

Holistic Methodologies

The hunting of the Snark

THE UNIVERSITY *of York*

Chris Kimble
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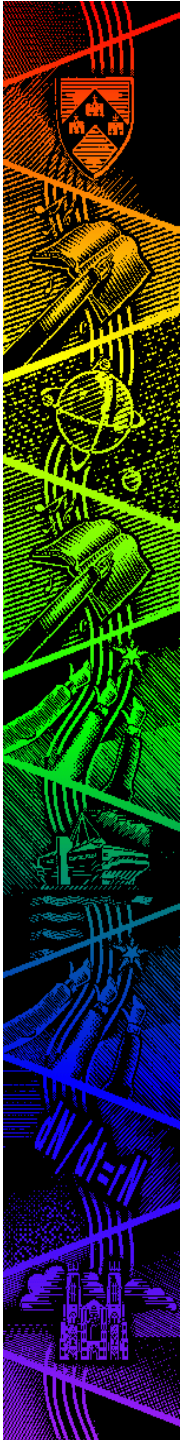
Overview

- A review of the theory
- Two types of Holistic method
 - ETHICS
 - Soft Systems Methodology (SSM)
- Strengths and weaknesses
- What happens in practice



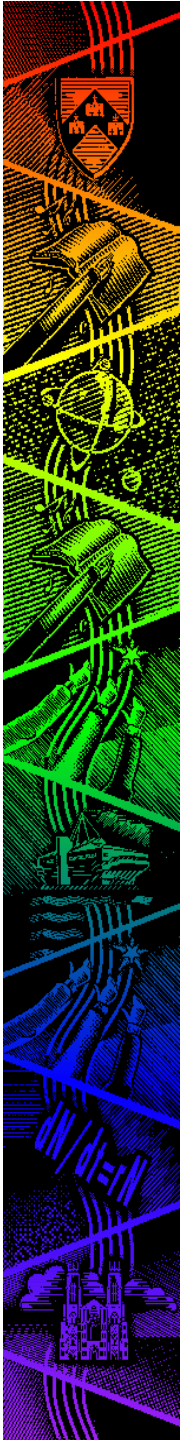
Preview

- What are the key features of holistic methods?
 - Attempt to deal with the whole system
 - Does not assume the software description is closed or complete
 - Relationships between features of the software design and reality are always a matter of conjecture and open to challenge
 - Abandons any relationship between program design and software design
 - Anti-realist ontology and empiricist epistemology



Empiricism and Anti-Realism

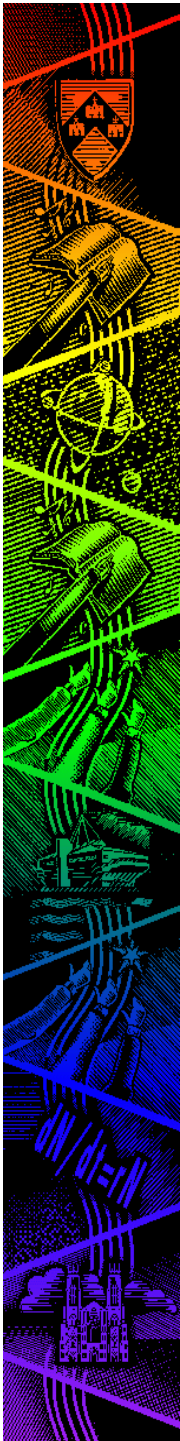
- *Empiricist* arguments deal principally with epistemology claiming that all knowledge derives from observation. Everything that can be known, can only be known through experience.
- *Anti-Realist* arguments deal principally with ontology claiming that the perception of reality is so bound to the mind that observes it, that it is impossible to conceive of the 'true' nature of objects

