



Center for  
**LifeLong  
Learning  
& Design**

University of Colorado at Boulder

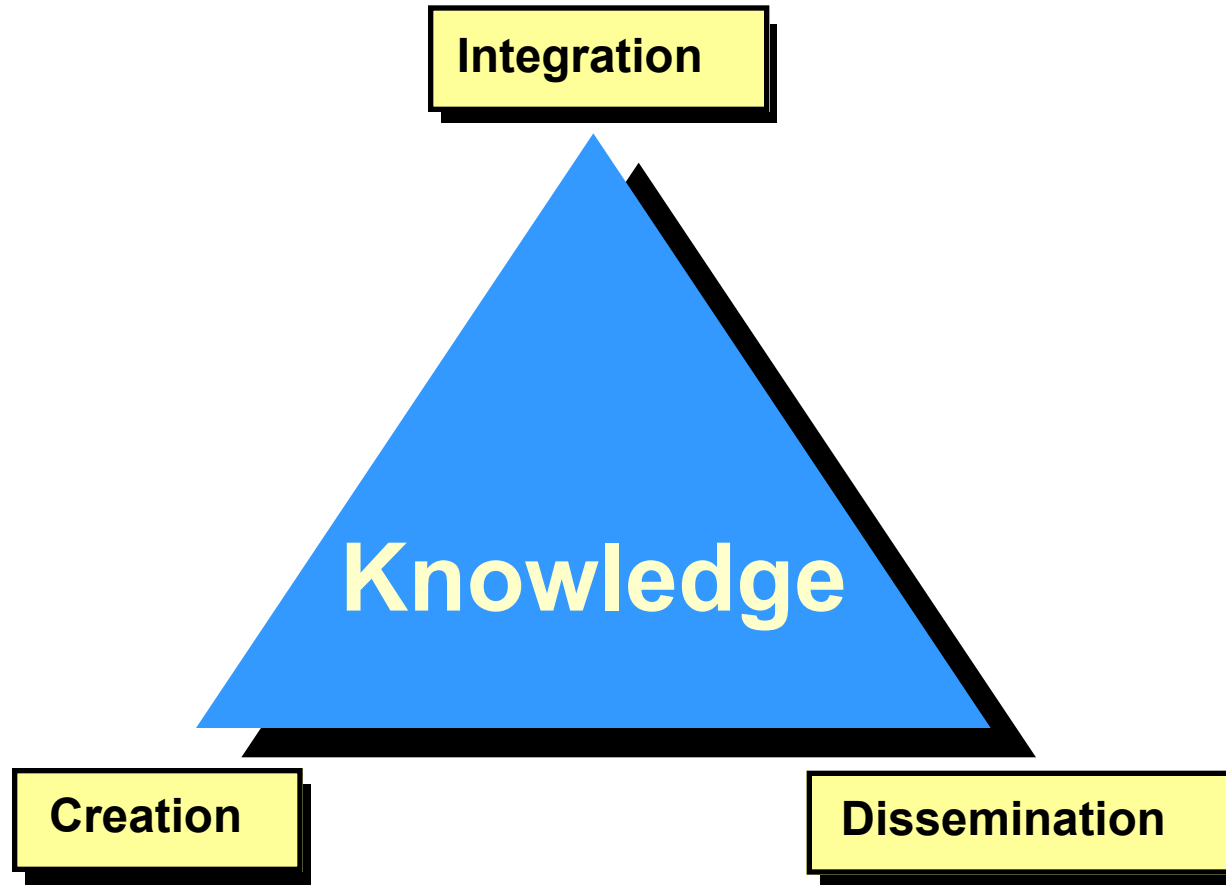
Wisdom is not the product of schooling  
but the lifelong attempt to acquire it.  
- Albert Einstein

# Knowledge Management (KM) — Push and Push Technologies

Gerhard Fischer and Leysia Palen  
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# Major Processes in Knowledge Management



# Knowledge Creation, Integration, and Dissemination

- **Creation:**

- breakdowns (backtalk of the situation)
- symmetry of ignorance
- creating shared understanding
- solving problems at level 3 in the seeding, evolutionary growth, reseeding model against the background of level 2

- **Integration:**

- shared understanding
- externalizations
- (enriched) work products and the discourses about them
- information repositories and organizational memories

