KNOWLEDGE MANAGEMENT IN THEORY AND PRACTICE

Chapter 4: Knowledge Capture and Codification

Learning Objectives

At the end of this chapter, students will be able to:

1. Define the basic terminology and concepts related to knowledge capture and codification;
2. Describe the major techniques used to elicit tacit knowledge from subject matter expert;
3. Explain the major roles and responsibilities that come into play during the knowledge capture and codification phase;
4. Demonstrate the general taxonomic approaches used in classifying knowledge that has been captured; and
5. Analyze the type of knowledge to be captured and codified, select the best approach to use, and discuss its advantages and shortcomings for a given knowledge elicitation application.

Introduction

- Knowledge capture and codification is the 1st high-level phase of the KM cycle; specifically, tacit knowledge is captured or elicited, and explicit knowledge is organized or coded.
- There should be a distinction between capture/identification of knowledge and new knowledge creation.
- Explicit knowledge that are already identified and coded typically represents only the tip of the iceberg in most organizations.

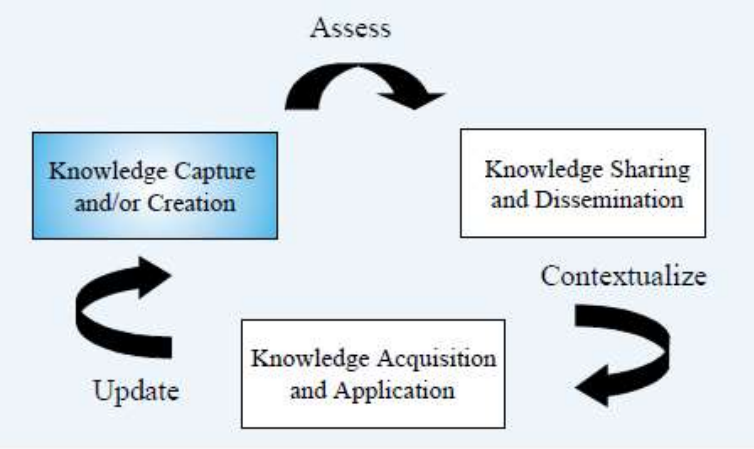
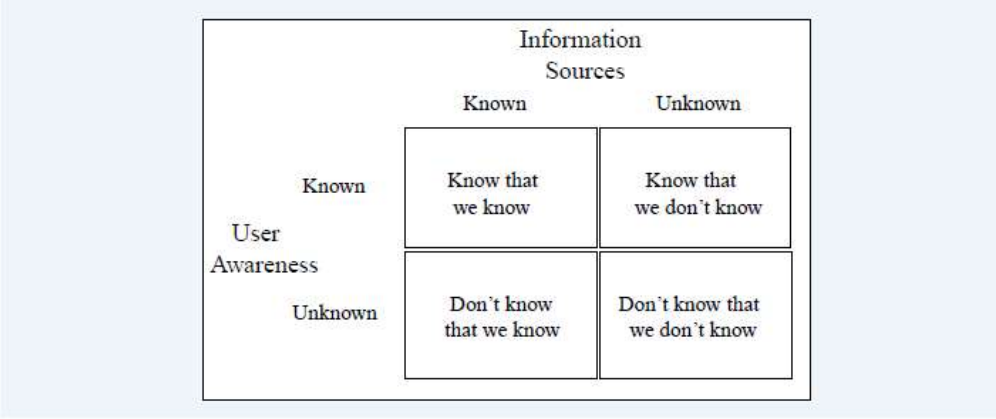


Figure 1. An integrated KM cycle

Introduction

- Traditional IS deals with highly-structured data (e.g., records, forms) that usually makes up 5% of organizational knowledge,
- In KM, there is still a need to capture and codified yet-to-be identified knowledge that are known to be present in the organization.
- Further, organizations need to facilitate creation of new knowledge through innovation (See Figure 2)
- Knowledge capture in an organization is not purely about technology.



Source: Frappaolo, 2004.

