



An Introduction to Incommensurability

or, hang on a minute, that doesn't add up

Overview

- Review and revision
 - The story so far ...
- Hang on a minute ...
 - Paradigms
 - Incommensurability
 - The incommensurability of paradigms
- Arguments for and Against



Review and revision

- We started with mathematics and concluded that:
 - Complete and closed systems have isomorphic equivalence
- Then we looked at some history and concluded that:
 - Programs were a description of the sequence of operations a machine can perform automatically and were always closed and complete
 - Software was a description of the relationships between human communities, their environment and the machines associated with them and was almost never closed and complete



Review and revision

- Then we looked at some more philosophy and defined what we meant by:
 - Reality, representations and descriptions
- The we looked at history again and noticed that:
 - In the early software design methods the relationship between representation and reality was assumed to be complete but not closed
 - In the later software design methods the relationship between description and representation was assumed to be closed but not complete

Review and revision



Programs



Older
approaches



Newer
approaches

Review and revision

- Then, we created four possible categories of software design method using:
 - Closure and completeness
 - Reality, representation and description
- We decided that these categories corresponded to the way that the term ‘methodology’ is used in Information Systems Design:
 - A collection of tools, techniques and methods unified by a common philosophy

Review and revision

- Then, we returned to philosophy to look at the underlying theoretical basis of our methodologies:
 - Rationalism and Empiricism for our epistemology
 - Realism and Anti Realism for our ontology
- Finally, we created four ‘strands’ of design methods using both our theoretical knowledge and or knowledge of actual design method ...

Review and revision

Research Strand	Ontological Position	Epistemological Position
Formal	Realist	Rationalist
Semi-Formal	Anti-Realist	Rationalist
Object-Oriented	Realist	Empiricist
Holistic	Anti-Realist	Empiricist

... and we examined the implications of each, in some detail, in the seminars



Review and revision

- So now we have:
 - A classification of software design methods based on philosophical theory
 - An idea of what sort of methods might fit into each category
 - An idea about what the practical implications of this classification might be
- And possibly ...
 - A belief that no one method is ‘the best’ and that different methods will suit different situations.



The Incommensurability of Paradigms

- We looked at the possibility of combining methodologies because:
 - Problems tend to be multidimensional, so perhaps we should not expect there to be one simple answer
 - Developing systems is an ongoing process that makes different demands at different times
 - In practice, this is what people tend to do anyway
- However, is combining or moving between methodologies as straightforward as it seems?

Paradigms

- Kuhn coined the term paradigm in his book, *The Structure of Scientific Revolutions*
 - Scientists become used to a certain way of seeing things; this clouds their vision and they tend to see what they expect to see
- The term is now used to describe the notion that we create our own reality from our beliefs, expectations and observations
 - A paradigm defines what is regarded as valid, meaningful and relevant

Paradigms

- Kuhn argues that the history of science can be seen as a succession of dominant systems of thought (paradigms)
 - Rival paradigms are not simply conflicting theories of how things work, but fundamentally different conceptions of what science is
 - Rational choice between two paradigms is impossible; for anyone whose perception of the world was shaped by one paradigm, the view of the other is incomprehensible
 - The shift from one paradigm to another is a sudden, radical transition - more a sociological phenomenon than a scientific one
- This is what Kuhn called a scientific revolution

Scientific Revolutions



Incommensurability

- Things are commensurable if they can be measured in the same units
 - Time in weeks and time in seconds are commensurable
- Incommensurability occurs when things lack a common measure, point of reference or criteria for comparison
 - Distance in meters and volume in litres are incommensurable
- Incommensurability is a discontinuity between ontologies
 - There is no shared language between paradigms that allows for any mutual understanding.

