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Mayank Trivedi

Pramukhswami Medical College

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Knowledge Management in Health Science Libraries

Mayank Trivedi, Chief Librarian
Pramukhswami Medical College, Gujarat, India
mjt143@gmail.com

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Abstract

Knowledge management in health science institutions is a major issue today. Health science professionals are routinely dealing with evidence-based medicine and problem-based learning. Health Science Librarian has a significant role in the decision making of clinical practice. The article focuses on the principles, strategies, components and barriers of knowledge management with special aspect in relation to Health Science Institutions.

Introduction

Where is the Wisdom we have lost in Knowledge
Where is the Knowledge we have lost in Information
Choruses from the Rock, T. S. Eliot

The terms information, knowledge and wisdom are interrelated. *Information* relates to description, definition, or perspective (what, who, when, where), *knowledge* comprises strategy, practice, method, or approach (how), while *wisdom* embodies principle, insight, moral, or archetype (why).

Before attempting to address the question of knowledge management, it's necessary to have an explanation regarding what knowledge is. The dictionary definition of knowledge is "the facts, feelings or experiences known by a person or a group of people." It is considered to be present in ideas, judgment, root causes, relationships, perspectives and concepts. Knowledge is the result of learning and is stored in an

individual brain or encoded in documents, product, facilities and concepts. We are all familiar with the popular saying “knowledge is power.” Knowledge is basically the full utilization of information and data, coupled with the potential of people’s skill. Yates-Mercer [1] observed that

- A collection of data is not information.
- A collection of information is not knowledge.
- A collection of knowledge is not wisdom.
- A collection of wisdom is not truth.

Medicine is one of the specialized branches of higher education where there occurs a tremendous amount of learning and research associated with the information explosion. Sharing of information amongst teachers, students and practitioners also contributes to a significant aspect of medical education. Today’s improvement in information technology has also ensured that such health-related information can also be shared with the community.

Traditionally, medical education has had as its foundation a combination of didactic instruction in the classroom and integrated, hands-on “Socratic Method” learning in the clinical setting. Of late, there has been an increase in the use of problem-based learning discussions (PBLDs) in an effort to integrate basic science knowledge and clinical decision making with a goal of teaching critical decision making skills to upcoming physicians and other health care providers. Problem-based learning stems from an appreciation that the application of static knowledge serves as a rich source of learning about dynamic and important clinical decisions that are made every day in the medical arena. Problem-based learning is not the only modality for education and we are unlikely to ever get rid of standard lectures for the delivery of information or the Socratic Method to engage students to develop their critical thinking skills, particularly in this part of the globe because of large number of students.

Medical education, especially in the advanced stages of training, has many unique problems such as the temporal and geographic distribution of students, residents and the physician instructors. Further complications result from unpredictable schedules that are present in most areas of medicine leading to poorly attended or cancelled lectures. Medical progress demands the reconciling of old and new information within the local context of the clinician, and this presupposes individual, critical appraisal of evidence and integration with clinical experience.

Effective knowledge transfer is of paramount importance in the advancement of our health care system. In any discipline, effective knowledge transfers consist of the delivery of factual knowledge about the topic and exposure to tools and thinking processes required to make critical decisions about the information at hand.

Traditional didactic lectures address the delivery of factual knowledge; however one can question both the effectiveness as well as the efficiency of this mode of education.[2]

The challenges faced by medical educators, accompanied by the tremendous amount of information explosion and the advancement of information technology have initiated the necessity of knowledge management.

Knowledge Management

Knowledge management is “an audit of intellectual assets that highlights unique sources, critical functions and potential bottlenecks which would otherwise hinder the knowledge flow to the point of use,” It protects intellectual assets from decay, seeks opportunities to enhance decisions, services and products through adding intelligence, increasing value and providing flexibility. e-Zest defines knowledge management (KM) as: “KM is the process by which information is used to create something actionable.”[3]

Arun O. Gupta, Senior Director Business Technology, Pfizer Ltd describes KM as a practice that addresses the need for information that is required for making effective decisions. If this information is structured, the same can be translated into knowledge by applying a set of predefined rules. For example, comments on discussion boards can be converted into useful FAQs.[4]

The purpose of knowledge management is to:

- Gain significant returns out of the data and information we produce and the way in which we produce it.
- Collect new materials; select materials for inclusion in database, input data, index data, search and retrieve data and deliver the output to the end user; perform data cleaning or deletion of redundant records from the database; check for the systems security. From this knowledge, librarians can build a web front and can allow the user to access the information in a quick and easy way.
- Connect each component of knowledge with a set of experts and develop an active database of such experts.
- Develop collections on important subjects.
- Develop links with resources both physical, such as institutions and individuals, and electronic, such as electronic resources available through the Internet.
- Capture knowledge from projects, assignments, gray literature, case studies, experts etc. on given subjects and make them accessible.
- Give as much information to the users as the users need to complete their assignments.

