Generative AI and Inquiring Systems: Ways of Patterning and Ways of Knowing

David Ing
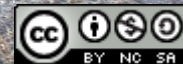
http://coevolving.com

Systems Thinking Ontario
Toronto, Ontario
January 2025

Ways of patterning (1970s-2010s) as a recipe collection

1.	Hierarchical (Physical) Categorization	Where can I find a cookbook in the library?
2.	Web Crawling → Keyword Indexing	Where can I find a recipe with this ingredient?
3.	Backlinks → Pagerank	Which recipe pages are most cited on the Internet?
4.	Machine Learning Pattern Recognition → Data Science	Which ingredients most frequently go together?

Ways of patterning (2010s→today) as a recipe collection

| 5.	Natural Language Processing → Backpropogation Weighting	What's the likeliest next ingredient in a recipe?
6.	Recurrent Neural Networks → Text Generation	Tell me a story about making an apple pie that a 5-year old could understand
7.	Self-Attention → Transformers	Summarize the main points of this Japanese cookbook for me, in English
8.	Adding (New) Contexts → Retrieval Augmented Generation	Here's a new cookbook you haven't read. Summarize what's new in it.

          January 2025

Q+A Chat Challenge #1

When choosing Large Language Models, when would an inquirer choose a Transformer over Retrieval Augmented Generation, or the reverse?

- OpenAI ChatGPT
- Microsoft Copilot
- Mistral LeChat (FR)
- Anthropic Claude
- Google NotebookLM
- Perplexity.ai

Systems Thinking Ontario: GenAI + Inquiring Systems

January 2025

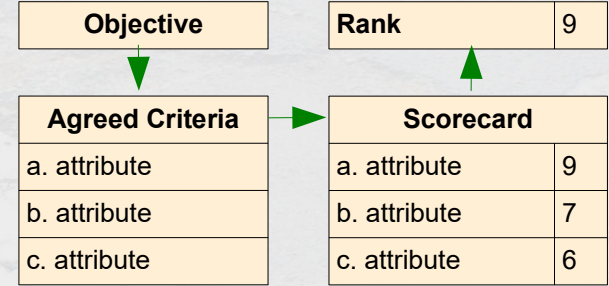# An inquiring system is a way of knowing for human beings

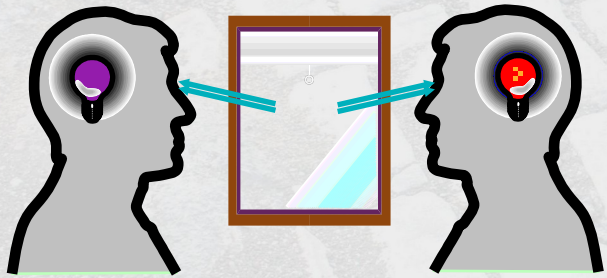## Inductive-Consensual IS: The first way (on *objective* views)
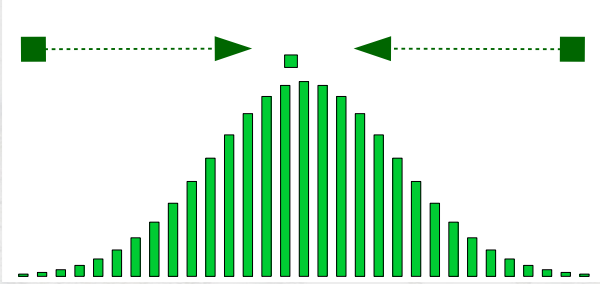
guarantor =
agreement
(consensus)

e.g. Delphi approach

Analytic-Deductive IS: The second way (on *objective* views)

guarantor =
logical consistency
(fact nets)

e.g. the "best man" for the job

Objective		Rank		9
Agreed Criteria		Scorecard		
a. attribute		a. attribute		9
b. attribute		b. attribute		7
c. attribute		c. attribute		6

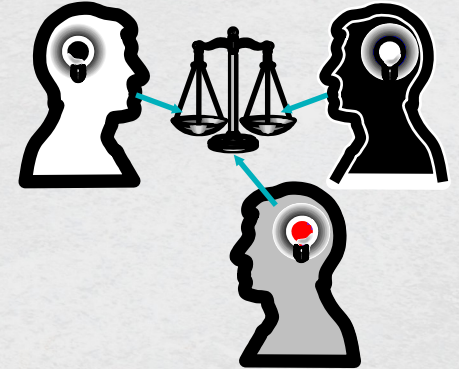## Multiple Realities IS: The third way (on *subjective* views)

model + data as inseparable whole

guarantor =
ability to see range of views
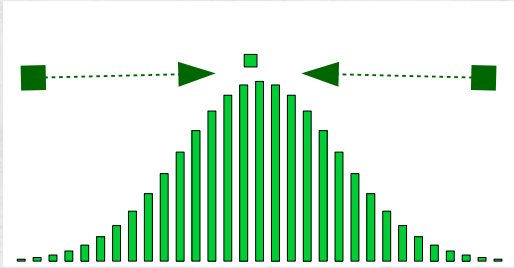(representations)

e.g. disciplinary views of drug problem

Dialectic IS: The fourth way (on *subjective* views)

guarantor =
conflict

e.g. challenging assumptions of what skid row housing should be

Mitroff, Ian I., and Harold A. Linstone. 1993. *The Unbounded Mind: Breaking the chains of traditional business thinking*. Oxford University Press.

