

# Knowledge Management Foundations

## Lecture 4: Knowledge Capture and Codification



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# Overview

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- ◆ Knowledge Capture Techniques
  - For tacit knowledge
  - For explicit knowledge

# KM Cycle Step 1: Knowledge Capture and Codification

## Tacit Knowledge Capture & Codification

- Ad Hoc Sessions, Roadmap, Learning History
- Storytelling, Interviews, Action Learning,
- Learn from Others, Guest Speakers,
- Best Practice Capture
- Abstract Concept Representation (mental models)

## Explicit Knowledge Capture & Codification

- Procedural Knowledge Representations
- Task Environment Analysis (TEA)
- Knowledge Use and Requirements Analysis (KURA)

# Approaches to Knowledge Capture and Codification

- ◆ How to describe and represent knowledge
  - Depending on the type of knowledge
  - E.g. explicit knowledge is already well described but may need to abstract/summarize it
  - Tacit knowledge on the other hand may require significant analysis and organization before it can be suitably described and represented
- ◆ Tools range from linguistic descriptions and categories to mathematical formulations and graphical representations

# Tacit Knowledge Capture Techniques

- ◆ Tacit Knowledge Capture
  - Ad Hoc Sessions, Roadmap, Learning History, Storytelling, Interviews, Action Learning, Learn from Others, Guest Speakers, Relationship Building, Systems Thinking
- ◆ Tacit Knowledge Codification
  - Proficiency Levels and Knowledge Profiles
  - Abstract Concept Representation (mental models)
  - Concept hierarchies (associative or semantic networks)

# Ad Hoc

- ◆ Community rapidly mobilizes in response to a member's call for help
- ◆ 30-min brainstorming
- ◆ Instant messaging, email, teleconference, chat rooms as well as face-to-face
- ◆ Use yellow pages to find experts in the area and ask them to participate

# RoadMap

- ◆ Host facilitated, collaborative problem-solving meetings
  - To solve day-to-day problems
  - To build trust among community members
  - To solve problems in a public forum which promotes common understanding of tools, approaches and solutions
- ◆ Leads to standards and guidelines for continuous process improvement
- ◆ Can also be used for benchmarking

# Learning History

- ◆ Useful to capture tacit knowledge
- ◆ A retrospective history of significant events in an organization's recent past, described in the voices of people who took part in them
- ◆ Researched through a series of reflective interviews, transcribed in Q&A format
- ◆ Systematic review of successes and failures

*“Those who cannot remember the past  
are condemned to repeat it”*

*George Santanya*

# Learning History Questions

- ◆ What was your role in the project/initiative?
- ◆ How would you judge its success?
- ◆ What would you do differently if you could?
- ◆ What recommendations do you have for other people who might go through a similar process?
- ◆ What innovative things were done or could have been done?

# Learning History Documentation

- ◆ Record and transcribe interviews
- ◆ Analyze data to identify like themes and sub-themes as well as quotes to be used
- ◆ Document key themes and validate quotes (e.g. make sure they are not anonymous nor taken out of context)
- ◆ Summarize and publish

# Learning History Template

Theme Title

Part 1

Overview of the Theme

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Part 2

*Commentary, conclusions and potential questions to be asked that relate to the adjacent quotes*

*quotes representing key responses to interview questions*

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Part 3

Brief summary of quotes, additional questions to provide more clarity to theme

# Storytelling

- ◆ An organizational story is a detailed narrative of management actions, employee interactions and other intra-organizational events that are communicated informally within the organization
- ◆ Conveying information in a story provides a rich context, remaining in the conscious memory longer and creating more memory traces than information not in context
- ◆ Can increase organizational learning, communicate common values and rule sets

# Activity: What's the Moral of the Story?

- ◆ Read the distributed fables – they are short fictional folk tales used to indirectly tell truths about life – they have a level of meaning beyond the surface story
- ◆ Take 5 min to read the stories and add a humorous moral to it
- ◆ Will then discuss in class

# The Chicken and the Jewel

- ◆ A chicken, scratching for food for herself and her chicks, found a precious stone and exclaimed, “If your owner had found you and not I, he would have taken you up and put you in your first jewelry. But I have found you for no purpose. I would rather have one kernel of corn rather than all the jewels in the world.”

