

# Knowledge Structures in Online Courses

So What?

Knowledge Structures in Online Courses

# Splitting Hairs re: Definitions (in the Research Literature)



## Knowledge

- Part of human sense-making
- Combined information
- Contextualized data
- Strategic
- Purposive
- Insightful

## Information

- Data, facts
- Inert



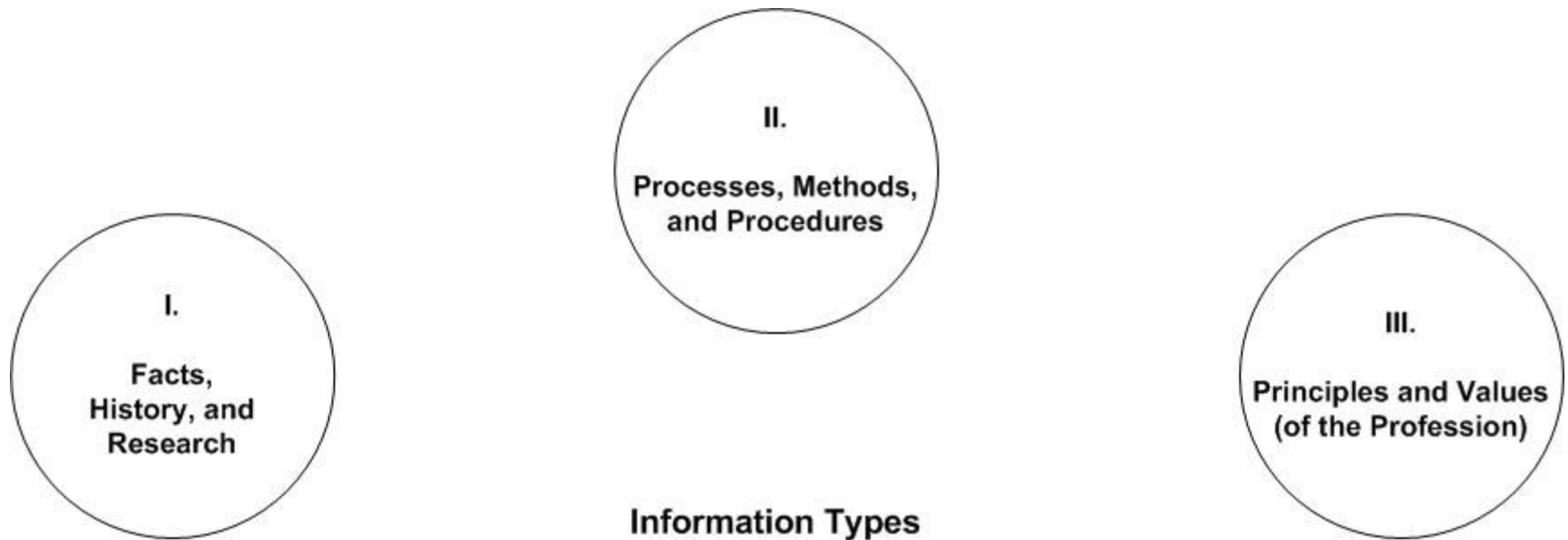
# Knowledge Structures (cont.)

- Cultural and paradigmatic (human-perceived)
- Sensory-based (sight, smell, taste, touch, and hearing)
- Research-based (hypothesis, test, conclusion); evidentiary
- Stories and case studies; articles; books (different levels of granularity, abstract to detailed)

# Knowledge Structures (cont.)

- Evolving, unsettled, semi-stable, and debated knowledge
- Invisible and “hidden” contents
- Subconscious and tacit knowledge of subject matter experts (SMEs) and practitioners

# Information Types



# Information Arrangements


- Topical, subject-matter-based
- Chronological (by epoch, phase, historical period, “punctuated equilibrium” development phases)
- Type or category
- Process, procedure, or practice (simple to complex)
- Principle, value, concept, or theme
- User-based / perspective-based
- Mixed methods \*

\*Most are mixed methods with one over-arching organizational structure.


