Overview

Agenda

• Cognitive Support (Cont'd)
• Different Roles in Knowledge Management
• Perspectives on Knowledge Management
Distributed Cognition [Walenstein 2002]

Cognition is not a process localized to an individual human mind, but one that is spread out amongst possibly many humans and artifacts.

A cognitive system will operate better or worse depending upon whether the appropriate external artifacts are available, and depending upon how they are designed.

Cognitive support can therefore be understood entirely in computational terms: support is the provision of computational advantage.

Cognitive Support [Walenstein 2002]

Thus the cognitive support provided by an artifact is the computational advantage that it provides.

Designing cognitive support can be considered as computational reengineering.

Example: Calculator, Notebook, Calendar

But what different classes of cognitive support exist?
Cognitive Support Classes [Walenstein 2002]

The RODS Framework for Analyzing Cognitive Support

• Reduction
• Optimization
• Distribution
• Specialization

Task Reduction [Walenstein 2002]

• Removing unnecessary steps or unused computations
• Example:
  – Programmer’s editor might insist on having the developer re-read every line of code in a program before each and every edit she makes
  – Sending an SMS via a phone book entry
  – Unnecessary computations being performed
  – Removing these will decrease the amount of cognitive work done
Algorithmic Optimization [Walenstein 2002]

• Relies on the fact that
  – Differences in encoding or procedure can create differences in performance without changing the outcome
  – Information content remains unchanged

• Example:
  – Arabic and roman numbers: Roman numbers require more complex computation (symbol substitution) for most of us

Distribution [Walenstein 2002]

• Divide cognitive work
  – Thereby reduce the work done by each processor
  – Parallelize
  – Cognitive Offloading

• Allows to perform computations that otherwise might exceed the capabilities of one limited processor

• Using external memory
  – Example: Calculator, Type checker
Specialization [Walenstein 2002]

• Make use of specialized cognitive abilities. These are fast, effort-free and execute at least partially in parallel, in contrast to deliberate reasoning which is slow, serial and effortful

• Example: Visual search

Formal Representation:

<table>
<thead>
<tr>
<th>97976</th>
<th>14301</th>
</tr>
</thead>
<tbody>
<tr>
<td>69768</td>
<td>13504</td>
</tr>
<tr>
<td>76596</td>
<td>97697</td>
</tr>
<tr>
<td>32432</td>
<td>43533</td>
</tr>
<tr>
<td>51323</td>
<td>32432</td>
</tr>
<tr>
<td>31411</td>
<td>24350</td>
</tr>
<tr>
<td>30239</td>
<td>10002</td>
</tr>
<tr>
<td>42312</td>
<td>32143</td>
</tr>
<tr>
<td>12344</td>
<td>76565</td>
</tr>
</tbody>
</table>

Graphical Representation:
Problem for today’s lecture

• How to start a Knowledge Management Initiative in Organizations

• What are possible starting points?
• What are possible strategies / techniques?
• What are the implications of choosing one over the other?

Roles in Knowledge Management and selected KM Support Categories

[Strohmaier2004] Based on [Schreiber et al. 02]

Knowledge management interventions are typically organised as a project [Maier02]
Knowledge Infrastructures

- Knowledge Infrastructures are an Enabler for Knowledge Management [Siv01].
- Knowledge Infrastructures aim to support and improve the work of knowledge workers [DJB95].

**3 Main Dimensions:**

- **Human Systems**
  - Business Processes, Roles, Projects, Institutions, ...
  - Intranets, KM-Systems, Portals, CSCW, ...
  - Culture, CoP, Learning, Mentoring, Experience Mgt., ...

- **Technological Systems**

- **Organizational Systems**

The Knowledge Manager

The knowledge manager (or CKO - Chief Knowledge Officer) is regarded to be highest ranked role in knowledge management [Mai02, p.143].

In this steering position, his main responsibility is to develop and implement a knowledge management strategy that is aligned to an organization’s business strategy [Leh00, p. 226], [SAA+02, p. 22], [MHV03, p.107].

He initiates and coordinates knowledge management projects and monitors the results in terms of their contribution to the KM strategy as well as in terms of achieving economic benefits.

In larger organizations, this role is typically performed by one CKO who supervises various knowledge managers in his business unit [Mai02].

Is often implicitly executed by some other role in an organization

What roles take on implicit KM responsibilities?
The Project Manager

The project manager (or knowledge project manager [MHV03]) is in charge of running knowledge management projects [SAA+02, p. 22].

He focuses on aspects related to project management such as the development of project goals and plans or the coordination of project team members [MHV03, p. 107].

The project manager takes a business perspective on the project to ensure that the project goals are met in time and within the provided resources.

He is also responsible for dealing with project monitoring, controlling and/or marketing.
The Knowledge Worker

Knowledge workers are the primary target group of a knowledge infrastructure development project (also see [Mai02, p. 150]).

Knowledge workers are regarded to execute knowledge intensive work within or outside of business processes. They implicitly or explicitly generate, store, transfer and apply knowledge.

