



Center for  
**LifeLong  
Learning  
& Design**

University of Colorado at Boulder

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

# Organizational Learning

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# Why Organizational Learning

- the **individual human mind is limited** (requires distributed cognition)
- to address the **symmetry of ignorance** (requires communication, mutual learning and mutual understanding, boundary objects)
- to avoid that **organizations get stuck** in the status quo and in their own successes
- **organizational memories** as central components of organizational learning
  - must serve work by making stored knowledge relevant to the current design task
  - must be extended and updated as they are used to support work practices
  - artifacts provide external realization of ideas and concepts, thereby allowing others to share, critique, and extend them

# The Human Mind is Limited

- there is only so much we can remember
- there is only so much we can learn
- human beings have a bounded rationality ---> satisficing instead of optimizing
- talented people require approximately a decade to reach top professional proficiency
- when a domain reaches a point where the knowledge for skillful professional practice cannot be acquired in a decade:
  - specialization will increase
  - practitioners will make increasing use of books and other external reference aids

# The Limitation of my Mind

- Symbolics ==> Mac ==> NT / Windows-98 / Unix / Linux / .....
- stand-alone machines ==> networks (“distributed computing is an environment in which I can not get my work done, because a computer fails whose existence I was not even aware of”)
- being a multi-media author (graphics (Tufte, Kosslyn), color (Travis), movies, sounds, production values)
- World Wide Web (being an author, search engines, bookmarks, file formats)
- high functionality applications (Unix, Word, Canvas, Powerpoint, .....
- programming substrates (Schemepaint, Agentsheets, Hypergami, Dynasite, .....
- *conviviality: “I want to understand these environments and domains”*
  - *independence of high-tech scribes / specialists*
  - *incremental problem framing prohibits delegation*

# Distributed Cognition

- **between:**
  - human beings
  - humans and things/artifacts
- **advantage of humans:**
  - shared understanding
  - background knowledge
- **advantage of things:**

*“a thing/artifacts is available at the bidding of the user - or could be - whereas persons formally become a skill resource only when they consent to do so, and they can also restrict time, place, and methods as they choose.”*

----> the “Nobel Prize Winner / Distant Learning” fallacy
- **increase in socially shared cognition and practice** — Wittgenstein: *“If a lion could speak would we understand him?”*

# Organizational Learning

- organizational learning focuses on recording 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)
- workers are more than just procedure followers, they are constantly improvising
  - let people legitimately improvise
  - a threat: to work according to the rules
  - workers = creative humans
- create corporate/artifact memories where knowledge and improvisations can be captured and made part of the organizations collective knowledge base
- regard breakdowns as opportunities (IBM: communicate openly, reward people for acknowledging failure)
- claim: “Innovation is everywhere - the problem is learning from it” (John S. Brown)”

# Principles for Helping Organizations Use What They Know

- capture a significant proportion of the knowledge that practitioners generate in their practice 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 corporate memory as it is required, in the form of performance support tools or training
- develop mechanisms to deliver and acquire knowledge that respect or, better, improve upon the work processes in which practitioners already engage

# Xerox Advertisement

- **ancient dilemma:**

- “no one head is big enough to hold all the knowledge a business needs to know”

## **Xerox Solutions:**

- “make it simpler to find, capture and the knowledge in your company”
- “now all your heads can work together”
- “keep the conversation going — share the knowledge”



