2 Understanding Knowledge

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Overview

- Definitions
- Cognition
- Expert Knowledge
- Human Thinking and Learning
- Implications for Management

Definitions

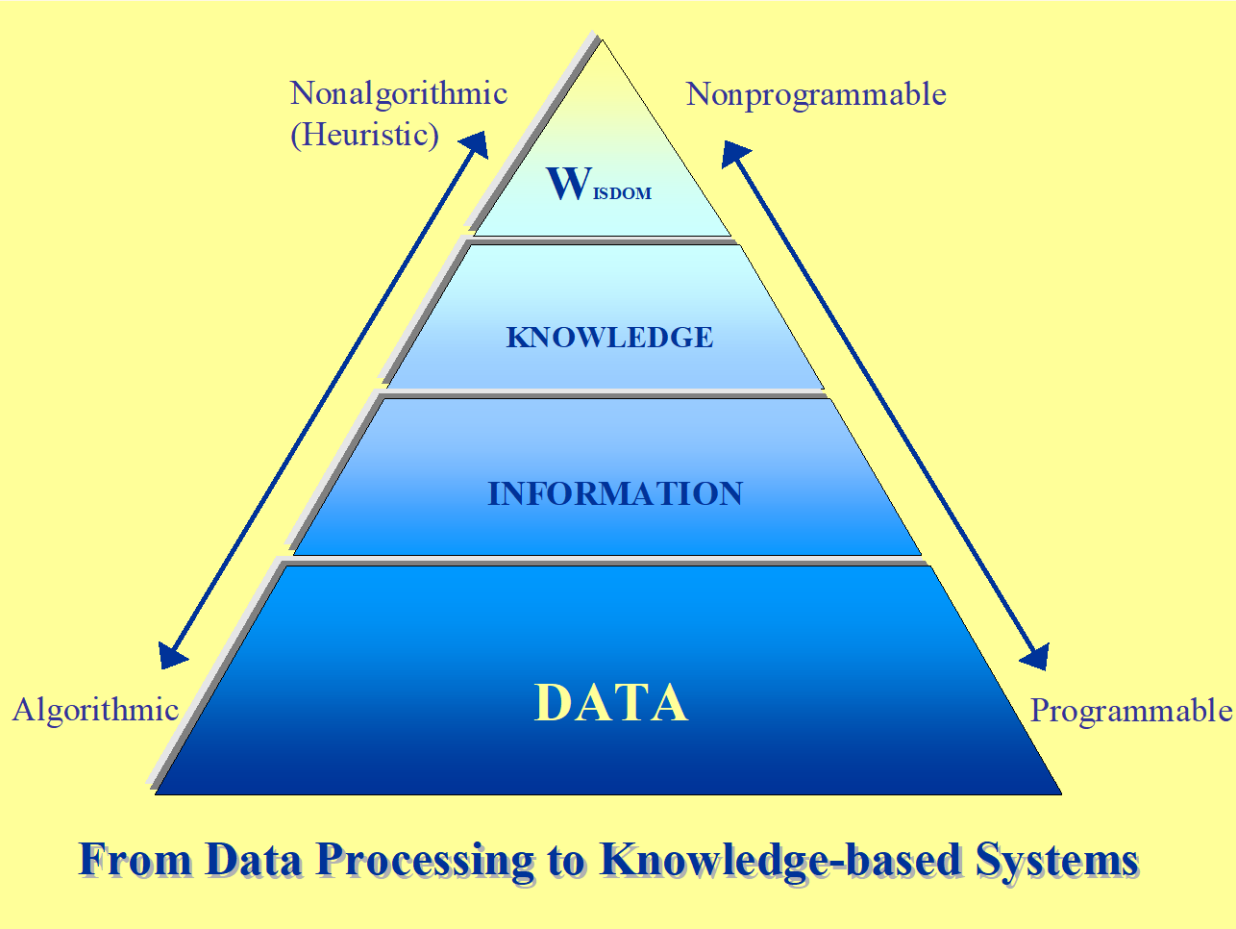
- Knowledge: Understanding gained through experience or study "know-how"
- Intelligence: Capacity to acquire and apply knowledge; thinking and reasoning; ability to understand and use language
- Memory: Ability to store and retrieve relevant experience at will; part of intelligence

