



16th

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ICCE 2008

International Conference on Computers in Education

National Central University

Graduate Institute of Network Learning Technology

Toward an Ecology of Learning & Knowing

Jon Mason

28 October 2008



Is there a Strategic Way Forward for e-learning standardisation?



Which Future?





Discussion Points

- Context
- Theories of Learning and Knowledge, Sense-Making
- Intersections of Knowledge Management & e-Learning
- Models



- Convergence of e-infrastructure
 - e-learning
 - knowledge management
 - performance support
 - and more ... [keyword = services]
- e-learning is mainstreamed
 - transforming access & delivery of education and training ... & its traditional resource base
 - spans home, workplace, and institution



- Evolving trends of Internet technologies
 - Web 2.0
 - Service Oriented Architectures
 - Grid computing
 - Wireless & mobile access
 - Semantic Web
 - Networks, networks, networks!



- The Open Agenda
 - ✓ Open Standards
 - ✓ Open Source
 - ✓ Open Content
 - ✓ Open Access
 - ✓ ...
 - Open Assessment?
 - Open Government?
 - Open Bureaucracy? ...



We all Know this!

*... So, how to keep pace?
... how to be strategic?*

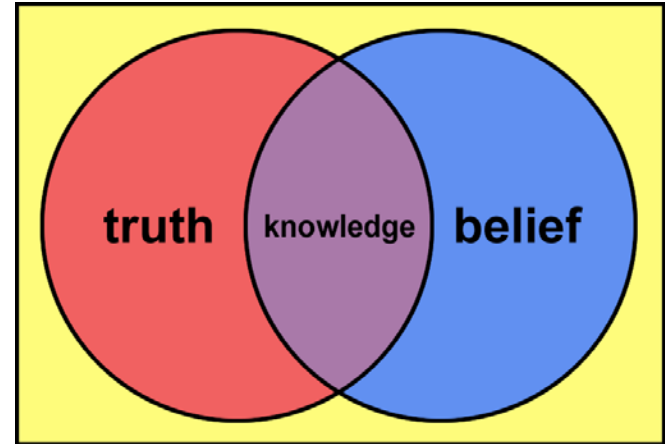


Epistemological Architecture?

...as important as an IT Architecture!



- The study of theories of knowledge
- Deeply philosophical



- Why is it important?
 - Provides perspective on learning
 - Provides perspective on managing data & information
 - Provides perspective on communication
 - Provides perspective on interface design
 - Assists in cross-cultural understanding

<http://en.wikipedia.org/wiki/Epistemology>



Concepts & Metaphors

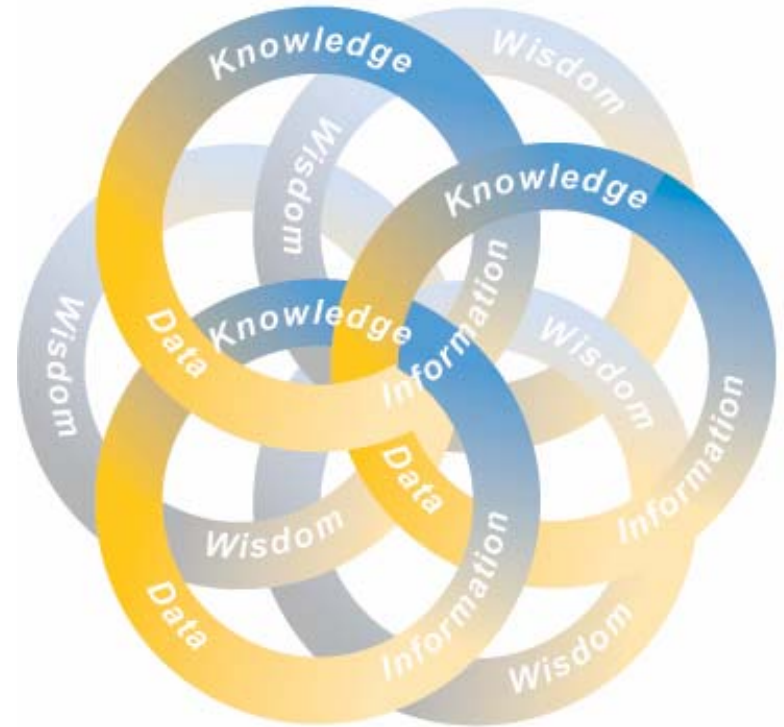
- Architecture
- Ecology
- Ecosystem
- Perspective
- Dynamics
- Complexity
- Coherence
- Dynamics
- Networks
- Facets

- **e-Learning** – typically involves:
 - ✓ Learning with ICT (building knowledge)
 - ✓ Online activities (mostly)
 - ✓ The Web, but not necessarily ...

- **Knowledge Management** – typically involves:
 - ✓ Information management (Know-What)
 - ✓ Stewardship of intellectual capital
 - ✓ Managing processes (Know-How)
 - ✓ Networks (Know-Who)
 - ✓ Knowledge sharing ... (learning)



How to Model this?