# Logical Substructure

- Creates coherence for learners
- Strengthen the clarity of the information presentation and usage
- Offers natural transitions between modules or sections of learning

# Ways of Knowledge Sharing in E-Learning

- **MEMORIZATION:** flash cards, fill-in-the-blanks, mix-and-match, drill work, automated simulation practices, virtual labs, virtual dissections, videos, audio, multimedia experiences
  - **ANALYSIS:** primary research, secondary research, interviews, information collection and organization, non-fiction and fiction writing, troubleshooting, evaluation
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# Ways of Knowledge Sharing in E-Learning (cont.)

- **PROBLEM-SOLVING:** cross-word puzzles, story problems, case studies, role-play simulations, virtual world immersions
  - **CREATIVITY:** project-based learning, inquiry-based learning, individual or shared designs, discussions, research, digital content creation (digital papers, audio, video, multimedia), e-portfolio work, cross-domain innovations, R&D (research and development) work
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# Knowledge Capture

- Research (quantitative, qualitative, and mixed methods)
- Reflective writing (informal capture: wikis, blogs; formal capture: domain-field peer-reviewed publications)
- Meta-analyses

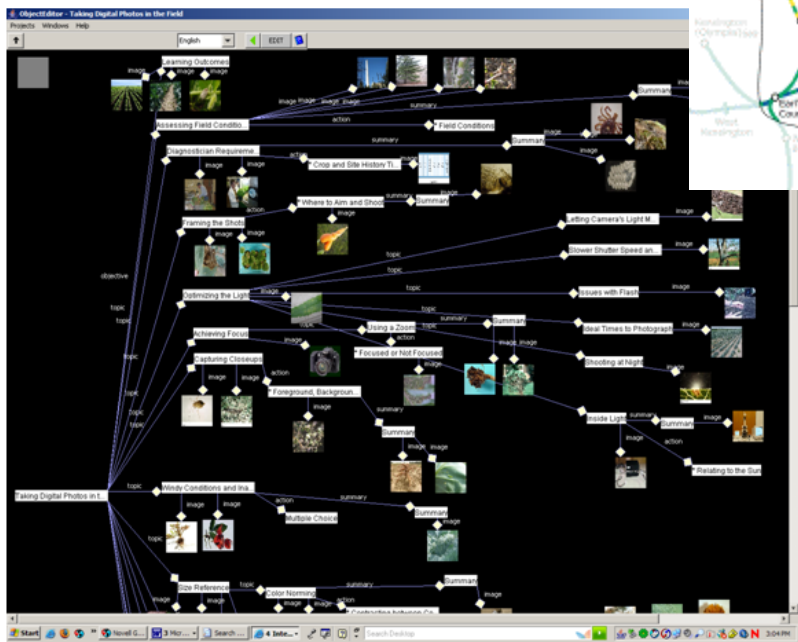
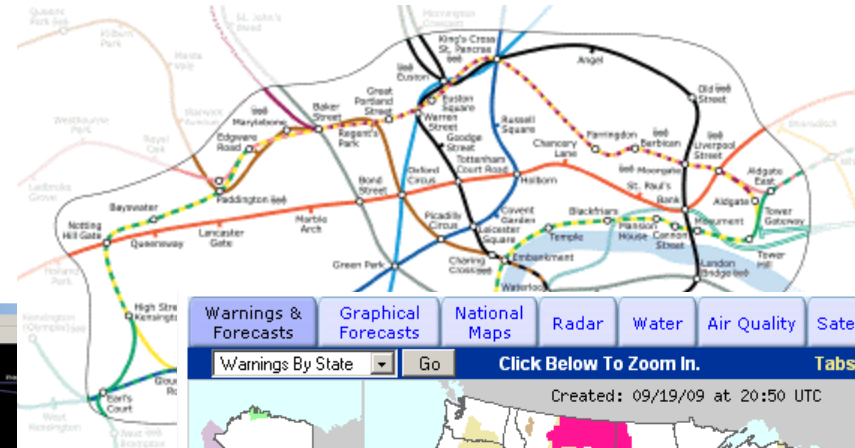
# So What?

