Knowledge Management Basics

1. Introduction

To solve any problem, people need knowledge. The needed knowledge is there somewhere, described in some way, but it is often unavailable to those who need it most and at the right time and place.

A short story from Maharashtra, India.

During a workshop on knowledge management I asked if workshop participants could tell me about a real life example of seeking the knowledge that has not been readily available. They told me about the situation a few years ago when after several years of shortage of onion on the market, farmers had very good year and there was a big surplus of onion supply. Many farmers couldn't sell their crops. The problem was that after so many years of selling very easily, almost immediately after the harvest, they did not know how to store onion for a longer time to sell it later on local or international markets for a better price.

I did not know much about the preservation of onion, in particular, in tropical climate, but I was quite sure that such knowledge must exist somewhere and that it has been described in some form. Well, I did some search on the Internet, and I found that a group of researchers at the University of Michigan had been conducting research on the preservation of onions and garlic in the tropical climate and elaborated simple methods that were tested with farmers. There was a missing link that would allow for bringing the existing knowledge to farmers in Maharshtra described in their language.

A farmer needs to know how to produce new and better crops and deliver them to the market; an extension worker needs knowledge of new agricultural technologies; an administrator needs to know new legislation and about governance; a decision maker needs the knowledge relevant to developing new policies.

Defined practically, knowledge is the ability to take effective action [Dave Snowden]. This means that just making information available is not enough - to become knowledge, information has to be made to have some kind of effect. For example, unless a farmer can understand information about fertilizers so that it can have a tangible effect on his crops, the information is not knowledge.

The main issue is how to make knowledge available to those who really need it. In the age of great scientific advances we appear to possess knowledge on just about everything. This includes technical issues, social and political sciences and expertise in financial matters. But if there is so much sophisticated and advanced knowledge, why it is so difficult to solve such basic problems like providing clean drinking water, effective health care and education for everyone, and eliminating hunger and poverty?

2. Why do we need knowledge management?

In any human activity we use knowledge, be it the knowledge of our ancestors on how to cultivate the land, the knowledge described in books on how to perform mathematical calculations or the knowledge on how to govern acquired by a young prince from his father the king. Knowledge is ultimately a human faculty and resides in human minds. It is described and transferred in some form. In this sense we deal with a description or representation of knowledge. The tacit knowledge that cannot be explicitly described is shared/communicated through direct contact between people, discussions, or teaching.

The handling of knowledge is not a new phenomenon. We have been collecting, describing, organizing and sharing knowledge for millennia. The realization that knowledge is a critical element has been heightened in recent years by the impact of information and

communication technologies, debates on more effective methods of using academic as well as traditional knowledge, and immense opportunities for everybody to access sources of knowledge at all levels.

In a complex world of today one can learn and acquire knowledge from many sources, but in most cases we are flooded with information and not gaining enough knowledge. The solution of development problems requires knowledge from many diverse domains and sources. Effective organization and use of knowledge assets at all levels (individual, team, institutional) requires processes to collect, codify, create, retain and disseminate knowledge objects (i.e. objects that represent/describe knowledge such as books, manuals, computer programs, maps, photographs), in short **knowledge management**.

For example, an institution responsible for developing policies in the natural resources sector would need mange the knowledge described in geographical atlases, biodiversity surveys, geological surveys, census databases, economic plans, documents concerning environmental protection, etc. The institution should also know those who are the best specialists to be consulted on specific issues concerning the NRM policies and in general where and how the relevant knowledge can be obtained. What we really manage are the institution's knowledge processes, not the knowledge itself. The organization that introduced KM approaches agree that KM is important for facilitating better decision-making processes, building the intellectual capital of an organization, eliminating redundant processes and improving operations, fostering better internal and external communication.

3. What is the relationship between data, information and knowledge?

The terms: data, information and knowledge are usually used interchangeably. However, in the discussion on knowledge management and its practical implementations we need some informal definitions to understand and explain the relationships, methods and tools.

The following simple examples illustrate definitions of data, information and knowledge.

Having an entity (record) composed of three items: Maguinda, 55, 15% completely out of context, we may see them as just pieces of data, i.e. text and numbers representing some facts, phenomena or objects in the real world. Data can be written/produced on paper or represented inside a computer as sequences of zeros and ones. In today's computer systems, a datum (data item) can be a text, a number, a string of symbols, a picture, a voice/video recording, or a drawing.

> **Data are formal representations of facts, objects or phenomena existing in the real world or abstractions created by human mind.**

In the context of a population survey the above data become meaningful, i.e. – the name of a village, the number of households below the poverty line and the percentage of adult people who are illiterate. A local government can use this information when planning a poverty eradication project or a computer program can produce a summary report based on a collection of data records. In both cases the data become information (have a meaning) in the context of a processor (person or machine/computer) that "understands" these data items.

