time, interact with peoples, post the information and share the discoveries. The most successful technology implementations are those that are accepted by human based strategies and from an understanding of the patterns of information use already present. People should be aware of the technology which they are using for knowledge sharing; they have the responsibility of using that technology otherwise peoples will not maintain the technology and the benefits of knowledge sharing will be lost.
- 5) **Improve student learning and outcomes, don't settle for procedural tinkering:** Different learning and teaching strategies are used to improve students learning. At the time of examination teachers should draw different kind of questions and gather the outcome and then the results are reviewed. Such kind of processes promotes participation, interaction and learning to the teacher as well as student also.
- 6) **Expect an iterative process that endures over time:** Knowledge management is the process that endures over time.



- 7) **Consider the larger picture:** By starting from small processes a vision of large picture will be maintained. Peoples should be rewarded for sharing information then it positively reflects. When Knowledge management is used in overall organization functioning processes then it gives better outcomes (Petrides L. & Nodine T., 2003).

### STATEMENT OF PROBLEM

Knowledge is present in talents, concepts, root causes, ideas, judgments, observations, relationships, decisions and a concept of every individual. For knowledge to have value it should be shared, tasted and used. Each field is benefited from knowledge management. Even an academic institute can be benefited from knowledge management. In academic institute no formal knowledge management is in place. The Knowledge sharing is important process in knowledge management. The transfer of knowledge from a knowledgeable teacher to his colleagues happens informally and depends on the initiatives taken by both. The new teacher may face problems while teaching the subject, drawing its question papers and taking practicles. But if the experienced teacher do not share any kind of data or guidelines then it is difficult for the new teacher to teach the subject. Proper methods of storing knowledge are not applied, the knowledge may be lost and is not passed over to the next generation. One good example is what happened in NASA (National Aeronautics and Space Administration) admitted publicly that the knowledge of how to put a man on the moon has been lost. The lessons that were learned and innovations that were sparked cannot be found in the organizational memory of NASA (By Dr. K.L Dalkir AP in McGill Graduate School of Information and Library Studies).

To reduce the loss knowledge should be stored in a stable easily accessible, cumulative knowledge base (i.e. knowledge bank) and retain and make available when needed by providing an easy to use and efficient interface. Knowledge management is aimed at achieving this goal. Providing a knowledge bank to a newly recruited teacher can excel the quality of teaching.

### OBJECTIVES

- 1) To develop an understanding of concepts and the theories in the areas of knowledge management.
- 2) To understand the need for Knowledge bank.
- 3) To provide an interface for effective and easy use of Knowledge bank.
- 4) Design framework and partly implement knowledge bank for academic institute.

### RESEARCH METHODOLOGY

Data should be in qualitative form collected from academic institute through interviews, observations, questionnaires, different research papers, journals, question formats, examples case studies, practicals, class room lectures, etc. From this data different initiatives of knowledge management will be identified. Knowledge bank is one of the initiatives for knowledge management and to develop it what are the different technological requirements are identified. Knowledge bank will be implemented with Java as front end and XML as back end.

### DIFFERENT INITIATIVES OF KNOWLEDGE MANAGEMENT

Technology is the most important imperative for knowledge management. Effective knowledge management typically requires an appropriate combination of technology. Knowledge Management cannot be implemented by putting up a single, however complex, system in place to manage knowledge. It is an integration of several information systems initiatives that help to people to create and share knowledge effectively.

