Semantic Technologies & Sense-Making Technologies

Dr Jon Mason
jon.mason@cdu.edu.au

http://cdu.academia.edu/JonMason

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Questions from this photo

• Are semantics sufficient?

• Does it make sense to ask what this photo means?
Questions from this photo

• What describes this photo?
• Who took it?
• Where was it taken?
• When was it taken?
• What kind of birds?
• What do you think about this photo?
• Can this photo express meaning?
• Is this formation typical for these birds?
• Is the number 11 significant for these birds?
Sense-Making / Sensemaking

• Recent origins
  - Vannevar Bush (1945) – visioning the “memex”
  - Brenda Dervin (1983) – Communications & Info Science
  - Karl Weick (1993) – Sensemaking in Organizations
  - Dave Snowden (2002) – Complexity & Knowledge

• Common-sense construct with hi-utility
  - We all need to make sense of things (routinely)
  - “structuring the unknown” (Weick)
  - “a mandate of the human condition” (Dervin)
Sense-Making ≠ Meaning Making
Complexity & Knowledge

Cynefin Framework
- Snowden (2002)

Human-Computer Interaction

- **Spatial** – depicting objects and their spatial relationships
- **Argumentational** – representing proposition(s) and the logical operations that might link them
- **Faceted** – properties of an entity or entities within a domain
- **Hierarchical** – showing asymmetrical, one-to-many relationships
- **Sequential** – depicting a time series or chronology
- **Network** – depicting arbitrary, many-to-many relationships

http://discovery.ucl.ac.uk/14803/1/14803.pdf
Data-Frame Model

**Data:**
- recognize data from world

**Frame:**
- defines what counts as data, organizes

**Elaboration Cycle**
1. Elaborate a frame:
   - add and fill slots
   - discover data
   - infer new relationships
   - discard data

**Reframing Cycle**
1. Question a frame:
   - detect inconsistencies
   - track anomalies
   - judge data quality

2. Reframe:
   - compare frames
   - seek a new frame

**Preserve**

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**Sources:**

Figure 1. The Data/Frame Theory of sensemaking.
FIGURE 1. A conceptual model of sensemaking in intelligence analysis (Pirolli & Card, 2005). (Figure available in color online.)
FIGURE 1. A conceptual model of sensemaking in intelligence analysis (Pirolli & Card, 2005). (Figure available in color online.)
Sense-Making ≠ Meaning Making

in most cases
Sense-Making [Digital Learning] via Timelines …
Digital Learning Inputs

Hypertext & Multimedia
World Wide Web
Apple & Microsoft
Learning Technology Standards
Google
"Content is King"
Learning Management Systems
Web Services
e-Research
YouTube
Social Media, e-Portfolios
Open Educational Resources
Cloud Computing
Smart phones & tablets
ATC21S
Learning analytics
EDUPUB

Digital Revolution


Paris OER Declaration

Friesen – Re-Thinking e-Learning Research

Laurillard – Re-Thinking for the Knowledge Society

Laurillard – Re-Thinking University Teaching
Information & Communications Technology

- hypertext
- Intelligent Technologies
- hypermedia
- Social Media
- Collaboration Technologies
- Semantic Technologies
- Smart Technologies
- Sense-Making Technologies
- Analytics

......... Digital Revolution .................
The *Why* Dimension

- Asking
- Learning
- Understanding
- Knowing
- Explaining

Why
The *Why* Dimension

- **Why?**
  - It is fundamental to learning & making sense of things
  - Current digital tools don’t support it very well

- **What did I find?**
  - A significant gap in digital learning tools
  - As powerful as Google is, it does not handle *why* questions well
  - *Why* seeks explanation more than information
  - *Why* has high linguistic utility
  - *Why* is ambiguous & multi-dimensional – but it makes you think!
- Emerging out of Anthropology & Linguistics
- Common set of Semantic Primes
- Why does not belong

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>PRIMES</th>
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<tbody>
<tr>
<td>Substantives</td>
<td>I, YOU, SOMEONE/PERSON, PEOPLE</td>
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<tr>
<td>Relational Substantives</td>
<td>SOMETHING/THING, BODY, KIND, PART</td>
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<tr>
<td>Determiners</td>
<td>THIS, THE SAME, OTHER</td>
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<tr>
<td>Quantifiers</td>
<td>ONE, TWO, SOME, ALL, MANY/MUCH</td>
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<tr>
<td>Evaluators</td>
<td>GOOD, BAD</td>
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<tr>
<td>Descriptors</td>
<td>BIG, SMALL</td>
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<tr>
<td>Mental/Experiential Predicates</td>
<td>THINK, KNOW, WANT, FEEL, SEE, HEAR</td>
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<tr>
<td>Speech</td>
<td>SAY, WORDS, TRUE</td>
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<tr>
<td>Actions And Events</td>
<td>DO, HAPPEN, MOVE</td>
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<tr>
<td>Existence And Possession</td>
<td>THERE IS/EXIST, HAVE</td>
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<td>Life And Death</td>
<td>LIVE, DIE</td>
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<tr>
<td>Time</td>
<td>WHEN/TIME, NOW, BEFORE, AFTER</td>
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<tr>
<td></td>
<td>A LONG TIME, A SHORT TIME</td>
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<td>FOR SOME TIME</td>
<td>MOMENT</td>
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<td>Space</td>
<td>WHERE/PLACE, HERE, ABOVE, BELOW, FAR, NEAR</td>
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<td>Logical Concepts</td>
<td>SIDE, INSIDE, TOUCH (CONTACT)</td>
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<td>Intensifier, Augmentor</td>
<td>NOT, MAYBE, CAN, BECAUSE, IF</td>
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<td>Similarity</td>
<td>VERY, MORE</td>
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<td>LIKE/WAY</td>
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Citizendum image based on Goddard (2002)
Sense-Making Technologies

Technologies that support:
(an indicative list)

• Process modeling and mapping
• Computer supported argumentation
• Simulation and animation
• Human-computer interface design
• Dialogic scaffolding supporting prolonged inquiry, question formulation and clarification
Questions emerging

• Might different genres of sense-making technologies emerge?

• Is interoperability necessarily an issue?

• What standards might be relevant?

• …