- Make each Knowledge Center as a one-stop center for accessing knowledge on different subjects or topics of interest to users in the public libraries.
- Train every user in accessing information and guide the users to the appropriate resource.

The components of knowledge management[5] are:

1. People management—recognition of the skills of people
2. Process management—links into the identification and deployment of practices may be associated with business process reengineering.
3. Information management—knowledge, and not just information and data, should be available from wherever it is needed to all those authorized to receive it. The language should be simple and appropriate making both input and output easy.

The five enablers for knowledge creation are vision, strategy, structure, system, and staff.

Knowledge Resources

There are numerous kinds of knowledge resources. The intellectual and knowledge-based assets fall into one of two categories: explicit or tacit. Explicit knowledge is that what we can express to others. It is formal and systematic, easily communicated and shared, as in product specifications or a computer program. Tacit knowledge is that knowledge which comprises the rest of explicit knowledge, i.e. which we cannot communicate in words or symbols. It is highly personal, hard to formalize and therefore it is difficult to communicate. It is transferred by tradition and shared experience, for example through apprenticeships or job training.

The four basic fundamentals of knowledge are:

1. *Knowledge Capture*
Capturing the EXPLICIT and TACIT knowledge in people to share, sustain and grow the competencies.
2. *Disseminate*
Effectively, in both time and space across the organization and its partners.
3. *Re-Use*
Efficient re-use of knowledge created at different times and space by others within.
4. *Collaborate*
Effectively, among members of every group and across groups.

Key elements of Knowledge Management Implementation

Implementation of knowledge management requires:

1. High-level commitment to change.
2. Human Resource of organization.
3. To and fro communication in the hierarchical structure of management.
4. Understanding among the staff.
5. Keeping track of the process of workflow in the organization.

A knowledge management system should be able to provide information relevant to the ongoing projects at the right time and in the right context.

Process of Knowledge Management

Singh[6] explains that the knowledge management process is about acquisition, creation, packaging, and application or reuse of knowledge. Some examples of each of these types of knowledge management process are:[7]

- *Knowledge acquisition*: finding existing knowledge, understanding requirements, searching among multiple sources.
- *Knowledge creation*: research activities, creative processes in advertising, writing books or articles, making movies, etc.
- *Packaging*: publishing, editing, design work.
- *Applying or using existing knowledge*: auditing, medical diagnosis;
- *Reuse of knowledge for a new purpose*: leveraging knowledge product development processes, software development.

Knowledge Management in Health Science Libraries

The Department of Health, UK is an active member of the government's Knowledge Network, coordinated by the Office of the e-Envoy. The Department takes a highly pragmatic approach to knowledge management which it views as a continuous process of change with three aspects:

- Creating the knowledge base—both tangible and intangible
- Making it available in a user-friendly form
- Encouraging and teaching people to seek, share, and use knowledge.

The Department developed its own knowledge management strategy in 2001. The strategy is built around two simple but effective concepts:

- Recognizing the ways in which you/we/they are doing it (knowledge management) already - for example through the use of e-mail, shared document drives, desktop access to information and knowledge databases, the Departmental intranet, online staff directories, meetings, seminars, informal chats at the coffee machine etc.
- Building on this by doing it better—for example by improving access to information and ‘joining up’ information assets, providing training and guidance, piloting new ways to capture and share knowledge etc.

The Department’s strategy, built around three key ingredients—people, processes and technology, included a two-year implementation plan and covered four key strands: leadership and accountability; people and change; content and processes; and information and technical infrastructure.

Health science librarians require knowledge of the content of information resources and should be skilled in their use. They must understand the principles and practices related to providing information to meet specific user needs and how to assure convenient access to all forms of information including:[8]

- information needs of health practitioners, researchers, educators, students, and consumers
- information seeking and transfer characteristics of user groups and individuals
- assessment of identified information needs
- health sciences and other information resources and their relevance to specific information needs
- retrieval strategies and techniques
- analysis, evaluation, and synthesis of information for identified information needs
- development of services tailored to meet needs of individuals and groups (resource sharing).