- 1) **Portals:** These are designed to organize Web-based information sources on one desktop interface. It combines several Internet technologies such as search tool, new feeds, links to favourite web site, content organized by topic, and so forth.
- 2) **Groupware and discussion forums:** Groupware is asset of hardware, software, people and procedures designed to help groups work together (Dennis A., Poothari S. and Natharajan V., 1996). Traditional groupware had been focused primarily on private, often LAN based, internal networks but web groupware brings together group members in different locations working on different platforms. Web groupware allows any –place-ant-time interaction so long as there is an Internet connection. It allows for Parallel communication, ideas, and opinions simultaneously (Swallows knowledge, TCB books). E-mail, voice mail, audio video conferencing is used as an effective electronic collaboration tool. It connects experts with the seekers of that expertise, recognizing the power of conversation to convey critical knowledge (Gundry J. and Metes G, 1996).
- 3) **Web Search Engines:** Search engine is information retrieval system designed to help find information stored on computer system. Search engines help to minimize the time required to find the information and the amount of information that will be consulted.
- 4) **Document Management Systems:** A document or report is information but document representation style or report format is a knowledge element which can be reused as a template for generating similar documents and reports.
- 5) **Knowledge Bank:** World Bank president James Wolfensohn articulated the idea of the knowledge bank in 1996. Building a knowledge bank for an organization can encourage the administrators, lecturers, researchers, information workers, and librarians to submit their own digital contents. The Knowledge Bank is all about depositing and retrieving knowledge when needed by members of the communities.
- 6) **Knowledge discovery initiatives:** Data mining is a process of discovering knowledge from large amount of data stored in databases, data warehouses or other information repositories. The process of knowledge discovery generally involves an interactive sequence of the following steps; Data cleaning, data integration, data selection, data transformation, data mining, pattern evolution and knowledge representation (Han J. & Kamber M, 2001).

### TECHNOLOGY REQUIREMENT OF KNOWLEDGE BANK

Technologies play important role in knowledge sharing because they provide an efficient and automated means to track data over time, interact with colleagues, post information and share discoveries.

- 1) **Network:** A computer network is a group of interconnected computers. One of the goal of computer network is resource sharing. In resource sharing the different resources at different geographical location are shared. Another important goal is file transfer protocol (FTP). Using FTP different types of files are transferred from one computer to another. Peer-to-Peer Networking: A peer to peer (or P2P) computer network uses diverse connectivity between participants in a network.

Virtual Private Network- A **virtual private network (VPN)** is a private network using public network to connect remote users together So, VPN helps employees at different geographical area work together like desktop sharing.

- 2) **XML:** XML is primarily intended to meet the requirements of large –scale web content providers for industry specific markup.
- 3) **Server:** Server is a computer dedicated for processing the requests that are sent by clients (other computers) in the network. The process between client and server is called as request-response type of process. Server handles concurrent requests at a time. There are many types of servers, such as mail servers, file servers, web servers, proxy servers, Application server, communication server, database server, fax server, game server, home server, print server, standalone server and client server.
- 4) **Dynamic Data exchange:** DDE is a technology for communication between multiple applications under Microsoft Windows or OS/2. It is first introduced in 1987. The primary function of DDE is to allow Windows applications to share data. For e.g. Value in a cell in Excel could be linked to other applications, so when a value is changes in those applications that are immediately reflected in excel.
- 5) **Java Server Pages:** JSP technology enables Web developers and designers to rapidly develop and easily maintain, information-rich, dynamic Web pages that leverage existing business systems. As part of the Java technology family, JSP technology enables rapid development of Web-based applications that are platform independent (Sun Microsystems, 2008).

**IMPLEMENTATION OF KNOWLEDGE BANK (STEPS)**

The knowledge that any staff member will have will be deposited in the knowledge bank. The deposited knowledge can be withdrawn whenever needed. This knowledge bank is created for Academics. The knowledge bank will be stored on the server. There will be separate folder for each subject.

**SECURITY AND ACCESS LEVELS**

Users will be authenticated before using Knowledge Bank.

There are four types of tasks and the users will be given permissions to perform these tasks. The four tasks are

