

Chapter 5: Knowledge Capture Systems: Systems that Preserve and Formalize Knowledge

What Are Knowledge Capture Systems?

- **Knowledge Capture Systems** is one of the KM process that support the process of retrieving or eliciting and store either explicit or tacit organizational and individual **knowledge** that resides within people, artifacts, or organizational entities.
- These systems can help capture knowledge that resides within or outside organizational boundaries including within consultants, competitors, customers, suppliers, and prior employers of the organization's new employees.
- is the process by which knowledge is converted from tacit to explicit form (residing within people, artifacts or organizational entities) and vice versa through the sub-processes of **externalization** and **internalization**.
- Rely on mechanisms and technologies to support externalization and internalization
- Knowledge can be captured using mechanisms or technologies so that the captured knowledge can then be shared and used by others.

- Both mechanisms and technologies can support knowledge capture systems by facilitating the knowledge management processes of externalization and internalization.
- **Externalization** is the sub-process through which an organization captures the tacit knowledge its workers possess so that it can be documented, verbalized and shared. This is a difficult process because tacit knowledge is often difficult to articulate.
- The development of models or prototypes, and the articulation of stories are some examples of mechanisms that enable externalization.
- **Internalization** is the sub-process through which workers acquire tacit knowledge. It represents the traditional notion of learning. Knowledge capture can also be conducted outside an organization.
- Learning by observation and face-to-face meetings are some of the mechanisms that facilitate internalization

Knowledge Management Mechanisms to Capture Tacit Knowledge:

Organizational stories:

- **Organizational stories** are “a detailed narrative of past management actions, employee interactions, or other intra- or extra-organizational events that are communicated informally within organizations” include a plot (or plan), major characters, an outcome, and an implied moral play a significant role in organizations characterized by a strong need for collaboration.
- **Storytelling** is the mechanism by which early civilizations passed on their values and their wisdom from one generation to the next.
- The earliest mechanisms for knowledge capture dates to the anthropological use of stories - the earliest form of art, education and entertainment.
- organization stories are Important to capture and transfer tacit knowledge
- Organizational stories typically include a plot, major characters, an outcome, and an implied moral.

- Stories originate within the organization and typically reflect organizational norms, values, and culture.
- Because stories make information more vivid, engaging, entertaining, and easily related to personal experience and because of the rich contextual details encoded in stories, they are the ideal mechanism to capture tacit knowledge.
- Stories have been observed to be useful to capture and communicate organizational managerial systems (how things are done), norms, and values.

The following **eight steps** to successful storytelling will help work magic in the organization:

1. Have a clear purpose.
2. Identify and example of successful change.
3. Tell the truth.
4. Say who, what, when.
5. Trim detail.
6. Underscore the cost of failure.
7. End on a positive note.
8. Invite your audience to dream.

Techniques for Organizing and Using Stories in the Organization

1. Anthropological observation:

- use of naïve interviewers, citing an example where they used a group of school children to understand the knowledge flows in an organization.
- The children were naïve, therefore they asked innocent and unexpected
- questions which caused the subjects to naturally volunteer their anecdotes. They were also curious, which resulted in a higher level of knowledge elicitation.
- asked innocent and unexpected questions
- caused the subjects to naturally volunteer their anecdotes
- curiosity resulted in a higher level of knowledge elicitation

2. Story-telling circles:

- formed by groups having a certain degree of coherence and identity such as a common experience in a project. Story circles are best recorded in video. Certain methods can be used for eliciting anecdotes such as:

Methods for eliciting anecdotes:

- Dit spinning(fish tales) -represents human tendencies to escalate or better
- the stories shared previously.
- Alternative histories-are fictional anecdotes which could have different turning points, based for example on a particular project's outcome.
- Shifting character or context -are fictional anecdotes where the characters may be shifted to study the new perspective of the story.
- Indirect stories -allow disclosing the story with respect to fictional characters, so that any character similarities with the real-life character are considered to be pure coincidence.
- Metaphor-provides a common reference for the group to a commonly known story, cartoon, or movie.

Designing the Knowledge Capture System

- The documentation available in organizations is the result of applying expertise rather than expertise itself. For example, a radiologist interpreting high precision functional images of the heart will have the results of his diagnosis captured in a document, but the reasoning process by which he reaches the diagnosis is not usually captured.
- In addition, consider the process of engineering for complex systems.
- Traditional methods for documenting and representing the engineered designs include creating engineering drawings, specifications, and **computer-aided design (CAD)** models.
- But often the decisions leading to the design choices including the
- assumptions, constraints, and considerations, are not captured. Capturing these decisions is not only important but may lead to a more useful representation of the design, specifically when designing complex systems in an environment characterized by
- high uncertainty.

- Knowledge-elicitation techniques have been studied and used extensively in AI for the development of expert systems.
- The purpose of these techniques is to assist the knowledge-elicitation process based on interview sessions between a knowledge engineer and the domain expert, with the goal of jointly constructing an expertise model.
- Although computers may understand the resulting expertise models, these models may not directly meet the objective of capturing and preserving the expert's knowledge so it can be transferred to others, or in other words, so others can learn from it.
- **concept maps** as a knowledge modeling tool and **context-based reasoning (CxBR)** to simulate human behavior are the two systems based on different methodologies and intelligent technologies.

Concept Maps

- A **concept map** or **conceptual diagram** is a diagram that depicts suggested relationships between concepts.
- is one type of knowledge capture system
- is a system as knowledge modeling tool.
- represent organized knowledge
- is a way of representing relationships between ideas, images, or words in the same way that a sentence diagram represents the grammar of a sentence, a road map represents the locations of highways and towns, and a circuit diagram represents the workings of an electrical appliance.
- A concept map typically represents ideas and information as boxes or circles, which it connects with labeled arrows in a downward-branching hierarchical structure.
- The relationship between concepts can be articulated in *linking phrases* such as "causes", "requires", or "contributes to."

- The technique for visualizing these relationships among different concepts is called *concept mapping*. Concept maps have been used to define the ontology of computer systems, for example with the object-role modeling or Unified Modeling Language formalism.
- Concepts, enclosed in circles or boxes.
- Two concepts connected by a linking word to form a proposition, semantic unit or unit of meaning
- Vertical axis expresses a hierarchical framework for organizing the concepts
- inclusive concepts are found at the top, progressively more specific, less inclusive concepts arranged below relationships between propositions in different domains are cross-links.
- concept maps may be used to measure a particular person's knowledge about a given topic in a specific context.
- can help formalize and capture an expert's domain knowledge in an easy to understand representation of an expert's domain knowledge.
- a concept map-based browser, is to capture the knowledge of experts.
- The navigation problem, an important concern in hypermedia systems, is alleviated by the use of concept maps, which serve as guides in the traversing of logical linkages among clusters of related objects.
- The Cmap- Tools extend the use of concept maps beyond knowledge representation to serve as the browsing interface to a domain of knowledge.