A Framework for Inter-Organizational Collaboration and Sensemaking Integrating Communication and Knowledge Management Tools

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- The opinions presented in this paper are NOT those of Army Research Office (ARO) and are solely those of the authors.
Agenda

- Introduction
- Requirements
  - Sensemaking
  - Communities of Practice
  - Knowledge Management
- Framework
- Implementation
- Scenario
Introduction

- Thesis research on “collaborative sensemaking”
- Military often involved in collaboration with
  - Other militaries
  - Governments
  - Businesses
  - NGO’s
- Each organization may have its own:
  - Goals, culture, language, or vision of the world
  - Processes, procedures, terms, and acronyms
- How can they work together towards their goals?
Sensemaking
An Example

UN Group set out to plan a relief effort for Afghanistan.

- Group consisted of several bodies from UN, World Bank, & Oxfam (anti-poverty NGO).
- Leader spent most time working on political issues
- Due to changing circumstances in Afghanistan they had difficulty meeting
- Many did not speak until workshops were held in Pakistan.
Sensemaking Requirements

- **Wicked Problems**
  - Difficult to understand
  - Multiple people and organizations involved
  - Stakeholders have radically different views of the world

- **Key Questions**
  - How do all of these people communicate?
  - How do they arrive at a shared understanding?
  - How do you integrate past knowledge with collaboration processes?
Sensemaking

- Sensemaking is an approach to solving such a “wicked” problem.
- Sensemaking key properties:
  - Personal (system must support each person’s role)
  - Retrospective (-> knowledge management)
  - Social (-> communities of practice)
- Processes Involved:
  - Comprehending
  - Mutual understanding
Sensemaking Requirements

Network Centric Warfare (NCW)

- From Alberts & Hayes (2006)
- A way to achieve more autonomous, “self-synchronizing” groups.
- Groups must be able to react with up-to-date information.
- Need better information sharing and collaboration
  - Recommend creating socio-technical networks facilitated by technology
Sensemaking Requirements

- Framework
- helps
- Different Stakeholders
- Achieve Mutual Understanding
- of
- by
- Flexible
- Acronyms
- Information
- Sensors
- Documents
- Goals
- Jargon
- Retrospection
- Crossing “Silos”
- Conversation
- Knowledge Management
Collaboration &
Communities of Practice
Requirements
Communication

- How do they communicate now?
- Emergency Management:
  - Synchronously: telephone, cell phone, satellite phone
  - Follows chain of command within each organization
  - Long hierarchy before information reaches the top
    - Even longer before it is transmitted across boundaries
- Inter-Organizational Collaboration:
  - People hesitant to report information because they view it as wasted time
  - Meet face-to-face one or twice (travel is difficult, not everyone attends)
  - Talk individually by telephone, collectively by conference call
  - Use e-mail and / or electronic mailing lists.
Communication Hierarchy and Silos

In the Scenario

Observing Scenario
Communities of Practice

- Topics Vary Widely
  - Troops discussing tactics
  - Students learning a new subject
  - Engineers discussing programming

- Vary by
  - Size
  - How long they’ve existed
  - People co-located or not
  - How similar people are to one another
  - Within or across organizations
Benefits to Organizations

- **Short-term:**
  - Improve quality of decisions
  - Find answers more quickly
  - Get additional perspectives on problems

- **Long-term:**
  - Build new capabilities and alliances
  - Increase strategic thinking about employee knowledge and capabilities
  - Reduce “silos”
  - Better retain talent
  - Allow distributed cognition—pooling of knowledge
Carroll’s CoP Framework

- **Carroll’s Framework:**
  - **Communities of Practice**
    - Each group of people can be thought of as a community
    - Supporting tools different based mainly on time and place restrictions
  - **Common Ground**
    - Mutual beliefs, knowledge, assumptions, etc.
    - Also involve grounding process (unconsciously establishing mutual knowledge, see next slide)
  - **Social Capital**
    - Reciprocity, trust, and social dilemma
  - **Human Development**
    - Zone of proximal development, opportunistic learning
Factors that affect communications and grounding

<table>
<thead>
<tr>
<th>Factor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-presence</td>
<td>People in same physical space</td>
</tr>
<tr>
<td>Visibility</td>
<td>People can see one another</td>
</tr>
<tr>
<td>Audibility</td>
<td>People can hear one another</td>
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<tr>
<td>Co-temporality</td>
<td>People are experience conversation of roughly the same time</td>
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<tr>
<td>Simultaneity</td>
<td>People take turns in order</td>
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<tr>
<td>Reviewability</td>
<td>People can review messages</td>
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<tr>
<td>Revisability</td>
<td>People can revise messages</td>
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</tbody>
</table>
Communication Tool Requirements

- Time (Asynchronous, Synchronous)
- Place (Co-located, distributed)
- Activity (Push, Pull)
- Smartness (One-to-one, Broadcast)
- Device Required
- Usability (Speed, Readability, Portability)
# Communication Requirements

<table>
<thead>
<tr>
<th></th>
<th>Same Time</th>
<th>Different Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Same Place</strong></td>
<td>Required</td>
<td>Not Required</td>
</tr>
<tr>
<td><strong>Different Place</strong></td>
<td>Required (e.g., Telephone)</td>
<td>Required (e.g., Broadcast / Push / Pull / One-to-one)</td>
</tr>
</tbody>
</table>
Knowledge Management
Knowledge Management (KM)