- Upload
- Search
- Download
- Remove

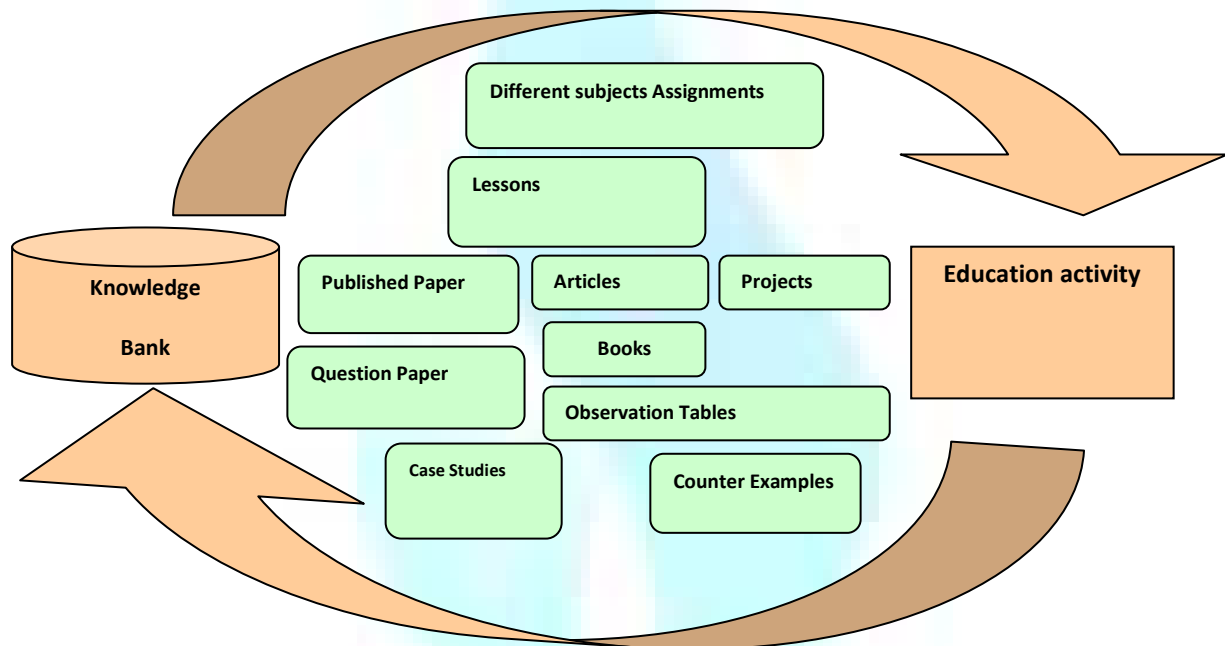
There will be one Administrator. He can only remove the knowledge elements from the bank. There are many users. All users are allowed to upload, download and search in the knowledge bank. The Permission for download will be given to only some of the users.

**Upload Interface:** After the user has logged in he will be provided interface to perform the task he is allowed. After user selects the upload option, the interface will query him about the details of knowledge element i.e. subject, special subject, year of publication of particular document (journal/article), keyword, author and the name of the file that is to be uploaded.

**Search Interface:** The search will provide options to search on such as subject, special subject, author, keywords etc. The list of documents matching the search criteria will be displayed.

**Download:** By selecting appropriate file name user can download the required document.

**Remove:** The outdated documents are removed. Only the user, which will have the authentication, will remove the documents.

**FIGURE 2: KNOWLEDGE BANK**

STEPS for implementation knowledge bank

**1) IDENTIFY THE KNOWLEDGE ELEMENTS**

For identification of knowledge elements data from different departmental laboratories was collected. Data from different staff members was collected. Interview, Observation and survey techniques are used for identifying knowledge elements. Questions will be read out to the interviewee and their responses will be noted down. Different views from different interviewee will be collected and then analysed.

**2) IDENTIFY ATTRIBUTES OF KNOWLEDGE ELEMENTS**

Any knowledge element in any subject can be understood by its attributes. Attributes clearly specify its type, need, usage; subject under consideration and its measurements. Particular knowledge element is studied. Recordable things are attributes of the knowledge elements. The other attributes vary from one knowledge element to other and these are better known to the people who create and use the knowledge element. The attributes extracted in the interview process.

**3) DESIGNING OF UPLOAD INTERFACE**

This will vary depending on knowledge element and their attributes. The different controls like Label, Text Box, radio buttons, calendar controls etc will be used for designing upload interface.

**4) DESIGNING THE SEARCH INTERFACE**

Search will depend on users of knowledge bank. Mainly those who are going to withdraw will be able to specify the search criteria. These should be uniform though knowledge elements will be having different attributes. For example author wise search, Year wise search, course wise search, subject wise search and mainly important keyword wise search. Grid Control which looks like a table can be used for displaying data according to search condition.

