What are the factors influencing success of knowledge transfer instruments?

Markus Strohmaier

Univ. Ass. / Assistant Professor
Knowledge Management Institute
Graz University of Technology, Austria

e-mail: markus.strohmaier@tugraz.at
web: http://www.kmi.tugraz.at/staff/markus
Administrative Issues

• Week 10 class will be held in week 9,
• One day after our regular class

That means

• **Week 9:** 1.12.2008 13:00-14:30 and 2.12. 12:15-13:45 (Guest Lecture Dr. Tobias Ley)
• **Week 10:** 8.12. 2008 no class
Overview

Last Lectures:
• Knowledge Organization
• Broad Knowledge Bases
• Knowledge Acquisition

Today:
• Knowledge Transfer
Overview

What do we serve today?

- Selected **Theories** of Knowledge Transfer
- Illustrative examples
Overview

• Discretionary Databases

A shared database is discretionary if users contribute to the database voluntarily.

What are other examples of discretionary databases?
Example: Online Forum
## Schools of KM
[Earl 2001]

### Table 1. Schools of Knowledge Management

<table>
<thead>
<tr>
<th>SCHOOL ATTRIBUTE</th>
<th>TECHNOCRATIC</th>
<th>ECONOMIC</th>
<th>BEHAVIORAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SYSTEMS</td>
<td>COMMERCIAL</td>
<td>ORGANIZATIONAL</td>
</tr>
<tr>
<td></td>
<td>CARTOGRAPHIC</td>
<td></td>
<td>SPATIAL</td>
</tr>
<tr>
<td></td>
<td>ENGINEERING</td>
<td></td>
<td>STRATEGIC</td>
</tr>
<tr>
<td>FOCUS</td>
<td>Maps</td>
<td>Income</td>
<td>Space</td>
</tr>
<tr>
<td>AIM</td>
<td>Processes</td>
<td>Knowledge Assets</td>
<td>Knowledge Exchange</td>
</tr>
<tr>
<td>UNIT</td>
<td>Knowledge Directories</td>
<td>Knowledge Flows</td>
<td>Knowledge Capabilities</td>
</tr>
<tr>
<td>EXAMPLE</td>
<td>Enterprise</td>
<td>Activity</td>
<td>Place</td>
</tr>
<tr>
<td>CRITICAL</td>
<td>Bain &amp; Co</td>
<td>Know-how</td>
<td>Business</td>
</tr>
<tr>
<td>SUCCESS FACTORS</td>
<td>AT&amp;T</td>
<td></td>
<td>Skandia</td>
</tr>
<tr>
<td></td>
<td>Frito-Lay</td>
<td></td>
<td>British Airways</td>
</tr>
<tr>
<td></td>
<td>Culture/Incentives</td>
<td>Knowledge Learning and Information Unrestricted Distribution</td>
<td>Specialist Teams</td>
</tr>
<tr>
<td></td>
<td>to share Knowledge Networks to Connect People</td>
<td>Process</td>
<td>Institutionalized Process</td>
</tr>
<tr>
<td>PRINCIPAL IT CONTRIBUTION</td>
<td>Profiles and Directories on Internets</td>
<td>Intellectual Asset Register and Processing System</td>
<td>Design for Purpose</td>
</tr>
<tr>
<td>&quot;PHILOSOPHY&quot;</td>
<td>Connectivity</td>
<td>Commercialization</td>
<td>Encouragement</td>
</tr>
</tbody>
</table>

**Markus Strohmaier**  
2008
Knowledge Transfer: Effective sharing of ideas, knowledge, or experience between units of a company or from a company to its customers. The knowledge can be either tangible or intangible.