- **Dissemination**

- learning on demand
- integration of working and learning
- contextualized information presentation
- knowledge delivery
- reflection-in-action / making argumentation serve design

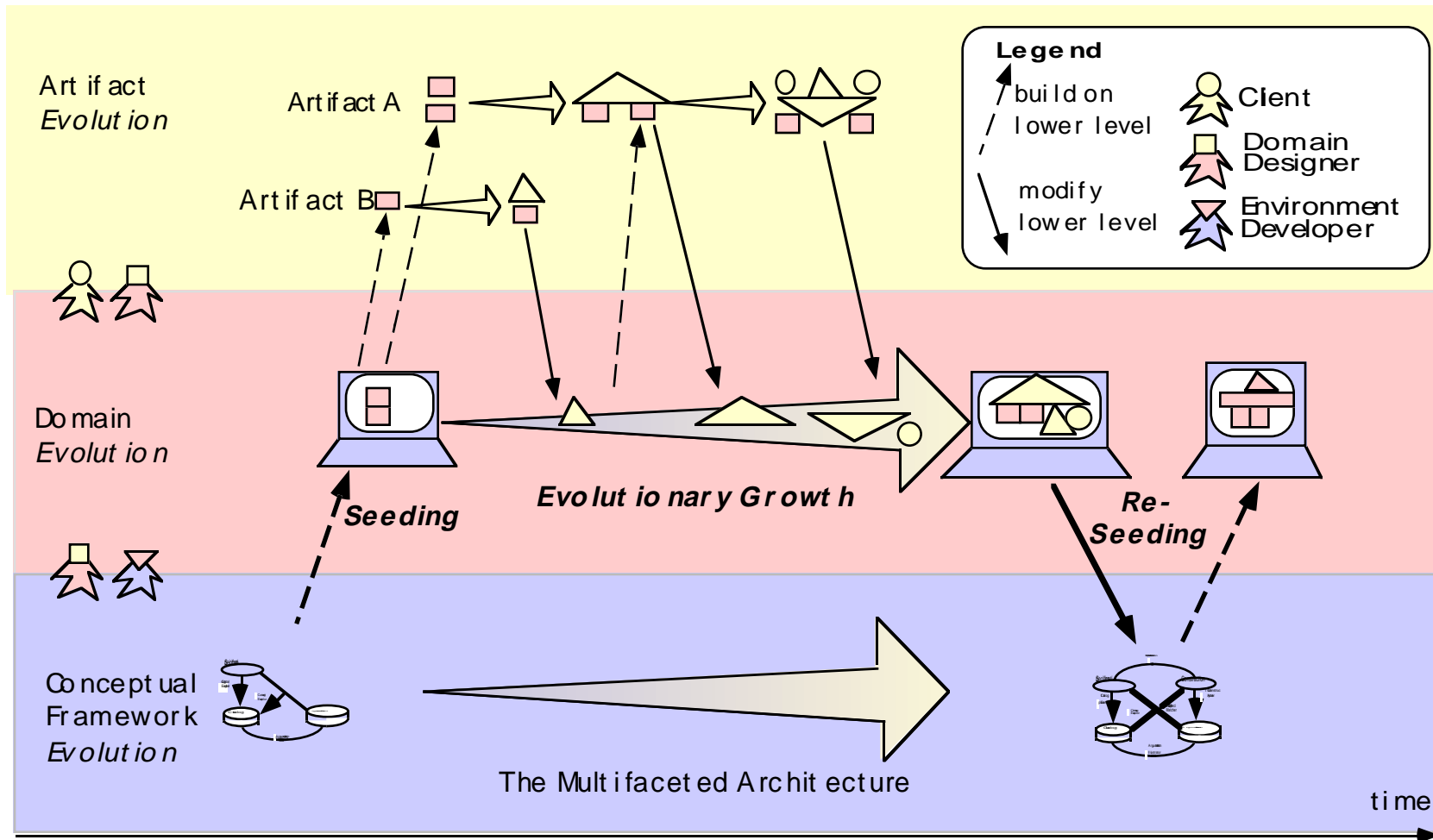
## KM: Traditional versus New Models of Working and Learning in Organizations

|                    | traditional                            | new  |
|--------------------|--|--|
| Paradigm           | knowledge transmission                 | knowledge construction                                     |
| Learning           | classroom                              | on demand  |
| Tasks              | system driven (canonical)              | user/task driven   |
| Social structures  | individuals in hierarchical structures | collaborative in flat structures (communities of practice) |
| Work style         | standardize                            | improvise  |
| Information spaces | closed, static                         | open, dynamic  |
| Breakdowns         | errors to be avoided                   | opportunity for innovation and learning                    |
| Communication      | centralized, top-down                  | decentralized, peer-to-peer                                |