Figure 3 shows an example for the interface for uploading question paper into the knowledge bank.

FIGURE 3: DESIGN OF UPLOAD INTERFACE FOR QUESTION PAPER

**Upload Interface For Question Paper**

Course: MSc(Computer Science) [Add Course]

Subject: Computer Science [Add Subject]

Special Subject: Networking [Add Sp.Sub.]

Subject Code: 11103

Author: Ms. Meher

Semester: I

Year: Nov 2004

Maximum Marks: 100      Total Marks: 120

Duration: 3 Hr.

Location: College Library [Add Loc.]

Format of Questions: Multiple Choice (Selected), Answer in Brief, Shortnote, Definitions

Instructions to candidates: Draw neat and clean diagrams

File Name: c:\knowledge Bank\paper1.doc [Browse]

[Upload]

FIGURE 4: DESIGN OF UPLOAD INTERFACE FOR BOOK

**Upload Interface For Book**

Course: MSc(Computer Science) [Add Course]

Subject: Computer Science [Add Subject]

Special Subject: Data Structure [Add Sp.Sub.]

Type of Book:  Text Book  Reference Book

Book Name: Data Strusture and Algorithms

Authors: Mrs. Kavita Kale

Keywords: Image Structure, Stack, Linked Lists, Queues, Trees

Number of pages: 95

Publisher Name: Tata McGraw Hill

Year: Nov 2004

Edition: Second

ISBN No.: 81-204-02345 -1

Location: College Library [Add Loc.]

Comments: book is used for bca,bcs,mca,mcs

File Name: c:\knowledge bank\data1.pdf [Browse]

[Upload]

FIGURE 5: DESIGN OF SEARCH INTERFACE

**Search Interface**

Course

Subject

Special Subject

Authors

Year

Sun	Mon	Tue	Wed	Thu	Fri	Sat
26	27	28	29	30	31	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	1	2	3	4	5	6

Knowledge Elements

Question Paper       Book       Published paper

Counter example       Article       Case Study

Observation Table       Lecture       Projects

Written Assignment

## RESULT AND DISCUSSION

College is the most important educational institute where more knowledge interaction between teacher and student happens. There are lots of other subjects & courses in the college that students can learn. So the knowledge must be saved and retrieved whenever necessary. Here knowledge bank plays very important role. Following are some of the advantages of knowledge bank in education.

- 1) Knowledge bank will become knowledge asset of the organization.
- 2) Knowledge bank provides information to the staff which is helpful for the staff for teaching in the classroom.
- 3) Make the knowledge bank rich in content as the usage increases. As new staff members are adding knowledge to the knowledge bank the knowledge bank become rich and richer.
- 4) Knowledge Bank improves teacher efficiency. If teacher wants to teach the topic and he/she wants more information related to that topic then he/she can search in the knowledge bank and will get more information so that the teacher will teach the particular topic more efficiently.
- 5) Knowledge bank can be used by staff members, which will improve and accelerate learning.
- 6) Knowledge transfer from one person to another is better.
- 7) New knowledge which will be produced can be kept in knowledge bank so that whenever it is needed it is withdrawn from the knowledge banks.

## CONCLUSION

As we know KM is used to achieve objectives. The outcome of Education system is knowledge that student possess. If knowledge bank is used for knowledge sharing then it will increase an academic excellence.

## LIMITATIONS

The study will be restricted to only P.E. society's institute at college level. The design and interface will be completed in given time but the implementations will be partly done for studying the results of the knowledge management.

## SCOPE FOR FURTHER RESEARCH

All over the world companies are finding knowledge management is useful and advantageous which is successful leading to high performance. To start with KM initiative K-audit is firstly performed for successful management. In this paper we have not considered K-audit. So after considering K- Audit the performance of knowledge bank can also be improved. All over the world in education systems like universities does not have knowledge sharing across them. The knowledge generated in research activity is shared through thesis and research paper but there is no knowledge sharing across different universities at research level. Research activity which is currently going on is only guide and student and university knows. If any other fellow want to perform research on the same topic then he will never know who are performing research on the same topic currently. Another thing is there is no knowledge from placement point of view shared across universities and industries

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