*The ignorant despise what is precious  
only because they cannot understand it*

# The Crow and the Pitcher

- ◆ A crow, perishing with thirst, saw a pitcher, and hoping to find water, he flew to it with delight. When he reached it, he discovered to his grief that it contained so little water he could not possibly get at it. He tried everything he could think of to get to the water, but all his efforts were in vain. At last, he collected as many stones as he could carry and dropped them one by one into the pitcher, until he brought the water within his reach and saved his life.

*Necessity is the mother of invention*

# The Donkey and His Shadow

- ◆ A traveler hired a donkey to convey him to a distant place. The day being intensely hot, and the sun shining in its strength, the traveler stopped to rest, and sought shelter from the heat under the shadow of the donkey. As this afforded protection for one, and as the traveler and the owner of the donkey both claimed it, a violent dispute arose between them as to which of them had the right to the shadow. The owner maintained that he had let the donkey only, not his shadow. The traveler asserted that he had, with the hire of the donkey, hired his shadow also. The quarrel proceeded from words to blows, and while the men fought, the donkey galloped off.

*In quarrelling about the shadow,  
we often lose the substance.*



# Try it out....



- ◆ Form groups of 3
- ◆ Try to write the moral of the story from one of the three fables handed out
- ◆ Write these on the white board

# The Man & His 2 Sweethearts

- ◆ A middle-aged man, whose hair had begun to turn gray, courted two women at the same time. One of them was young, and the other well advanced in years. The elder woman, ashamed to be courted by a man younger than herself, made a point, whenever her admirer visited her, to pull out some portion of his black hairs. The younger, on the contrary, not wishing to become the wife of an old man, was equally zealous in removing every gray hair she could find. Thus it came to pass that between them both he very soon found that he had not a hair left on his head.

Those who seek to please everybody please nobody.

# The Farmer & the Stork

- ◆ A farmer placed nets on his newly-sown land and caught a number of cranes, which came to pick up his seed. With them he trapped a stork that had fractured his leg in the net and was earnestly beseeching the farmer to spare his life. “I am no crane but a stork, a bird of excellent character – look at my feathers – they are not the least like those of a crane!” The farmer laughed aloud and said, “It may be all you say, I only know this: I have taken you with these robbers, the cranes, and you must die in their company.”

Birds of a feather flock together

# The Oak & the Reeds

- ◆ A very large oak was uprooted by the wind and thrown across a stream. It fell among some reeds, which it thus addressed: “I wonder how you, who are so light and weak, are not entirely crushed by these strong winds.” They replied, “ You fight and contend with the wind, and consequently, you are destroyed; while we on the contrary bend before the least breath of air, and therefore remain unbroken and escape.”

Stoop to conquer

# Interviews

- ◆ With subject matter experts, stakeholders, process performers, customers – anybody that can shed new light on a topic or issue
- ◆ Used to gather knowledge for the community and its knowledge base

Gather good stories!!

# Action Learning

- ◆ Based on the fact that people learn by doing
  - Formation of small groups of people who share common issues, goals or learning needs
  - They meet regularly, report on progress, brainstorm alternatives, try out new things and evaluate the results
  - Task-oriented learning that is useful for narrow, well-defined issues

# Learn from Others

- ◆ Benchmarking can be used to identify better ways of doing business
  - Site visits or tours to see how a practice is applied in a specific environment
  - Interactions with customers to better understand their problems, preferences & feedback
- ◆ Others include conferences, exhibits, commissioned studies

# Guest Speakers

- ◆ Inviting guest speakers to a community is an opportunity to bring a fresh perspective or point of view
  - Selected based on targeted interests
  - Internal and external to the organization

# Best Practice Capture

- ◆ Date prepared
- ◆ Point of contact
  - Name, organization, contact information
- ◆ Members who participated in the development of the best practice
- ◆ Problem statement
- ◆ Background
  - Note any research that was conducted, summary of significant findings, root cause identification
- ◆ Best Practice Description
  - Models, business rules, use graphics whenever possible