(MIT, Definitions for Inventing the Organization)

What are instruments that can facilitate knowledge transfer?
Overview

• Knowledge Transfer through Organizational Knowledge Repositories or Memories
  – A different type of knowledge base
  – Many of the concepts from knowledge organization still hold (categorization, taxonomies, etc)
  – But embedded in an organizational context
  – Designed to facilitate knowledge transfer/retention in organizations
  – Often critical to organizations, less critical to employees/customers
Knowledge Transfer
Background and State of the Art

Research on Knowledge Transfer focuses on

- **Theories**
  - Focus on the Nature of Knowledge Transfer
  - Example: Knowledge Flow Theory

- **Modeling Languages**
  - Identification, Visualization and Analysis of Knowledge Transfer Situations
  - Examples: B-KIDE, KODA, KMDL

- **Instruments**
  - Improve and Facilitate Knowledge Transfer
  - Examples: Wikis, mentoring, experience factory
Example

B-KIDE, [Strohmaier05]
Knowledge Flow Theory
[Nissen 2004]

Classification of different types of knowledge flows along 3 dimensions

• Explicitness
  – Tacit / Explicit

• Reach
  – Individual, Group, Organization, Interorganization

• Life Cycle
  – Evolve, Apply, Distribute, Formalize, Organize, Create, …

Formalization:
\[ a = a_1 e + a_2 r + a_3 l \]
Knowledge Flow Theory
[Nissen 2004]
Knowledge Flow Theory
[Nissen 2004]

Excercise:

Describe the following knowledge management instruments and techniques with Knowledge Flow Theory in a formal way:

• Folksonomies
• Ontology Engineering
• ConceptNet
• Games with a Purpose

Formalization:

\[ a = a_1e + a_2r + a_3l \]

- **Explicitness**
  - Tacit / Explicit
  
- **Reach**
  - Individual, Group, Organization, Interorganization

- **Life Cycle**
  - Evolve, Apply, Distribute, Formalize, Organize, Create, …
Modes of Knowledge Creation
[Nonaka 1994]

Legend: Each arrow represents a form of knowledge creation. A—Externalization; B—Internalization; C—Socialization; D—Combination

Figure 1. Knowledge Creation Modes
Knowledge Transfer
[Alavi & Leidner 2001]

What's the difference between F and G?

Figure 2. Knowledge Transfer among Individuals in a Group

Legend:
D--The Process of Knowledge Application
E--The Process of Learning
F--The Transfer of Individual Explicit Knowledge to Group Semantic Memory and vice versa
G--The Transfer of Individual Tacit Knowledge to Group Episodic Memory and vice versa
Types of Knowledge Reuse Situations
[Markus 2001]

Four distinct types:

- **Shared work producers**
  - who produce knowledge they later reuse
- **Shared work practitioners**
  - who reuse each other’s knowledge contributions
- **Expertise-seeking novices**
  - who seek advise from experts
- **Secondary knowledge miners**
  - who seek to answer new questions or develop new knowledge
Types of Knowledge Reuse Situations
[Markus 2001]

Shared work producers:
• People working together in a team
  – e.g. a team of software developers
• Shared work producers create and document the knowledge they later reuse *themselves*
• Ideally, this makes it easier to reuse knowledge

Challenges:
• *Filing, organizing and searching for knowledge might still pose challenges*

• Example: Software Development
  *(What did I want to achieve with this specific piece of code? What do my comments mean?)*
Types of Knowledge Reuse Situations
[Markus 2001]

Shared work practitioners:
• People doing similar work in different settings, a Community of Practice
  – e.g. a group of software consultants
• Shared work practitioners produce and create knowledge for each other’s use

Challenges:
• quality of resources, up-to-dateness

• Example: Professional Services
(What did my colleague consultant wanted to achieve with this specific piece of code? What do his/her comments mean?)
Types of Knowledge Reuse Situations
[Markus 2001]

Expertise-seeking novices:
• People with an occasional need for expert knowledge
  – e.g. Secretary
• Knowledge producers differ significantly in their knowledge background from the knowledge consumers
• Expertise-Seeking Novices do not possess the required knowledge and do not need to acquire it themselves because they rarely need it

Challenges:
• Jargon, don’t know right questions, easy access, etc

• Example: Secretary in need of PC administration knowledge
  (How can I configure my computer to print on the network printer?)
Types of Knowledge Reuse Situations [Markus 2001]

Secondary knowledge miners:
• People who seek to answer new questions or develop new knowledge through analysis
  – E.g. Website Analyst
• Shared work producers analyze records produced by other people for different purposes