Figure 2. The Known and Unknown Matrix

Introduction

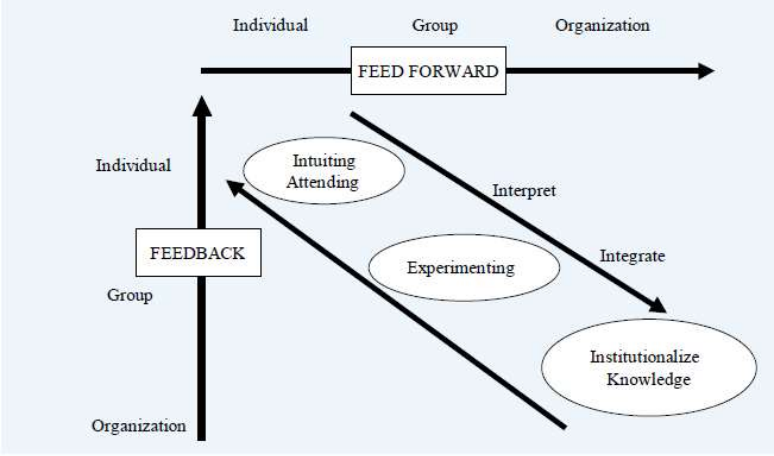
- Embodiment of organization memory are:
  a) Employee experiences
  b) Tangible data
  c) Knowledge stores inside
- Knowledge represents intellectual currency which will devalued & ignored if not capture in a proper way (It must be spent, in order to be valued)
- Knowledge is the only sustainable competitive advantage
  a) It had to be protected, cultivated, shared
  b) The key is to transform the individual knowledge to organization knowledge

Introduction

- Organizations need to possess any knowledge which has value to them in order to increase their agility & ability
- They must possess:
  a) Learning ability
  b) Skills to apply

Tacit Knowledge Capture

- Individual inside the firms play critical role in acquiring firms' knowledge
- The firms also play significant role for individual knowledge
  a) New knowledge – exploration
  b) Existing knowledge – exploitation
- Capturing technique using experts' system,
  a) Gathering know-how from experts so it can perform like one
  b) Using questionnaire, interview, surveys, observations, talk aloud



Source: Crossan, Lane, and White, 1999.

Figure 3. The 4I Model of Organizational Learning

Tacit Knowledge Capture

Tacit Knowledge Capture at Individual and Group Levels

- Transformation of valuable expertise from knower (expert/document) to knowledge repository
- Reducing a vast volume of content from diverse domains into a precise, easily useable sets of facts & rules (e.g., Reporter, journalist)
- Expert system:
  a) Knowledge engineer interview the experts
  b) Produce conceptual model of the critical knowledge
  c) Translate the model into computer-executable
- The goal is to extract and render explicit procedural knowledge that comprise know-how

Tacit Knowledge Capture

Tacit Knowledge Capture at Individual and Group Levels

- Procedural knowledge
  a) How to do things
  b) How the diagnose
  c) How to make decision
  d) How to prescribe
- Declarative knowledge, knowing ‘what’
- The major task of knowledge engineer:
  a) Analyzing information & knowledge flow
  b) Working with expert to obtain information
  c) Design & implement expert system

Tacit Knowledge Capture

Tacit Knowledge Capture at Individual and Group Levels

- The experts' responsibility:
  a) Explain critical knowledge & know-how
  b) Introspective & patient
  c) Effective communication skills

- 3 approaches to knowledge acquisition which must be used simultaneously (Parsaye, 1998):
  a) Interviewing experts
  b) Learning by being told
  c) Learning by observation

Tacit Knowledge Capture

Interviewing Experts

- **Structured Interview**:
  a) Interviewer must have strong communication & conceptual skills, and know the subject
  b) Uses open and close question
  c) 4 techniques: paraphrasing, clarifying, summarizing, and reflecting

Tacit Knowledge Capture

Interviewing Experts

- 4 Techniques:

a) **Paraphrasing** – restates the perceived meaning of the speaker's message using your own words; the goal is to check the accuracy with which the message was conveyed and understood

b) **Clarifying** - lets the expert know that the message was not immediately understandable; the goal is for the expert to elaborate the original message so that the interviewer gets a better idea of the intended message

Tacit Knowledge Capture

Interviewing Experts

- 4 Techniques:

c) **Summarizing -** helps the interviewer compile discrete pieces of information and form a knowledge acquisition session into a meaningful whole; the goal is to confirm that the expert's message was heard and understood correctly.

d) **Reflecting feelings** - mirrors back to the speaker the feelings that seem to have been communicated, the goal is to clear the air of some emotional reaction or negative impact of the message

Tacit Knowledge Capture

Interviewing Experts

- **Stories**:
  - Telling of a happening or a connected series of happenings, whether true or fictitious (Denning, 2001)
  - An organizational story can be defined as a detailed narrative of past management actions, employee interactions, or other key events that have occurred and that have been communicated informally
  - Knowledge-sharing stories need to be authentic, believable, and compelling

Tacit Knowledge Capture

Interviewing Experts

- **IBM**:
  - Storytelling, as a knowledge disclosure technique, allows us to uncover knowledge in the context of its use.
  - IBM views stories as a powerful means of knowledge discovery and knowledge transfer; good at conveying complex messages; regards storytelling as a unifying and defining component of all communities.
  - In addition, failure stories or lessons learned help a community to learn from its mistakes.