# L<sup>3</sup>D's Work in KM: Theoretical and Conceptual Frameworks

- **knowledge acquisition** ---> **knowledge construction** (breakdowns and symmetry of ignorance as sources for new knowledge)
- **closed system** ---> **open and evolvable systems** (seeding, evolutionary growth, reseeding model, M1-M3 model of the WWW)
- **information** ----> **attention economy**
  - saying the "right" thing at the "right" time in the "right" way
  - making information relevant to the task at hand
  - integration of working and learning and supporting learning on demand
  - supporting "reflection-in-action" and making argumentation serve design (critiquing)
- **complement information access** ("pull" technologies) with **information delivery** ("push" technologies)
- **individual** <---> **social** (group, organization): how do we effectively collect individual knowledge and make it accessible to the entire organization?

# The Seeding / Evolutionary Growth / Reseeding (SER) Model



# Knowledge as Commodity

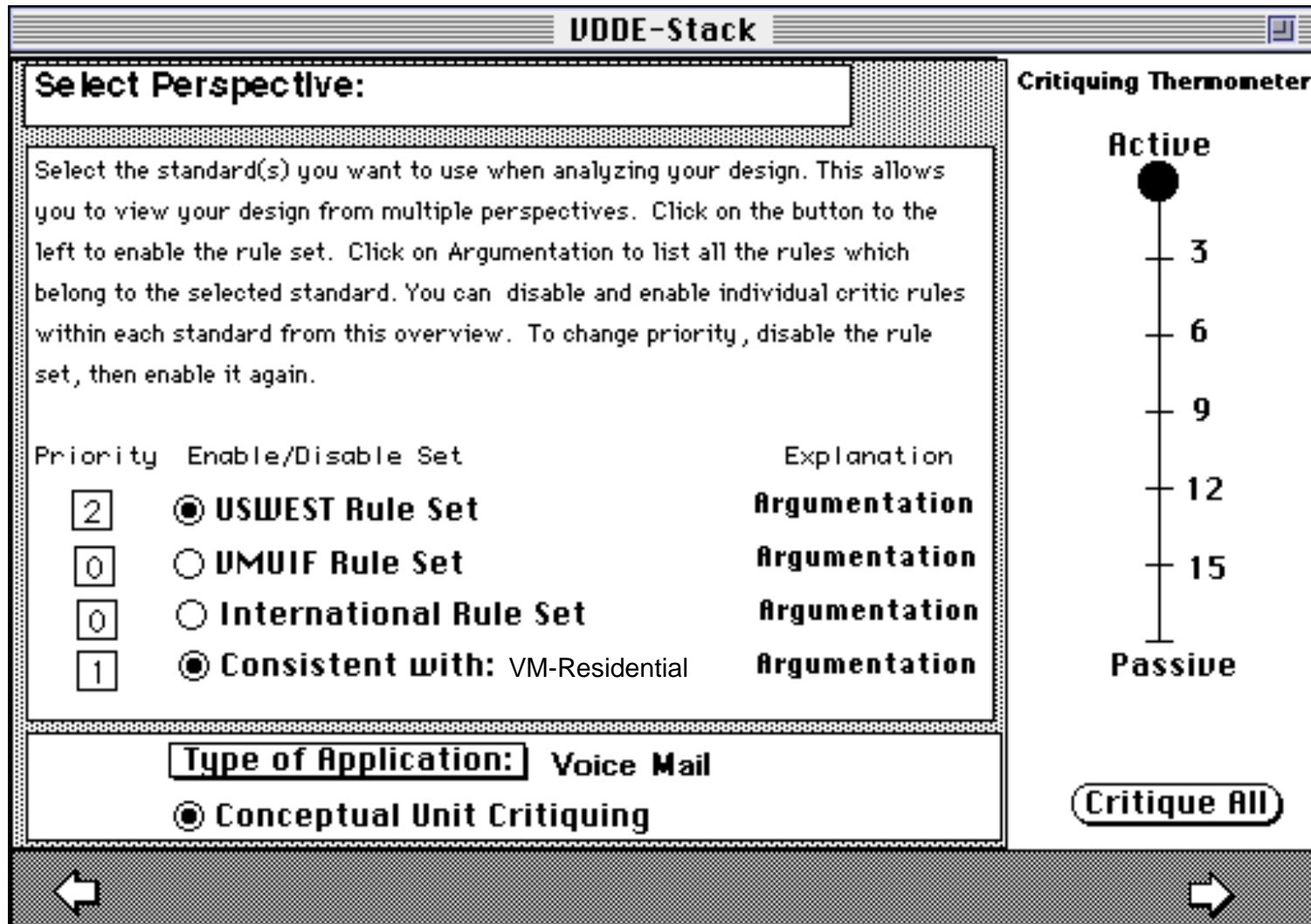
- Postman, p 116 in “The End of Education”: *“Knowledge is presented as a commodity to be acquired, never as a human struggle to understand, to overcome falsity, to stumble towards the truth”*
- John Thomas, IBM: “knowledge management” today seeks to continue and expand the trend of decontextualizing 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*