Health Sciences Resource Management

Health sciences librarians must know the theory of, as well as have skills needed for identifying, collecting, evaluating, and organizing resources and developing and providing access to databases[9] including: identification and selection of materials and their sources, acquisition of materials, bibliometric techniques, thesauri construction, bibliographic tools, cataloging and classification theory, national and international standards and conventions including cataloging and filing rules, indexing, abstracting, and classification systems, inventory control systems, serial publications, resource conservation and preservation, publishing industry, trends in

information formatting, production, packaging, dissemination and copyright issues.[[10](#)]

Information Systems and Technology

Developments in technology have reshaped the goals and systems of health sciences librarianship and changed the way information professionals function. Health sciences librarians must be able to understand and use technology and systems to manage all forms of information, including:

- basic principles of automated systems: (record and file construction, computer hardware and software, telecommunications and networking, database management software),
- systems analysis, artificial intelligence and expert systems,
- human behavior and technology,
- acquisition, design, use, and evaluation of information systems,
- integration of systems and technology into the long-term information management needs and plans of the institution.

Instructional Support Systems[[11](#)]

Teaching ways to access, organize, and use information to solve problems is an essential and ever-widening responsibility of the health sciences librarian. Effective instruction entails not only knowledge of the structure and content of specific courses and technology, but also an understanding of and expertise in learning theory and cognitive psychology, curriculum and instructional development, instructional systems design, educational needs assessment and analysis, learning style appraisal, instructional methodologies and evaluation of learning outcomes.

Research, Analysis, and Interpretation

The library has its responsibility to explore the “fundamental nature of biomedical information storage and organization, utilization, and application in learning, patient care, and the generation of new knowledge.” In order to conduct and interpret research, the health sciences librarian is called upon to apply knowledge, skills, and understanding of the theoretical basis of health sciences information; education and clinical practice; information structure, transfer, and processing; analysis, evaluation, and application of research results; methods for evaluating system effectiveness and efficiency; statistical theory and research methodologies

Knowledge Management in Evidence Based Medicine (EBM)[[12](#)]

It is now recognized that hormone therapy has been widely recommended as a preventative therapy and adopted in the absence of long-term random controlled trials proving efficacy and safety. Evidences allowed clinicians to conclude that hormone therapy was the right thing. Pervasive focus is given on EBM in medical education, research, and clinical practice and the translation of knowledge into clinical medical practice. While the principle that clinical practice should be based on the best available research evidence is not new to modern medicine, the means of achieving this principle has been formalized and is currently understood to be the practice of EBM; that is, ‘the integration of best research evidence with clinical expertise and patient values.’ EBM can thus be seen as a tool that gives clinicians the knowledge and authority to determine both the limitations of a given piece of evidence within the specific clinical context, and the consequences of applying that evidence within the context of the individual patient. KM allows doctors to scrutinize and integrate into practice new information and trends in medical management. ‘Standard-of-care’ guidelines should be viewed as the beginning point for discussion, and doctors must be aware that industry is impacting fundamental building blocks of medical change research, dissemination of information, and guideline development. By critically analyzing available evidence and integrating that knowledge with clinical experience and patient values, doctors will be able to explore the applicability of guidelines and maintain required tension between autonomy and treatment directives.

Global scenario:

The KM Cluster was founded in the San Francisco Bay Area and Silicon Valley in 1998. Focus is on practice excellence and leadership. Popular themes are enterprise collaboration, value networks, prediction markets, organizational learning, communities of practice, social networks, intellectual capital, complexity science, storytelling and narrative, content management, measurement & metrics, new media, innovation & invention and analytics & taxonomies.

About the Innovation and Knowledge Management Practice

The Innovation and knowledge management practice is part of The Conference Board of Canada’s Policy, Business and Society Division. The mission of the practice is *to help Canadian organizations to prosper... through innovation, knowledge and technology*. The Conference Board actively addresses innovation, and the functional management of knowledge, skills, and technology within organizations—as well as strategic policy issues that relate these factors to competitiveness. The practice integrates Conference Board expertise in the management of technology, knowledge management, connectedness, information technology, organizational effectiveness, leadership, partnerships, education, learning, economics, regulation and taxation. They nurture and deliver this expertise through an interactive mix of executive

networks, public conferences, workshops, study tours, courses, publications and customized research.

