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A Total Framework for Inquiry

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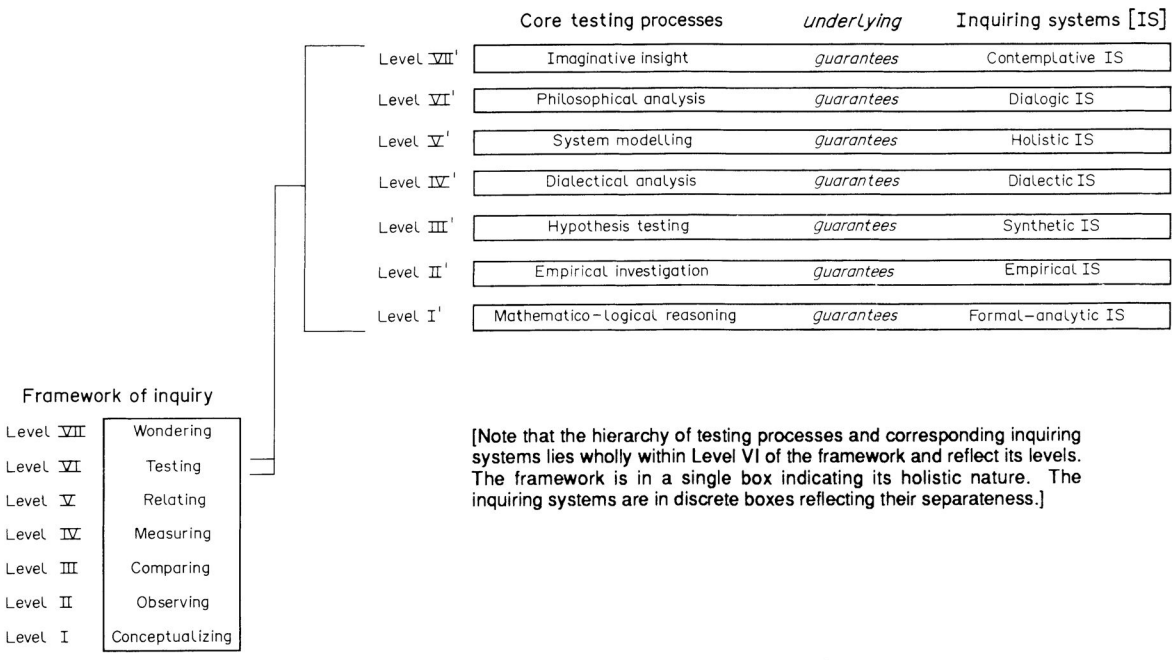
Abstract - The *total framework for inquiry* is formulated as consisting of seven hierarchical levels. The lower five, as described previously (*Syst. Res.* **2** (1985), 95-104), are concerned with representing knowledge: the sixth level has the function of testing and contains 'inquiring systems'; and the seventh level contains the function of wonder. The *inquiring systems* are an image of the framework and therefore also form a seven-level hierarchy in which the lower five levels have been identified previously by Churchman (*The Design of Inquiring Systems*, Basic Books, New York, 1971). Two further inquiring systems are described: the sixth is the 'dialogic' and the seventh is the 'contemplative'. The *core testing processes* which underlie each of the seven inquiring systems and provide each with its different guarantee of truth are distinguished. Each core testing process (and hence each inquiring system) is shown to be underpinned by a particular level in the inquiry framework. Various symmetries and the possibility of homology between the two hierarchical structures are briefly explored. (The total framework is diagrammed in the figure below.)



[Note that the hierarchy of testing processes and corresponding inquiring systems lies wholly within Level VI of the framework and reflect its levels. The framework is in a single box indicating its holistic nature. The inquiring systems are in discrete boxes reflecting their separateness.]