Tacit Knowledge Capture

Interviewing Experts

- **IBM**:
  - IBM has a four-stage storytelling approach:
    a) **Anecdotal elicitation** – done via interviews, observation, and story circles
    b) **Anecdotal deconstruction** – analyzing cultural issues, ways of working, values, rules, and beliefs to yield the story's key messages
    c) **Intervention/communication** – designing a constructed or enhanced story
    d) **Story deployment** – storytelling workshops can be run to elicit the knowledge and cultural values of an organization as well as both its best and worst practices

Tacit Knowledge Capture

Interviewing Experts

- **IBM**:
  - Capturing anecdotal or tacit knowledge builds an accurate picture of the existing culture, discloses enablers and inhibitors to sharing, and identifies business issues:
    a) **Values—**moral principles or standards—are identified
    b) **Rules—**the code of discipline that drives or conforms behavior—are also identified
    c) **Beliefs—**the collection of ideas that a community regards as true or shares faith in—are elicited.
  - Storytelling is a cathartic process through which employees can share experiences and build social capital and networks; it significantly achieves agreement among the participants.

Tacit Knowledge Capture

Interviewing Experts

- **Learning by Told**:
  - Interviewees express & refine their knowledge
  - Knowledge engineer clarify & validate
  - Tools:
    a) Task analysis (job specifications & descriptions)
    b) Process & protocol analysis (the way knower apply their knowledge)
    c) Simulation (model, software, maps, practices)

Tacit Knowledge Capture

Interviewing Experts

- **Learning by Observation**:
  - 2 expertise:
    a) Motor-based (operating, conducting)
    b) Cognitive expertise (conceptual, analysis)
  - Present the problem, scenario, case to solved by the experts
    a) Knowledge can't be observed, but behavior & expertise can
  - Using tools such audio & video could increase the successfulness of the process
    a) Screen capture

Tacit Knowledge Capture

Interviewing Experts

- **Other Methods of Tacit Knowledge Capture**:
  - Ad hoc sessions.
  - Road maps.
  - Learning histories.
  - Action learning.
  - E-learning.
  - Learning from others through business guest speakers and benchmarking against best practices.

Tacit Knowledge Capture

Interviewing Experts

- **The learning history process consists of**:
  - **Planning** - establishes the scope of the learning history to be captured
  - **Reflective interviews** - consists of asking participants to talk about what happened from their own perspective; their analysis, evaluation, and the judgment they used can bring insights
  - **Distillation** - consists of synthesizing the information that was gathered from the interviews into a summary format
  - **Writing**
  - **Validation**
  - **Dissemination**

The content is then written up, validated, and published in order to disseminate the learning history and to anchor it as part of the organizational memory.

Theme Title	For example, "Repurposing of objectives for the ACME Division in 1995 in response to new environmental regulations"
Part 1: Overview of Theme	Brief overview of the event, emphasizing why it was a significant event in the organization's history, why it needs to be well understood in order to better meet today's objectives, who was involved, what triggered the event, and so on.
Part 2: Description	Chronological commentary, conclusions, and the questions that were asked together with the responses; quotes representing key responses to questions should appear as separate right-hand-side column and be aligned with the content the quote refers to.
Part 3: Summary	Brief summary of quotes, additional questions to provide more clarity to the theme; a stand-alone section that can be made available and be understood by those who were not participants in the original event.
Part 4: Best Practices	Describe any best practices that group consensus identified. Include the following information: ▪ Date prepared ▪ Point of contact (name, contact information) ▪ Members who contributed to the development of the best practice ▪ Problem statement (what does best practice address) ▪ Background (enough context to understand the problem and the proposed solution) ▪ Best practice description (model, business rules—use graphics where appropriate)
Part 5: Lessons Learned	Describe any lessons learned identified by the group. Include the following information: ▪ Date prepared ▪ Point of contact (name, contact information) ▪ Members who contributed to the development of the best practice ▪ Problem statement (what does best practice address) ▪ Background (enough context to what happened, what went wrong, and how to prevent a recurrence) ▪ Lesson learned description (model, business rules—use graphics where appropriate)

