SRM UNIVERSITY
DEPARTMENT OF INFORMATION TECHNOLOGY
Model Examination IT1102- Knowledge management
III YR - V SEM MAX MARKS: 100 Date: 22/10/2016
Answer KEY

Instructional Objective Covered
IO1: Design and develop knowledge-based information systems for knowledge representation, management, and discovery
IO2: Understand various knowledge management tools.
IO3: Discuss about relevant case studies to understand how knowledge Management is applied in real time scenario.
Student outcome(s) and Sub-outcomes covered in this test:
Outcome l: An ability to effectively integrate IT-based solutions into the user environment
Outcome i : An ability to use current techniques, skills, and tools necessary for computing practice.

Part-A MCQ Answer ALL (20 x1 = 20 Marks)

1) **Which of the following is the knowledge that people carry in their minds and is, therefore, difficult to access?**
(A) Explicit knowledge (B) Tacit knowledge
(C) Procedural (D) Declarative knowledge

2) **Which one of the following is most suitable for different place, same time conditions in knowledge sharing process?**
(A) Face to face meeting (B) Peer to Peer shared computer
(C) E-Mail (D) Video conferencing

3) **The developing system is verified and validated from the beginning of the cycle.**
(A) Knowledge management life cycle (B) Supply chain management
(C) Customer Relation management (D) Software development life cycle

4) **Processed Data; An aggregation of data that have meaning :**
(A) Knowledge (B) Data
(C) Information (D) Wisdom

5) **Which is the number one challenge in getting people to share their knowledge rather than hoarding it :**
(A) Change in culture (B) Knowledge Evaluation
(C) Knowledge Processing (D) Knowledge Implementation

6) **Reasoning by analogy is known as :**
(A) Deductive Reasoning (B) Inductive Reasoning
(C) Case-Based Reasoning (D) Inferencing

7) **Aquiring new ideas based on hundreds of previously stored concepts :**
(A) Learning by example (B) Learning by Experience
(C) Learning by Discovery (D) Chunking

8) **Knowledge management emphasizes :**
(A) Doing the right things (B) doing thing right
(C) Increased efficiencies (D) reengineering

9) The Internet was originally a project of which agency?
(A) NSF (B) NSA
(C) ARPA (D) DARPA

10) What does IP mean?
(A) Internet Provider (B) Internet Procedure
(C) Human capital (D) Internet Protocol

11) What does XML stand for?
(A) eXtensible Markup language (B) X-Markup Languge
(C) Example Markup Language (D) Extra MarkUp Language

12) Who is making web standards?
(A) Mozilla (B) WWW Consortium
(C) Microsoft (D) Goolge

13) Which of the following comes as last priority while implementing Knowledge Management ?
(A) Global Connectivity (B) Distributed Exertise
(C) Rapid changes in Products & Processes (D) Changing technologies

14) The main focus of Knowledge management in a firm is :
(A) Leverage knowledge resources to achieve business objectives
(B) Information Management
(C) Document Management
(D) Process Improvement

15) The main purpose of business strategy
(A) Positioning the firm's product or service in the market
(B) Increse profit
(C) Increase sales
(D) To fight competitor

16) Knowledge is ---------- in the minds of the knowers :
(A) Embodied (B) embedded
(C) Represented (D) memorized

17) Which of the following make Knowledge Management efforts futile?
(A) Sharing of valuable knowledge
(B) Sharing Best Practices
(C) Lack of solid Business case
(D) Identification and disseminate knowledge

18) The intellectual capital does not mean :
(A) Customer capital (B) Organizational capital
(D) Human capital (D) Financial capital

19) Knowledge management success in future is not dependant on :
(A) Short term gains (B) People improvement
(C) Process improvement (D) Organizational improvement

20) **Which of the following is not recommended for fostering Knowledge management?** :
(A) Ignoring people or cultural issues
(B) Valuing and rewarding Individual's knowledge
(C) A Culture that recognizes tacit knowledge
(D) Encouraging employees to share knowledge

Part-B **Answer ANY five** **(5 x 4 = 20 marks)**

---

21) What is chunking of knowledge?

1.4 Expert Knowledge

It is the information woven inside the mind of an expert for accurately and quickly solving complex problems.

- Knowledge Chunking
  - Knowledge is usually stored in experts long-range memory as *chunks*.
  - Knowledge chunking helps experts to optimize their memory capacity and enables them to process the information quickly.
  - Chunks are groups of ideas that are stored and recalled together as an unit.

22) What are the key characteristics of a Learning Organization?

Key Characteristics of a Learning Organization

Those engaged in attempting to build learning organizations are involved in the risky business of creating a new organizational culture. To create an entirely new organizational culture requires effort and commitment on the part of everyone involved, as well as a good imagination in the mind of the person charged with directing its implementation. The organization's members need to thoroughly know their organization as it currently exists, as well as have a vision of what its members desire for it to become in the future. Simply imitating another organization's culture is unlikely to succeed in the long run because each organization is different, with different traditions, employing different people with different abilities and skills, and having different prevailing attitudes.

- Facilitation of effective communication throughout the organization in order to diffuse needed information quickly and effectively, coupled with a willingness on the part of the organization's members both to accept and put that information to use
- Retention of organizational memory; it is essential that access to information be assured whenever it is needed and at whatever level of the organization it may be needed
- Establishment of information systems/software that will allow new information to be related to other information and to existing knowledge in order to create new knowledge and know-how
- Implementation and installation of information systems that facilitate the managerial decision-making processes

In other words, a learning organization requires the creation of a knowledge infrastructure that can serve both as a repository of knowledge and as a facilitator

23) Explain the five leaning disciplines as per Peter Senge.

Learning organizations display five characteristics:

1. Systems thinking

Sometimes we lose the 'forest for the trees,' as the old cliché goes. Systems thinking provides a framework for you to see patterns and interrelationships, or the big picture. For example, businesses are often focused on the next fiscal quarter. Most of their decisions are based upon the next quarter without much, if any, thought about the long-term consequences of the decision. Systems thinking asks you to look beyond the immediate concerns and issues and look at the issue as part of a whole system.

2. Personal mastery

Three components are essential for you to obtain personal mastery. First, you must obtain a personal vision, which is a concrete picture of the future you desire. Second, you must accept and use creative tension. You need to try to make reality reach your vision. Third, you must have a commitment to truth and not deceive yourself no matter how comforting or convenient self-deception might be.

3. Mental models

You need to change your mental models, which are simplified frameworks we use to understand the world that affects our behavior. For example, a common mental model for managers is that low-level production workers are lazy. We can effect this change by discovering the models, testing the models' validity, and seeking to improve them.

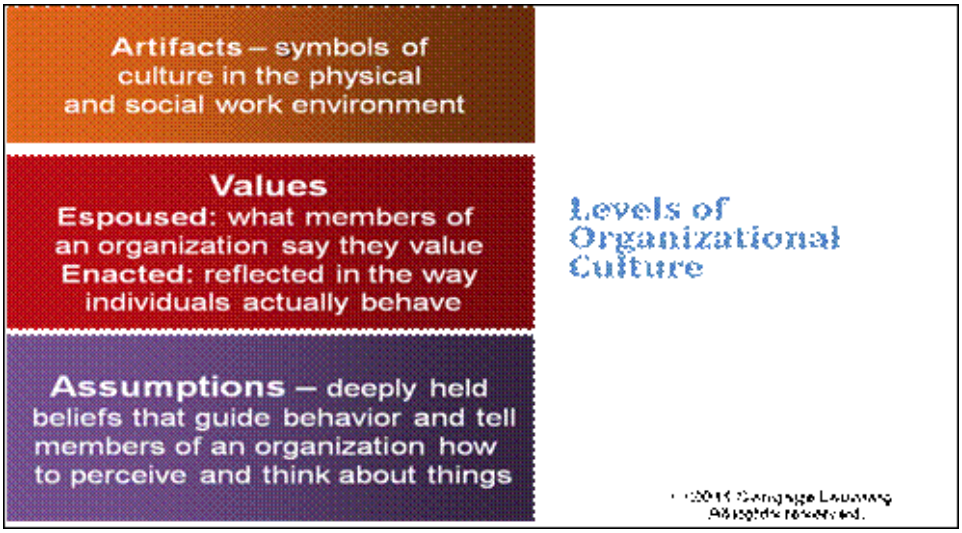
4. Shared vision

A shared vision is not some canned 'mission statement,' but rather provides the answer to the question, 'What do we want to create or accomplish?' Note that it's not just what the impersonal organization wants to create or accomplish, but what the members of the organization want as well. A shared vision facilitates learning and pursuit of excellence in execution of goals because all members of the organization will want to pursue the common vision.