# Lessons Learned & Best Practices Capture

Situation	
Observer	
Date	
What went wrong? Lessons Learned	
What went right? Best practices	

# CIDA: Example of a Best Practice in Forestry

## **Best Practice: Bolivia:**

Emerging best practices for combating illegal activities in the forest sector

B2: Simplifying norms and reducing their number

The Bolivian government in reforming its timber concession policies decreed that the concession fee would be \$ 1 per hectare per year. This contrasted sharply with previous complex norms that mandated timber concession fees based on species types, volumes and quality of timber, which left much room to interpretation, misclassification and disguised measurement errors. The new rule is singular, simple and clear: a concession covering 100,000 hectares must pay \$ 100,000 in concession fees per year. There is no room for interpretation or modification based on doubtful criteria. Monitoring compliance and prosecution is extremely easy, as the evidence is transparent. While the economic soundness of charging a uniform fee for timber concessions of differing commercial value is questionable, the new norm has the undeniable advantage of diminishing the incidence of corruption or arbitrariness in determining concession fees

# CIDA: Example of KM Lessons Learned

	Appoint a DG of KM and Change Management.
	Use existing web and intranet infrastructures to support KM and communities.
	Most communities of practice already exist – increase their exposure, help them get set up and give them the required resources.
	Identify short, mid-term and long-term business (not KM) goals for each community.
	Biggest obstacle encountered was lack of senior management support.
	Need to create awareness and shared understanding so employees clearly see the benefits of KM
	Supervisors can be good role models to help all CIDA realize that knowledge sharing is expected of everyone.

# Abstract Concept Representation

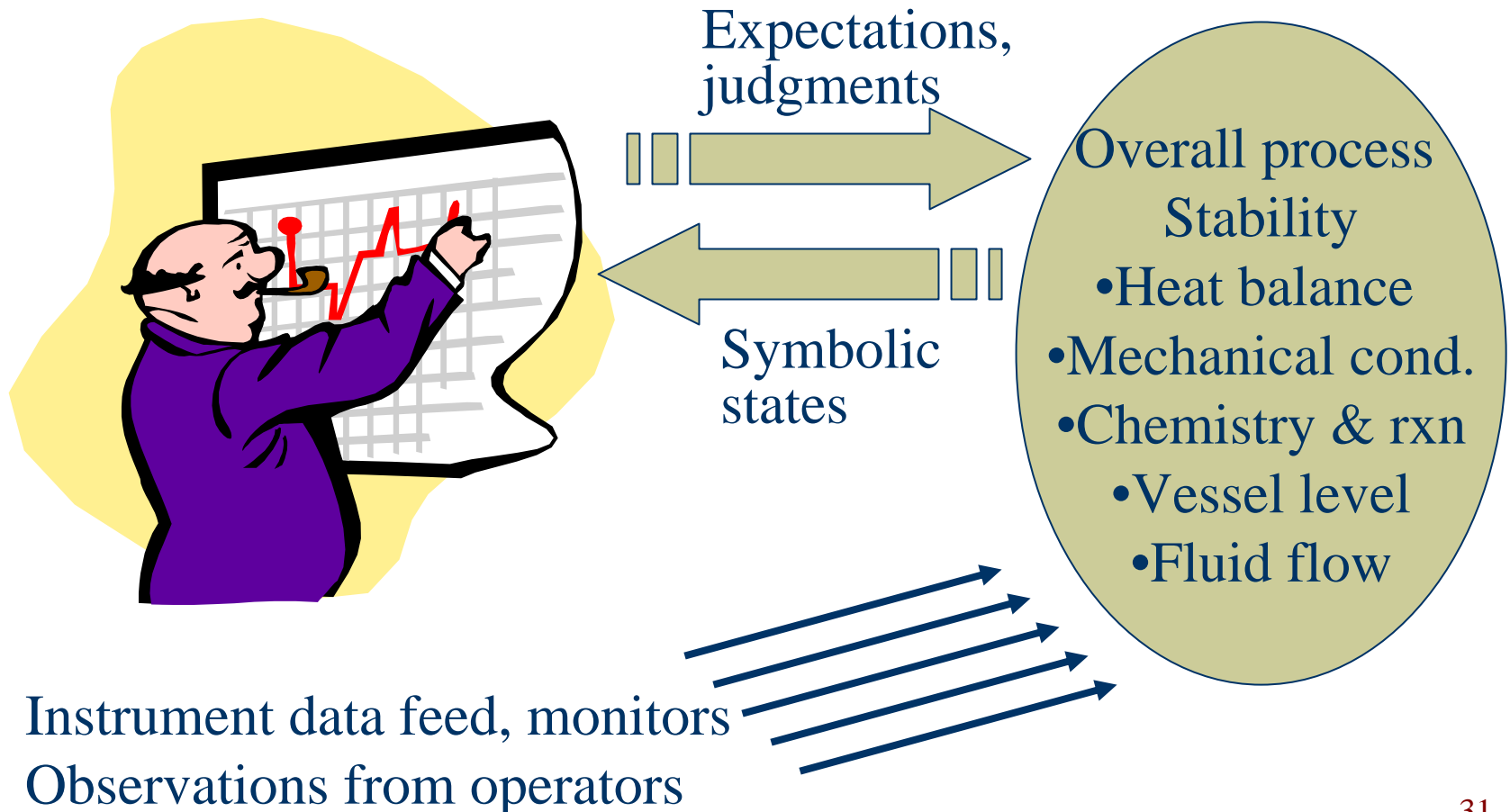
Mental models, knowledge scripts, work function profiles