> **Information is a data item presented in a context that allows inferring from and about the meaning of the data by a human mind or by the machine.**

The analysis of the population data in order to assess the level of poverty and propose possible solutions to the problem requires *knowledge*. The first thing one has to know is how to analyze the data; how the poverty is defined; what the possible ways to alleviate poverty are; what the people's reaction to poverty alleviation programs would be; who can help plan and deliver a program, etc. In dealing with information we have *explicit knowledge* (facts, procedures, experiences that can be described in documents and databases, encoded as computer programs or presented by means of communication) and *tacit knowledge*

(judgments, insights, skills, beliefs, etc. that cannot be explicitly formulated but are critical in understanding information and problems).

> **Information considered/processed/understood in order to solve a problem, take an action or answer a question together with its broader context of related information and actions is called knowledge.**

We will not dwell any further on the definition of knowledge. There is no consensus on what knowledge is and the discussion will probably continue as long as people will try to understand how the human mind works and what the limits to human cognition are. In this paper we take a very pragmatic approach to defining knowledge in the context of computer-based systems and practical applications of knowledge management. We concentrate on methods and tools used to collect, codify, organize, retain, communicate and transfer knowledge and thus to enhance the ability to use information to solve problems.

The main sources of difficulty with understanding and defining knowledge in the context of computer-based systems are:
- the long history of associating knowledge with only the human mind (… and there is a good reason for that since knowledge, in a broad sense, encompasses inferring/thinking , beliefs, logic, intuition, cognition, truths, intelligence);
- in practice, computer programs are a form of encoding of some knowledge (e.g. arithmetic operations, analysis of chemical processes data, text formatting, playing chess).

Knowledge in the context of a computer system is **a representation** (text, data structures, structures of formal knowledge description languages) of facts, objects, phenomena, abstractions (*factual knowledge*) and procedures/processes (*procedural knowledge* including *tacit knowledge*). Representations allow automatic operations on knowledge (problem solving, decision-making support, information retrieval, creating new knowledge, dissemination). We may say that **knowledge** is the ability to solve problems and answer questions by retrieving (possessing) relevant information. Intelligence is the ability to create new knowledge. These working definitions should suffice for a general discussion.

4. What it means to manage knowledge?

The need for computer-based knowledge management systems was identified when large companies realized that making huge databases and document repositories available was insufficient for solving problems in environments where users' knowledge of how to use the data and how to extract relevant knowledge from documents was inadequate. Managing codified knowledge is only one aspect of knowledge management and relatively easy to accomplish.

The main issue is **the human factor** in knowledge management and handling/sharing of tacit knowledge. The term knowledge management has been criticized from the point of view that one cannot "manage" the contents and processes of the human mind. However, on the practical utilitarian ground we can talk about and implement systems that encompass people and electronic tools to manage knowledge assets (factual and procedural knowledge descriptions and human capabilities). To manage means to have effective control and to use available resources to achieve an end. In this sense, knowledge management means having control over knowledge assets and using knowledge management tools and methods in applying and sharing knowledge to achieve the intended goals.

We realize that knowledge management is more than the maintenance of electronic representations of facts and procedures and it must encompass the "management" of human skills and attitudes, the recognition of tacit knowledge, the culture of sharing knowledge, cognitive processes, etc. Ultimately, knowledge resides in people, not in machines and books. The complexity of knowledge management systems lies in their diverse components and internal and external relations.

> **Knowledge management is the judicious use of means of collecting, codifying, processing, retaining and disseminating knowledge in order to achieve intended goals.**

There are many terms used in regards to operations on knowledge and knowledge attributes. The literature and discussions on knowledge management include words such as acquire, capture, learn, record, retain, and gather to denote the **collecting of knowledge**; describe, encode, and model to denote **the codification of knowledge**; generate, create, organize, develop, increase, verify, validate, synthesize, and reuse to denote the **processing of knowledge**; demonstrate, communicate, educate, access, and distribute to denote the **dissemination of knowledge**. When classifying knowledge, the following terms are used: explicit, tacit, static, dynamic, factual, procedural, formal and indigenous. We will use these terms assuming their intuitive meaning in the context of discussed problems.

Repositories of Knowledge Resources:
- People
- Books, texts, manuals, and other media
- Libraries (physical and digital)
- Courses and other learning experiences
- Organizational processes and contexts
- Training and apprenticeship programs
- Professional knowledge and tradecraft of individuals, working groups, and associations, both formal and informal
- News services

5. Methods and Tools

Knowledge management methods and tools include technical as well as non-technical approaches. Technical tools are based on information and communication technologies. Non-technical tools support knowledge sharing among people in a form of direct contacts.

• Knowledge Mapping
The **knowledge map** is a tool for presenting what knowledge resides where (e.g. people, media, organizational units, sources of knowledge outside the organization) and what are the patterns of knowledge flow (access, distribution, learning). Knowledge mapping is the first step in creating the inventory of knowledge (i.e. the knowledge base) and developing the processes of knowledge sharing

• Yellow pages
The **yellow pages** facility is a structured collection of data and documents about people in the organization. It includes an interface for obtaining information about the expertise, areas of interest, publications and some personal data of the project stakeholders and associated individuals. It also provides contact information. The purpose of yellow pages is to facilitate communication and knowledge sharing between individuals and groups of people.