One Model is often not sufficient!



nouns

verbs

context

Complex Adaptive Systems

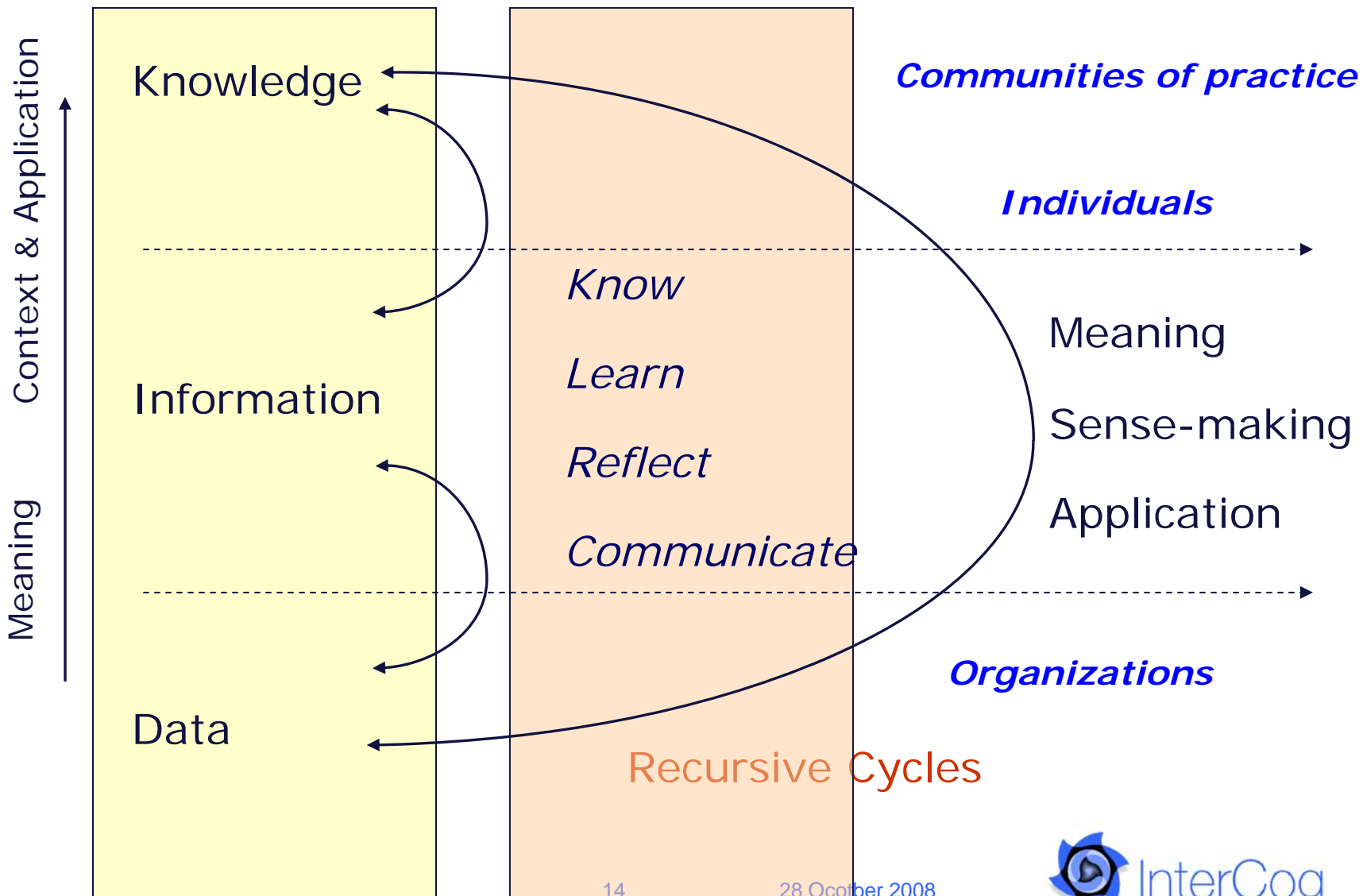
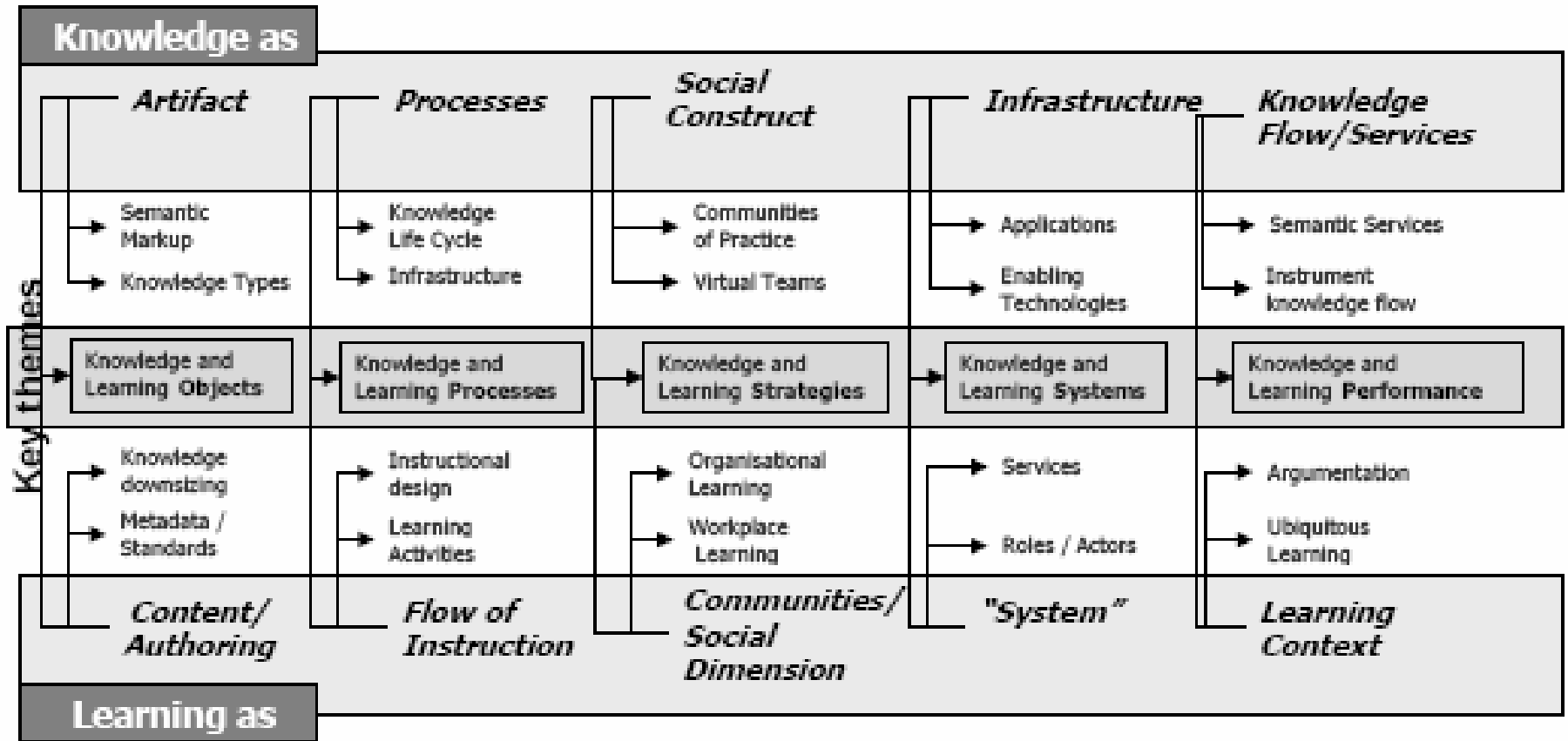