5. Team learning

- ☐ The five disciplines of what the book refers to as a "learning organization" discussed in the book are:
- ☐ "Personal mastery is a discipline of continually clarifying and deepening our personal vision, of focusing our energies, of developing patience, and of seeing reality objectively."[2]
- ☐ Mental modelsare deeply ingrained assumptions, generalizations, or even pictures of images that influence how we understand the world and how we take action."[2]
- ☐ "Building shared vision - a practice of unearthing shared pictures of the future that foster genuine commitment and enrollment rather than compliance."[2]
- ☐ "Team learning starts with dialogue, the capacity of members of a team to suspend assumptions and enter into genuine thinking together."[2]
- ☐ "Systems thinking - The Fifth Discipline that integrates the other four."[2]

24) What is organizational culture?



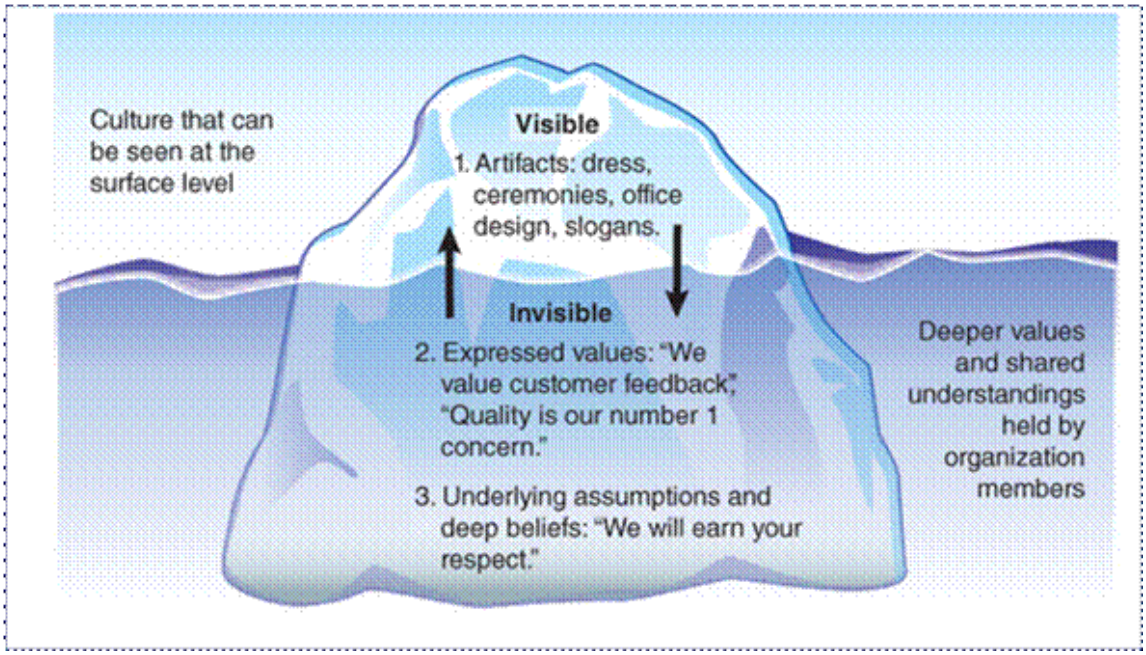
CULTURE

Dimensions of Organizational Culture

To better understand organizational culture, we can compare it to an iceberg, as shown in Figure 3.1, with visible and invisible layers. The first visible layer of an organization's culture, which Edgar Schein (2010) called **cultural artifacts**, are what you physically see and hear upon entering the headquarters of a company: the physical layout, the ways people dress and act, tangible symbols such as pictures on the walls, and the interior decoration. Visible cultural layers also include the atmosphere the people create, which in turn reflects the company's values. For example, Google's visible culture looks and feels like a relaxed college campus, and Google's values include "You can be serious without a suit" ("Our Philosophy," n.d.). Google employees receive 12 weeks of fully paid maternity leave; gourmet chefs, who provide on-site healthy, free lunches, snacks, and dinners; free on-site doctors at company headquarters; and free massages throughout the day ("Benefits," n.d.).

Figure 3.1 Organizational Culture Dimensions

Organisational Culture



25) What is controlled vocabulary?

CONTROLLED VOCABULARY

Basically an authority list, a controlled vocabulary, is a consistent set of index terms used to represent a document or work and assist searchers in locating it. These index terms are usually a subset of a master list previously compiled by a professional indexer. Frequently referred to as descriptors, these index terms are assigned to the content and concepts of, or embodied in, documents for which each descriptor has a high degree of relevance.

A controlled vocabulary serves as a powerful searching aid for information scientists and end users that, in many instances, can effectively navigate the English language. Once the searcher establishes the correct term or terms for a concept, all similar items, whether or not they are used within a document, should be collocated. In contrast to natural language searching, a controlled vocabulary greatly reduces the number of search terms that are needed to locate materials on a given subject. An additional benefit of a controlled vocabulary is the reduced time spent retrieving those items that are most relevant for the research query.

The significance of a thoughtfully constructed controlled vocabulary and useful thesaurus may be seen in the growing arena of knowledge management. There is

26) What are the components of knowledge strategy?

Given the above definition of a knowledge strategy, it becomes clear that a knowledge strategy comprises several discrete components:

- An articulated business strategy and objectives
- A description of knowledge-based business issues
- An inventory of available knowledge resources
- An analysis of recommended knowledge levers

27) What are the future challenges for knowledge management?

FUTURE CHALLENGES FOR KM

What lies ahead for KM? One camp predicts no future for KM, citing a number of KM failures to deliver. This gloomy forecast can be mitigated somewhat: it is true that, as with all innovation, initial expectations were on the unrealistic side, partly because the people component of KM was underestimated at the same time that the role of KM technology in KM solutions was overemphasized. According to Pollard (2003), this failure was the result of the unrealistic expectation that human organizational behavior could be easily and rapidly changed. Of course, behavioral change at the individual level and cultural change at the organizational level are two very difficult and lengthy processes. The KM "quick fix" was therefore vastly misleading.

The return on KM investments should not be perceived exclusively as short-term gains but rather should be seen as long-term process, people, and organizational improvements. Unfortunately, people change their behavior only when there is an overwhelmingly compelling argument to do so (there is no "leap of faith" on which much of KM was predicated), or where there is simply no alternative. Skyrme (2002), for example, discusses some of the cornerstones

Part-C **Answer ALL (either/or type) (5 x 12 = 60 Marks)**

---

28) a) i) Define and explain the four step process of knowledge management Life cycle

KM Life Cycle

KM goes through a series of steps, making up an ongoing life cycle. The four-step process, summarized in Table 1.5, includes gathering, organizing, refining, and disseminating. These and alternative approaches to the KM life cycle are explained in detail in Chapter 3.