Figure 4. Sample Learning History Template

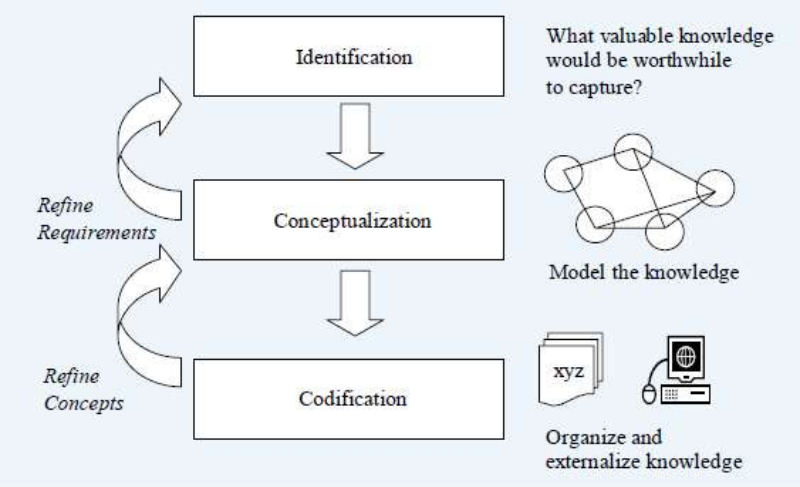


Figure 5. **Key Knowledge Acquisition Phases** - summarizes the key steps involved in knowledge acquisition at the individual and group level. Identification (characterizing key problem aspects); Conceptualization (specifying the key concepts and the key relationships among them); Codification (rendering validated content into an explicit form which are easily disseminated.

Tacit Knowledge Capture

Tacit Capture in an Organization

- **4 Major organizational knowledge acquisition (Malhotra, 2000)**:
  - Grafting
    a) Migrations of knowledge between firms (merger, acquisition, alliances)
  - Vicarious Learning
    a) One firm observing other firm's demo of techniques & procedures
  - Experiential learning
    a) Knowledge acquisition within the firm by doing & practicing it, based on repetition of experiences
    b) Refinement & improvement the process (single loop)

Tacit Knowledge Capture

Tacit Capture in an Organization

- **4 Major organizational knowledge acquisition (Malhotra, 2000)**:
  - Inferential Process
    a) Learning within the firm thru interpretation of event, states, changes, outcomes
    b) Deductive & experimental learning, establish causal links between actions & outcomes
    c) Double loop - changing assumptions & frameworks

Tacit Knowledge Capture

Explicit Knowledge Codification

- Converting knowledge into a tangible, explicit form (documents) so it can be communicated widely & less cost
- The issue of codification quality:
    a) Accuracy
    b) Understandability
    c) Accessibility
    d) Currency
    e) Credibility

Tacit Knowledge Capture

Explicit Knowledge Codification

- Why codification?
    a) Easily understood, maintained, improved
- Codification Techniques:
    a) Cognitive maps
    b) Decision tree
    c) Knowledge taxonomies
    d) Task analysis

Tacit Knowledge Capture

Explicit Knowledge Codification

- Cognitive Maps
    a) Representation of the 'mental model' of a person knowledge
    b) Provide good form of codified knowledge
    c) Process of human mind to make sense of their complex environment
    d) Allow expert to construct knowledge model