Table 2. Principle characteristics of the hierarchy of practical inquiring systems as used within a situation to aid a decision-maker

Level	Nature (labels) Col. 1	Result of an inquiry (example from health services research) Col. 2	Growth of knowledge in the situation Col. 3	Relation between realities and representations (cf. core testing processes) Col. 4
I′	Formal (analytic, deductive, rationalist)	A value-free analysis pertinent to the situation, e.g. analysis of the different types of health care programmes.	Generating ever more elaborate and grounded analyses.	Representations, deriving from elementary formal reasoning, reveal and embody enduring self-evident properties of the situation. Realities are complex and difficult to know. cf. mathematico-logical reasoning.
II′	Empirical (inductive)	Empirical content on its own pertinent to the situation, e.g. and epidemiological survey of morbidity.	Amassing and organizing ever more facts.	Representations are justified by the facts (i.e. realities) deriving from sensory experience. Ideas and reasoning are subjective and hence untrustworthy. cf. empirical investigation.
III′	Synthetic (representational, explanatory)	Selection of a better alternative in the situation, e.g. randomized controlled trials of alternative regimens of care.	Trying out and progressively improving ever more detailed alternatives.	Representations and realities are inseparable, each deriving from and interacting with the other. So multiple representations of the same reality need to be developed and compared. cf. hypothesis testing.
IV′	Dialectical (conflictual, critical)	Exposure of conflicts in the situation due to opposing assumptions, with or without a resolution, e.g. critical analysis of a health policy decision.	Devising ever more powerful syntheses and recognizing ever more antinomies.	Complete representations must contain at least two directly opposite representations and agreed realities can support either. Representations are imbued with value and affect agreement on reality. cf. dialectic analysis.
V′	Holistic (interdisciplinary, 'soft-system', developmental)	Formulation of a model to indicate actions to change the whole situation, e.g. developing a model for practical organizational change.	Developing ever more extensive and finely-tuned models.	Representations are used to alter realities in line with intentions. Representations require key factors in reality to be interrelated to form a structured system. cf. system modelling.
VI′	Dialogic (philosophical)	A conceptual analysis of aspects of the situation divorced from immediate action, e.g. understanding the meaning of dying.	Producing ever more sophisticated arguments and conclusions.	Representations depend on a properly used framework of relevant fundamental terms provided by ratiocination and discourse. Realities are taken for granted, are not relevant or are challenged directly. cf. philosophical analysis.
VII′	Contemplative (imaginative, speculative, intuitive)	A whole formulation which completely grasps the situation and its resolution. (No specific example—can apply to many topics at each level.)	Creating ever more imaginative possibilities at all levels.	No distinction exists between realities and representations. Representation stems from truth immanent in the mind which employs image, symbols and the logic of the unconscious. cf. imaginative insight.

Table 2. (contd)

Certainty of output Col. 5	Indications for use Col. 6	Dangers (usual criticisms) Col. 7	Contraindications for use Col. 8
Very uncertain, as analysis may be inapplicable or artificial in the actual situation.	• Well-understood and well-defined topic with clear objectives. • Inquirer understands the topic and how it relates to the situation.	• Proliferation of propositions with little concern for data or implementation. • Analysis becomes a self-fulfilling prophecy (i.e. 'true by definition').	• Situation is poorly understood. • Inquirer does not understand the issue in context. • Analysis is over-extended or over-elaborate.
Uncertain because experience is fallible, and facts get very complicated on close inspection.	• Well-structured recognized problem. • Agreement about relevant objectives. • Simple experiment or data collection will suffice. • Inquirer has a 'feel' for data.	• Proliferation of data with little concern for explanations or subjectivity (e.g. goals, attitudes). • Excessive reliance on agreement. • Loss of extreme possibilities.	• Ill-structured problem is made to look well-structured. • Hard data is limited, too costly to obtain, or inaccessible. • Consensus on data is lacking.
Maximum certainty because many perspectives and possibilities can be examined.	• Ill-structured problem but an overall picture is available and a part can be defined and focussed on. • Objectives are clearly given. • Inquirer takes a balanced and unbiased view.	• Proliferation of alternatives. • Important alternatives are omitted, or trivial ones are included. • Realities and representations are changed to carry out the test. • Too ready acceptance of the validity of controls and indicators.	• Overall picture is unavailable. • Objectives are confused. • Inquirer is biased.
Uncertainty which may lead to vacillation between alternatives or to polarization.	• Ill-structured topic whose true nature is in doubt and subject to intense debate by experts. • Opposing objectives in the situation. • Inquirer capable of intuitive and synthetic reasoning.	• Proliferation of unnecessary conflict. • Loss of contact with specific realities. • Excessive influence of prejudice. • Development of weak compromises.	• An optimal solution is available. • Issue is well-structured and uncontentious.
High uncertainty as the situation is ever-developing and psycho-social aspects of participants and inquirer must be included.	• Situation demanding explicit structuring so as to aid intervention. • Concern for future development. • Objectives unclear. • Use of personal power likely. • Inquirer can reason reflectively.	• Generation of unnecessary complexity, uncertainty and individual awareness to violation of values. • Lack of concern for reliability, validity, consistency, objective certainty, or conflict and power issues.	• Simple alternatives must be decided. • Sense of certainty of results or acceptability to participants are of over-riding importance.
Absolute uncertainty; source of doubt and dogmatic belief.	• A framework for thinking is required. • Difficulty with problem formulation. • Issues of self-description or identity are present. • Inquirer capable of sustained theorizing and arguing.	• Degenerates into sterile word-play. • Degenerates into fanaticism. • Lack of a basic understanding of the topic in practical terms.	• Practical inquiry at lower levels is needed urgently.
Absolute certainty: source of faith and inspired belief.	• Existing paradigm or idea has too many obvious anomalies; or too many philosophical objections • Inquirer capable of concentrated contemplation and abandonment of previously held convictions.	• Development of an idee fixe, or messianism; which may lead to the insight being applied outside its area of development. • Nothing but speculation. • Motivated by a desire for glory.	• Much immediately useful can be done within the existing paradigm. • Social recognition of the need for imaginative reformation is missing.

