So, what is “Information”? In a few words on this sheet of paper, please give your definition.

So, what is the information here?
What do you see here?

What do you see here?

What do you see here?

What can the stone-age person from New Guinea see on this picture?
Let’s Watch Betty Lou Helping Bert With the Bottle Caps at Sesame Street

Observations

- Information is
  - In the eye of the beholder
  - Hard and soft concept
  - Context-sensitive
    - Time (historical dimension)
    - Group
    - Culture
    - Code/language

Let’s Watch Betty Lou Helping Bert With the Bottle Caps at Sesame Street

- Information as acquired or derived knowledge and facts:
  - Betty Lou helped Bert to know where to collect bottle caps.
- Information as (recording) process
  - Betty Lou helped Bert in counting the bottle caps and recording this information on a piece of paper
- Information as coded data
  - Betty Lou and Bert entered the results into a computer where it gets stored in binary format
- Information as quantitative measure
  - Betty Lou and Bert run a program in the computer, which reports how many bottle caps Bert has collected over the past four weeks
- Information as measure of uncertainty
  - Betty Lou and Bert run a program that calculates how probable it is that Bert runs out of collectable bottle caps some time next week.

Definitions of Information

Main Entry: information

... Function: noun

Date: 14th century

1 : the communication or reception of knowledge or intelligence

2 a (1) : knowledge obtained from investigation, study, or instruction (2) :
- INTELLIGENCE, NEWS (3) : FACTS, DATA
  b : the attribute inherent in and communicated by one of two or more alternative sequences or arrangements of something (as nucleotides in DNA or binary digits in a computer program) that produce specific effects c (1) : a signal or character (as in a communication system or computer) representing data (2) : something (as a message, experimental data, or a picture) which justifies change in a construct (as a plan or theory) that represents physical or mental experience or another construct
d : a quantitative measure of the content of information; specifically : a numerical quantity that measures the uncertainty in the outcome of an experiment to be performed

3 : the act of informing against a person

4 : a formal accusation of a crime made by a prosecuting officer as distinguished from an indictment presented by a grand jury

Marriam-Webster dictionary http://www.m-w.com/cgi-bin/dictionary
Definitions of Knowledge

Main Entry: knowledge
Function: noun ...Etymology: Middle English knowlefe, from knowlechen to acknowledge, irregular from known...Date: 14th century
1 obsolete: COGNIZANCE
2 a (1) : the fact or condition of knowing something with familiarity gained through experience or association (2) : acquaintance with or understanding of a science, art, or technique b (1) : the fact or condition of being aware of something (2) : the range of one's information or understanding <answered to the best of my knowledge> c : the circumstance or condition of apprehending truth or fact through reasoning <COGNITION d : the fact or condition of having information or of being learned <a man of unusual knowledge>
3 archaic: SEXUAL INTERCOURSE
4 a : the sum of what is known : the body of truth, information, and principles acquired by mankind b archaic : a branch of learning

synonyms KNOWLEDGE, LEARNING, ERUDITION, SCHOLARSHIP mean what is or can be known by an individual or by mankind. KNOWLEDGE applies to facts or ideas acquired by study, investigation, observation, or experience <rich in the knowledge of human nature>. LEARNING applies to knowledge acquired especially through formal, often advanced, schooling <a book that demonstrates vast learning>. ERUDITION strongly implies the acquiring of profound, recondite, or bookish learning <an erudition unusual even in a scholar>. SCHOLARSHIP implies the possession of learning characteristic of the advanced scholar in a specialized field of study or investigation <a work of first-rate literary scholarship>.

Merriam-Webster dictionary http://www.m-w.com/cgi-bin/dictionary

How about …

• “Let us have the data speak for themselves…”
• “Let’s compare our model with the real world…”
• “Q.e.d.”
• “This knowledge has been objectified”
• “We know this with certainty”
• “St. Paul is an awful edifice”

Observations

• Circular reference
  – Information rests on knowledge, while knowledge rests on information
• Information as representation of data and/or an outside world
  – “…[W]e must call into question that the idea that the world is pregiven and that cognition is representation. In cognitive science, this means that we must call into question the idea that information exists ready-made in the world and that it is extracted by a cognitive system…”