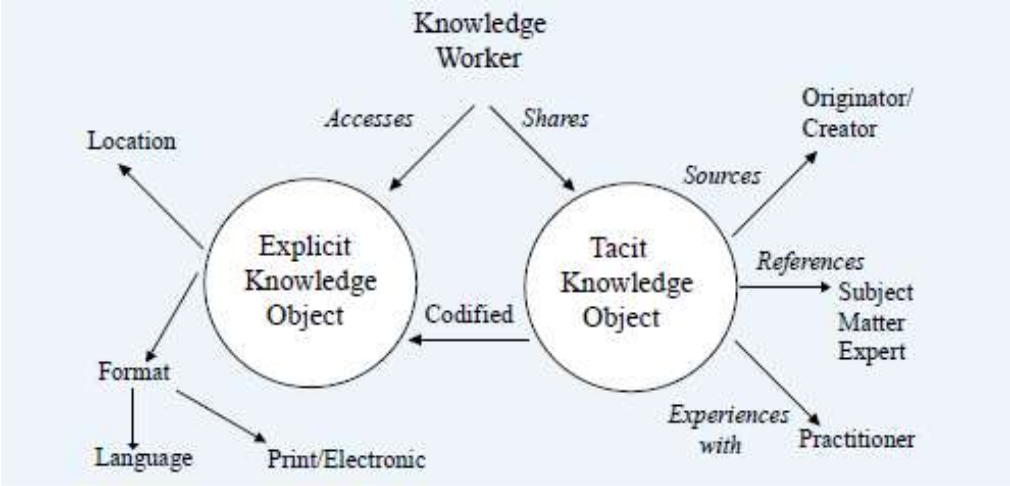


Figure 6. Example of a concept map

Tacit Knowledge Capture

Explicit Knowledge Codification

- Decision Tree
    a) Usually in the form of flowchart, compact & efficient
    b) Support with alternate paths indicating the impact of different decision

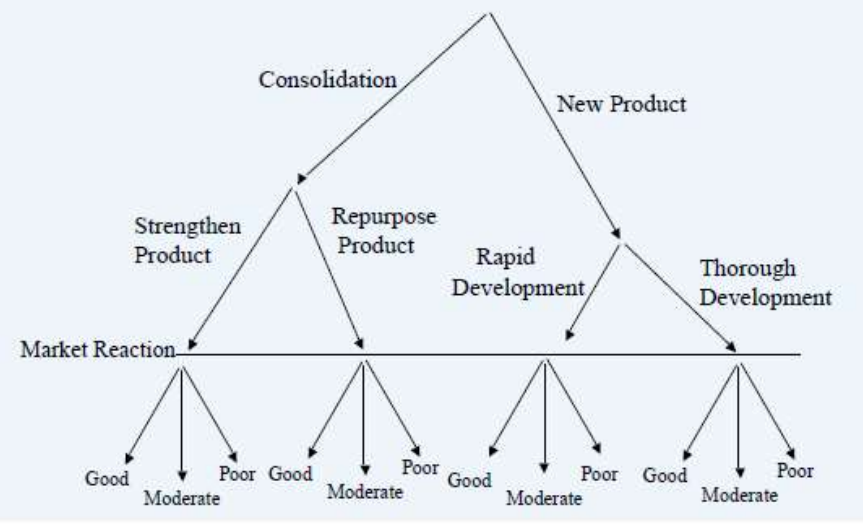


Figure 7. Example of a decision tree

Tacit Knowledge Capture

Explicit Knowledge Codification

- Knowledge Taxonomies
    a) Concept viewed as building block of knowledge & expertise
    b) Identify key concept
    c) Graphically presented that it reflect organization concept in particular field
    d) Explain the dependency of hierarchical concept
    e) The higher the concept, the more general