The capturing phase deals with knowledge capture and includes e-mail, audio files, digital files, and the like. In this phase, it is important to go to all the sources available and never judge the usefulness of the captured knowledge until after it is subjected to exhaustive testing. In this phase, KM systems are an ideal approach to eliciting and representing knowledge into a form that can be available to many users—a key KM process. This process is discussed in detail in later chapters.

After the capturing phase, captured data or information should be organized in a way that can be retrieved and used to generate useful knowledge. One can use indexing, clustering, cataloging, filtering, codifying, and other methods to do the organizing. Speed, user-friendliness, efficiency of access, and accuracy are important elements to consider throughout the organizing phase.

After organizing the information, it should be refined. Data mining can be applied in this phase. Data mining takes explicit knowledge found in databases and transforms it into tacit knowledge. Data-mining software is used to find patterns in data, predict behavior, and warn against future problems based on the data supplied in data warehouses. For example, the sales records for a particular brand of tennis racket might, if sufficiently analyzed and related to other market data, reveal a seasonal correlation with the purchase by the same parties of golf equipment.

TABLE 1.5 Four-Process View of Knowledge Management

Four-Process View of KM	
• **Capturing**	—Data entry
	—Scanning
	—Voice input
	—Interviewing
	—Brainstorming
• **Organizing**	—Cataloging
	—Indexing
	—Filtering
	—Linking
	—Codifying
• **Refining**	—Contexualizing
	—Collaborating
	—Compacting
	—Projecting
	—Mining
• **Transfer**	—Flow
	—Sharing
	—Alert
	—Push

ii)Define fact,procedural rule,heuristic,intelligence,Experience and common sense

- A fact is generally a statement representing truth about a subject matter or
- domain.

- A procedural rule is a rule that describes a sequence of actions.
- A heuristic is a rule of thumb based on years of experience.
    - Intelligence implies the capability to acquire and apply appropriate knowledge.
- Memory indicates the ability to store and retrieve relevant experience according
    - to will.
- Learning represents the skill of acquiring knowledge using the method of in-
    - struction/study.
        - Experience relates to the understanding that we develop through our past actions.
        - Knowledge can develop over time through successful experience, and experience can

- lead to expertise.
    - Common sense refers to the natural and mostly unreflective opinions of humans.

(OR)

b) Describe briefly about
i)Procedural Knowledge
ii)Declarative Knowledge
iii)Semantic Knowledge with example
iv)Episodic Knowledge

Procedural knowledge represents the understanding of how to carry out a specific procedure.
– **Declarative knowledge** is routine knowledge about which the expert is conscious. It is shallow knowledge that can be readily recalled since it consists of simple and uncomplicated information. This type of knowledge often resides in short-term memory.
– **Semantic knowledge** is highly organized, "chunked" knowledge that resides mainly in long-term memory. Semantic knowledge can include major concepts, vocabulary, facts, and relationships.
– **Episodic knowledge** represents the knowledge based on episodes (experimental information). Each episode is usually "chunked" in long-term memory

Procedural knowledge, also known as **imperative knowledge**, is the knowledge exercised in the performance of some task. See below for the specific meaning of this term in**cognitive psychology** and **intellectual property** law.

Procedural knowledge is different from other kinds of knowledge, such as declarative knowledge, in that it can be directly applied to a task. For instance, the procedural knowledge one uses to solve problems differs from the declarative knowledge one possesses about problem solving because this knowledge is formed by doing.[1]

In some legal systems, such procedural knowledge has been considered the intellectual property of a company, and can be transferred when that company is purchased.

One limitation of procedural knowledge is its job-dependent so it tends to be less general than declarative knowledge. For example, a computer expert might have knowledgeabout a computer algorithm in multiple languages, or in pseudo-code, but a Visual Basic programmer might know only about a specific implementation of that algorithm, written in Visual Basic. Thus the 'hands-on' expertise and experience of the Visual Basic programmer might be of commercial value only to Microsoft job-shops, for example.

One advantage of procedural knowledge is that it can involve more senses, such as hands-on experience, practice at solving problems, understanding of the limitations of a specific solution, etc. Thus procedural knowledge can frequently eclipse theory.

Procedural knowledge is, in a nutshell, knowing **how to do** something. It contrasts with **declarative knowledge**, which is knowledge **about** something.
For example, I may read about the importance of perfect arm strokes and coordination while swimming and yet drown like a stone when inside the pool. This may sound obvious, I know, but as far as language learning goes, there's more to it than meets the eye.
Declarative knowledge enables a student to **describe a rule** and perhaps apply it in a drill or a gap-fill. **Procedural knowledge**, on the other hand, enables the student to **apply that rule** in real language use.

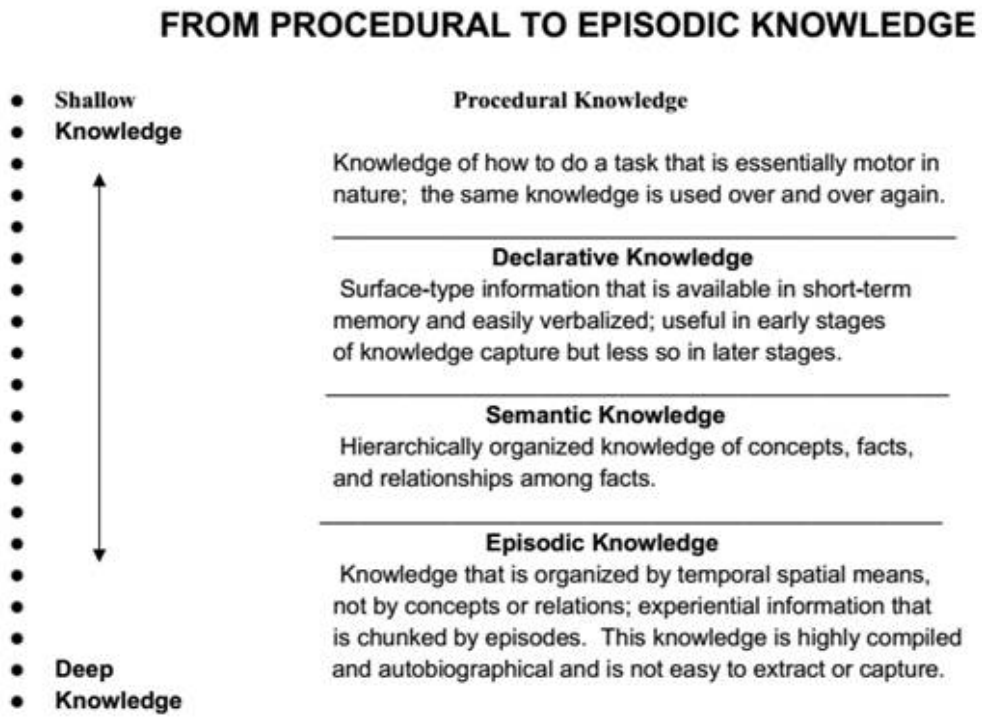
Episodic memory represents our memory of **experiences** and specific **events** in time in a serial form, from which we can reconstruct the actual events that took place at any given point in our lives. It is the memory of **autobiographical events**(times, places, associated emotions and other contextual knowledge) that can be