Attempts of Sense Making

• Information as the “enigmatic” concept
  – “(T)he fundamental link among all that we are, know, and do not know” (Norton, 2001, 15)
• Information as
  – (1) Process, (2) knowledge, and (3) thing; (Buckland, 1991)
• Information is text
  – Answering NEOT questions (When, where, who, & what)-- while
• Knowledge is text
  – Answering WY questions (How, why); (Quigley & Debons, 1999)
More Attempts

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Data</th>
<th>Information</th>
<th>Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wrig [41]</td>
<td>-</td>
<td>Facts organized to describe a situation or data</td>
<td>Truths and insights, perspectives and concepts, judgements and</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>expectations, methodologies and knowledge</td>
</tr>
<tr>
<td>Norvik and Takamachi [23]</td>
<td>-</td>
<td>A flow of meaningful messages</td>
<td>Commitments and beliefs derived from these messages</td>
</tr>
<tr>
<td>Spiek and Spiekewert [12]</td>
<td>Not yet interpreted symbols</td>
<td>Data with meaning</td>
<td>The ability to using meaning</td>
</tr>
<tr>
<td>Davenport [15]</td>
<td>Simple observations</td>
<td>Data with relevance and purpose</td>
<td>Valuable information from the human mind</td>
</tr>
<tr>
<td>Davenport and Prusak [16]</td>
<td>A set of discrete facts</td>
<td>A message meant to change the receiver's perception</td>
<td>Experiences, values, insights, and contextual information</td>
</tr>
<tr>
<td>Quigley and Delone [29]</td>
<td>Text that does not answer</td>
<td>Text that answers the question who, what, where,</td>
<td>Text that answers the questions why and how</td>
</tr>
<tr>
<td></td>
<td>questions to a particular</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>problem</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chen et al. [32]</td>
<td>Facts and messages</td>
<td>Data vested with meaning</td>
<td>Justified, true belief</td>
</tr>
</tbody>
</table>

More Attempts

Knowledge (Some Other Definitions)

- K = I + U (Knowledge is equal to Information plus Understanding) (Brooking)
- Knowledge is information in a context that supports proper decisions and actions (Penny)
- The idea that knowledge can be slotted into a data-to-wisdom hierarchy is bogus (Stewart)

Knowing

MENO. And how will you inquire, Socrates, into that which you do not know? What will you put forth as the subject of inquiry? And if you find what you want, how will you ever know that this is the thing which you did not know?

SOCRATES. I know, Meno, what you mean; but just see what a tiresome dispute you are introducing. You argue that a man cannot inquire either about that which he knows, or about that which he does not know; for if he knows, he has no need to inquire; and if not, he cannot; for he does not know the very subject about which he is to inquire? [p. 4] Plato, Meno

Stocks and Flows in IM

![Diagram of Stocks and Flows in IM]
Tacit Knowing

- Knowledge that is present but inexpressible (Polanyi)
- Intuition, motor skills, subconscious knowing
- Scrutinizing the tacitly held particulars destroys the conception of the entity altogether

 Tacit and Explicit Knowing

- Nonaka’s understanding of tacit knowledge
- Tapping untapped individual and organizational knowledge

Information and Learning

- Norms
- Assumptions
- Strategies
- Organizational Action → Outcomes
  → Single-Loop Learning
  → Double-Loop Learning

Information Management Cycle

- Information Organization and Storage
  → Information View
  → Adaptation Behavior
  → Information Organization and Storage
### Information Needs