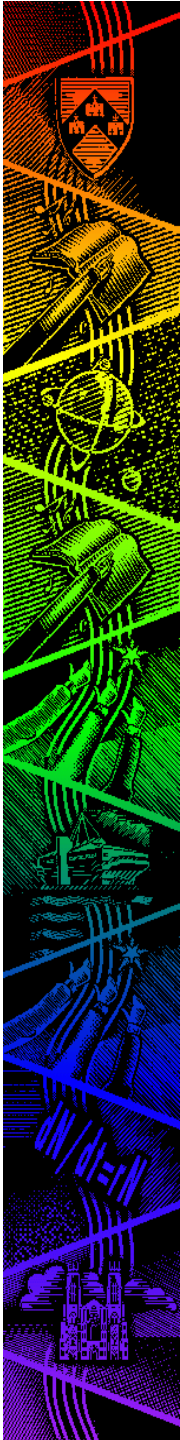


Holistic Methodologies



- Holism (from holon, a Greek word meaning entity) is the idea that the properties of a system cannot be determined or explained by the sum of its components alone.
- Holistic Methodologies are concerned with whole systems rather than with the analysis or dissection of systems into parts.



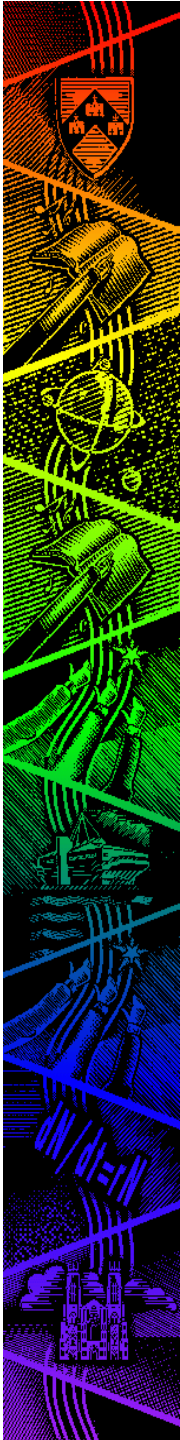


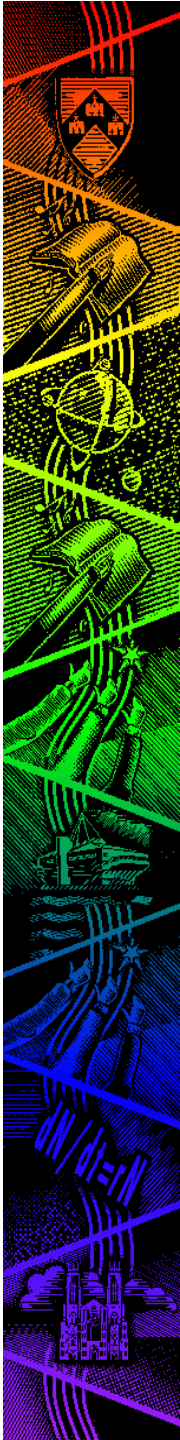
“Soft Methodologies”

- Soft systems design methodologies are based on the analysis and modelling of people, their environment and their perceptions .
- They are approaches based on the analysis of the Human Activity System (e.g.SSM) or on participation (e.g. ETHICS)
- They usually deal with conflicting requirements or ill-defined problems and focus on the subjective world of people and perceptions.
- They are usually descriptive in nature.

ETHICS

- Several versions are available:
 - A fifteen step version (Mumford, 1983).
 - A six stage, twenty-five step version (Hirschheim, 1985)
 - QUICKETHICS - QUality Information from Considered Knowledge (Mumford, 1989).
- The apparent separation of “social” and “technical” sometimes leads to this being described as a structured methodology