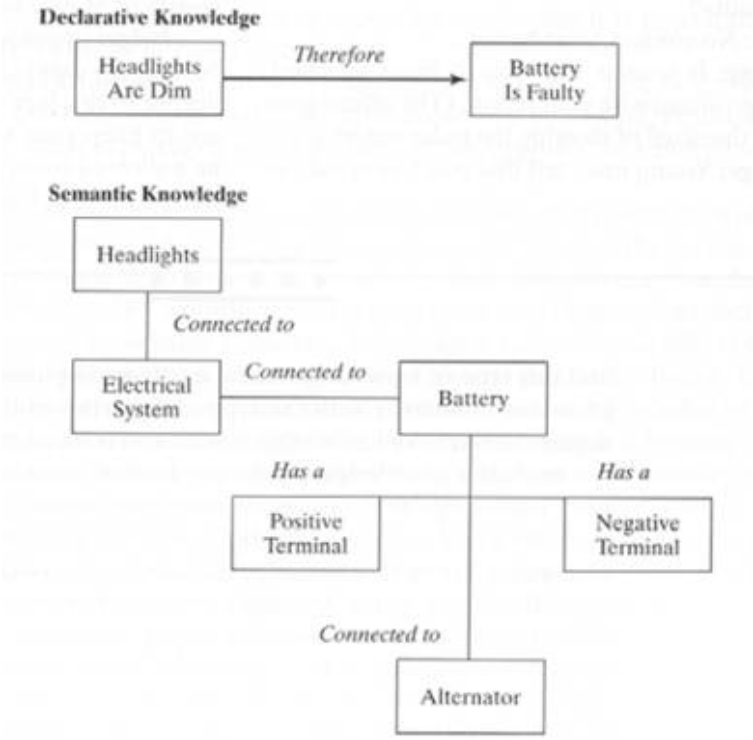
explicitly stated. Individuals tend to see themselves as actors in these events, and the **emotional charge** and the entire**context** surrounding an event is usually part of the memory, not just the bare facts of the event itself.

Semantic memory, on the other hand, is a more structured record of **facts**, **meanings**, **concepts** and **knowledge about the external world** that we have acquired. It refers to general factual knowledge, shared with others and **independent of personal experience** and of the **spatial/temporal context** in which it was acquired. Semantic memories may once have had a personal context, but now stand alone as simple knowledge. It therefore includes such things as types of food, capital cities, social customs, functions of objects, vocabulary, understanding of mathematics, etc. Much of semantic memory is abstract and relational and is associated with the meaning of **verbal symbols**.

Declarative memory ("knowing what") is memory of facts and events, and refers to those memories that can be **consciously**recalled (or "declared"). It is sometimes called **explicit memory**, since it consists of information that is explicitly stored and retrieved, although it is more properly a subset of explicit memory. Declarative memory can be further sub-divided intoepisodic memory and semantic memory.

Procedural memory ("knowing how") is the **unconscious** memory of skills and how to do things, particularly the use of objects or movements of the body, such as tying a shoelace, playing a guitar or riding a bike. These memories are typically acquired through repetition and practice, and are composed of automatic sensorimotor behaviours that are so deeply embedded that we are no longer aware of them. Once learned, these "body memories" allow us to carry out ordinary motor actions more or less automatically. Procedural memory is sometimes referred to as **implicit memory**, because previous experiences aid in the performance of a task without explicit and conscious awareness of these previous experiences, although it is more properly a subset of implicit memory.



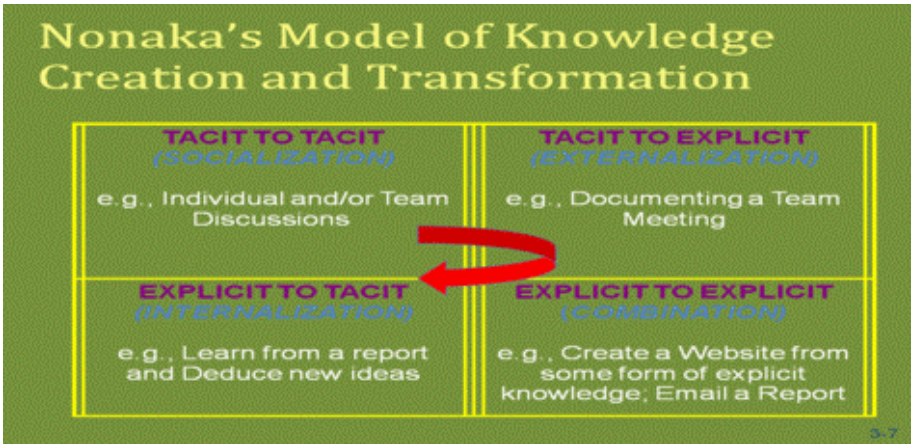


29) a. Discuss in detail Nonaka Model of Knowledge creation and transfer. (12)

Nonaka's Model of Knowledge Creation & Transformation

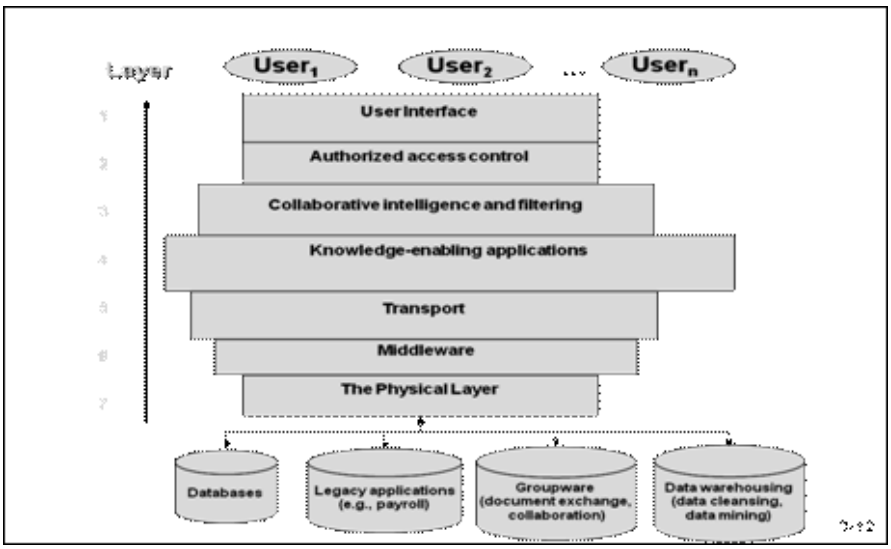
In 1995, Nonaka coined the terms *tacit knowledge* and *explicit knowledge* as the two main types of human knowledge. The key to knowledge creation lies in the way it is mobilized and converted through technology.

- **Tacit to tacit communication** (Socialization): Takes place between people in meetings or in team discussions.
- **Tacit to explicit communication** (Externalization): Articulation among people trough dialog (e.g., brainstorming).
- **Explicit to explicit communication** (Communication): This transformation phase can be best supported by technology. Explicit knowledge can be easily captured and then distributed/transmitted to worldwide audience.
- **Explicit to tacit communication** (Internalization): This implies taking explicit knowledge (e.g., a report) and deducing new ideas or taking constructive action. One significant goal of knowledge management is to create technology to help the users to derive tacit knowledge from explicit knowledge.



(OR)

b. Explain the knowledge architecture with a diagram. What are the functions of each layer? (12)



KM Architecture

Visualize the building blocks of a KM system in the form of layers
User Interface being the least technical, and data repository the most technical
These layers represent internal technologies of the company

The User Interface (Layer 1)

Interface between users and the KM system
Usually as a web browser
The goal is to remove barriers to information and tacit (*made explicit*) knowledge represented in the data repositories

The User Interface (Layer 1)

User interface should be *consistent, relevant, visually clear, easy to navigate,* and *easy to use*
Usability testing by the actual users is the final test of acceptability
Authorized Access Control (Layer 2)
Authorized Access Control (Layer 2)
Collaborative Intelligence and Filtering (Layer 3)
Personalized views based on roles and stored knowledge
Intelligent agents to reduce search time for needed information
Knowledge-Enabling Application (Layer 4)
Referred to as *value-added layer*
Provides knowledge bases, discussion databases, automation tools, etc.
Ultimate goal: demonstrate by knowledge sharing how employees' performances are improved
Transport Layer (Layer 5)
Most technical layer to implement
Includes LANs, WANs, intranets, extranets, and the Internet
Ensures that the company will become a network of relationships

Considers multimedia, URLs, graphics, connectivity speeds, and bandwidths
Middleware (Layer 6)
Focus on interfacing with legacy systems and programs residing on other platforms
Designer should address databases and applications with which KM system interfaces
Makes it possible to connect between old and new data formats
Physical Repositories (Layer 7)
Bottom layer in the KM architecture
Represents the physical layer where repositories are installed
Includes data warehouses, legacy applications, operational databases, and special applications for security and traffic management

30) a Explain in detail the architecture of the Web Search Engine with a diagram. How Web directories differ from search engines? Give examples. (12)

A search engine is a program that indexes documents, then attempts to match documents relevant to a user's search requests.
The term search engine is most commonly used to refer to Web search engines.
A Web search engine is a special web site that catalogs other web sites and has search capability; it is an Internet tool that lets users quickly and simply find the answers to questions or information on topics or keywords. A search engine uses 'spiders' or 'robots', which are programs to index the Web sites, reading the content of the pages, indexing them and returning that data to the Search Engine. The process is entirely automated.