Why should distance learning instructors care about knowledge structures in online courses (and online learning)?

# Codified Knowledge Structures

- Hierarchies
- Origins
- Types / classifications / taxonomies
- The natures of a thing / ontologies
- Relationships
- Evolutions
- Navigable (through the Internet, Web, and desktop software systems)

# Technological Structuring of Information



Warnings & Forecasts   Graphical Forecasts   National Maps   Radar   Water   Air Quality   Satellite   Climate

Warnings By State   Go   Click Below To Zoom In.   Tabs At A Glance

Created: 09/19/09 at 20:50 UTC

American Samoa • Guam • Puerto Rico/Virgin Islands

Flash Flood Warning	Coastal Flood Advisory	Hazardous Seas Watch
Flash Flood Watch	Small Craft Advisory	Fire Weather Watch
Flood Warning	Lake Wind Advisory	Extreme Fire Danger
Gale Warning	Wind Advisory	Coastal Flood Statement
Freeze Warning	Frost Advisory	Special Weather Statement
Red Flag Warning	Flood Watch	Hazardous Weather Outlook
Flood Advisory	Gale Watch	Short Term Forecast

# Metadata Labeling of Information

- Databases / digital repositories / digital libraries / digital referatories / wikis (knowledge management systems)
- The problem of incoherence in metadata labeling between and within fields (semantics and syntax) in terms of annotations
- METADATA SCHEMAS: [IEEE Learning Object Metadata](#) and [Dublin Core](#) and [IMS Meta-data Information Model](#)

# Metadata for Learning Objects

(A Broad Over-simplification)

- **Who** made it? (the author, the publisher, the organization)
- **What** is it? What are the learning contents? What learning theory is used? What are the learning objectives? What language is it in? What grade level? What types of learning occurs? Who is the optimal learning audience? Who owns it?
- **When** was it made? How recent is the learning and information?
- **Where** was it made?
- **Why** was it made? What part of a developmental learning sequence does it fit in?
- **How** was it made? What technologies were used?

# The “Ilities”

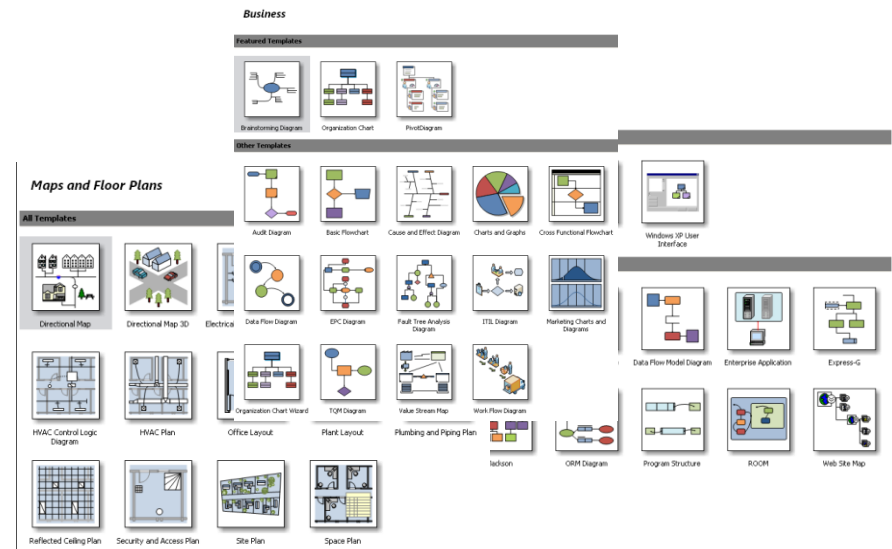
Some Ilities	Elaboration
Usability	Intuitive, self-explanatory user interface; structural and functional transparency; accessibility
Maintainability	Ease of modifications
Scalability	Ability to continue services at low and high-loads and other circumstances
Availability / Reliability	Responsiveness of archival system in calling up desired resource
Extensibility	The accommodation of necessary changes to “extend” a system into the future
Security	Informational assurance, proper levels of access
Portability	Transferability and ability to be migrated to different platforms
Interoperability	Ability to be used on various platforms and systems
Reusability	Sharability between systems; playability; usage in different learning contexts