Table 1. Levels and their characteristics in the basic 'framework of inquiry'

Level	Practical activity	Vehicle (label used in [23])	Experiential location	Purpose	Puzzle	Inherent error	Degree of uncertainty
I	Conceptualizing (recognizing, distinguishing or identifying)	Concept or idea (entity)	Subjective	Reducing confusion	Does it exist?	Making the wrong distinction	High uncertainty
II	Observing (indicating, referring or pointing to)	Fact or thing (observable)	Objective	Making public what was private	Is that it?	Misclassification	Some uncertainty
III	Comparing (ranking, ordering or valuing)	Comparison (comparable)	Subjective	Apportioning value	Which is more?	Systematic bias	Minimum uncertainty
IV	Measuring (i.e. comparing using a standard unit)	Measurement (measurable)	Objective	General application	How much is it?	Random error	Some uncertainty
V	Relating (connecting or formulating)	Relation (relatable)	Subjective	Basis for action	How does it fit in? What is it about?	Missing the main point	High uncertainty
VI	Testing (substantiating or guaranteeing)	Inquiring system	Objective	Maximizing certainty	Is it true? How is it guaranteed?	Limitations of the inquiring system	Maximum possible certainty
VII	Wondering (speculating or conjecturing)	Imagination	Subjective	Meeting the need to know	What needs to be known? And how?	Asking the wrong question	Absolute uncertainty

Table 3. Abstract characteristics of the core testing processes, most clearly manifest in inquiry divorced from practical application

Level	Process	Key activity (verb)	Key activity (object)	Means	Product (generalization)	Assessment of the product	Product : Process relation
I′	Mathematico-logical reasoning	Defining	Concepts	Axioms	Theorem	Is it proven?	Inherent within
II′	Empirical investigation	Correlating	Data	Sensory perception	Law or Association	Is it verified?	Inherent with
III′	Hypothesis testing	Comparing	Alternative possibilities	Indicators and controls	Theory	Is it falsfiable?	Inherent within and imposed upon
IV′	Dialectical analysis	Developing and reconciling	Thesis–Antithesis (opposites)	Syntheses	Principle	Does it resolve?	Imposed upon
V′	System modelling	Inter-relating	System of elements	Structuring into and within levels	Model	Does it represent?	Imposed upon
VI′	Philosophical analysis	Ratiocinating	Key ideas	Rules of rational discourse	Conclusion	Is it reasonable?	Imposed upon and inherent within
VII′	Imaginative insight	Contemplating	Unbounded totality	Identity of mind and universe	Revelation or Insight	Is it inspired?	Identity (distinction not recognized)