Figure 1 Knowledge and learning key pillars

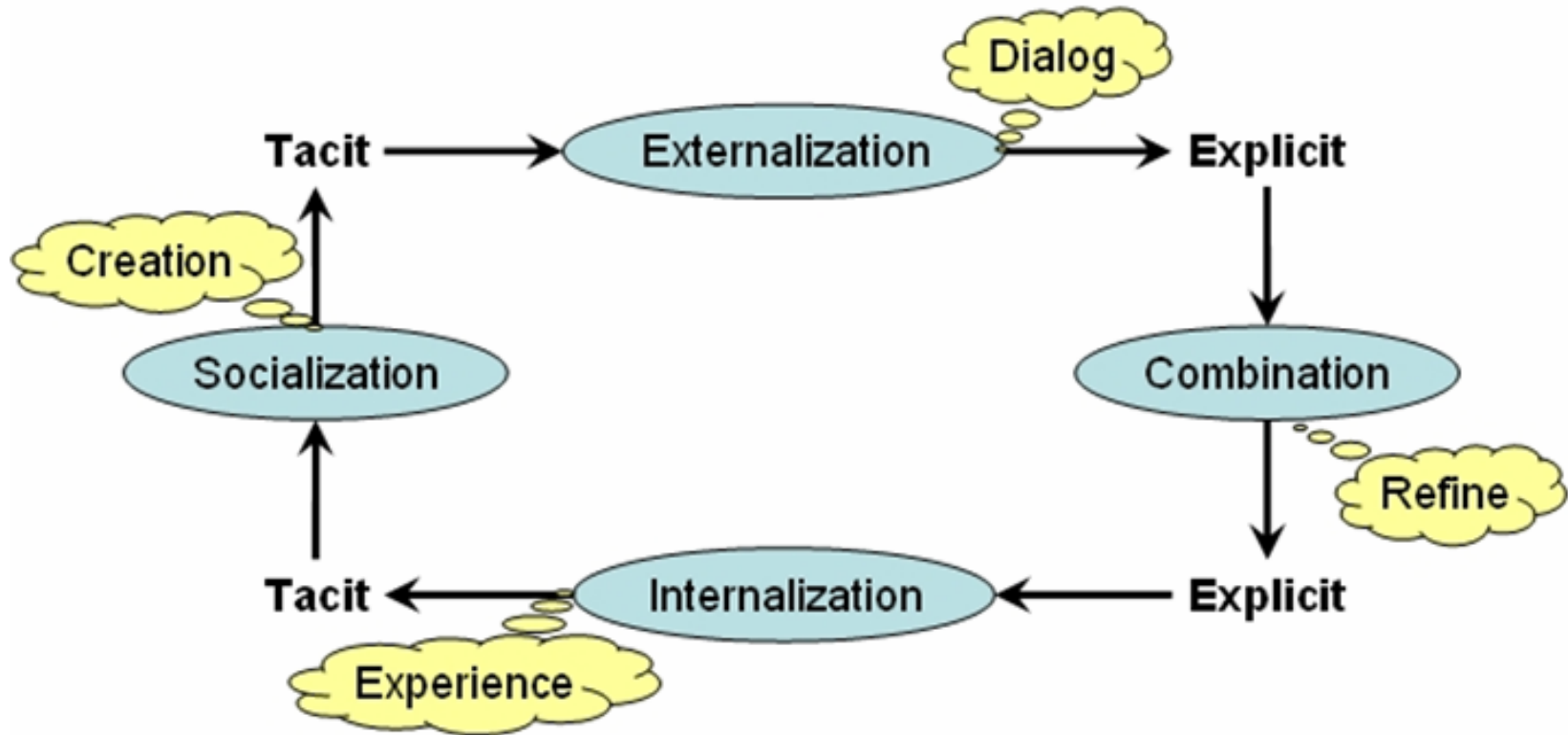


Source: M. D. Lytras & M. A. Sicilia (2005). *The Knowledge Society – A Manifesto for Knowledge and Learning*, *Int. J. Knowledge and Learning*, Vol. 1, Nos. 1/2, 2005. page 3

<http://www.inderscience.com/storage/f410121258637119.pdf>



The SECI Model

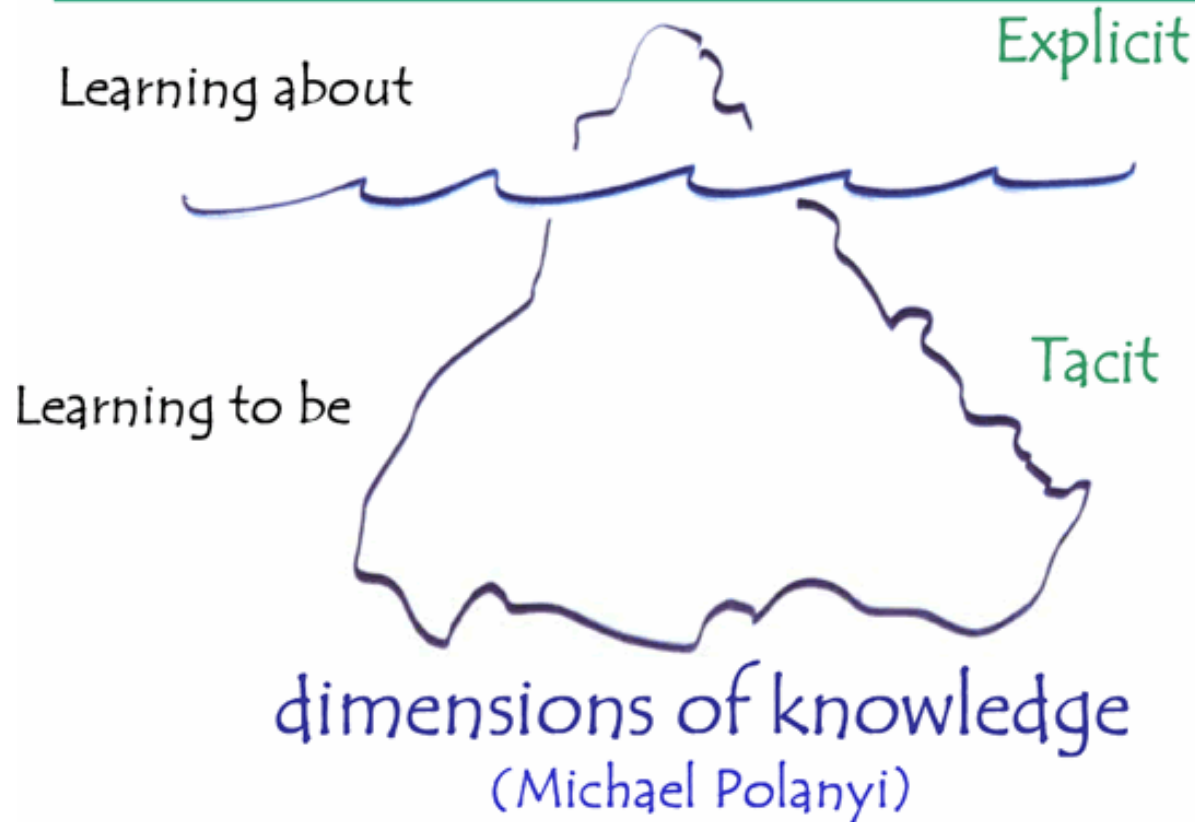


Source: Nonaka and Takeuchi (1998)