Challenges:
• Induction

• Example: Analyzing User Access Logs for Website Optimization
  (What do users search for on our company website?)
## Types of Knowledge Reuse Situations

[Markus 2001]

| Description                                                                 | Shared Work Producers                                                                 | Shared Work Practitioners                                                                 | Expertise-Seeking Novices                                                                 | Secondary Knowledge Miners                                                                 |
|                                                                            | People working together on a team, either homogeneous or cross-functional; producers of knowledge for their own later reuse | People doing similar work in different settings; producers of knowledge for each other’s use | People with an occasional need for expert knowledge that they do not possess and do not need to acquire themselves because they need it rarely | People who seek to answer new questions or develop new knowledge through analysis of records produced by other people for different purposes |
| Purpose of Knowledge Reuse                                                 | • Keep track of current status and things needing attention                           | • Acquire new knowledge that others have generated (e.g., how to handle a particular type of problem) | • Answer arcane question or solve an ad hoc problem                                      | • Seek answers to new questions or create new knowledge                                   |
|                                                                            | • Recall reasons for decisions when decisions need to be revisited or when there is turnover among team members | • Get advice about how to handle a particularly challenging or unusual situation that is new to the team | • Approximate the performance of experts                                                |                                                                                       |
|                                                                            | • Learn how the team can perform better on the next project                          | • Gain access to observations that spur innovations                                      | • Minimize the need for experts                                                        |                                                                                       |

Markus Strohmaier

2008
Picture a pasture open to all, limited in space and food supply.

- Each herdsman will try to keep as many cattle as possible on the commons
- He will ask himself: **What is the utility to me of adding one more animal to my herd?**

- The **positive component**: increment of 1 more animal to sell
- The **negative component**: overgrazing – equally shared by all the herdsmen. Corresponds to only a fraction of -1
- **Conclusion**: add as much animals as possible
- **Therein lies the tragedy of the commons.** Each herdsman is locked into a system that compels him to increase his herd without limit – in a world that is limited.

Can you give examples of the Tragedy of the commons in today’s world?
The Tragedy of the Commons
[Garrett Hardin 1968]
http://www.sciencemag.org/cgi/content/full/162/3859/1243

Examples of the Tragedy of the Commons

• Depletion of fish stock in international waters
• Traffic congestion on urban highways
• Pollution
• Global Warming / Climate Change

• Can you find others?

Is knowledge as a form of a public good prone to the tragedy of the commons problem? If so, how?
Example: Online Forum

Forums

- Login to post a new forum topic.

General discussion

This is the place where everyone can ask any questions about Forum-Software.org or anything else they would like to know.

Problems and Bugs in demonstration websites
A forum software demo does not work? Post your messages here to help admins maintain them and find where the problem is.

About Forum-Software.org
Post your questions about Forum-Software.org here. Webmasters will answer you as soon as possible.

Demonstrations update requests
Post a message here if you want to ask Forum-Software.org webmasters to update one of the forum software demonstrations. Please specify the name and the version you would like to test.

PHP / MySQL Forum Software Troubleshooting
Please post your problem and solution in this category, to let the community answer and probably fulfill your request.

Beehive Forum
The forum dedicated to Beehive Forum software.

FUDForum
The forum dedicated to FUDForum software.
Message Board in an Organizational Intranet

Let’s start from zero!
Knowledge sharing and social dilemmas [Cabrera2002]

Social dilemmas describe paradoxical situations in which individual rationality – simply trying to maximize individual payoff – leads to collective irrationality.

-> The tragedy of the commons

The Free-riding / Defecting Problem:

to enjoy a resource (e.g. pasture, an information resource) without contributing to its provision

The Ramp up Problem:
Without users providing resources, no additional users will be attracted

In Knowledge Sharing contexts (as opposed to classic public goods), the cost of the contribution of knowledge does not lie in the contribution itself. The cost has to do with the process of making that idea available. [page 9]
Three Potential Solutions
[Cabrera2002]

1. Restructuring the payoff function
2. Increasing perceived efficacy of individual contributions
3. Establishing group identity and promoting personal responsibility
Restructuring the Pay-Off Function

[Cabre2002] = Reducing the perceived costs or increasing the perceived benefits of contributing.