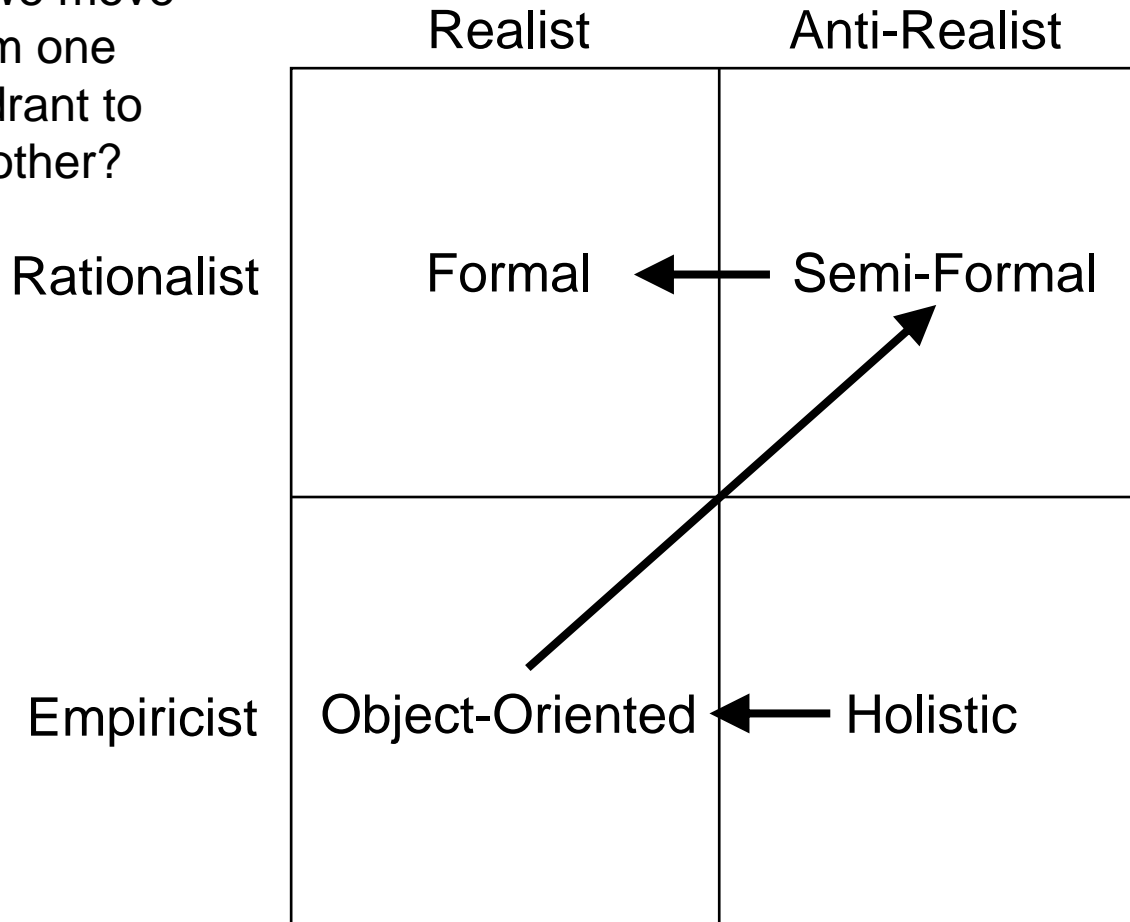


The incommensurability of paradigms

- The worldview that emerges from a new paradigm is incommensurable with our previous worldview
 - Paradigms transform our view of the world
 - New Paradigms = New Reality
- However, paradigms shifts between paradigms do happen over time
 - When do paradigm shifts occur?
 - If paradigms are incommensurable, can we formulate rules to predict these shifts?

Paradigm Shifts

Can we move
from one
quadrant to
another?



Question

- Can we move from one quadrant to another?





For Incommensurability

- The need for philosophical consistency
 - ‘let a thousand flowers bloom’ relativism and post-modernism = chaos
- Core beliefs cannot be changed as an act of will
 - You can’t start to believe in something (you believe is) impossible
- The Sapir-Whorf hypothesis - "language determines thought"
 - You can only understand something if you are able to talk about it



Against Incommensurability

- Paradigmatic Diversity
 - All paradigms are not equal - the number of paradigms depends on the number of different assumptions made
- Paradigmatic Pluralism
 - A contingency approach that selects horses for courses maintains philosophical consistency
- Paradigmatic Transcendence
 - There is a meta-paradigm that transcends the differences between paradigms