Thus, the role of a knowledge worker is broader than that of a knowledge user [SAA+02, p. 22] (additional focus on knowledge generation, storage and transfer), and

is not related to the role of a knowledge management worker [MHV03, p. 108], who is a trained person dedicated to perform operational knowledge management activities such as categorizing or structuring knowledge bases.

Knowledge Worker Support – Example

HR Portal for Managers
Business Process Oriented Portal Structure

HR Kerngeschäftsprozesse & -Informationen für Abteilungsleiter:

- Mitarbeitergespräche
- Mitarbeitertraining
- Mitarbeiterentwicklung
- Skills Management
- HR Neuigkeiten
- HR Prozessdokumente
The Knowledge Analyst

The knowledge analyst is responsible for analyzing organizational knowledge work executed by knowledge workers.

Similar to the role system analyst [You89, p. 56], he investigates a complex object system (organizational knowledge work) and generates models that illustrate core aspects of the system under investigation.

In doing so, the knowledge analyst provides specific knowledge views on the system that represent a fundament for subsequent activities of knowledge infrastructure designers.

The Knowledge Analyst – Exemplary Models

[Strohmaier 2006]  [Gronau 2006]
The Knowledge Infrastructure Designer

The knowledge infrastructure designer is responsible for transforming the developed models of organizational work into a design that describes a supportive environment for knowledge workers (in analogy to [You89, p. 57]).

He develops a design of the system, which is the basis for implementation.

The knowledge infrastructure designer (or an implementation team) implements the final design.

He also accompanies the validation of the solution with knowledge workers.
Schools of KM
[Earl 2001]

- These perspectives are not mutually exclusive.
- These perspectives are not complete.
- No focus on one single type of knowledge
- Perspectives span different levels (data – information – knowledge)

- Technocratic perspective
  - Support for knowledge workers, conditioning knowledge workers
- Economic perspective
  - Creation of revenue from the exploitation knowledge and intellectual capital
- Behavioural perspective
  - Stimulating a knowledge culture, social aspects

How do these broad categories relate to KM roles?
Capture knowledge in knowledge bases

- Make individual knowledge explicit and available to the organization
- Codifying experience and expertise for others
- Knowledge bases tend to be domain-specific, supporting and improving specific knowledge-intensive work tasks and particular sorts of decision-making
- Examples can be found in engineering design and maintenance

- For example, Airbus Industries create CD-ROMs of airplane maintenance technical expertise—maintenance manuals—to distribute to technical staff in airports worldwide. The essence is that authorized technical specifications and repair and maintenance procedures are distributed in a controlled and updateable manner.

What concept (data-information-knowledge) would predominately apply to this approach?

Knowledge can not only be derived from data, but from experience and expertise

- This requires efforts in validation
- Underlying philosophy: externalization

Implications:

- IT is essential: without IT, this approach would not be feasible
- IT which captures, stores, organizes, and displays knowledge provided by knowledge workers is a critical enabler
Cartographic Perspective [Earl 2001]

- Focus on mapping organizational knowledge
- „Who knows what“: Increase transparency about who in an organization knows what
- Via, e.g., the construction of knowledge directories or „yellow pages“
- Gateways to knowledge, rather than knowledg directories
- Importance of orientational/navigational knowledge
- Example: Bain and Company
  Implementation of a „peoplefinder“ database
  Emphasis on connecting people and communication instruments such as e-mail, video-conferencing or face-to-face meetings
Cartographic Perspective
[Earl 2001]

- In contrast to the system's perspective, focus is on incentivizing exchange of knowledge with others rather than giving knowledge to a system.

- Quality and Up-to-dateness of competency / skills profiles are critical to this approach.

- Based on the assumption that updating profiles is cheaper than mapping what the organization knows in different domains.

- The main contribution of IT is to connect people via e.g. intranets, synchronous and asynchronous communication instruments.

- And to help them locate knowledge sources.

Knowledge Maps


- Vorteile die sich dadurch ergeben sind:

  - Transparenzerhöhung (und damit verbunden ein verbessertes Verständnis von Abläufen, Prozessen und Zuständigkeiten)
  - Erleichterte Lokalisierung von Wissen
  - Erleichterte Erkennung von Wissensdefiziten bzw. -überschüssen
  - Erleichterte Einordnung von neuem Wissen.
Wissenslandkarte
[Hackl 2005]

Abbildung 3: Benutzenzübersicht der Wissenslandkarte

Markus Strohmaier 2007
Comparison

**TABLE 1**

<table>
<thead>
<tr>
<th></th>
<th>Laissez faire</th>
<th>Reengineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy</td>
<td>hire good people and leave them alone</td>
<td>get people to do work differently</td>
</tr>
<tr>
<td>Focus</td>
<td>inputs/outcomes</td>
<td>activities</td>
</tr>
<tr>
<td>Detail</td>
<td>macro</td>
<td>micro</td>
</tr>
<tr>
<td>Evaluation</td>
<td>multi-yearly</td>
<td>hourly/daily</td>
</tr>
<tr>
<td>Level</td>
<td>individual</td>
<td>large group</td>
</tr>
<tr>
<td>Participation</td>
<td>broad</td>
<td>narrow</td>
</tr>
<tr>
<td>Commitment</td>
<td>persuasion</td>
<td>mandate</td>
</tr>
<tr>
<td>Analytic Emphasis</td>
<td>understanding existing environment</td>
<td>design new environment</td>
</tr>
<tr>
<td>Work Done By</td>
<td>insiders</td>
<td>outsiders</td>
</tr>
<tr>
<td>Primary Barrier</td>
<td>loyalty to discipline</td>
<td>fear of change</td>
</tr>
</tbody>
</table>