India is also not falling behind the other countries. Several medical universities and medical colleges have started giving medical education through e-learning. Among them are the Manipal Academy of Higher Education, Manipal; Rajiv Gandhi University of Health Sciences, Bangalore; Medvarsity Online Ltd; Apollo Hospital, Hyderabad. These institutions are providing health information through knowledge management. Some Indian websites which are giving health KM are MedClik.com, Eklavya.org, etc.[13]

The 21st century has been acknowledged as the ‘Knowledge Century.’ Every nation finds itself operating in an increasingly competitive and globalized international environment where the information infrastructure, research and innovation systems, education and lifelong learning, and regulatory frameworks are crucial variables. In the next few decades, India will probably have the largest set of young people in the world. Given this demographic advantage over the countries of the West, and even China, we are optimally positioned, in the words of our Prime Minister, to “leapfrog in the race for social and economic development” by establishing a knowledge-oriented paradigm of development. On 13 June 2005, the Prime Minister of India constituted the National Knowledge Commission, with stalwarts like Mr. Sam Pitroda as a member of that commission and with the mandate of devising and guiding reforms that will transform India into a strong and vibrant knowledge economy in coming years. The commission has been given a timeframe of three years from 2 October 2005 to 2 October 2008 to achieve its objectives. The overall task before the National Knowledge Commission is to take steps that will give India the ‘knowledge edge’ in the coming decades, i.e. to ensure that our country becomes a leader in the creation, application and dissemination of knowledge in the sectors of health, agriculture, government and industry using Information and Communication Technology (ICT) to enhance standards in education and widely disseminate easily accessible knowledge that is useful to the public.[14]

Patni Computer Systems, India’s sixth largest software services exporter, is one of the few organizations that makes extensive use of KM. The company has created a knowledge center, which allows its employees to learn about new technologies, have discussions, get technical queries answered and even draft quick sales proposals. For Patni, this system has led to a reduction in training time and a boost in productivity due to better sharing of knowledge among its employees.

Here are some of the features of the knowledge center:

- Information about the quality management system, information related to different projects, related best practices and lessons learned, technology related white papers and tutorials.
- A searchable repository of reusable software components
- Based upon a Web-based model, information is accessible from all Patni offices
- Classification of content according to industry verticals and technologies
- A discussion forum for exchange of ideas and solutions
- A helpdesk for facilitating process consulting to projects
- A marketing center which holds frequently asked questions by customers (the same is used by employees in sales and marketing). Additionally, case studies and templates for proposals and newsletters are also captured in the knowledge center.
- A role-based access privilege model that ensures that every user has access only to information pertaining to his department

The DAISY Consortium, project NOVA and several other initiatives facilitate knowledge access even for disadvantaged people; hence there is no dearth of technologies for knowledge access. Problems of knowledge accessibility arise due to uneven access to technology which leads to the digital divide. There is a need to develop ICT infrastructure for tackling knowledge management problems of developing countries.

Librarians as Knowledge Managers

Tools of knowledge management consist of 70% services and 30% technology. Librarians provide these services and are thus playing the role of knowledge manager. Their functions are:

- Providing services to the user community
- Sharing of information and understanding of user needs
- Analyzing documents, classifying and sorting them for easy retrieval
- Building the indexes, etc.

A Closer Look at KM System Types[\[15\]](#)

Knowledge systems can be divided into three main types: Informational Knowledge Systems, Knowledge Management Tools, and Dynamic Knowledge Systems. Maintaining and developing knowledge repositories in medical colleges and hospitals,

e.g. the organization's intranet, key information databases and collections, video conferencing, telemedicine, etc. is important along with coordinating the capture of knowledge from projects and assignments and incorporating it into databases of best practices and/or case studies. It also involves identifying and forming links with sources of important knowledge, both inside and outside the organization, providing connections between the needy and the provider. Identification of subject experts, maintaining a skills database, connecting people who share similar needs or are working on similar problems, etc. remains an important facet of KM system. In summary, KM provides a 'one stop shop' for multiple knowledge and information needs, assisting in information and knowledge skills training.

Dynamic Knowledge Management System

A system with no KM tools is fully functional in terms of learning and innovation capabilities, but it is unable to take advantage as they lack the navigation, discovery, and knowledge enhancing capabilities offered by those tools. A system low on the dynamic components learns from past mistakes but does not have the ability to innovate beyond its existing knowledge. It lacks the challenge and action orientation necessary to stimulate the innovation. This is the most typical imbalance in today's knowledge environments.