Definitions

- Learning: Knowledge acquired by instruction or study; consequence of intelligent problem solving
- Experience: Relates to what we've done and to knowledge; experience leads to expertise
- Common Sense: Unreflective opinions of ordinary people
- Heuristic: A rule of thumb based on years of experience

Data, Information, and Knowledge

- Data: Unorganized and unprocessed facts; static; a set of discrete facts about events
- Information: Aggregation of data that makes decision making easier
- Knowledge is derived from information in the same way information is derived from data; it is a person's range of information



From Data Processing to Knowledge-based Systems

Data, Information, and Knowledge

- Data is a set of discrete facts about events
- Information becomes knowledge with questions like "what implications does this information have for my final decision?"
- Knowledge is understanding of information based on its perceived importance
- Knowledge, not information, can lead to a competitive advantage in business

Question for discussion

- People do not think in the same way as machines, because they are "biological." Do you agree? Explain.

Types of Knowledge

- Shallow and deep
- Explicit and tacit
- Procedural versus episodical
- Chunking knowledge

Knowledge as Know-How

- Know-how distinguishes an expert from a novice
- Experts represent their know-how in terms of heuristics, based on experience
- Know-how is not book knowledge; it is practical experience

Reasoning and Heuristics

Humans reason in a variety of ways:

- *Reasoning by analogy*: relating one concept to another
- *Formal reasoning*: using deductive or inductive methods
- *Case-based reasoning*: reasoning from relevant past cases

Deductive and inductive reasoning

- *Deductive reasoning:* exact reasoning. It deals with exact facts and exact conclusions
- *Inductive reasoning*: reasoning from a set of facts or individual cases to a general conclusion

FROM PROCEDURAL TO EPISODIC KNOWLEDGE

- Shallow Knowledge
- Deep Knowledge

Procedural Knowledge

Knowledge of how to do a task that is essentially motor in nature; the same knowledge is used over and over again.

Declarative Knowledge

Surface-type information that is available in short-term memory and easily verbalized; useful in early stages of knowledge capture but less so in later stages.

Semantic Knowledge

Hierarchically organized knowledge of concepts, facts, and relationships among facts.

Episodic Knowledge

Knowledge that is organized by temporal spatial means, not by concepts or relations; experiential information that is chunked by episodes. This knowledge is highly compiled and autobiographical and is not easy to extract or capture.

Explicit and Tacit Knowledge

- *Explicit* knowledge: knowledge codified and digitized in books, documents, reports, memos, etc.
- *Tacit* knowledge: knowledge embedded in the human mind through experience and jobs
- Tacit and explicit knowledge have been expressed in terms of knowing-how and knowing-that, respectively
- Understanding what knowledge is makes it easier to understand that knowledge hoarding is basic to human nature.

Knowledge As An Attribute of Expertise

- An expert in a specialized area masters the requisite knowledge
- The unique performance of a knowledgeable expert is clearly noticeable in decision-making quality
- Knowledgeable experts are more selective in the information they acquire
- Experts are beneficiaries of the knowledge that comes from experience
- Academic knowledge contributes to conceptual knowledge—a prerequisite for practical knowledge

Human Learning

Learning occurs in one of three ways:

- Learning by experience: a function of time and talent
- Learning by example: more efficient than learning by experience
- Learning by discovery: undirected approach in which humans explore a problem area with no advance knowledge of what their objective is.

Question for discussion

- **What type of knowledge is used in each of these activities?**
  - tying a shoelace
  - debugging a computer program
  - baking a pie
  - replacing a car's flat tire
  - negotiating peace with a hostile country
  - driving in congested traffic

Question for discussion

- List five heuristics that you employ in everyday life. By what kind of learning have you arrived at these rules of thumb?

Thank You !

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