- From Wikipedia: “A range of practices and techniques used by organizations to identify, represent and distribute knowledge, know-how, expertise, intellectual capital and other forms of knowledge for leverage, reuse and transfer of knowledge and learning across the organization.”
KM Processes

- Creating / Transferring
  - Like Nonaka’s spiral
- Planning
  - Requirements definition
- Assessing
  - Assignment of value
- Maintaining
  - Reviewing, updating, etc
- Integrating
  - Is it used by other applications and people?
- Organizing
  - How can people find the knowledge
# KM – Nonaka’s Spiral

<table>
<thead>
<tr>
<th>From:</th>
<th>Tacit</th>
<th>Explicit</th>
</tr>
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<tbody>
<tr>
<td>Tacit</td>
<td>Socialization</td>
<td>Externalization</td>
</tr>
<tr>
<td>Explicit</td>
<td>Internalization</td>
<td>Combination</td>
</tr>
</tbody>
</table>
KM Tools

- Most tools are focused on creating knowledge from data.
  - Data Mining

- Knowledge Storage:
  - Databases, Files, Documents
  - FAQ’s
  - Often not standardized across organizations

- Limited methods to find knowledge
  - Search engines
  - “Knowledge-based” search
  - Lack of integration big problem
KM Bottlenecks

- **Narrow Bandwidth**
  - To capture knowledge from its source (often one person)

- **Acquisition Latency**
  - Delay from when knowledge has been captured to when it can be consumed (e.g., Wait for publisher)

- **Knowledge Inaccuracy**
  - Mistakes are made, may take a long time to correct

- **Maintenance Trap**
  - The more knowledge that is captured, the more difficult it is to maintain
Knowledge Management Requirements

Create
Transfer through
Externalization
Internalization
Socialization
Combination
avoid
Narrow Bandwidth
Latency

Assess
Value
Security

Integrate
Knowledge
Communication
Tools

Organize
Maintain
Revisable
Reviewable
avoid
Maintenance Trap
Inaccuracy
The Framework
Framework

- Must support two scenarios

Communication
- Allows people to use tools that fulfill their needs
  - Devices (phones, PDA’s, computers, etc)
  - Applications (compendium, wiki, etc)
  - Communication protocols (e-mail, RSS, text messages, etc)

Knowledge Management
- Support processes
- Reduce bottlenecks
- Portable across organizational boundaries
Framework

- Two different ways to represent framework:
  - Theoretical
    - Includes broader terms like KM, Communication, Collaboration, etc.
    - Still working on how to best represent this in a graphic
  - Implementation
    - Specific applications
    - How it is used in specific scenarios
Framework - Theoretical
Framework - Implementation
EM Communication Hierarchy

In the Scenario

Observing Scenario
EM Communication Hierarchy

Transcribe Communications that Cross this Boundary
EM Communication Hierarchy

Old channels still exist, but decision maker can bypass them if necessary
EM Communication Hierarchy

- Hierarchy is shorter
  - Managers can see communications down to smallest level if they wish
- Silos are reduced
  - Information crosses boundaries with no effort
Asynchronous Communication Tool

- Requirements match capabilities of bulletin boards
Bulletin Boards

- Records discussions in threads.
  - Each thread is in a forum.
    - A forum may be grouped inside of another forum.
- Useful way to organize the communications.
- Also allows:
  - Discussions with other strategists
  - Searching across boundaries
  - Using tags to classify discussions
  - Hierarchical permissions
- Content can be stored forever, or deleted.
Sensemaking

Definition

Sensemaking is difficult to define, but most simply it can be thought of as the “making of sense” (Weick, 1995), though practically this definition is not of much use. Weick pieces together several defintions to say that sensemaking involves placing stimuli into frameworks, which allows people to comprehend, understand, explain, attribute, extrapolate, and predict. It is perhaps more helpful to understand sensemaking by its properties:

- Grounded in identity contraction
- Retrospective
- Enactive of sensible environments
- Social
- Ongoing
- Focused on and by extracted cues
- Driven by plausibility rather than accuracy

References

- Weick, 1995, Sensemaking in Organizations
Wiki

- Collaborative editing
  - Version control system built in
  - Much like an encyclopedia
- Knowledge management tool that:
  - Reduces bottlenecks
  - Easy to use
  - Can be standardized across boundaries
  - Can be integrated into other applications
Bulletin Board + Wiki Scenario

1. Navigates to BB
2. Doesn’t understand “sensemaking”
3. Hovers over link
4. Retrieves brief definition from wiki
5. Wants to know more, so clicks link
6. Taken to wiki page on sensemaking

Sensemaking means “making sense” of information by placing it in some framework.
A Scenario

- See paper for a scenario in which this framework can be used.
- Supports emergency management
  - Managers can see what’s happening in the field and discuss it with others
- Supports distributed/asynchronous collaboration
  - People can interact through bulletin board or e-mail. Wiki can be used to create and store documents, terms, etc.
Future Research Directions

- Completed an experimental study testing integration of wiki and bulletin board.
- Test using Army participants
- Implement and test in real-world case study
- Implement other parts of framework
Questions & Comments?