[http://www.slsquared.com/kmbook/index.php?title=Knowledge_Creation_and_Transformation_\(SECI\)](http://www.slsquared.com/kmbook/index.php?title=Knowledge_Creation_and_Transformation_(SECI))



Beyond textbook learning: learning-about \implies learning-to-be



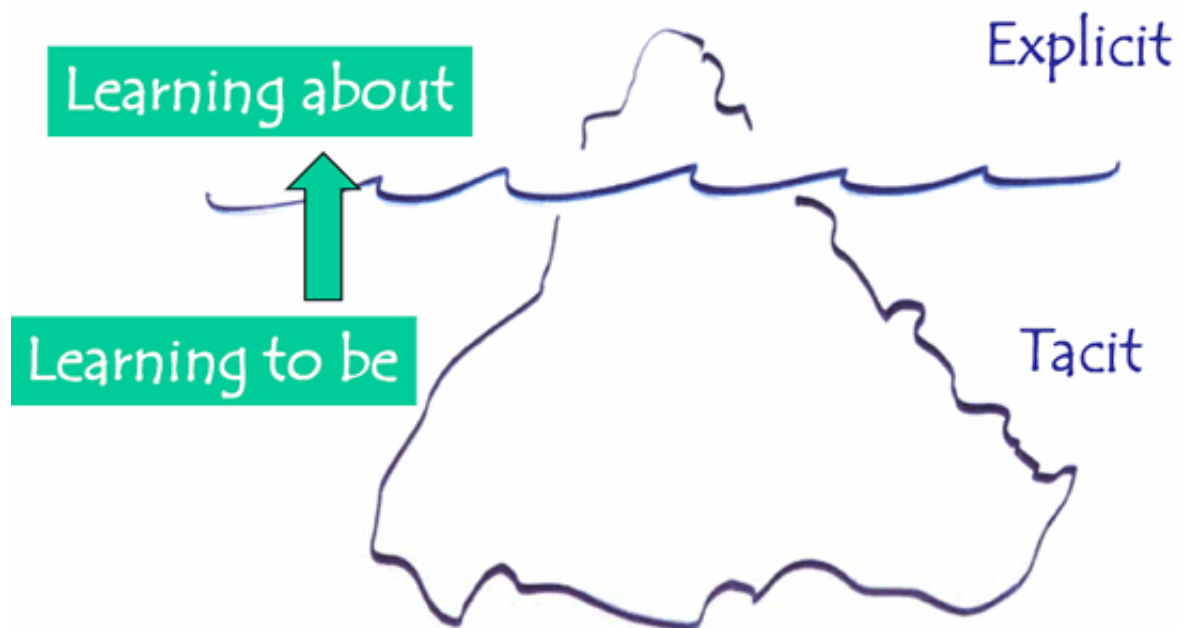
Source: J. Seely Brown (2008) Minds on Fire

<http://connect.educause.edu/Library/EDUCAUSE+Review/Minds+on+Fire/OpenEducation/45823?time=1205809478>

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Reversing the Flow



Key: unleashing productive inquiry

Source: J. Seely Brown (2008) Minds on Fire

<http://connect.educause.edu/Library/EDUCAUSE+Review/Minds on Fire Open Education/45823?time=1205809478>

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The Brewing Perfect Storm of Opportunity

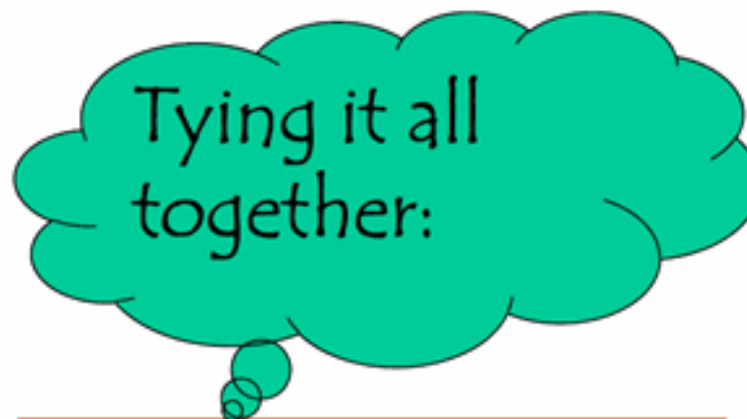
Transformative Initiatives

OER ...

eScience

eHumanities

Web 2.0 & beyond



Open Participatory
Learning Ecosystem

New kinds of ecosystems
for supporting learning 2.0

Source: J. Seely Brown (2008) Minds on Fire

<http://connect.educause.edu/Library/EDUCAUSE+Review/49/Minds onFireOpenEducation/45823?time=1205809478>

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“I Link, therefore I am”

William Mitchell, *Me++*

“We participate, therefore we are.”