- ◆ Abstract concepts are difficult to represent
  - Yields above 15% ROI are ok
  - The portfolio must be balanced
  - Risky investments must have high yields
  - Spread risks by investing in many industries
  - Look at both the company and the industry
  - If prime is high, investment yield should also be high

# Mental Models

- ◆ Overall concept of ‘stability’ for the running of a refinery
  - Discrete symbolic states that are qualitative representations of operating modes
    - Plant is nice and stable today
    - Plant is heating up
    - Plant is slightly unstable and ‘bumpy’
  - Link these to expectations and judgments
  - Communicate with others using highly specialized language that they share and understand
  - Identify normal vs. exception states of operation

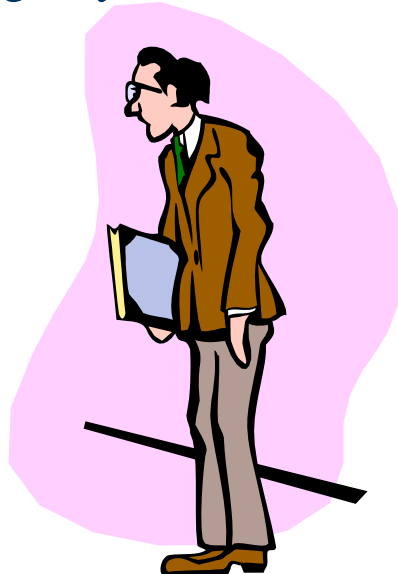
# Mental Model of Stability



# Mental Model of Supply-Demand Balance

## Overall Supply & Demand Balance

- Market is moving up
- Market is edging down
- Only a few big buyers...



