
**Wisdom is not the product of schooling but the lifelong attempt to acquire it.**
**- Albert Einstein**

# Organizational Memories

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***"Those who cannot remember the past are condemned to repeat it."***
***George Santayana***

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# Organizational Learning

- **organizational learning** focuses
  - on recording knowledge (primarily informal knowledge, tacit knowledge)
  - gained through experience (in the short term), and subsequently making that knowledge available to others when it is relevant to their work (in the long term)

- create "**organizational/corporate/group/artifact" memories** where knowledge and improvisations can be captured and made part of the collective knowledge base

- principles for helping organizations use what they know
  - capture a significant proportion of the knowledge that practitioners generate in their work
  - develop a culture in which individuals see their efforts as part of the larger process of building the organization's capabilities
    * updating the organizational memory through new lessons gleaned from practice
    * updating the organizational memory through organizational reflection, in which the raw knowledge from practice is sifted, synthesized, and elaborated
    * delivering the knowledge in the organizational memory as it is required: relevance to the task at hand, learning on demand, performance support, training, .....
  - develop mechanisms to deliver and acquire knowledge that respect or, better, improve upon the work processes in which practitioners already engage (socio-technical aspect)

# A Group has No Head: The Need for Organizational Memories

- distributed cognition emphasizes that the heart of intelligent human performance is not the individual human mind but **groups of minds in interaction with each other and minds in interactions with tools and artifacts**

- distributed cognition between the individual human mind and artifacts (such as memory systems) often function well, because the required knowledge which an individual needs is distributed between her/his head and the world (for example: an address book, a folder system of e-mail messages, a file system, ..... )

- **a group has no head** — therefore externalizations are critically more important for organizational learning than for individual learning

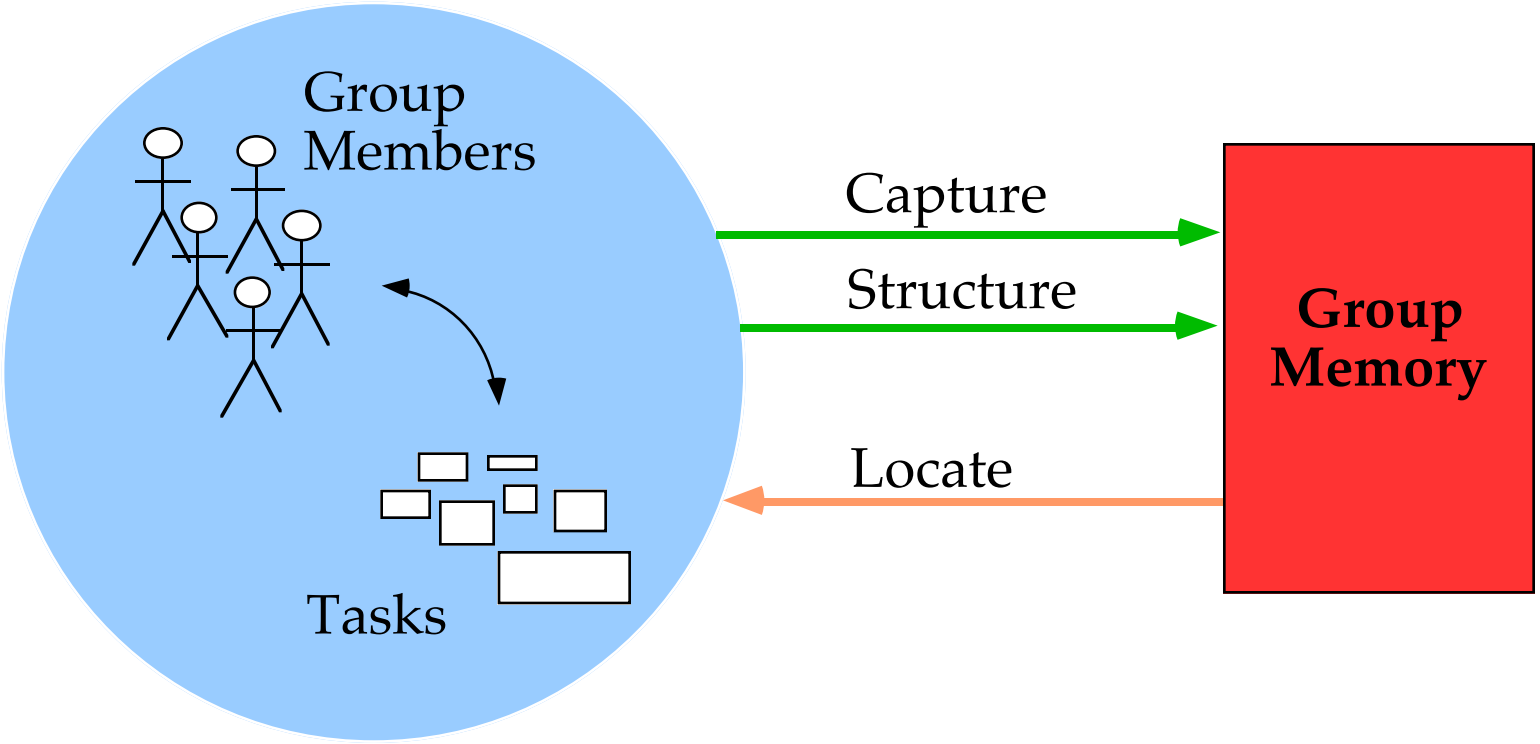
- **externalizations**
  - create a record of our mental efforts, one that is “outside us” rather than vaguely in memory
  - represent situations which can talk back to us, which can be critiqued and negotiated
  - embody our thoughts and intentions in a form more accessible to reflective efforts