A systems approach sweeps in across 4 modes of knowing

John Locke (1632-1704)

Gottfried Wilhelm Leibniz (1646-1712)

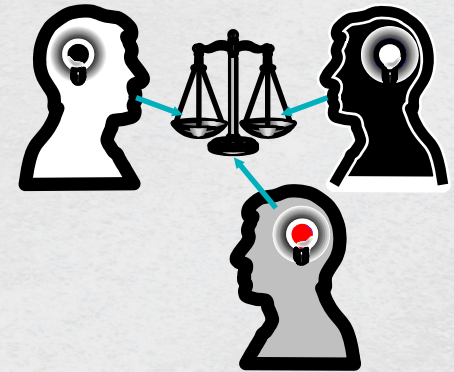| Objective		Rank	9

Agreed Criteria		Scorecard	
a. attribute		a. attribute	9
b. attribute		b. attribute	7
c. attribute		c. attribute	6

The fifth way of knowing
Systems Approach
(with multiple perspectives)
guarantor = **progress**
(sweeping-in process)

Edgar Arthur Singer (1973-1954)
C. West Churchman (1913-2004)
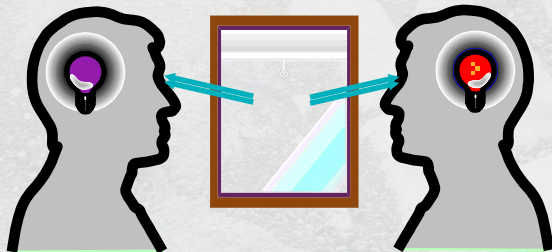
Immanuel Kant (1725-1804)

Georg Wilhelm Friedrich Hegel (1770-1831)

Mitroff, Ian I., and Harold A. Linstone. 1993. *The Unbounded Mind: Breaking the chains of traditional business thinking*. Oxford University Press.

David Ing, 2025

Q+A Chat Challenge #2a

Describe the five ways of knowing as described in C. West Churchman "The Design of Inquiring Systems", and its extension from Churchman's student Ian Mitroff in "The Unbounded Mind".

- OpenAI ChatGPT
- Microsoft Copilot
- Mistral LeChat (FR)
- Anthropic Claude
- Google NotebookLM
- Perplexity.ai

Systems Thinking Ontario: GenAI + Inquiring Systems

January 2025

Q+A Chat Challenge #2b

The Canadian government has previously funded nuclear power plants based on Candu reactors in the 1950s and 1960s. By 2025, expertise in commercial production of nuclear power plants has declined. Applying the five ways of knowing in the inquiring systems of C. West Churchman and Ian Mitroff, describe how a decision on choosing Small Modular Reactors for Canada might be made.

- OpenAI ChatGPT
- Microsoft Copilot
- Mistral LeChat (FR)
- Anthropic Claude
- Google NotebookLM
- Perplexity.ai

Q+A Chat Challenge #2c

On December 27, 2024, an article by Matthew McClearn on "As construction of first small modular reactor looms, prospective buyers wait for the final tally" was published in the Globe and Mail at https://www.theglobeandmail.com/business/article-as-construction-of-first-small-modular-reactor-looms-prospective/ . Could you update your response on inquiring systems based on this updated news?

- OpenAI ChatGPT
- Microsoft Copilot
- Mistral LeChat (FR)
- Anthropic Claude
- Google NotebookLM
- Perplexity.ai

Q+A Chat Challenge #2d

I am uploading the text of the article by Matthew McClearn on "As construction of first small modular reactor looms, prospective buyers wait for the final tally". Could you update your response on inquiring systems based on this updated news?

- OpenAI ChatGPT
- Microsoft Copilot
- Mistral LeChat (FR)
- Anthropic Claude
- Google NotebookLM
- Perplexity.ai

If they can get you asking the wrong questions,
they don't have to worry about answers (Thomas Pynchon)

Type **1** error	**False positive**: finding a (statistical) relation that isn't real
Type **2** error	**False negative**: missing a (statistical) relation that is real
Type **3** error	**Tricking ourselves**: Unintentional error of solving wrong problems precisely (through ignorance, faulty education or unreflective practice)
Type **4** error	**Tricking others**: Intentional error of solving wrong problems (through malice, ideology, overzealousness, self-righteousness, wrongdoing)

Ian I. Mitroff and Abraham Silvers. 2010. *Dirty Rotten Strategies: How We Trick Ourselves and Others into Solving the Wrong Problems Precisely.* Stanford University Press.

Systems Thinking Ontario: GenAI + Inquiring Systems   January 2025   David Ing, 2025