John Seely Brown & Richard Adler,
Minds on Fire: Open Education, The Long Tail, & Learning 2.0



Knowledge is a Thing & a Flow

Peter Drucker



"Excessive focus on explicit knowledge
leads to **paralysis by analysis.**"

“Only when tacit and explicit knowledge interact
can innovation occur.”

Ikujiro Nonaka, *The Knowledge Advantage*



If you want understanding,
you have to reenter the human world of stories.
If you don't have a story,
you don't have understanding.

David Weinberger



InterCog Sense-Making Model





InterCog Sense-Making

- Who
 - What
 - When
 - Where
- } Key Questions of Information
- Why
 - How
 - Which
- } Key Questions for Learning
Discernment & Wisdom
- If
- Key Question for Futures Thinking



The Challenge of Theory



Learning Theories

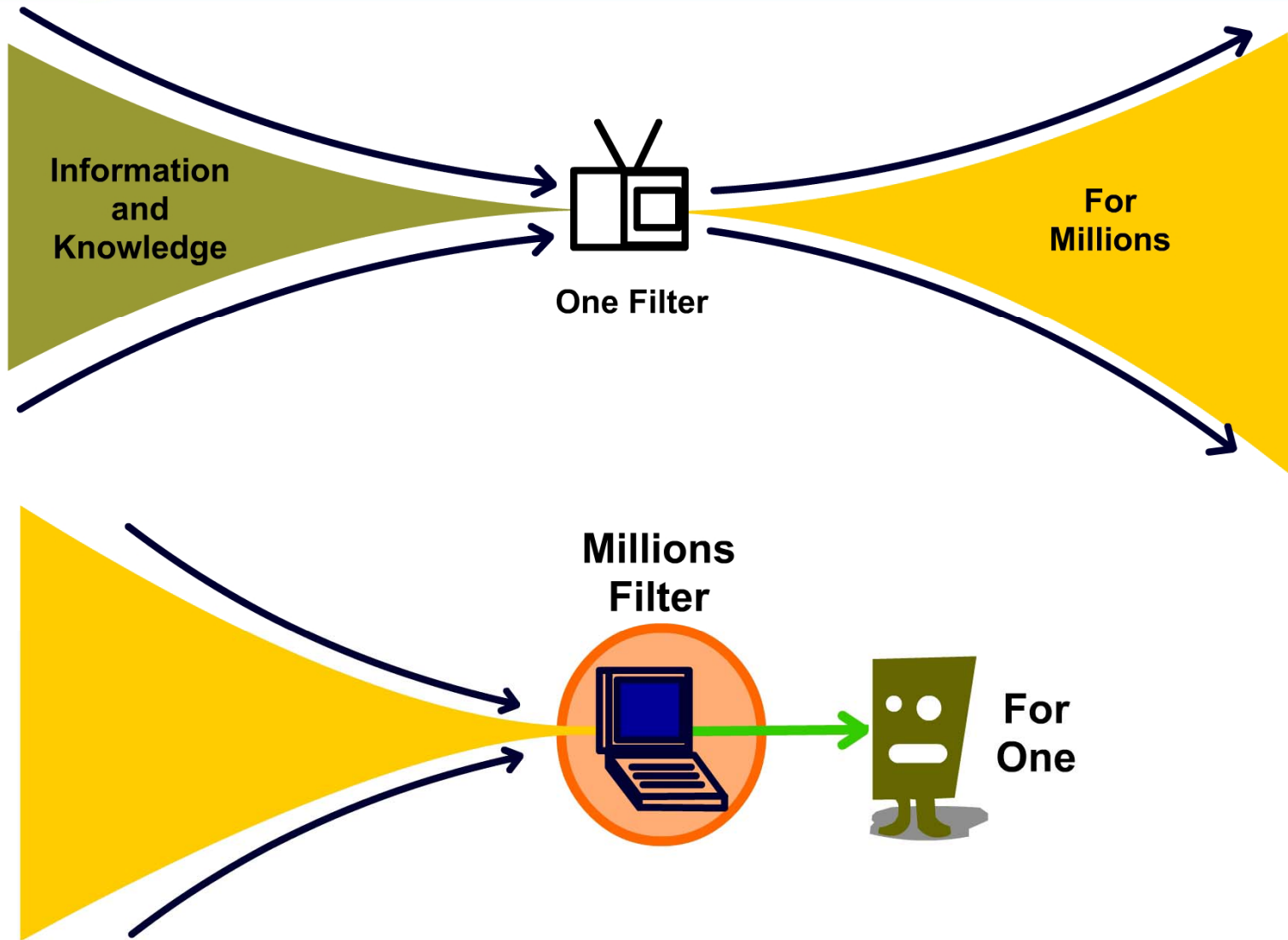
- ACT* (J. Anderson)
- Adult Learning Theory (P. Cross)
- Algo-Heuristic Theory (L. Landa)
- Andragogy (M. Knowles)
- Anchored Instruction (J. Bransford & the CTGV)
- Aptitude-Treatment Interaction (L. Cronbach & R. Snow)
- Attribution Theory (B. Weiner)
- Cognitive Dissonance Theory (L. Festinger)
- Cognitive Flexibility Theory (R. Spiro)
- Cognitive Load Theory (J. Sweller)
- Component Display Theory (M.D. Merrill)
- Conditions of Learning (R. Gagne)
- Connectionism (E. Thorndike)
- Constructivist Theory (J. Bruner)
- Contiguity Theory (E. Guthrie)
- Conversation Theory (G. Pask)
- Criterion Referenced Instruction (R. Mager)
- Double Loop Learning (C. Argyris)
- Drive Reduction Theory (C. Hull)
- Dual Coding Theory (A. Paivio)
- Elaboration Theory (C. Reigeluth)
- Experiential Learning (C. Rogers)
- Functional Context Theory (T. Sticht)
- Genetic Epistemology (J. Piaget)
- Gestalt Theory (M. Wertheimer)
- GOMS (Card, Moran & Newell)
- GPS (A. Newell & H. Simon)
- Information Pickup Theory (J.J. Gibson)
- Information Processing Theory (G.A. Miller)
- Lateral Thinking (E. DeBono)
- Levels of Processing (Craik & Lockhart)
- Mathematical Learning Theory (R.C. Atkinson)
- Mathematical Problem Solving (A. Schoenfeld)
- Minimalism (J. M. Carroll)
- Model Centered Instruction and Design Layering (A.Gibbons)
- Modes of Learning (D. Rumelhart & D. Norman)
- Multiple Intelligences (H. Gardner)
- Operant Conditioning (B.F. Skinner)
- Originality (I. Maltzman)
- Phenomenonography (F. Marton & N. Entwistle)
- Repair Theory (K. VanLehn)
- Script Theory (R. Schank)
- Sign Theory (E. Tolman)
- Situated Learning (J. Lave)
- Soar (A. Newell et al.)
- Social Development (L. Vygotsky)
- Social Learning Theory (A. Bandura)
- Stimulus Sampling Theory (W. Estes)
- Structural Learning Theory (J. Scandura)
- Structure of Intellect (J. Guilford)
- Subsumption Theory (D. Ausubel)
- Symbol Systems (G. Salomon)
- Triarchic Theory (R. Sternberg)