## L<sup>3</sup>D's Work in KM: Systems Building Efforts of the Past Decade

- **Janus / KID:** making argumentation serve design, embedded critiquing
- **Voice Dialog Design Environment:** domain construction and controlling the intrusiveness of “pull technologies”
- **Network:** incremental formalization (---> the artifact itself can be used to locate and access information in addition to browsing and search)
- **Indy:** embedded communication, history mechanisms
- **location / comprehension / modification cycle:** now applied to Gamelan, Educational Object Economy, Behavior Exchange
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- **Envisionment and Discovery Collaboratory:** knowledge construction, shared understanding, integration of action and reflection space

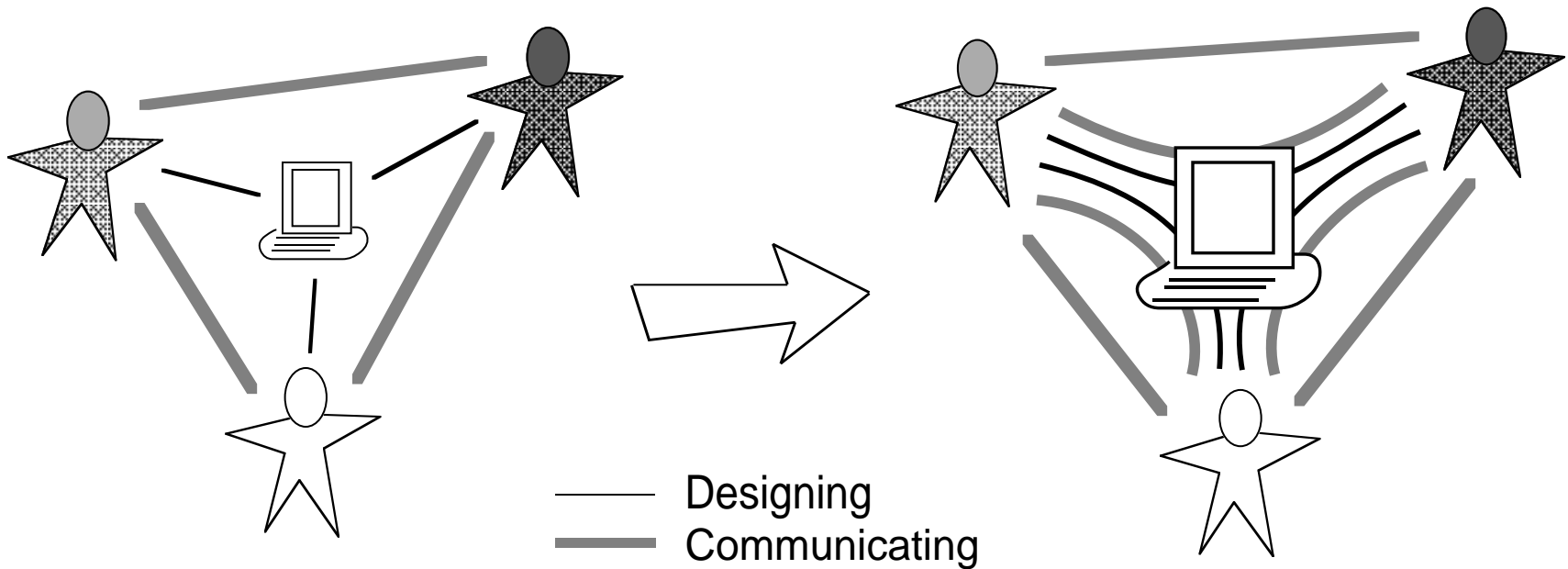


# Voice Dialog Design Environment



# Embedded Communication

(see assignment)



Computer stores  
the artifact

Computer mediates  
design and communication

## L<sup>3</sup>D's Work in KM — Assessment

- **KM: new technology is necessary, but not sufficient ---> change of work practices, mindsets and reward structures is necessary**
  - design rationale research
  - reuse versus “not invented here”
  - media competition
- **motivation for a group is different than for an individual**
  - who is the beneficiary and who has to do the work?
  - utility = value /effort
- **engage skilled professionals in realistic work situations**
  - requires useful and usable systems (not just demo systems)
  - prerequisite for evolutionary growth
- **“collaborative systems will not work in a non-collaborative society”**  
a student's observation in a class using technologies to enhance peer-to-peer learning, sharing of information, self-evaluation, etc.

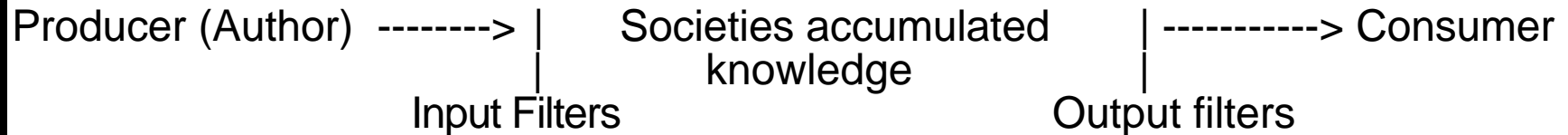
# Pull and Push Technologies

|                                | pull  | push  |
|--------------------------------|---|---|
| function                       | information access                                | information delivery  |
| examples                       | passive help systems, search, browsing, bookmarks | critiquing, active help systems, agent-based systems, broadcast systems |