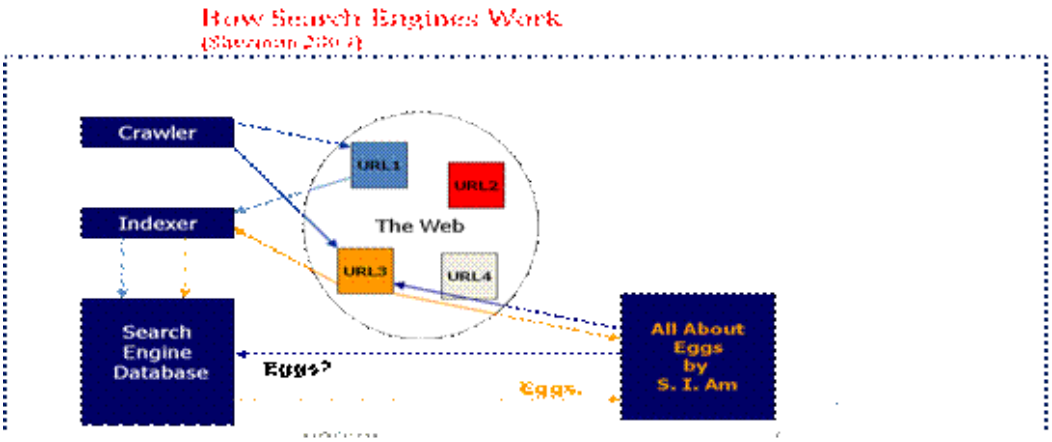
Keywords are words or phrases entered by people looking for webs sites via search engines.
Keywords are words or phrases that describe your topic. These are the words the search engine uses to find what it thinks are sites that match what you're looking for
The more specific a keyword, the more specific the results will be.

Spider

Also known as robots or crawlers, ***Spiders*** are the programs that are used by Search Engines for indexing the web and gathering the HTML information that is on ther web pages.

Ex:

www.google.com
www.altavista.com
www.askjeeves.com
www.excite.com
www.go.com
www.go2.com
www.hotbot.com
www.lycos.com



The following elaborates how do search engines work.

- crawlers, spiders: go out to find content
  - in various ways go through the web looking for new & changed sites
  - periodic, not for each query
    - no search engine works in real time
  - some search engines do it for themselves, others not
    - buy content from companies such as Inktomi
  - for a number of reasons crawlers do not cover all of the web – just a fraction
  - what is not covered is "invisible web"
- organizing content: labeling, arranging
  - **indexing** for searching – automatic
    - keywords and other fields
    - arranging by URL popularity - PageRank as Google
  - **classifying** as directory
    - mostly human handpicked & classified
- as a result of different organization we have basically two kinds of search engines:
    - search – input is a query that is then searched & displayed
    - directory – classified content – a class is displayed
      - and fused: directories have now also search capabilities & vice versa

Directory

A Web directory is an organized, categorized listing of Web sites.
Directories use human editors to look at websites and to decide how to categorize sites for inclusion.
http://www.yahoo.com is a popular Directory.
Some more directories:
www.about.com
www.looksmart.com
www.netcenter.com
www.suite101.com

Difference between a search engine and a directory

A search engine uses automated 'spiders' or 'robots' to catalog websites.
A directory uses people to go through a web site and catalog the web site.
A search engine is a service that is reviewed by an automated search engine spider in order to rank your website.
A directory is a service that is reviewed manually by individuals who look at the sites for content and subject matter and ranks them accordingly.

Directories vs Search Engines

The terms "directory" and "search engine" are often used interchangeably.
Much of the confusion stems from the various combinations of the two models that have developed over time.
There are advantages and drawbacks to using a Web directory as opposed to a search engine. One vehicle may be better suited to certain types of searches than the other. Directories place an emphasis on linking to site home pages and try to minimize deep linking. This makes directories more useful for finding sites instead of individual pages.

(OR)

b. What are WANs? Explain in detail various WAN technologies and their features. (12)

WANs

WANs are also interconnections of computers and peripherals and may also transmit data at high speeds, but typically over larger geographic areas such as cities, states, and countries. The Internet is probably the best known example of a WAN designed to transmit data.

What should a knowledge manager know about WANs? A knowledge manager should know the differences, advantages, and disadvantages of WANs designed for voice and those designed for data. Once this information is known, the knowledge manager can better understand the underlying communication lines necessary to access and to support a WAN.

Today, there are dozens of ways a user can connect his/her computer to a computer network. The following examines eight of the more common forms of communication lines.

The first is the old tried-and-true technology of a dial-up phone line and a modem. Dial-up lines can offer speeds of up to 56 Kbps (actually that is the theoretical limit while the actual speed is much less than that). This technology is the most common and well proven and the hardware is very reasonably priced

A second technology, which is offered by the local phone companies, is an ISDN. ISDN can obtain data transfer speeds up to 128Kbps and can transfer the data using a digital format. A computer wishing to transmit data over an ISDN line will need an ISDN modem (a little more costly than a dial-up modem) and an ISDN contract with a telephone company. ISDN costs roughly $40-$50 per month and is available in most locations around the country.

A third technology, and one of the newest, is a DSL. DSL transfers data digitally at speeds up to several million bps. DSL comes in many varieties and at many different costs. As a rough estimate, you can expect to spend around $200 per month for a 128 Kbps and faster line. However, contact your local phone company to find out if they even offer DSL service and then ask them how much it costs.

A fourth technology is the cable modem. This service is offered by your local cable television operator and is not yet available in most areas. More than likely, this service will be slow to expand due to the very large start-up costs required of the local cable operators. It is likely that you will see DSL services expanded before you see cable modem service offered. Nonetheless, cable modems are capable of speeds up to 2 Mbps and cost roughly $40-$50 per month.

The fifth form of technology has been around for quite some time. T-1 lines are digital phone lines that transmit data at 1.544 Mbps. The local phone company can offer a T-1 line, but expect to pay several hundred dollars per month for such a service.

Frame relay is the sixth form and is a relatively new entrant in the communications arena and is also a service that is offered by the local telephone company.

k.

---

31) A. i) What are the benefits of converting a Library to a Virtual Research Center?

The organization's libraries were dispersed, largely based in major metropolitan areas. Each was funded independently and operated autonomously. Staff size and resources varied, ranging from solo professionals limited to fee-based online sources to multi-staff centers offering both electronic resources and a traditional physical collection. A few libraries specialized in subject areas that required deep expertise.