The impact of the Web:

- Connectivism (George Siemens)
- Social Learning (Seely Brown, et al)

Impact of Networks





- Networks, Networks, Networks
- Connections, Connections, Connections
- Diversity not uniformity
- Knowledge resides in networks
- Knowledge also resides in non-human appliances
- Learning is enabled/facilitated by technology
- Capacity to know is of high value
- Emergent patterns

Source: G.Siemens <http://www.connectivism.ca>



Connectivism – identifying key skills

1. Anchoring
2. Filtering
3. Connecting
4. Being human
5. Creating and deriving meaning
6. Evaluation/authentication
7. Critical/creative thinking
8. Pattern recognition
9. Navigate knowledge landscape
10. Acceptance of uncertainty
11. Contextualizing

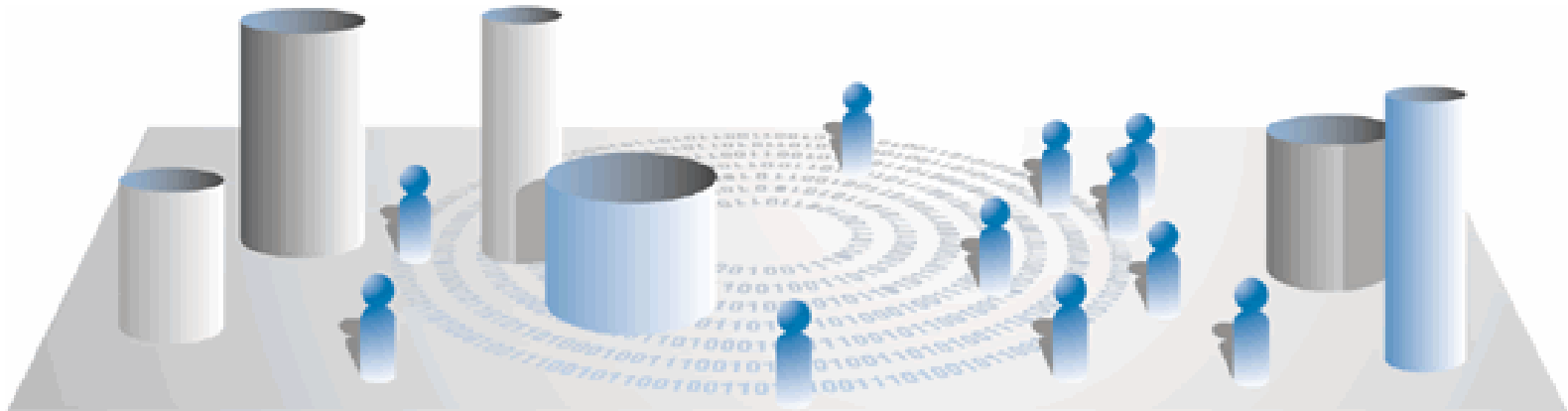
Source: G.Siemens <http://www.connectivism.ca>