| systems                        | WWW, Gamelan, Behavior Exchange                   | DYK, Tip of the Day, Pointcast, How the West was Won                    |
| strengths                      | non-intrusive                                     | serendipity, unknown, relevant knowledge is offered                     |
| weaknesses                     | task relevant knowledge may remain hidden         | intrusiveness, decontextualized information                             |
| major system design challenges | supporting users in expressing queries,           | situation awareness, intent recognition, task models, user models       |

# New System Building Efforts

| Challenges       | GIMMe                            | DynaSites   | Persona | ePost-it |
|------------------|----------------------------------|---|---------|----------|
| <b>objective</b> | Group Memory                     | WWW Support for Collaborative Design                |         |          |
| <b>Capture</b>   | Email (captured with low effort) | Explicit Effort,<br>More Control and Expressibility |         |          |
| <b>Access</b>    | LSA, Browsing Structures         | Dynamic Structures,<br>Integration (via Glossary)   |         |          |
| <b>Sustain</b>   | Restructuring                    | Restructuring, Embedded Communication               |         |          |

# The Producer / Consumer Model



## input filters

- to attempt that new knowledge is “consistent with already existing knowledge” , “socially accepted” or “useful at a given historical time”
- to guard against erroneously adding “wrong” solutions, societies have been willing to accept high overhead costs caused by ancient priests, the holy inquisition, medieval librarians, an elaborated patent system, modern reviewing procedures for scientific papers ---> **question: what do we have and what do we need for the WWW?**
- only knowledge that would pass these input filters would be allowed to enter the repositories of accumulated knowledge

## output filters:

- to control the re-use of the accumulated knowledge
- examples: guilds, professions, formal educational institutions