## Buyer's Behaviour & Potential Plans

- Europe may be good buy
- Hershey is buying sugar futures

Demand Projections

## Seller/Supplier Behavior & Plans

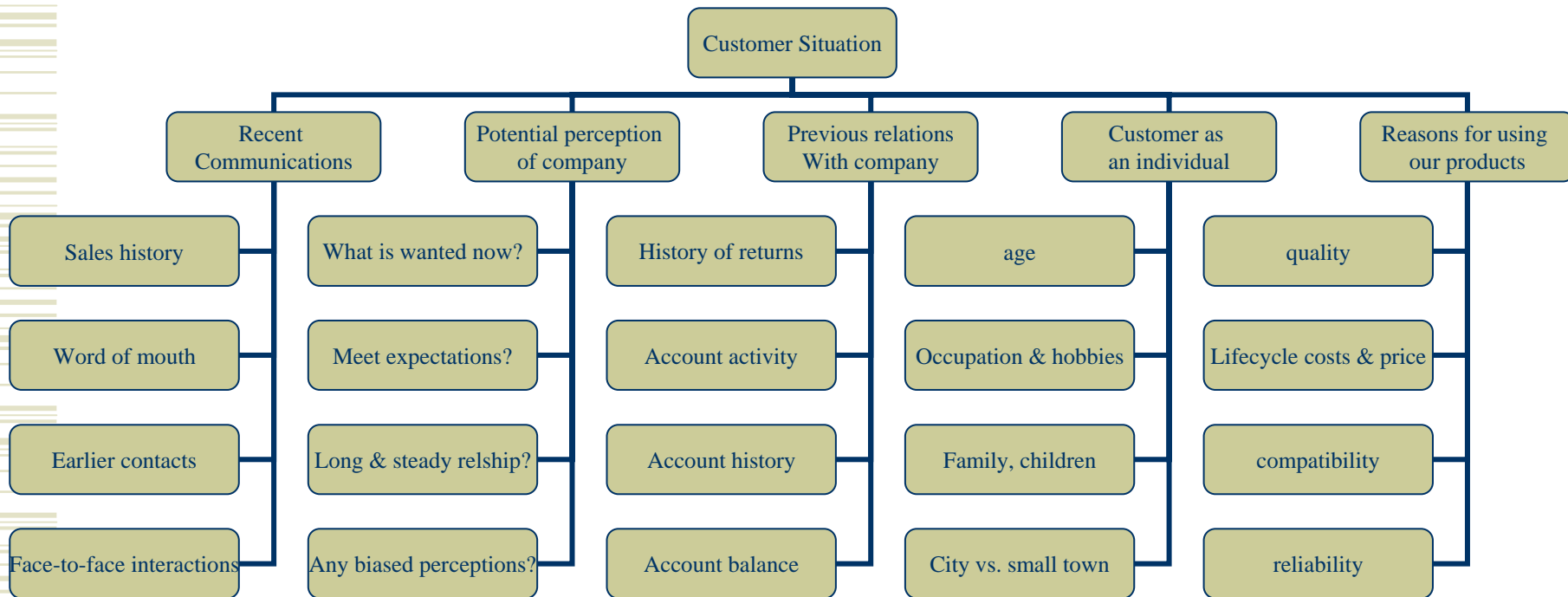
- Acts hastily when supply is short
- Tries to sell on early rumors

Supply Projections

# Codification of Abstract Knowledge

- ◆ Most of these mental models are kept in the heads of experts
- ◆ Some can be externalized and captured
  - Need to incorporate individual views, believed causalities, concepts, judgments and hypotheses
- ◆ Such highly abstract knowledge is typically represented using a concept hierarchy

# Concept Hierarchy for Abstract Knowledge – Customer Situation



# Summary: Tacit Knowledge Capture and Codification

- ◆ Tacit Knowledge Capture Techniques
  - Ad Hoc Sessions, Roadmap, Learning History
  - Storytelling, Interviews, Action Learning,
  - Learn from Others, Guest Speakers,
  - Best Practice capture
- ◆ Tacit Knowledge Codification Techniques
  - Mental models
  - Concept hierarchies, semantic networks
  - Best practices, lessons learned