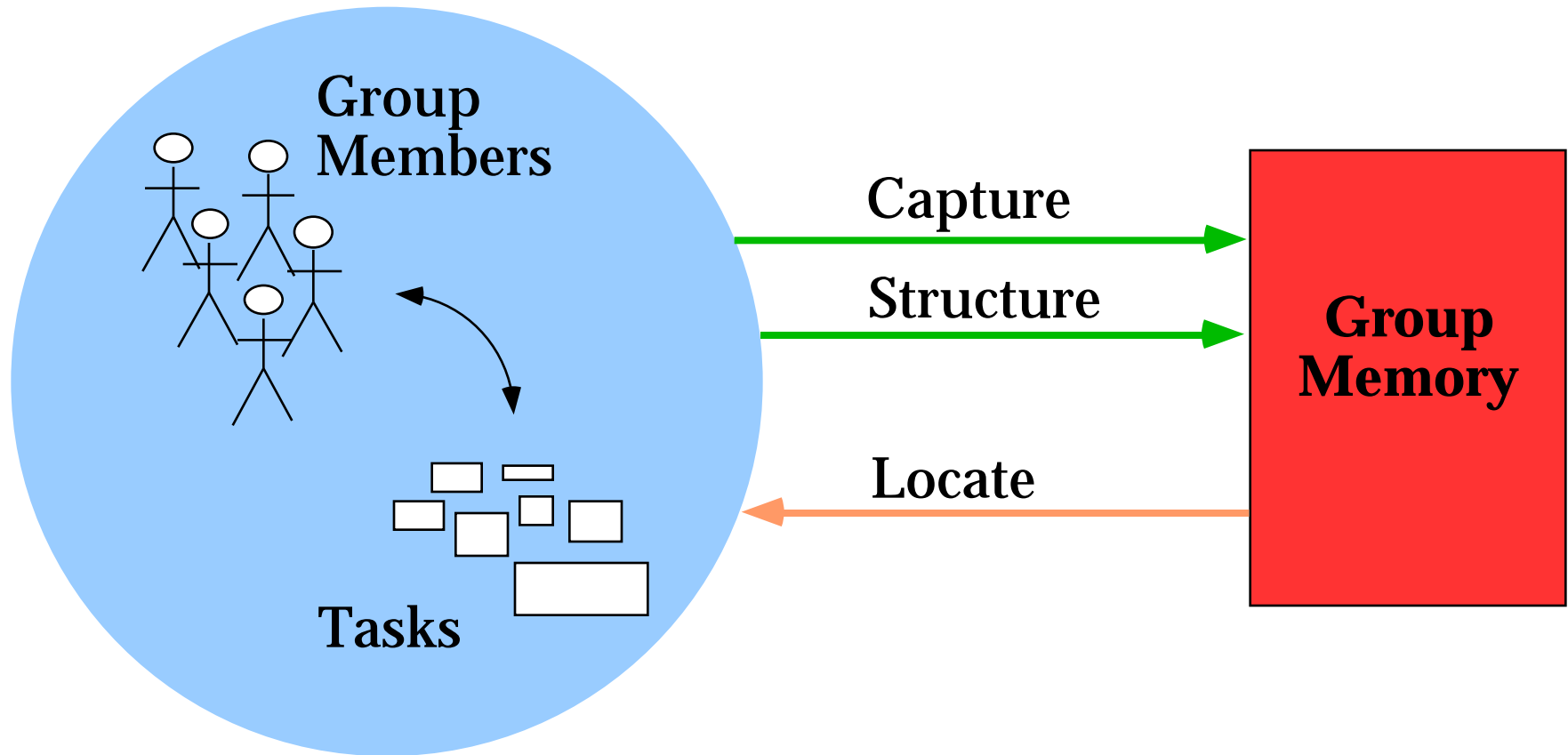
# John Thomas: Knowledge Management in IBM

- IBM is going to start a "Knowledge Management Institute" in Cambridge Mass.
  - First, "Knowledge Management" became a hot topic.
  - Second, everybody -- well, many people -- relabelled what they were doing as "Knowledge Management."
  - Third, people began to notice that there was no coherent plan (not surprising since much of it was a relabelling effort).
  - Fourth, we have task forces to try to coordinate Knowledge Management.
- sometimes, "knowledge management" today seeks to continue and expand the trend of decontextualizing knowledge to a silly extent -- e.g.,
  - the myth that we can simply "capture" the knowledge of a thirty-year expert in explicit form so we can fire the expert and hire someone with no relevant skills off the street who can now use the "knowledge base" to perform like an expert
  - the myth that in the ideal company, all knowledge will be captured worldwide and instantly fed via high band-width lines to a central place where globally optimal decisions can be made for the entire company and fed back out to the periphery for implementation

## 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, ..... )
- **but 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