If the cost of contributing to a discretionary database is lower, the benefits associated with defecting are also lower.

For a humorous example, see http://www.soledadpenades.com/2007/03/11/the-next-captcha-generation-for-myspace-forms/
Restructuring the Pay-Off Function  
[Cabrera2002]

Two principle ways to increase individual payoffs:

- **Cooperation-contingent transformation**
  - A selective incentive or reward is offered which is contingent on an individual’s behavior
  - such as social recognition, can be extremely powerful incentives so long as they are public, infrequent, credible, and culturally meaningful

- **Public good transformation**
  - The perceived value of the collective gain is increased. If the value of the collective gain is greater for the individual than the cost, the incentive to cooperate will increase. (no direct rewards)
  - One way to increase the value of the collective gain is to combine a knowledge exchange program with a gain-sharing or profit sharing plan in which every individual receives a bonus based on the success of the knowledge-sharing program.

Examples:
- Make it easier for people to share information
- Information about the existence and rationale of systems
- Availability of training opportunities
- Assure that employees have the time and resources necessary

Example: Siemens Sharenet
## Restructuring the Pay-Off Function

[Cabrera2002]

### Table 1
Examples of interventions aimed at restructuring the payoff function

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced information technology</td>
<td>♦ Reduce cost of contributing</td>
</tr>
<tr>
<td>Rewards or selective incentives</td>
<td>♦ Increase benefit of contributing</td>
</tr>
<tr>
<td>Gain-sharing programs</td>
<td>♦ Increase perceived value of collective gain</td>
</tr>
<tr>
<td>Align human resource policies with participation</td>
<td>♦ Increase benefit of contributing</td>
</tr>
<tr>
<td></td>
<td>♦ Send clear message about importance of knowledge exchange and creation for the organization</td>
</tr>
</tbody>
</table>
Increasing efficacy
[Cabrera2002]

Information self-efficacy
• An employee’s belief that the information he or she has would be helpful to co-workers were they to receive it.

Connective efficacy
• is the belief that others will actually receive the information if it is contributed.

Examples:
• Provide feedback whenever others use their contributions
Increasing efficacy  
[Cabrera2002]

Table 2
Examples of interventions aimed at increasing the efficacy of contributions

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide feedback to contributors</td>
<td>♦ Increase information efficacy</td>
</tr>
<tr>
<td></td>
<td>♦ Increase connective efficacy</td>
</tr>
<tr>
<td></td>
<td>♦ Create further opportunities for knowledge combination and creation through deeper processing of others’ contributions</td>
</tr>
<tr>
<td>Ensure a critical mass of participants</td>
<td>♦ Make potential value of shared knowledge greater than individual cost</td>
</tr>
<tr>
<td>Advanced technology</td>
<td>♦ Increase information efficacy by reducing redundancies</td>
</tr>
<tr>
<td></td>
<td>♦ Increase connective efficacy by reducing search difficulties</td>
</tr>
<tr>
<td>Training</td>
<td>♦ Increase information efficacy</td>
</tr>
<tr>
<td></td>
<td>♦ Increase connective efficacy</td>
</tr>
</tbody>
</table>
Promoting group identity and personal responsibility [Cabrera2002]

A sense of group identity influences contributions to a public good, i.e. individuals share more information when common group identity was made salient [page 18].

Axelrod: the probability of cooperation increases when

• Interactions among participants are frequent and durable
• Participants are easily identifiable
• There is sufficient information available about each individual's actions
### Table 3

Examples of interventions aimed at increasing group identity and personal responsibility

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encourage communication</td>
<td>✧ Increase sense of group identity</td>
</tr>
<tr>
<td></td>
<td>✧ Increase commitment</td>
</tr>
<tr>
<td></td>
<td>✧ Increase frequency of interactions</td>
</tr>
<tr>
<td></td>
<td>✧ Increase identifiability</td>
</tr>
<tr>
<td></td>
<td>✧ Increase expectations of others’ participation</td>
</tr>
<tr>
<td>Create knowledge sharing communities or communities of practice</td>
<td>✧ Increase sense of group identity</td>
</tr>
<tr>
<td></td>
<td>✧ Increase frequency of interactions</td>
</tr>
<tr>
<td></td>
<td>✧ Increase identifiability</td>
</tr>
<tr>
<td>Publicize information about employees’ contributions</td>
<td>✧ Increase identifiability</td>
</tr>
</tbody>
</table>
Example: Promoting Group Identity

Stacysmom

Just want to send you hugs and say to think only pos here I know its hard but the unknowing can stress us out and in the end its all fine.