# Explicit Knowledge Capture and Codification Techniques

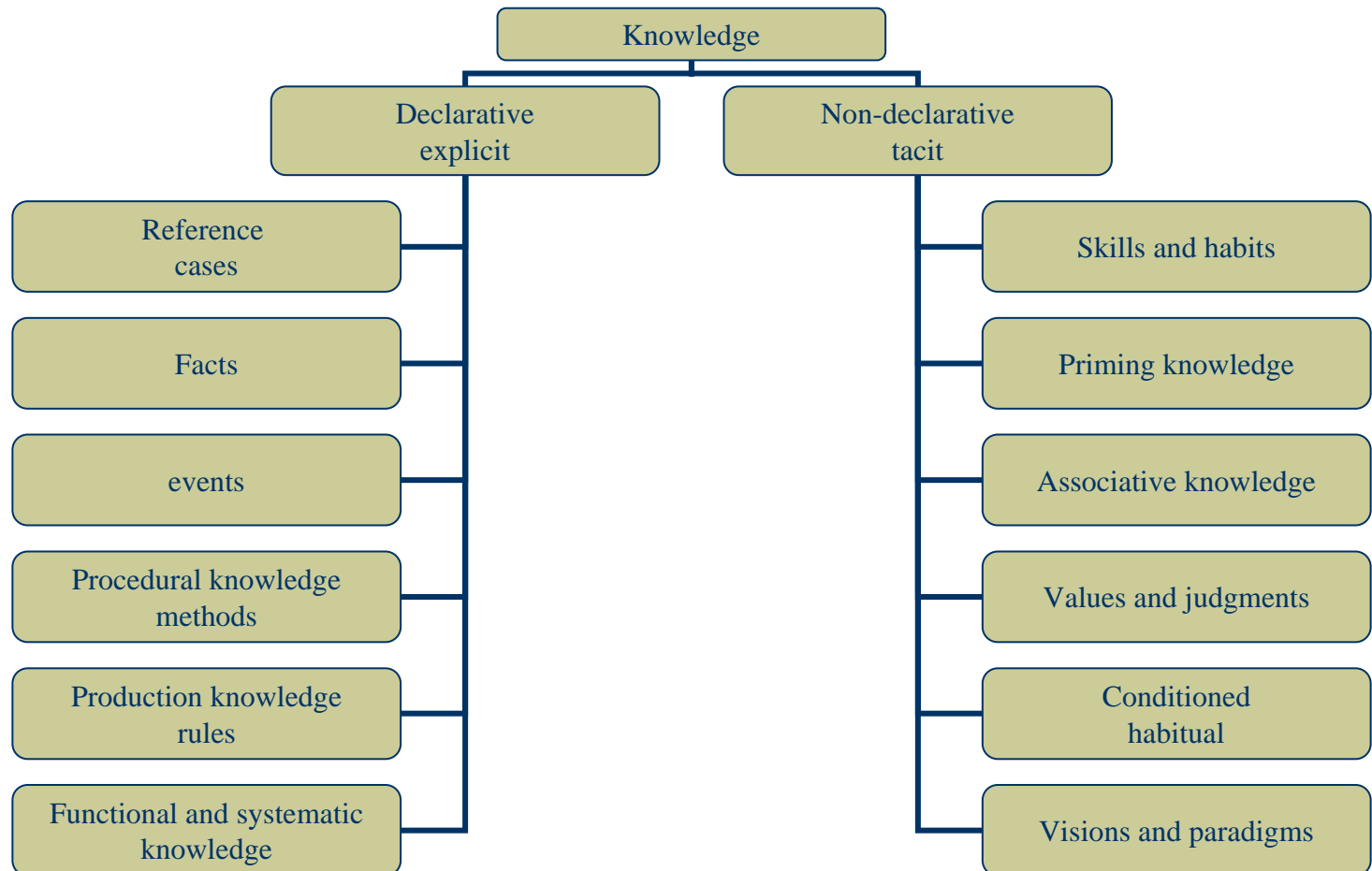
- ◆ Procedural Knowledge Representations
- ◆ Task Environment Analysis (TEA)
- ◆ Knowledge Use and Requirements Analysis (KURA)

# Procedural Knowledge Representations

Schemas, scripts, episodes, events, routines

- ◆ **Episodes** are collections of distinct steps e.g. prepare job description, discuss with manager, obtain approval from HR, evaluate candidates
- ◆ **Events** are the distinct occurrences e.g. episode “evaluate candidate” consists of events: receive a cv, candidate interview scheduled, etc.
- ◆ **Scripts** are the how-to’s: e.g. hiring script contains list qualifications needed, advertise, acknowledge, schedule interview, conduct interview, check references....
- ◆ **Schemas** are more general sets of tactics – hiring schema would include: determine what type of candidate is needed, determine hiring strategy (e.g. contact key individuals, hire headhunter, advertise in which publics)
- ◆ **Routines** are the detailed, rigid steps that must be carried out – for the hiring process these would be: write job description according to company standard, research salary range and obtain approval from HR, determine whether you have the authority to hire or to recommend, ....