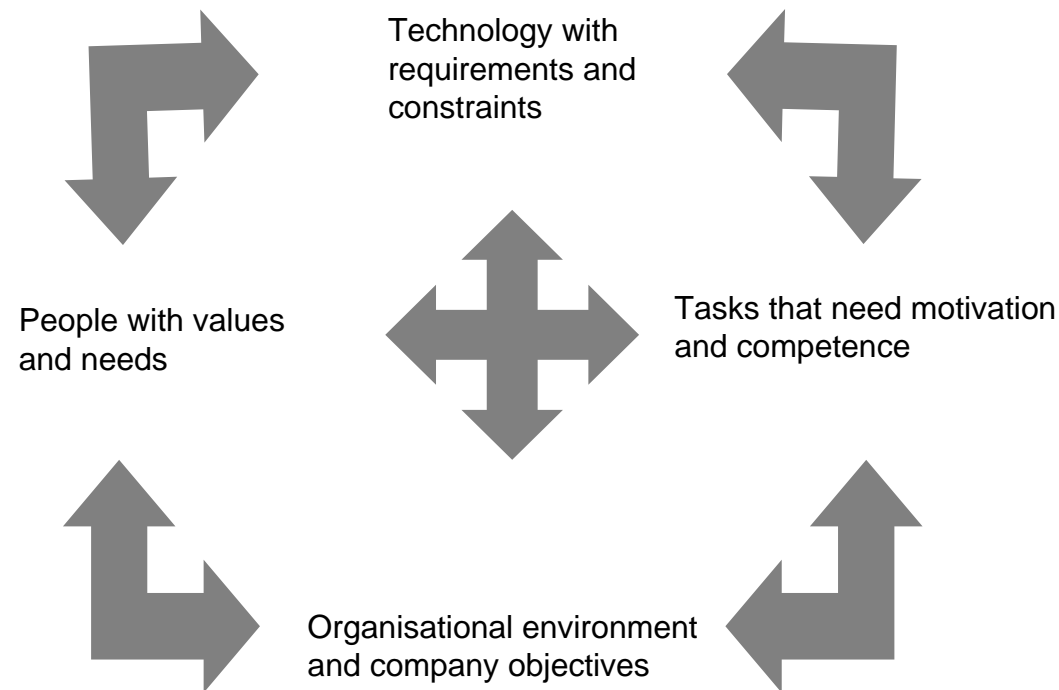


ETHICS

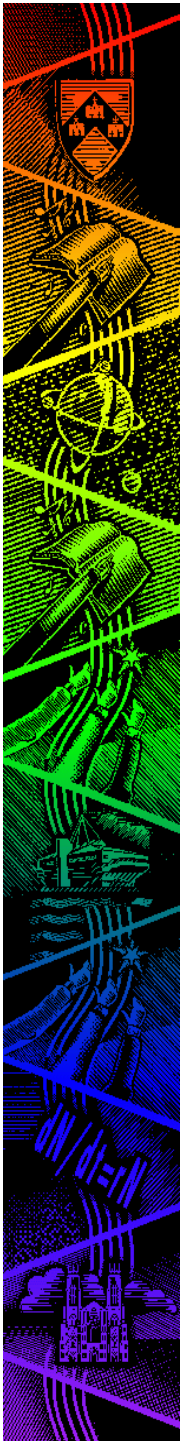
- ETHICS is an acronym for “Effective Technical And Human Implementation of Computer-Based Systems”
- It was devised by Enid Mumford as a participative approach to information systems development.
- It is explicitly based on the socio-technical approach to the analysis of systems.

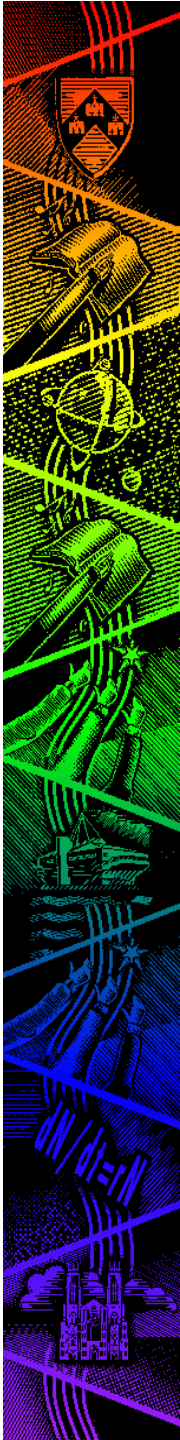
The Socio-Technical Approach

- The socio-technical approach is based on work of Leavitt (1964)