The Technology InfoCenter ("InfoCenter"), the subject of this case study, is one of these specialty libraries. Because of the fast-moving changes in information technology (IT), the InfoCenter was established to provide vital timely information services to the organization's technology specialists. Its continuing focus is the market, application, and use of IT. The InfoCenter's customers are the business integration consultants working for clients in many different industries who are located primarily in the United States, Canada, and Latin America. Similar groups are in place for Europe and Asia Pacific that provide secondary research as well as other knowledge, including electronic newsletters.

Charge by Information Type → Measure Value

Prior to the shift from "provider of information" to "provider of value," the InfoCenter measured success by the quality and quantity of its external and internal knowledge resources and its volume of calls. These measures are a good start, but seem to fall into the category of "what can we measure" instead of "what do we want to measure." The desired type of measure—value added—aligns with the KM literature that suggests KM measures are really business measures, such as cycle time improvement, quality, business growth, and proposal success rates. However, if the InfoCenter claimed credit for some of these business measures, that rationale would not be credible to senior management or other groups, since the InfoCenter's contributions are but one of many factors influencing these outcomes. So the InfoCenter kept thinking.

ii) Discuss the knowledge Management issues to be addressed in developing countries.

Status of KM in Developing Countries

- There are no action plans, in general, to fund training KM specialists and to manage explicit or tacit knowledge.
- Technical and human resource expertise does not exist to develop, maintain, and market KM considering the socioeconomic conditions in developing countries.
- Information specialists are not consulted in the development of national information policies and in designing KM systems.
- Information and knowledge acquisition and dissemination are supply-driven and system-driven, rather than market-driven to meet "real needs" of clients.
- There is a near total absence of marketing strategies.
- A "not invented here" syndrome that militates against the policies and implementation of projects to support KM exists in most developing countries.

- There is a general public perception that explicit, knowledge-based information systems do not really promote knowledge sharing.
- There is a tendency to create "heavy" information system models disassociated from the socioeconomic reality.
- There is an absence or lack of "sustainability plans" (i.e., budgeting for and the provision of indigenous resources for ongoing support) in national plans and in project implementations.
- An understanding of the role and importance of KM as an important tool in building a strategic national asset is necessary.
- Obtaining even basic day-to-day information is a constant source of frustration in most countries, and the application of basic KM technologies to resolve those issues are seldom considered.
- Tacit knowledge, an important ingredient in oral society in developing countries, remains strong, but strategies to capture and share "best practices" have not been articulated.

(OR)

b. i) Explain the knowledge management tools used in Medicine.

Knowledge Management tools in Medicine

At the NLM at the National Institutes of Health, interdisciplinary teams have produced several important knowledge management tools to facilitate and improve retrieval from its databases. For example, Grateful Med provides an intelligent interface for searching MEDLINE, and PubMED offers sophisticated searching capabilities, including citation links, as well as the full text of 100 biomedical journals. PubMED links to molecular biology databases containing DNA/protein structures and three-dimensional structured data. NLM has also undertaken a major project, the Universal Medical Language System (UMLS) to support coordinated retrieval across disparate databases by linking controlled vocabulary terms. Because health information encompasses such varied fields as health administration, psychology, sociology, economics, medicine, and biology, creating a universal approach to retrieve from multiple databases is not trivial. The

ii) Compare economic indicators of advanced and less developed countries with knowledge management perspective.

Table 26.2 Some Knowledge Indicators

*Compiled from: *UNESCO Statistical Yearbook*, 1997.
**The data available only for 1994 is indicated in parentheses.

	Book Population (#of titles) (1995)	Newspapers and Periodicals		TV Licenses Issued (1995)	Radio Receivers (1995)	Libraries	
		Daily (1995)	Non-daily (1995)			Public Library	Service Points
G-7 Countries							
USA	62,039	1,611	9,728 (94)	215,000	559,000	Not Reported	Not Reported
Japan	Not Reported	121	Not Reported	85,500	114,500	1,475	1,950
Germany	74,174	406	38	46,000	77,000	13,032	13,032
France	34,765	80	227	34,250	52,000	2,315	3,366
Canada	17,931	107	1,650	21,000	309,950	1,045	3,672
UK	101,764	103	Not Reported	26,000	83,200	167	24,869
Italy	34,470	76	274	25,500	47,000	106	2,366
Developing Countries							
Bangladesh	Not Reported	51	Not Reported	525	5,600	Not Reported	Not Reported
Brazil	21,574(94)*	320	1,400	35,000	63,500	2,739	Not Reported
Chad	Not Reported	1	2	9	1,570	Not Reported	Not Reported
China	100,951	Not Reported	875	250,000	225,500	Not Reported	Not Reported
Colombia	Not Reported	34	Not Reported	4,200	20,200	1,378	Not Reported
Ethiopia	Not Reported	4	15	250	10,900	Not Reported	Not Reported
India	11,643	Not Reported	Not Reported	47,000	75,500	Not Reported	Not Reported
Kenya	300	5	Not Reported	500	2,600	1	21
Korea, Rep.	35,864	62	Not Reported	Not Reported	45,000	329	329
Malaysia	6,465	44	Not Reported	3,300	8,700	14	471
Mexico	Not Reported	310	45 (94)	20,000	24,000	5,630	Not Reported
Niger	Not Reported	2	5	105	620	Not Reported	Not Reported
Nigeria	1,314	27	Not Reported	6,100	18,700	12	76
Pakistan	124	223	719	2,680	12,500	4	10
Sri Lanka	3,933	9	Not Reported	915	3,700	Not Reported	Not Reported

32) a. Discuss case study on US Army regarding implementation of Knowledge management strategic plan.

Knowledge Management

Strategic Plan 2015

Department of the Army
U.S. Army Corps of Engineers

PLAN AT A GLANCE

Vision

USACE is an innovative and creative workforce that enthusiastically shares information across the entire enterprise to provide engineering solutions for the nation's toughest challenges.

Mission

Enable effective knowledge creation and sharing throughout the entire USACE enterprise in order to improve organizational effectiveness and create competitive advantage.

Goals

1) **Content** – By identifying and capturing the organization's most critical knowledge,
2) **Connect** – Ensuring that knowledge flows where it needs to from those who have it to those who need it,
3) **Collaborate** – Through sharing experiences, lessons learned, best practices, and results to shorten learning cycles and assist others.
4) **Integrate** – Through enterprise application of the three Cs (Content, Connect and Collaborate) remove barriers to knowledge sharing and be recognized as the premier public engineering organization and serve as a model for the Army.

What is the Purpose of Knowledge Management?

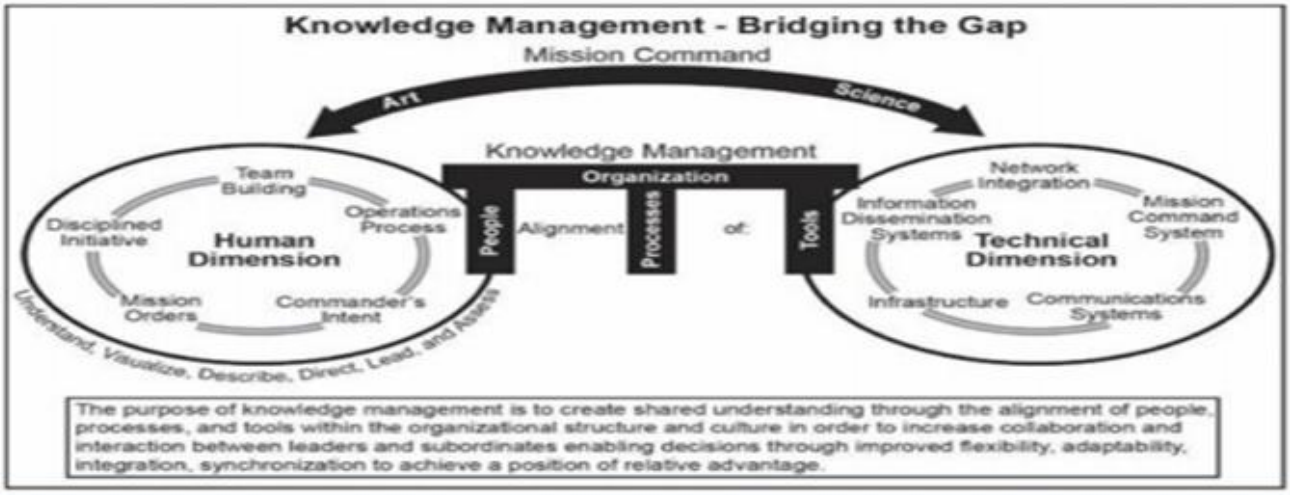
To apply a disciplined enterprise process to facilitate the flow of information and knowledge to the right people at the right time. Provide the ability to act more efficiently and effectively to find, understand, share, and use knowledge to create lasting value for USACE, its partners, stakeholders, and the people within the organization. We will accomplish this through:

- Identifying, capturing, and sharing knowledge that is critical to the successful delivery of assigned USACE missions.
- Facilitating the transfer of best practices exhibited by individuals and teams from across USACE through a structured approach that ensures replication.
- Seamlessly incorporating KM practices and principles into the daily workflow of all USACE employees.
- Integrating KM into the enterprise business framework and annual business budgeting cycles.
- Establishing KM Key Performance Indicators (KPIs) tied to strategic objectives that are outcome based and reportable to all USACE stakeholders.
- Gaining employee commitment to the KM processes by working with labor partners, creating a motivational reward structure, and promoting use/participation at the first-line supervisor level.
- Achieving enterprise search that sends a query to different content repositories from across USACE and pulls content from all of them.
- Improving employee engagement and succession planning through knowledge transfer.

USACE Knowledge Management Components

KM is organized into four components that enable the understanding and visualization of leaders and develops shared understanding of employees. The four components are:

1. People
2. Process
3. Tools
4. Organization



People – Of the four components of KM, people are the most vital for success. People include the Commanding General (CG) and staff; USACE Senior Executives and staff, Major Subordinate Command (MSC) commanders and staffs; other USACE leaders and staffs; and other entities that might contribute to answering information requirements. They include those inside and outside the organization that create, organize, apply, and transfer knowledge; and the leaders who act on that knowledge. Knowledge only has meaning in a human context. It moves between and benefits people, not machines.

The CKO plays a special role in enterprise KM. Working through the USACE Knowledge Management Leadership Team, the CKO is responsible for developing and implementing the enterprise KM strategic plan that integrates and synchronizes knowledge and information management for the enterprise.

The CKO synchronizes knowledge and information management to facilitate understanding for any problem set and to provide USACE staff with a framework of shared understanding. The CKO accomplishes this by using the tools, processes, and people available to facilitate an environment of shared understanding. Moreover, the CKO is concerned with sharing and disseminating knowledge and information inside and outside the organization. The CKO is the principal advisor in developing the plan, or blueprint, to facilitate situational and shared understanding of the operational environment, the

Process – The five-steps in the USACE KM process are assess, design, develop, pilot, and implement. Its activities are integrated into the operations process used in the planning, preparing, executing, and assessing of operations. This integration enables the transfer of knowledge between and among individuals and organizations. Knowledge exchange occurs both formally—through established processes and procedures—and informally—through collaboration and dialogue. The KM process also seeks to ensure that knowledge products and services are relevant, accurate, timely, and usable to commanders, senior leaders, and decision makers.

A.

KNOWLEDGE MANAGEMENT

Goals and Objectives

KM Strategic Goal 1*: *Content – Identify and capture relevant content through enterprise search capabilities. Establish what we know as an organization and what to share across the enterprise.

Objective 1.1 – Identifying Knowledge

An enormous amount of knowledge and information is created and shared throughout USACE every day, but not all of it is of critical importance. To use KM resources effectively, critical business knowledge must be separated from the rest of the information that is created. As an enterprise, USACE must identify critical knowledge by defining the capabilities and functions that support the strategic objectives of each mission area and business line and then outline the core competencies related to those capabilities and functions. Once knowledge that is vital to USACE mission areas has been clearly delineated, pockets that are at risk (i.e., known only by a few people) can be identified and the holders of that knowledge can be located.

Objective 1.2 – Collecting Knowledge

Collecting knowledge is the process of documenting and storing knowledge in media for ease of access and discoverability. It relates to the capturing and dissemination of tacit and explicit knowledge through information and communication technologies aimed at codifying, storing and retrieving it on an as needed

Knowledge collection strategies

1. *Structured Interviews*—formal, face-to-face Q&A sessions with senior experts and other long-tenured employees nearing retirement;
2. *Handoff Documents*—standardized documents for each job, a listing of primary responsibilities, where and how documents are stored, relevant collections of doctrinal literature, professional contacts, schedules, routine reports, budgeting, and a vision for the future;
3. *Lessons Learned*—a knowledge-sharing approach used to capture lessons and proven practices from a particular business process, project, event, or technical subject area.

Objective 1.3 – Reviewing Knowledge

Reviewing knowledge is the process of vetting and assessing knowledge for relevance, accuracy, and use. Some types of knowledge require formal review by experts, whereas others can be effectively reviewed and managed by a collective user community. Effective reviews of knowledge can be accomplished by:

- leveraging subject matter experts
- using communities of practice to vet and refine knowledge
- developing transparent review processes with clear timelines
- considering user-driven approaches to evaluate knowledge and expertise

Objective 1.4 – Sharing Knowledge

To succeed as a world-class engineering organization, all USACE employees must feel enabled to actively share their knowledge. This involves disseminating knowledge that has been collected and reviewed as well as direct, person-to-person sharing and collaboration. Knowledge sharing encompasses most of the standard approaches within the discipline of KM, from Communities of Practice and

Objective 1.5 – Accessing Knowledge

In order to achieve Level 3 maturity, and be recognized as a best-practice KM organization, USACE must provide employees with a single enterprise search function covering all organizational assets. Currently, disparate, time-consuming systems that are not interconnected dissuade USACE employees from seeking out relevant resources; therefore, using enterprise search, taxonomy/metadata, and alerts to make access as simple as possible is essential. It is also important to make knowledge available at employees' teachable moments, when they are faced with challenges or opportunities that make them more receptive to learning.

Objective 1.6 – Using Knowledge

The use of knowledge occurs when collected knowledge is finally applied to a new situation to solve a problem, improve a process, or make a decision. More specifically, value is created for USACE when the

(OR)

b. Present a case study on knowledge management implementation at NASA to function more like a learning organization

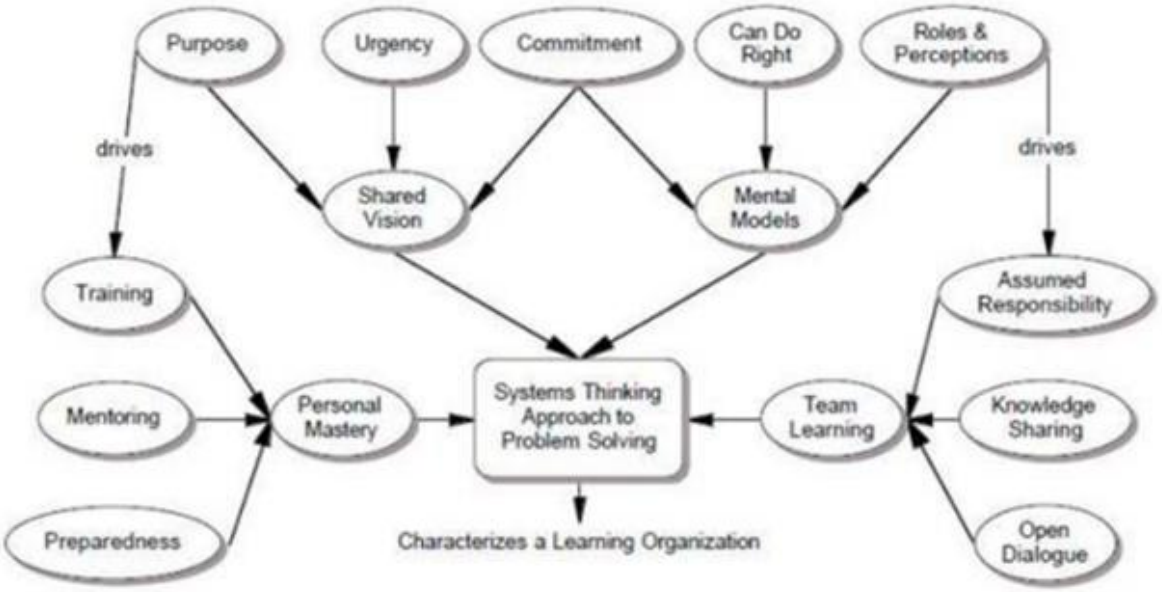
Knowledge Management at NASA – A Case Study