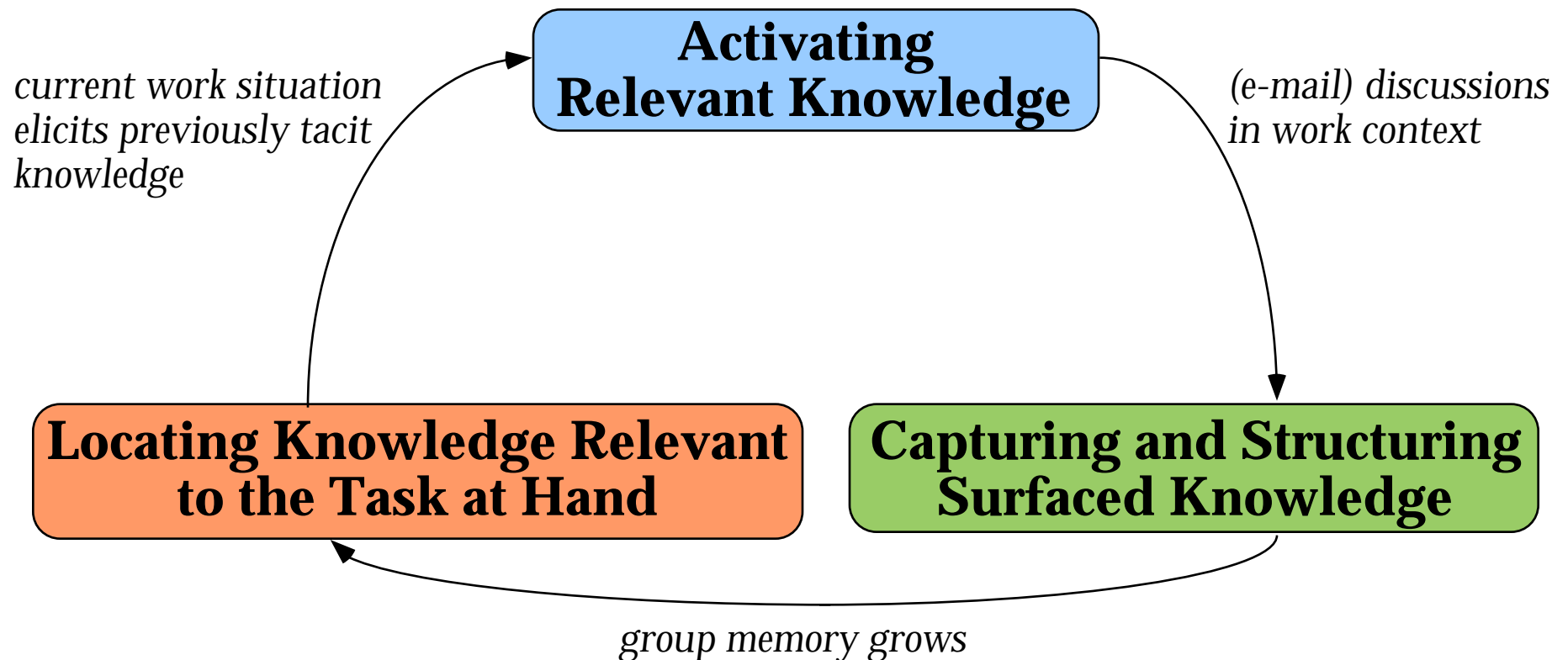
# Organizational Memories



# An Organizational Learning Cycle

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## Keeping Users Involved and Interested