Two Approaches to Knowledge Work Improvement

Davenport „Improving Knowledge Work Processes“

**Process Perspective**

[Earl 2001]

Assumption: Performance of business processes can be enhanced by providing operating personnel with knowledge relevant to their tasks

- Critical success factors both knowledge and information needs to be provided by IT
- „Give knowledge workers the knowledge and information to do the job“
- Essential contribution of IT: the provision of shared databases across tasks, processes, and organizational levels.

What concept (data-information-knowledge) would predominately apply to this approach?
Process Perspective
[Earl 2001]

- Example HP:
  Identifying key knowledge areas within divisions in order to
capture and make available known knowledge to support
knowledge workers

  Mapping knowledge links between divisions so that ideas may
be shared among different groups of knowledge workers
Commercial Perspective
[Earl 2001]

• Focus on protecting and exploiting a company’s knowledge or intellectual assets to produce revenue streams
• Including intellectual assets such as
  – Patents
  – Trade marks
  – Copyrights
  – know-how
• Most concerned with exploitation, and least concerned with exploration
• Intellectual capital often characterized as the difference between book and market value

• Success factor:
  – Organizational roles that aggressively manage knowledge property
  – Techniques and processes to measure and manage IC as a routinized process

What concept (data-information-knowledge) would predominately apply to this approach?

Example: Dow Chemical Company

• Turned the management of its patent portfolio into an active management process
• Patent department was incurring costs of $30 mio per annum, and generated revenues of only $25 mio.
• A patent can cost up to $250.000 over its entire lifetime
• Critical reflection on patents that Dow was holding and considering
  – Abandoning, donating, licensing or selling them.
• Over $40 mio savings in 18 months
Organizational Perspective [Earl 2001]

- Focuses on the use of organizational structures or networks to share or pool knowledge
- Knowledge communities, the archtypal organizational arrangement of a group of people with a common interest, problem or experience
- Designed and maintained for a business purpose
- Inter- or Intraorganizational
- Bringing together knowledge and knowers
- Combine both systems- and cartographic perspective
- A new role: knowledge intermediary

- Behavioural, because
  - Knowledge is exchanged in a nonroutine, personal and unstructured way
Organizational Perspective [Earl 2001]

- Example:
  Shell: Three different types of „forums“
  - Best Practice Forum: Most codified and structured, maintained and validated by the community
  - Discussion Forum: Least codified, around a topic of common interest
  - Task Forum: intermediate level of codification, centred around a community of people brought together to solve a significant challenge, e.g. turning around a business

- Each forum has a moderator, a „human hub“

Role of IT:
- Knowledge is often captured on video
- Knowledge base does not contain everything that could be externalized, but integrates cartographic aspects
- Videoconferencing
- Community support

Critical success factors:
- Culture of knowledge sharing and networking
- „Human hubs“ are essential to increase connectivity between knowledge workers
Spatial Perspective
[Earl 2001]

- Focuses on the use of space – or spatial design – to facilitate knowledge exchange
- Examples: the water cooler, coffee kitchen
- Basic assumption: Spatial layout of an organization (how teams are grouped in offices, how a building provides for serendipitous encounters) has an influence on the way knowledge is being shared
- Tacit knowledge is most likely to be discovered and exchanged through discussion
- Encourage socialization as a means of knowledge exchange

Example: Skandia’s Future Centre
- A converted waterside villa where groups can meet and where individuals can reflect
- Building designed for contactivity: to create contact and activity
- Dining area where individuals have to mingle with others

Other examples:
- Open space coffee bars, „main streets”, etc

Success factors:
- Contactivity as a driving objective
- Encouragement and legitimization („it is good to talk“)
Spatial Perspective

- Example: Skandia’ Future Centre

Strategic Perspective [Earl 2001]

- Knowledge management as a competitive strategy
- Knowledge and intellectual capital are viewed as the key resource
- The company chooses to compete on knowledge and is conceptualized as a knowledge business
- Knowledge as a source of differentiation

- Role of IT:
  - Open, depends on the conclusions drawn from developed knowledge strategies

What concept (data-information-knowledge) would predominately apply to this approach?
Strategic Perspective
[Alfeis 2003]

Figure 1: The Siemens – CIBIT Knowledge Strategy Process: The six steps and the results

Schools of KM
[Earl 2001]

Table 1. Schools of Knowledge Management

Markus Strohmaier
2007
Any further questions?

See you next week!