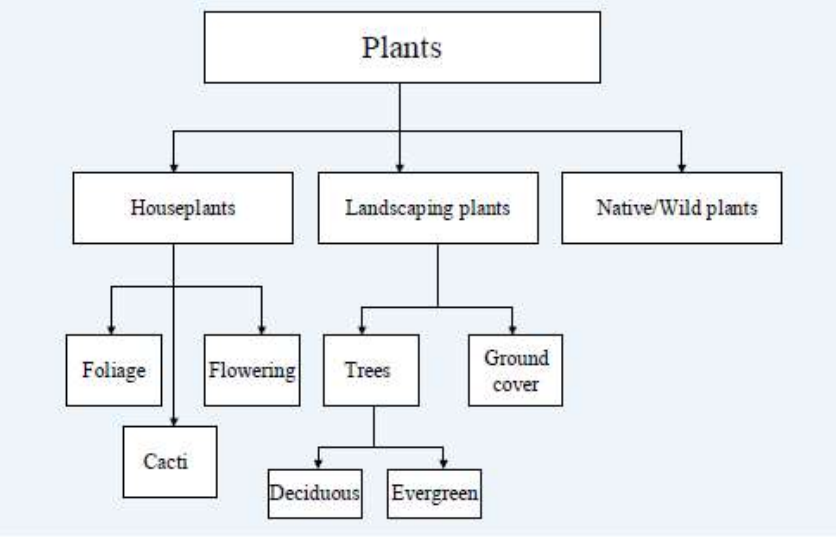


Figure 7. Example of a knowledge taxonomy

Taxonomic Approach	Key Features
Cognitive or concept map	▪ Key content represented as a node in a graph, and the relationships between these key concepts are explicitly defined. ▪ Can show multiple perspectives or views on the same content. ▪ Fairly easy to produce and intuitively simple to understand but difficult to use for knowledge related to procedures.
Decision tree	▪ Hierarchical or flowchart type of representation of a decision process. ▪ Very well suited to procedural knowledge—less able to capture conceptual interrelationships. ▪ Easy to produce and easy to understand.
Manual knowledge taxonomy	▪ Object-oriented approach that allows lower or more specific knowledge to automatically incorporate all attributes of higher-level or parent content they are related to. ▪ Very flexible—can be viewed as a concept map or as a hiearchy. ▪ More complex; will therefore require more time to develop as it must reflect user consensus.
Automated knowledge taxonomy	▪ A number of tools are now commercially available for taxonomy construction. ▪ Most are based on statistical techniques such as cluster analysis to determine which types of content are more similar to each other and can constitute subgroups or thematic sets. ▪ Good solution if there is a large amount of legacy content to sort through. ▪ More expensive and still not completely accurate—will need to validate and refine for maximum usefulness.

Table 1. Major taxonomic approaches to knowledge codification

Tacit Knowledge Capture

Explicit Knowledge Codification

- Knowledge Taxonomies – sorting techniques:
    a) Manual, automated
    b) Sorting card, cluster analysis (method of producing classification from data that are initially unclassified

Strategic Implications of Knowledge Capture and Codification

- Knowledge capture and codification are particularly critical when an issue of knowledge continuity arises
- KM - concerned with capturing and sharing know-how valuable to colleagues in an organization; knowledge continuity management – concerned on passing critical knowledge from exiting employees to their replacements.
- Knowledge continuity - should not only focus on the specific knowledge to be transferred but should also address strategic concerns at group and organizational levels.
- The organization needs to be aware of captured and codified in the form of a knowledge map or taxonomy as they critical knowledge assets.

Strategic Implications of Knowledge Capture and Codification

- Organizations also need to consider the impact of a departure on the communities to which they belong; their absence may literally leave a serious impact in the community network.
- The core of knowledge continuity management is about communication (Field, 2003)—employees need to understand what they know, that others need to know, and why this content needs to be shared with their peers.
- The more critical a job is to an organization, the more it should be part of a continuity management system.
- Sophisticated, complex, and tacit worker's knowledge – difficult to pass on; raise important questions concerning security and access, on top of a need for code of ethics to ensure that all concerned are treated in a professional manner.

Strategic Implications of Knowledge Capture and Codification

- Field (2003) makes several recommendations, including:
  a) Set up a knowledge profile for all critical workers.
  b) Foster mentoring relationships.
  c) Encourage communities of practice.
  d) Ensure that knowledge sharing is rewarded.
  e) Protect people's privacy.
  f) Create a bridge to organizational memory for long-term retention of the valuable content.

Practical Implications of Knowledge Capture and Codification

- Recommendations for promoting knowledge capture and codification follow:
  a) **Acknowledge knowledge contributors** - KM software should offer reports to identify those who are contributing or help to tap the tacit knowledge by building profiles of experts based on their contributions.
  b) **Remember to forget -** unlearning involves disposing of old frameworks and breaking away from the status quo—a form of double-loop learning.
  c) **Don't spill any knowledge during transfer** - conversion of tacit to explicit knowledge must be accomplished without significant loss of knowledge, should aim to carry out the "right" amount of knowledge acquisition and codification.
  d) **Remember the paradox of knowledge value** - the more tacit knowledge is, the more value it holds; it may be in the organization's interest to maintain that content at a certain minimal level

Key Points

- To survive, organizations need to constantly adapt and adjust to some extent.
- They need to learn via an ad hoc informal manner or whether there is deliberate intention to learn.
- According to Malhotra (2000), emergent knowledge acquisition is spontaneous and unplanned; it is risky since it does not guarantee that anything will be retained in the organization's corporate memory.
- Organizations need a methodical, systematic, intentional knowledge acquisition as a great strategic measure.
- Knowledge bases must be populated, and contents deployed to maximize efficiency and effectiveness throughout the organization.

Discussion Points

1. Why is it difficult to directly codify tacit knowledge?
2. What are some of the pitfalls that may be encountered in capturing tacit knowledge? How would you address these pitfalls?
3. What is the purpose of a learning history? What are its key components?

Discussion Points

4. What are the major taxonomic approaches to codifying knowledge that has been captured? What sorts of criteria would help you decide which one(s) to use in each organization? How would you maintain such a taxonomy?

5. Define knowledge continuity management and discuss its strategic implications for knowledge capture and codification.

Reference:

Dalkir, K. (2005). Knowledge management in theory and practice. *Elsevier.* pp. 77-105. ISBN: 0-7506-7864-X