# Taking Advantage of New Technos

- Being information-media literate and knowledge-structure literate
- Enhanced continuing learning
- Communicating most effectively using the emerging knowledge structuring / knowledge conceptualization; user interface design; multi-layering of technologies for e-learning
- Seeing and modifying your own inherent design in textbooks and online courses

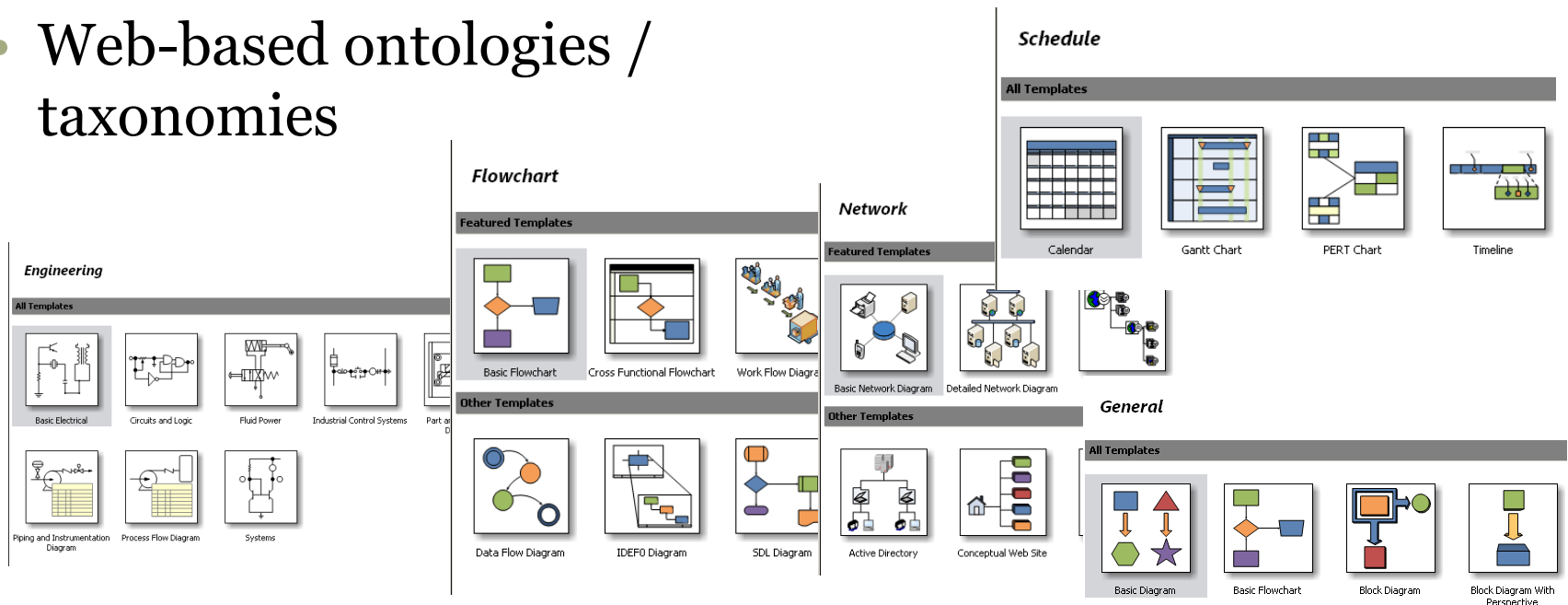
# Some Tools for Expressing Knowledge Structures

- Timelines, calendars, Gantt charts, schedules
- Flowcharts, data flows, workflows
- Charts, graphs, and tables
- Maps, directional maps
- Organizational charts
- Audit diagrams
- Cause and effect diagrams
- Part and assembly diagrams
- Systems diagrams
- Site plans and blueprints



# Some Tools for Expressing Knowledge Structures (cont.)

- Spatial plans
- Network diagrams
- Website maps
- Web-based ontologies / taxonomies



# Conclusion and Contact

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