I am preying your baby is good and healthy as i am sure he/she will be

Lillypic.com

I am a boy.

5 10 15 20 25 30 35
A look back

My shiny brandnew message board

No articles found

Title: My shiny brandnew message board
Description: 
Time Modified: 22/11/2007 11:52:49
Available starting: 
Expires on: 
Subdocuments: 0
Determinants of Knowledge Transfer

[Gupta 2000]

Value of Knowledge Stock

P1(+)

P2(+)

Motivational Disposition to Share Knowledge

P3(+)

Knowledge Outflows from the Subsidiary

Existence and Richness of Transmission Channels

P4(+)

Motivational Disposition to Acquire Knowledge

P5(+)

P6(+)

Knowledge Inflows into the Subsidiary

Absorptive Capacity

Figure 1. Determinants of intra-corporate knowledge outflows from and inflows to foreign subsidiaries: An overarching theoretical framework
<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
<th>Replies</th>
<th>Last Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/20/07</td>
<td>Heart Palpitations - 16 yr old Athlete</td>
<td>1</td>
<td>11/20/07 maggiemag</td>
</tr>
<tr>
<td>11/19/07</td>
<td>Dilated Cardiomyopathy</td>
<td>3</td>
<td>11/20/07 maggiemag</td>
</tr>
<tr>
<td>11/17/07</td>
<td>Low HDL and LDL</td>
<td>13</td>
<td>11/19/07 trademob</td>
</tr>
<tr>
<td>11/20/07</td>
<td>Chest pain</td>
<td></td>
<td>11/20/07 Trademob</td>
</tr>
<tr>
<td>11/20/07</td>
<td>Losing weight</td>
<td></td>
<td>11/20/07 Trademob</td>
</tr>
<tr>
<td>11/20/07</td>
<td>Anti Cardiopulmonary antibodies</td>
<td>2</td>
<td>11/20/07 Jack54</td>
</tr>
<tr>
<td>11/20/07</td>
<td>my medication</td>
<td></td>
<td>11/20/07 Andy0625</td>
</tr>
<tr>
<td>11/20/07</td>
<td>worried</td>
<td></td>
<td>11/20/07 Trademob</td>
</tr>
<tr>
<td>11/20/07</td>
<td>in a lot of pain</td>
<td>2</td>
<td>11/20/07 Jack54</td>
</tr>
<tr>
<td>11/20/07</td>
<td>Golf after by pass?</td>
<td></td>
<td>11/20/07 Jack54</td>
</tr>
<tr>
<td>11/19/07</td>
<td>Low of Pat Crouch</td>
<td>3</td>
<td>11/20/07 Pat_Crouch</td>
</tr>
<tr>
<td>11/20/07</td>
<td>Heart is too weak</td>
<td>1</td>
<td>11/20/07 Vienna13</td>
</tr>
</tbody>
</table>

**Note:** The red box highlights the Screenshot of the page captured on 11/20/2007.
Exam
Bonus Task

• Select a specific Social Software Application
• Based on Knowledge Sharing Dilemmas
  – Describe how the Social Software Application fits the dilemma
  – Describe how the Social Software implements the 3 potential solutions (list specific functionalities)
  – Describe potential improvements of the social software service based on KSD considerations

• Submit
  – A Din A4 page (one page!) containing your observations
    • Name the File using the following Syntax: „GWM08-BT2-YOURMATR-YOURLASTNAME.doc“
    – To me via e-mail using subject „[GWM08-BT2-YOURMATR]“
    – before the beginning of next week’s class
Any questions?

See you next week!