- knowledge is the key asset of the knowledge organization ----> organizational memory extends and amplifies this asset by **capturing, organizing, disseminating, and reusing** the knowledge created by its employees

# An Example of an Organizational Memory:

## The Group Interactive Memory Manager (GIMME)

Lindstaedt, S. (1998) *Group Memories: A Knowledge Medium for Communities of Interest*, Ph.D. Dissertation, University of Colorado at Boulder, Boulder, CO.



# An Organizational Learning Cycle

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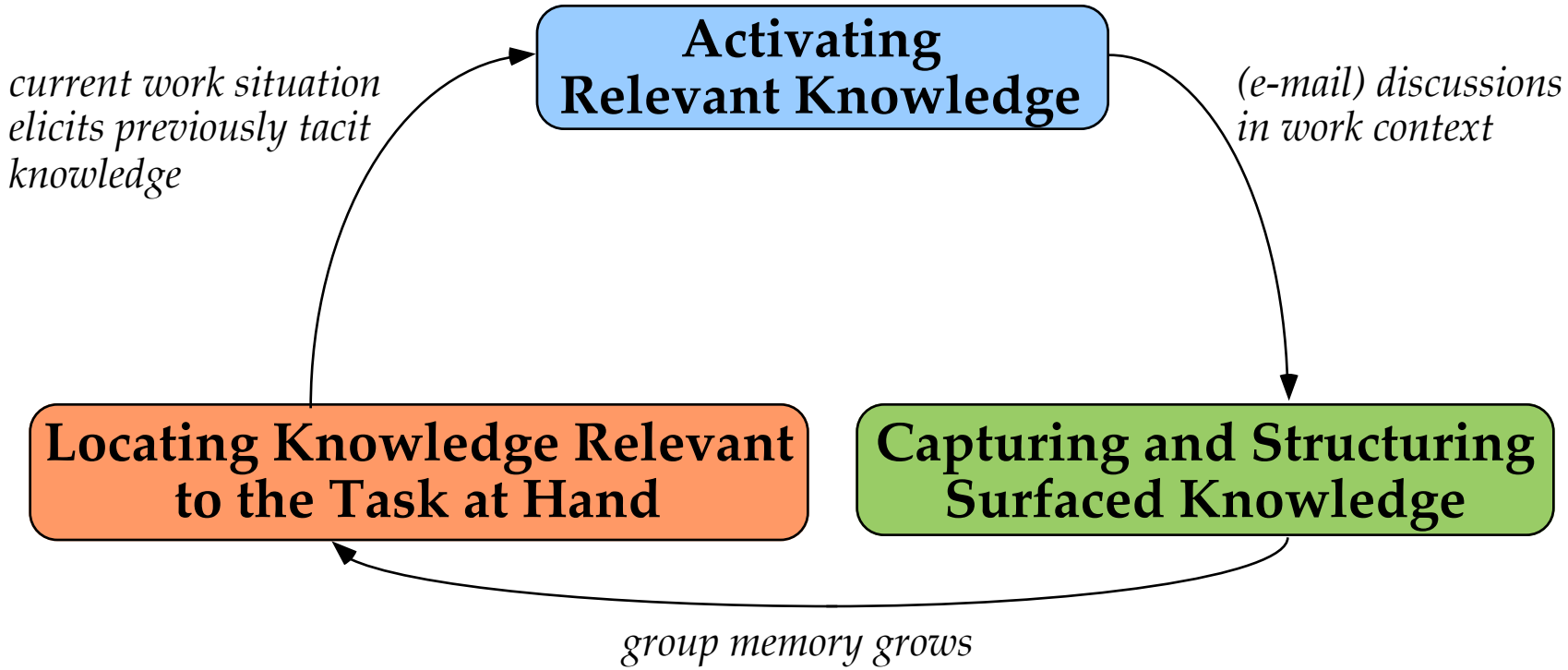
# Keeping Users Involved and Interested

Fischer, G., Lindstaedt, S., Ostwald, J., Schneider, K., & Smith, J. (1996) "Informing System Design Through Organizational Learning." In *Proceedings of the Second International Conference on The Learning Sciences,* Association for the Advancement of Computing in Education (AACE), pp. 52-59. Available at: http://www.cs.colorado.edu/~gerhard/papers/InformingSystemDesign.pdf.