• Best practices
The **best practices** facility is a collection of structured documents that contain descriptions of the best ways to do things or solve problems. The best practices knowledge base includes software that supports the maintenance of the collection of materials (new cases, revisions, supporting materials such as photos, maps, recordings), and formulation of queries. More sophisticated software may include case-based reasoning engine that assists the user in discovering potential solutions to new problems. In a basic form, the best practices facility is a repository of descriptions of good work provided by project staff. The purpose of this is to share the knowledge on what works and stimulate good solutions for new emerging problems. The best practices facility will not usually give a prescription for a solution but it will stimulate positive thinking and provide a base for analysis and identification of ways to do things.

• Storytelling
Storytelling is the use of stories in organizations as a communication tool to share knowledge.   It is used in organizational settings to help people relate to and connect to

important issues. One important aspect of stories in an international development context is precisely that stories provide the context in which knowledge arises as well as the knowledge itself. They are not dry recommendations listed at the end of a long document. They are memorable, more human and they nurture a sense of community and help build relationships.

While Denning's book focuses on the use of stories to ignite organizational change, stories can be used for a broad range of other purposes, including:

- Storytelling for communications

- Storytelling to capture tacit knowledge

- Storytelling to embody and transfer knowledge

- Use of stories for innovation

- Storytelling to build community

- Storytelling to enhance technology

- Storytelling for individual growth

The infoDev/IICT Stories database is perhaps the most visible example of an attempt to collect "stories" in the international development community. [There might be others, this is more a reflection of my own knowledge areas]. See the IICD/infoDev Stories Database at http://www.iicd.org/stories

• Peer Assist
A Peer Assist is a meeting or a workshop where people are invited from other teams to share their experience, insights and knowledge with a team who have requested some help. It is appropriate when the cost of gathering the help brings significant potential benefits to a team or project that is facing a challenge that others may be able to bring help to. It is appropriate when the diversity of views external to the team or project can broaden the range of options considered.

You may consider holding a Peer Assist when for example:
- your team is about to respond to a crisis similar to one that another team responded to last year;
- you are new to a role, about to tackle something difficult, and you are aware that others have done it before;
- you haven't done something for a while, and you are not sure how things and processes have moved on.

A Peer Assist does the following:
- Targets a specific technical or commercial challenge;
- Gains assistance and insight from people outside the team;
- Identifies possible approaches and new lines of inquiry;
- Promotes sharing of learning with each other;
- Develops strong networks among staff.
[Techniques for Capturing Learning in Tearfund, learn.doc]

• Knowledge Fair
Knowledge Fairs are seminars and workshops arranged to make people aware of technologies that are applicable across different sectors, and of other people who are exploring them. An example could be a meeting on procedures used in micro-credit projects.

• After Action Review
An After Action Review is meant to capture learning shortly after a particular event or action has been completed. It helps to make the informal learning process a conscious learning process and makes learning explicit. The AAR is about short-term knowledge capture. *[note5.doc]*

technical brief

• Mentoring
Mentoring is a one-to-one learning relationship in which a senior member of an organisation is assigned to support the development of a newer or more junior member by sharing his or her knowledge, experience and wisdom with them. Related term: Coaching. (Note: While the strength of mentoring lies in transferring the mentor's specific knowledge and wisdom, in coaching it lies in the coach's ability to facilitate and develop the other's own personal qualities.) *[KM Glossary]*

• Communities of Practice (Networks)
Networks of people who work on similar processes or in similar disciplines, and who come together to develop and share their knowledge in that field for the benefit of both themselves and their organisation(s). They may be created formally or informally, and they can interact online or in person. Related term: Communities of interest. *[KM Glossary]*

• Intranets, Extranets
Intranet is a private network inside a company or organization, which uses software facilities of the Internet, but is for internal use only, and is not accessible to the public. Intranets are seen also as infrastructure to integrate and manage wealth of information and other tools. The familiar browser is the front-end to make use of the intranet resources.

An extranet is an intranet extended beyond the organization boundaries. When selective access is provided to entities outside the organization and intranet becomes an extranet. For example, if your organization allows its suppliers, clients, partners you with etc. to have access and to make contribution to your intranet, its an extranet. Access would of course be restricted by security means like user ids and passwords etc. Extranet is equally suitable with organizations, NGOs, that work with other partners and institutions as this can enhance cooperation, collaboration and communication among.

• Mailing Lists
A list of email addresses of a group of people to whom information materials are sent by email.

• Electronic Conferences, Discussion Forums
Discussion Forums are online network discussion platform to encourage and manage online text discussions over a period of time among members of special interest groups or teams. These are very useful in capturing tacit knowledge. Discussion forums are also referred to as collaborative workspace. The discussion forums offer promising opportunities, by enabling participation, across time and distance, so that those most knowledgeable about development problems can actively contribute to their solution.

• e-Learning
The use of electronic information systems (especially internet technologies) to deliver learning and training

• Electronic Databases
A structured collection of organized, related data stored on a computer.

• Document Management
The purpose of a document management system is to provide information which documents are available and how they can be obtained. Document search engines assist people in searching for documents on specific subjects.

• Forums, Meetings, Workshops, Training and Seminars