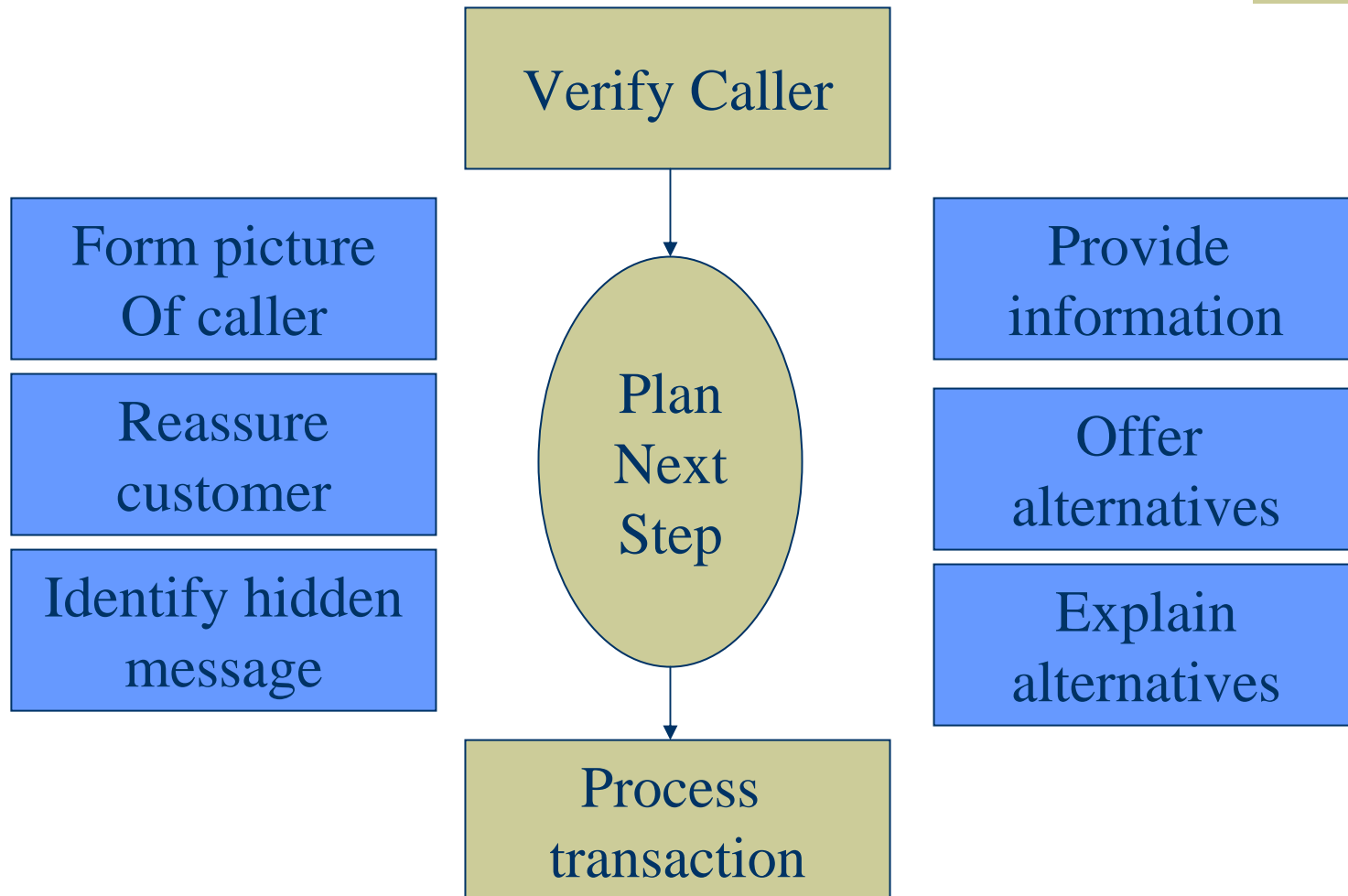
# Declarative and Procedural Knowledge Hierarchy