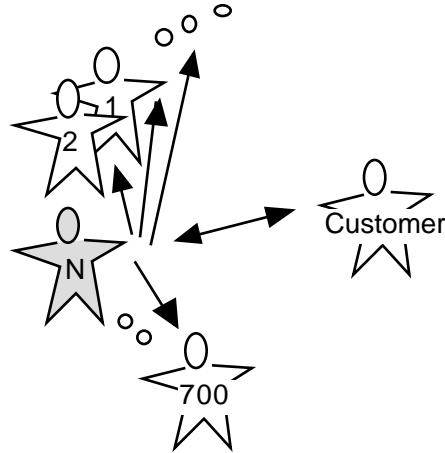


# The Problem of Capturing Knowledge

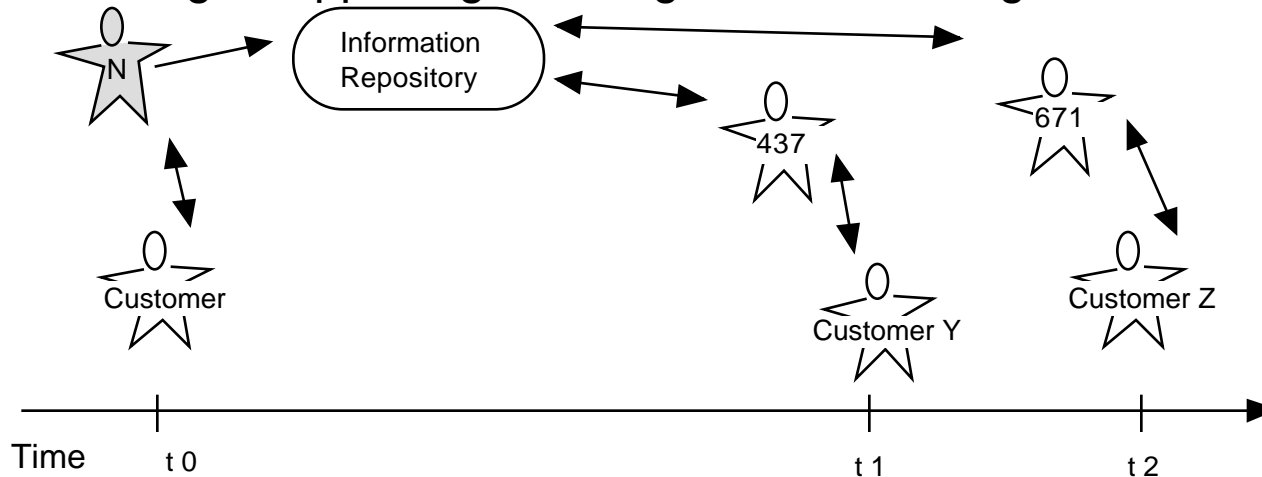
- **basic assumption:** organizational knowledge conveyed in (electronic mail) conversations is valuable beyond the particular situation in which it is originally raised
- **examples of different approaches and different systems:**
  - Group Interactive Memory Manager (GIMME) [Lindstaedt]
  - Design Rationale Systems such as gIBIS [Conklin] and PHIDIAS [McCall]
  - Performance Support Systems such as Answer Garden [Ackerman] and Team Info [Berlin]
  - Communication Support Systems such as Information Lens [Malone] and Coordinator [Flores/Winograd]

# Knowledge Management in Learning Organizations

- broadcasting leads to information overflow of decontextualized information



- the challenge: supporting the integration of working and learning



# Self-Analysis of L3D as a Learning Organization

- homogenous versus heterogeneous computing environment
- establish and share work practices and information
- collaborative work practices (power-user, local developers)
- jointly maintained information repositories:
  - address file
  - bibliography file ---> Endnote
  - large library of graphics
  - website
  - Sources
  - Dynasite spaces
- all is done with minimal overhead — a basic principle: “try to get buy”
- information producers: “who do I tell?”
- information consumers: “who do I ask?”

# Motivation

- **claim:**
  - the chief impediments to learning are not cognitive but motivational
  - people can learn many things if they want to
  
- **challenge: reinterpreting motivation at an organizational level**
  - who is the beneficiary and who has to do the work?
  - corporate memories: what will make employees want to share?
  - people need to make explicit what they know and take the trouble to enter it into the system
  - create communities (among peers, over the net)
  - provide access to real practitioners and experts



# Open Questions

- relationship between communities of practice and organizations?
- learning organization: but individuals learn — how exactly does the organization learn?
  - collaborative work practices (complement each other knowledge)
  - external artifacts (products, processes, group memories)
- extend our understanding from the individual to the organization:
  - reflective practitioner ----> reflective organization
  - creative individual ----> creative organization
- motivation

# The Envisionment and Discovery Collaboratory

- how does it support organizational learning
- which interesting properties as an organizational memory system does it have