NASA as a Learning Organisation

A learning organization is able to adapt and change and thereby address the challenges in its path towards the successful attainment of goals. It can do that because all of its members are learners

who engage their full intellectual capabilities and have access to the collective organizational knowledge. Peter Senge (1990) laid out the need for an organization to not only be excellent at personal mastery, mental models, shared vision, and team learning but also to have a well developed systems thinking capability throughout the organization. He called systems thinking the 'Fifth Discipline' that was needed to truly make a learning organization.

FIGURE 1: THE SENGE LEARNING ORGANIZATION MODEL



Senge's model links the need for shared vision, mental models geared toward learning, personal mastery of required skills and team learning in order to truly achieve the level of systems thinking required to develop a learning organization. Clearly communication, culture (openness) and structure are also integral to building a learning organization. What is not discussed in the Senge model are the infrastructure support systems necessary to enable a learning organization to function and the organizational power and politics insight needed to keep the focus on learning enabled outcomes. In *Working Knowledge*[5] Davenport and Prusak define many of the parameters

> Knowledge management then is helping the organization utilize its knowledge. The Goddard Plan for Building a Learning Organization being pursued here means that Goddard will seek to build systems, organize its work and workforce and lead by example in ways that enhance learning at every level of the organization. There are three goals of the plan for Goddard to become a better learning organization: 1) We Must Manage Our Knowledge Assets Effectively, 2) We Must Facilitate the Effective & Efficient Reapplication of Knowledge, and 3) We Must Continually Work to Build a Learning Organization Culture.

GOAL 1: Manage Knowledge Assets

Managing knowledge assets involves finding, tagging, structuring and filtering the content of knowledge generated and used at Goddard. Goddard works with science, engineering and project knowledge. Each has a different structure. An appropriate structure of our knowledge is critical for making it accessible in a timely and convenient manner. Goddard is building a distributed knowledge system whereby the communities, collections and networks of knowledge

GOAL 2: Facilitate Knowledge Application

Facilitating knowledge application is dependent on having appropriate systems to deliver knowledge as needed to users. The systems must be convenient, attractive, easily navigated and present knowledge in recognizable forms. Technology systems are as important as social systems for sharing and delivering knowledge in a timely manner.

Our index and search systems will discover

GOAL 3: Build the Learning Organization

Building the learning organization requires a set of policies, behavior expectations and a structure to the collective knowledge. Policies help set expectations for valuing knowledge collection and sharing. To be effective, learning behavior must be modeled by organizational leaders. Members of a learning organization take time to reflect, learn and share. They take time

Supporting Pillars for Knowledge Management

PILLAR 1: Global Intranet Search Capability[7]

Global search simply means someone at Goddard should be able to find where information and knowledge is located either through a web based search of documents, an expertise directory (finding the person who knows) or a social network (finding the group already working on the

PILLAR 2: Digital Repository Standards[9]

Historically, project documentation has been managed by each individual project within an Enterprise. The project documents (text, images, video clips, software, etc.) are stored and managed in project libraries using commercial off-the-shelf, internally developed or contractor developed systems. This practice provides the project manager with flexibility within the NASA

Learning Organization Outcomes

OUTCOME 1: Communities of Practice

Communities of practice are spontaneous, interactive support groups that form across organizational boundaries and often outside traditional or formal channels of communication in order to address common concerns and challenges. They might be related to career worklife, competitive marketplace dynamics, technology, professional development, innovation and experiment or a host of other organization topics. Smart organizations provide tools as needed for these groups to form, operate and sustain themselves toward meaningful ends. Communities

OUTCOME 2: Sharing Behavior[18]

Sharing behavior is also an outcome of providing the means for people at Goddard to share, collaborate and take pride in collective results. Though it may be thought of as an antecedent to good knowledge management, like communities of practice, demanding it can be counter-productive. Sharing behavior is something people do when the circumstances warrant it. The

Sharing behavior is an organization attribute that attracts bright people. Intellectually curious people often know that they have the best chance of being stimulated, creating new knowledge or participating in exciting discoveries where a team or community of like-minded thinkers are engaged in open and honest sharing of their ideas, insights and experiments. Goddard wants to continue to attract these people in line with the Human Capital Plan to sustain and build on the competencies that have characterized the Goddard Spaced Flight Center for fifty years.

Implementation Plan Matrix

Table 1 is a matrix of the three goals and the eight elements of the Architecture. (The outcomes are not listed because they relate to all the actions, not specific ones). The cells list the tactical actions related to each of the goals that are underway or planned.

TABLE 1: MATRIX OF GOALS, PRACTICES AND TACTICS

GOALS ***Pillars/Practices***	***GOAL 1: Manage Knowledge Assets***	***GOAL 2: Facilitate Knowledge Application***	***GOAL 3: Build the Learning Organization***
PILLAR 1: Center Global Search Capability	Adopt common meta-data tags across the Center.	Provide desktop global search to all employees.	Index all Goddard knowledge respecting ownership rights.
PILLAR 2: Center Digital Document Repository Standards	Build a digital archive system. Build a Center Doc. Mgmt. System.	Develop semantic search indices across the Center	Projects develop document repositories based on Center standards.
PRACTICE 1: Pause for Learning	Provide facilitators to conduct PALs through-out project life-cycle.	Develop PAL GUI system to represent project knowledge as lessons learned.	Use PAL as a leader development tool for communication and dialogue.
PRACTICE 2: Knowledge Sharing Workshops	Experienced project managers share their stories orally with emerging leaders.	Make workshops so valuable that emerging leaders will not want to miss the learning available.	Modeling by leaders of the acceptability of sharing mistakes and missteps of project management.
PRACTICE 3: Case Studies	Writing down the events, history and circumstances of a project life story.	Getting project mgrs to talk about their project experiences in training exercises.	Making sure all of GSFC is familiar with the learnings from our history.
PRACTICE 4: Project Management Training	Making stories into teaching cases. Collecting critical project documents to support the cases.	Develop and conduct a training course on the way Goddard does business based on case studies	Encourage the telling of stories at all levels (seminars, reviews, workshops, and training opptys)
PRACTICE 5: Goddard Design Rules	Establishing Design Rules for Goddard to make top level rules & procedures highly visible.	Moving LL and Best Practices into a process for updating rules and procedures.	Setting up an Office of Mission Success to monitor learning activities and knowledge mgmt.
PRACTICE 6: Review Processes and Common Lessons Learned	Capturing nuggets and lessons from incidents, accidents and reviews.	Mining records for insights, trends and rules. Making LL convenient to use.	Specifying use of LL in 7120.5 and related documents. Reporting CLL annually.