Adapted from Leavitt, H. (1964)



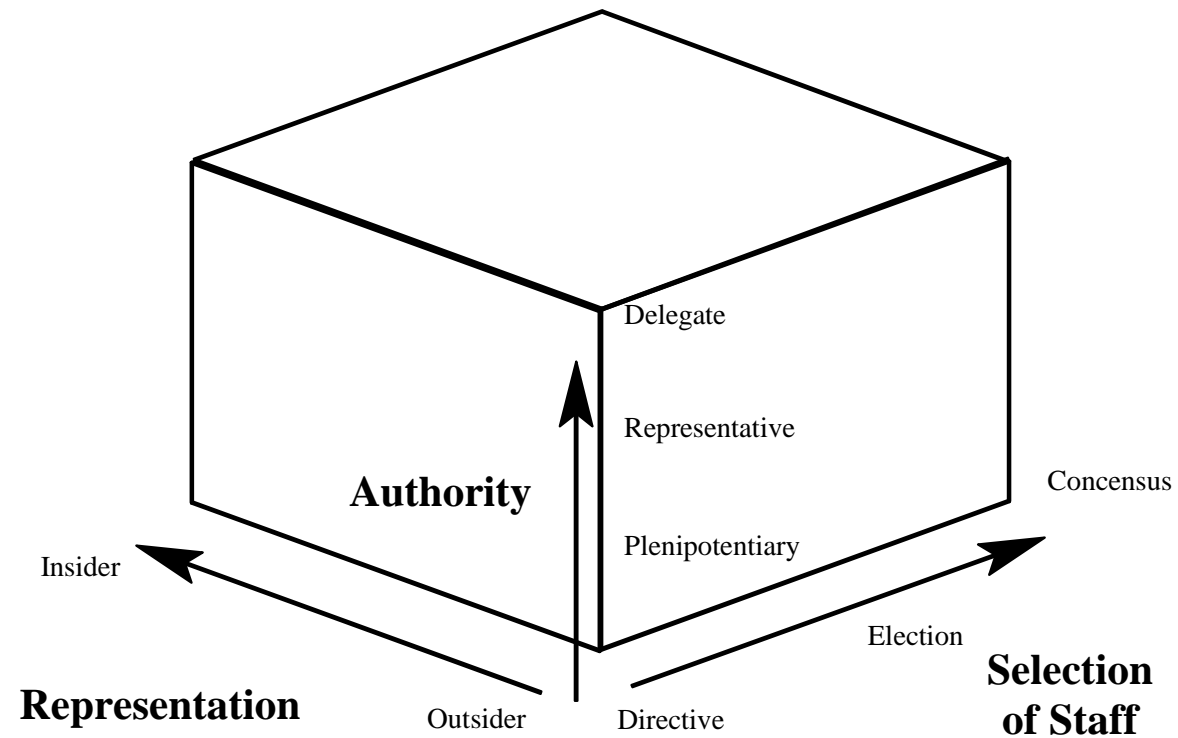


The Socio-Technical Approach

- Mumford defines the socio-technical approach as:
 - “... one which recognizes the interaction of technology and people and produces work systems which are both technically efficient and have social characteristics which lead to high job satisfaction.”
- It is concerned with the ‘fit’ between what employees want from their work and what they have to do in their jobs.
- This balance can be achieved by manipulating social and technical factors. Once a technology has been designed to optimise the socio-technical fit, a “better” performance will inevitably result.