# Knowledge Scripting & Work Function Profiling

- ◆ Used to represent knowledge, skills, and personal characteristics required for dealing competently with both routine and unusual tasks (exceptions)
  - Task scenarios
  - Knowledge intensive activities

# Knowledge Script for Customer Interaction



# Knowledge Intensive Steps

- ◆ Ask open questions to verify information given
- ◆ Think of several approaches to verify caller
- ◆ Listen for ‘red flag’ messages and problems
- ◆ Listen for caller emotion
- ◆ Determine caller attitude and mindset
- ◆ Type information and conduct conversation

# Codify knowledge, skill, personal characteristics of importance

<b>Knowledge</b>	<b>Skill</b>	<b>Pers.Chars.</b>
Hidden messages	Quick thinker	Extrovert
Analogies	Synthesize info	Inquisitive
Sales aspects	Prioritize work	Asks questions
Product marketing	Focus on topics	Confident
Product application	Listening skills	Positive self-image
Product lifecycle	Quick learner	Pleasant, sincere
Customer service	Verbal skill	Adaptive, patient
Company business	Writing skills	Emphatic
Product policies	Follow-through	unemotional

# Task Environment Analysis

- ◆ Task environment modeling and analysis (TEA)
- ◆ Knowledge use requirements analysis (KURA)
- ◆ In depth approaches providing specifics on intellectual functions, knowledge flows, learning, pooling of knowledge, creation of new knowledge,
- ◆ Level of knowledge representation does not go beyond knowledge segments or reference cases
- ◆ Relate knowledge flows, use and control to other activities in the task environment

# TEA & KURA Analyses

1. Area of knowledge
2. Knowledge-intensive tasks
3. Decisions
4. Knowledge flows
5. Information flows
6. Practices
7. Inhibitors
8. Cultural themes
9. Taxonomies
10. Task environment components
11. Task domain areas

# TEA & KURA Analyses (con't)

## 1. Area of knowledge

- Experience of, expertise, proficiency, competence, skill, capability,
- knowledge of, conceptual knowledge from talk-aloud interviews

## 2. Knowledge-Intensive Tasks

- Problem solving activities that require specific knowledge or expertise to be carried out
- Task knowledge, work products knowledge

# TEA & KURA Analyses (con't)

## 3. Decisions

- Specific conclusions with resulting acts, closely related to knowledge-intensive tasks such as problem-solving analysis & synthesis

## 4. Knowledge Flows

- Transferring or pooling expertise or special knowledge; may be on demand or regular; typically requires consulting others and on-the-job learning

# TEA & KURA Analyses (con't)

## 5. Information Flows

- Transfer of information from one source to an individual or a function

## 6. Practices

- Management, operational, and personal work practices that govern the behaviour and performance of the task environment

# TEA & KURA Analyses (con't)

## 7. Inhibitors

- Anything that constrains the performance of the function: physical, resource-related, traditions, etc.

## 8. Cultural Themes

- Accepted beliefs, hypotheses, and abstracted traditions of the organization that influence people's acts;
- unspoken policies
- informal cultural behaviours

# TEA & KURA Analyses (con't)

## 9. Taxonomies

- Specific organizing relationships for the task environment and accepted by the organization
- E.g. structure of the task environment's work objects, products, and services; tasks, resources, artefacts, the organization's configuration etc.

# TEA & KURA Analyses (con't)

## 10. Task Environment Components

- Knowledge workers present, individual artefacts used to perform tasks and specific concepts (e.g. concept of a “completed business analysis”) used to identify physical and mental “things” are listed

## 11. Task Domain Area

- Work practices, knowledge required, information used, stored and generated, financial affairs, human resources, physical work place

# Summary: Explicit Knowledge Capture and Codification

- ◆ Procedural Knowledge Representations
- ◆ Task Environment Analysis (TEA)
- ◆ Knowledge Use and Requirements Analysis (KURA)



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Next:

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- ◆ Knowledge Sharing and Communities of Practice