The Challenge of Practice



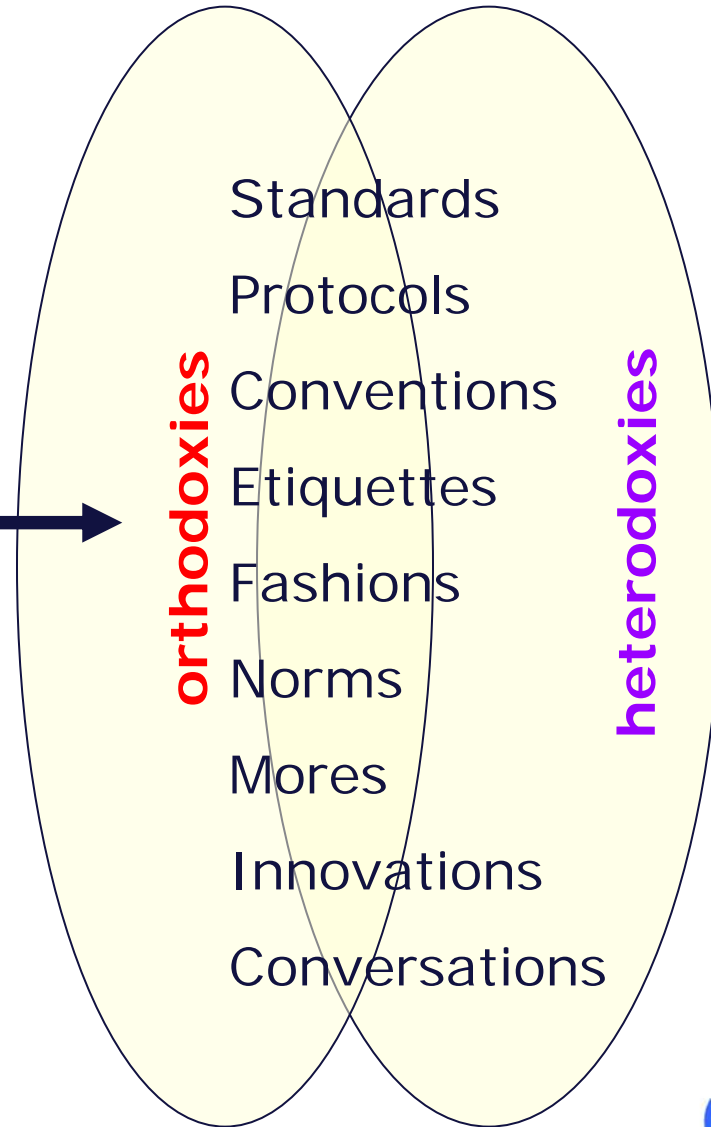
- The fundamental challenge of Knowledge Management is the “silo problem”



- The problem is deeper than just a “mentality” or attitude
- We are compelled to create this problem each time we create knowledge – because **meaning is contextual!**



Communities
of Practice

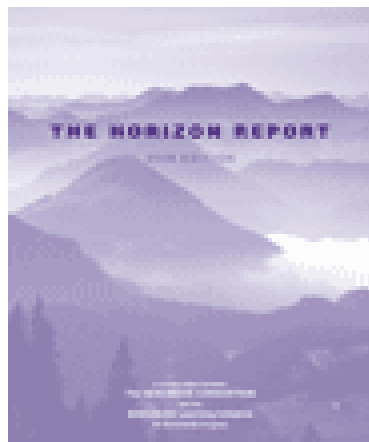




Identifying Key Trends



EDUCAUSE Learning Initiative Horizon Report 2008



- Identifies key tech trends ... 1-5 years
 - Grassroots video
 - Collaboration webs
 - Data mashups
 - Mobile broadband
 - Collective Intelligence
 - Social Operating Systems

<http://www.educause.edu/ir/library/pdf/CSD5320.pdf>



- Open Access Movement

<http://www.oercommons.org/>

http://en.wikipedia.org/wiki/Open_educational_resources

<http://creativecommons.org/>

<http://commons.carnegiefoundation.org/>

Share, Remix, Reuse!

- E-portfolio services

- New scaffolding to support deeper learning



*How to prepare for the future,
while making the most of the present?*



Questions



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