<table>
<thead>
<tr>
<th>Problem Dimensions</th>
<th>Information Needs (Examples)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Design</strong></td>
<td>Options, alternatives, target</td>
</tr>
<tr>
<td>Discovery</td>
<td>Small, defined set of tasks</td>
</tr>
<tr>
<td>2. Well-structured</td>
<td>Task, precise data, precedence tree, timeline</td>
</tr>
<tr>
<td>Individual</td>
<td>Product and process performance, quality, stability</td>
</tr>
<tr>
<td>3. Slow</td>
<td>Path to goal, time, ways to reach goal, benefit to similar tasks</td>
</tr>
<tr>
<td><strong>4. Specific goals</strong></td>
<td>Size, operational performance, preferences, deadlines</td>
</tr>
<tr>
<td>Short-term</td>
<td>New model, urgency, focus, define aspects of a data set, time to reach goal</td>
</tr>
<tr>
<td><strong>5. Initial data understanding</strong></td>
<td>Initial data set, processing time</td>
</tr>
<tr>
<td>New model</td>
<td>Clarity of data, aspects of a data set, time to reach goal</td>
</tr>
<tr>
<td><strong>6. Assumptions and constraints</strong></td>
<td>Information to help define problems, tools for data collection, analysis, and presentation</td>
</tr>
<tr>
<td>New model</td>
<td>Knowledge, data, methods to analyze problems, information to reach emergent explicit result</td>
</tr>
<tr>
<td><strong>7. Time pressure</strong></td>
<td>Information, data, methods to analyze problems, information to reach emergent explicit result</td>
</tr>
<tr>
<td><strong>8. Degree of risk</strong></td>
<td>Degree of risk, methods to analyze problems, information to reach emergent explicit result</td>
</tr>
<tr>
<td><strong>9. Benefits and costs</strong></td>
<td>Degree of risk, methods to analyze problems, information to reach emergent explicit result</td>
</tr>
<tr>
<td>New model</td>
<td>Integration of models, applications to empirical analysis, potential to impact another area</td>
</tr>
<tr>
<td><strong>10. Internal and external constraints</strong></td>
<td>Integration of models, applications to empirical analysis, potential to impact another area</td>
</tr>
<tr>
<td>New model</td>
<td>Integration of models, applications to empirical analysis, potential to impact another area</td>
</tr>
</tbody>
</table>

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### Information Products & Services

#### Data, Information, & Knowledge

<table>
<thead>
<tr>
<th>Activities</th>
<th>Data capture</th>
<th>Data selection</th>
<th>Data storage</th>
<th>Data modeling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Analysis</td>
<td>Information</td>
<td>Information acquisition</td>
<td>Information organization</td>
<td>Information distribution</td>
</tr>
<tr>
<td>Knowledge Management</td>
<td>Knowledge sharing</td>
<td>Knowledge use</td>
<td>Knowledge sharing</td>
<td>Knowledge use</td>
</tr>
<tr>
<td>Action Results</td>
<td>Strategies, alliances</td>
<td>Products, services</td>
<td>Processes, systems, structures</td>
<td></td>
</tr>
</tbody>
</table>

#### Data Processing & Information Management

<table>
<thead>
<tr>
<th>Values</th>
<th>Accuracy</th>
<th>Efficiency</th>
<th>Relevance</th>
<th>Action enabling</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Value generation</td>
</tr>
</tbody>
</table>

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**Choo, 2001**
Knowing and Not Knowing

<table>
<thead>
<tr>
<th>We Know What We Know</th>
<th>We Don't Know What We Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Mature organizations in stable environments</td>
<td>- Mature organizations in dynamic environments</td>
</tr>
<tr>
<td>- Information is organized, accessible</td>
<td>- Information is hidden, dispersed</td>
</tr>
<tr>
<td>- Knowledge is codified, sharable</td>
<td>- Knowledge is tacit, unrecorded</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>We Know What We Don't Know</th>
<th>We Don't Know What We Don't Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Organizations moving into new environments</td>
<td>- Organizations set in their ways or beliefs</td>
</tr>
<tr>
<td>- Information needs are clear, well-defined</td>
<td>- Information subject to tunnel vision</td>
</tr>
<tr>
<td>- New knowledge to be created, discovered</td>
<td>- Knowledge gaps exist, but unrecognized</td>
</tr>
</tbody>
</table>

After Joseph Luft and Harry Ingham, 1969

Organizational Memory

Managerial Challenges

Organizational Learning

Organizational

Technological

Social

Processes

Organizational learning

ICT

Intellectual Capital
The ICT Dimension of IM

Information Systems

The traditional MIS view

Information Problem Spaces

The Unity (not Dichotomy) of Information Management

After Michael Pidd, 2004
Concluding Food for Thought

Von Glasersfeld (1995)
Knowledge is not passively received, but built up by the cognizing subject
The function of cognition is adaptive and the serves the organization of the experiential world, not the discovery of ontological reality (p. 18)

Maturana & Varela (1981)
Everything said is said by an observer to another observer that could be himself

Remember, what can the stone-age person from New Guinea see on this picture?