DKS puts an equal emphasis on both the sharing of existing knowledge and the creation of new knowledge. Typical examples of this kind of system include informal CoP discussion databases, Idea Management systems, and to an extent, KM helpdesks and certain types of focused collaboration tools. DKS tends to rely on elements of interaction in the knowledge sharing process that is absent in other types of knowledge systems. As a result of the interaction, knowledge is not just captured, but frequently built on, improved, and challenged. This leads to the increased creation of new knowledge and innovation. In addition, due to the problem-solving format of DKS, the output is knowledge that is in an actionable format, in contrast to the learning format of IKS.

A knowledge center can bring core knowledge management responsibilities and activities under a single umbrella rather than leaving it to dispersed individuals and teams. Economies of scale can therefore be achieved through:

- Avoiding duplication of efforts and resources
- Pooling expertise
- Achieving bulk purchasing discounts
- Reusing knowledge and information in a variety of contexts
- Sharing available resources
- Consortia

Knowledge needs to be stimulated to be exposed. New knowledge is created when the current knowledge is contested. It is widely accepted that new knowledge is the lifeblood of companies in the ‘knowledge economy’—not least of which because they provide the foundation for future competitive advantage. The best way to introduce a new concept, such as knowledge management, is to focus on the quick wins that demonstrate tangible value, and the most easily understood impact is bottom line results.[16]

Dynamic Knowledge Systems[17] provide the environment for the stimulus, challenge, and creation of new knowledge as well as the gathering of old knowledge to take place. Idea management gives that environment a focus on results. It is also an effective springboard for the introduction of KM systems with more intangible returns. Successful KM systems rely on an equal balance between the three KM system components. An equal balance will give a company the ability to not only learn from its previous experience and resident knowledge—but will also to challenge, build, and innovate around that knowledge to gain competitive advantage. Unbalanced systems suffer from various unintended consequences. A system low on the Informational components is able to innovate, but never learns from its successes and failures, resulting in a directionless innovation process.

Barriers of Knowledge Management[18]

KM is subjected to a number of barriers. In KM one can never mandate anything. That actually has been one of the major issues with the failure of many complex KM systems over time. One can create the best KM tool available out there and then mandate to knowledge workers to make extensive use of it, but if they *feel* it is not part of their job, and themselves the whole system crashes! KM needs to move on from this preconception that you can mandate people to share their knowledge. It just doesn’t work like that. Most knowledge workers would be willing to share their knowledge because *they want to*, not because they have been told to do so. Knowledge sharing cannot be forced, if anything, only encouraged by motivation.[19]

KM as a concept came into existence in the mid-90s but doesn’t seem to have taken shape in the Indian enterprise. Currently, only 18% of companies and very few medical colleges and hospitals have adopted KM initiatives and only 17% plan to invest in this area in the future. The other challenges faced by the promoters of knowledge management are as follows:

1. Intellectual Capital: managing of tacit knowledge is not easy. Because, we don’t know what is in human mind. It is not possible to document tacit knowledge.

2. Culture: Because of narrow mindedness or insecurity majority of people don't want to share their knowledge; some people don't want to interfere they want to stay neutral and they are away from knowledge sharing.
3. Obsolescence: There are types of information which gets obsolete as soon as it is generated for ex: Stock market information. Because of these types of ever-changing information it is difficult to give this information quickly to capable user.
4. Overloading: Knowledge gets accumulated. If obsolete information is not removed it leads overload. And it is difficult to identify which is useful from this information.
5. Technology: Due to rapid changes in technology it is difficult to communicate the knowledge to the user because, technology helps knowledge management to a large extent. Technology is tool for knowledge management.
6. Structure: Structure of knowledge management should show overall economy. Whether to follow centralized or decentralized system.

Conclusion

To conclude, it may be stated that knowledge management is not managing or organizing books or journals, searching the Internet for clients or arranging the circulation of materials. However, each of the activities can in some way be part of the knowledge management spectrum and process. Knowledge management is about enhancing the use of organizational knowledge through sound practices of knowledge management and organizational learning. Thus, knowledge management is a combination of information management, communication and human resources. Good knowledge centers will put as much emphasis on connecting people with people—'know-who'—as they do on connecting people with information and document collections. They will be concerned with 'active' not 'archive' knowledge, so need to be fully up to speed with what is happening in the organization including current priorities and work in progress—'who is doing what now.'

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