# Examples of Organizational Memory Systems

- Designer Assistant — Terveen, L. G., Selfridge, P. G., & Long, M. D. (1995) "Living Design Memory: Framework, Implementation, Lessons Learned," Human-Computer Interaction, 10(1), pp. 1-37.

- Answer Garden — Ackerman, M. S. & McDonald, D. W. (1996) "Answer Garden 2: Merging Organizational Memory with Collaborative Help." In M. S. Ackerman (Ed.) Proceedings of ACM CSCW'96 Conference on Computer-Supported Cooperative Work, ACM Press, New York, pp. 97-105. Available at: http://www.acm.org/pubs/articles/proceedings/cscw/240080/p97-ackerman/p97-ackerman.pdf

- Team Info — Berlin, L., Jeffries, R., O'Day, V. L., Paepcke, A., & Wharton, C. (1993) "Where Did You Put It? Issues in the Design and Use of a Group Memory." In S. Ashlund, K. Mullet, A. Henderson, E. Hollnagel, & T. White (Eds.), *Proceedings of INTERCHI'93 Conference on Human Factors in Computing Systems,* ACM Press, New York, pp. 23-30.

- Design Environments (design memories organized around design artifacts) — Fischer, G. (1998) "Seeding, Evolutionary Growth and Reseeding: Constructing, Capturing and Evolving Knowledge in Domain-Oriented Design Environments," Automated Software Engineering, 5(4), pp. 447-464. Available at: http://www.cs.colorado.edu/~gerhard/papers/final-journal-sept30-97.pdf.

- Design Rationale Systems
  - ***gIBIS*** — Conklin, E. J., PhD (1996) *Designing Organizational Memory: Preserving Intellectual Assets in a Knowledge Economy,* at http://www.gdss.com/Questmap/DOM.htm.
  - ***PHIDIAS*** — Shipman, F. & McCall, R. (1994) "Supporting Knowledge-Base Evolution with Incremental Formalization." In *Human Factors in Computing Systems, INTERCHI'94 Conference Proceedings,* ACM, New York, pp. 285-291.

# Barriers for Organizational Memories

- **challenge:** how to capture *informal and tacit* knowledge

- **possible solutions:** groupware tools such as e-mail, Lotus Notes
  - externalize informal knowledge
  - fail to create a coherent organizational memory

- **factors why many organizational memory attempts have failed:**
  - require additional documentation effort with no clear short term benefit ("who is the beneficiary and who has to do the work")
  - do not provide an effective index or structure to the mass of information collected in the system

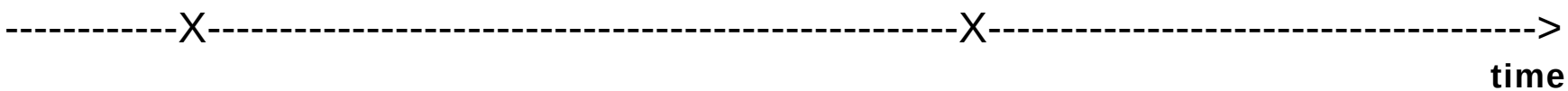
- **utility** = $\frac{\textbf{value}}{\textbf{effort}}$

**Examples:** GIMME, Andreas Girgensohn's video library, design rationale systems, DODEs

# Additional Issues for Organizational Memories

- **how can effort be reduced:**
  - usage data
  - embedded communication
  - capturing information without additional effort by users (GIMME)
  - incremental formalization

- **effort distribution**




| | |
|---|---|
| creating information for the OM | using the O |
| storing a message | retrieving a message |
| by-product of work and/or additional structuring effort | information access and/or information delivery |
| processing at read time | processing at question time |

## Collaboratively Constructed and Evolved Organizational Memories

- **Gamelan**
  - content: Java applets (an evolving community repositories of knowledge)
  - users: Java developers
  - http://www.gamelan.com

- **Educational Object Economy**
  - content: Java objects designed specifically for education
  - users: teachers and developers interested in producing educational software
  - http://www.eoe.org

- **Netscape Communicator**
  - distributed development and centralized integration
  - http://www.mozilla.org

- **Cathedral and Bazaar**
  - Linux operating system
  - http://earthspace.net/~esr/writings/cathedral-bazaar/cathedral-bazaar.html

# Collaboratively Constructed and Evolved Organizational Memories
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# continued

- **OWL** — Linton, F., Charron, A., & Joy, D. (1998) *OWL: A Recommender System for Organization-Wide Learning,* at http://www.mitre.org/technology/tech_tats/modeling/owl/Coaching_Software_Skills.pdf.
- **Expert Exchange** — http://www.experts-exchange.com/ (see lecture on “collaborative learning”)
- **Behavior Exchange** — http://agentsheets.cs.colorado.edu/Behavior-Exchange/Home ---> the idea of the Behavior Exchange is to empower a distributed community of people to design, build, and share agents as components for interactive SimCity™-like simulations. The Behavior Exchange is a community repository that acts like an ever growing box of LEGO™ pieces designed and improved by the members of the community.
- Dynasites’ **Community Space** for the Design, Learning and Collaboration class; Spring 99
- **Personas Project**
- **ePost-it Project**