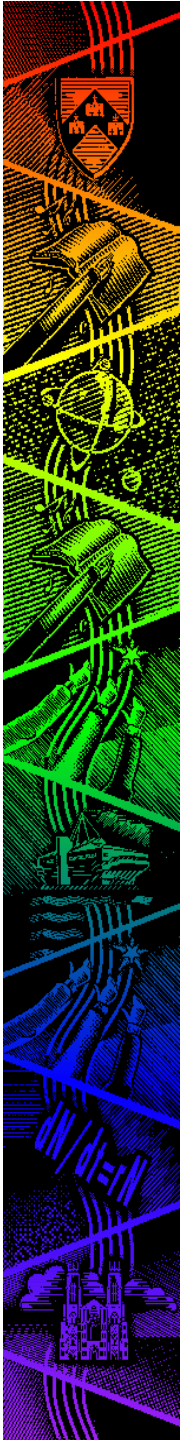
Participation

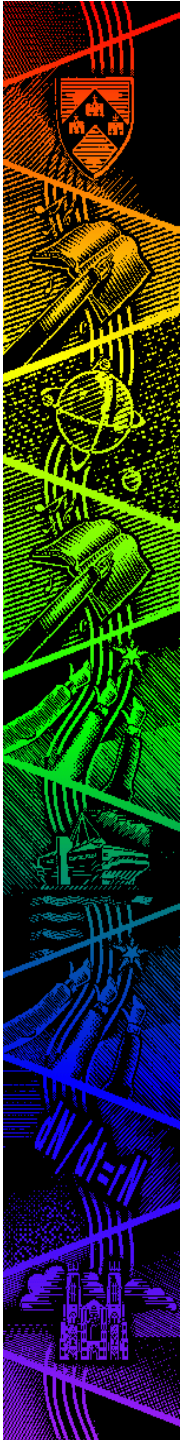
- Participation is a key element in many systems design methodologies.



Participation

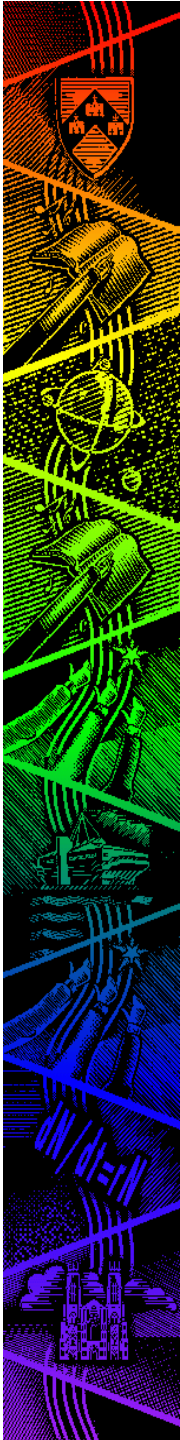
- Participation is *central* to ETHICS.
- ETHICS distinguishes between structure, content, and process.
 - Structure is the form of participation
 - Content concerns the boundaries of activities that are within the remit of participation.
 - Process is the mechanism by which the participation takes place.





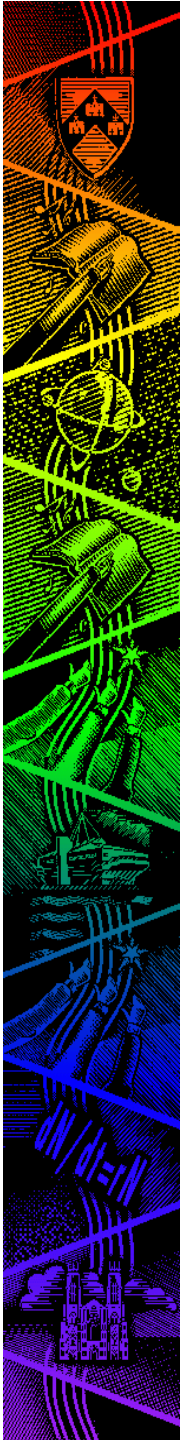
The Structures of Participation

- Consultative participation involves the participants giving evidence, but does not bind decision makers in any way.
- Representative participation is where selected or elected representatives take part in the decision-making process.
- Consensus is where all the constituents are involved in the decision making process.



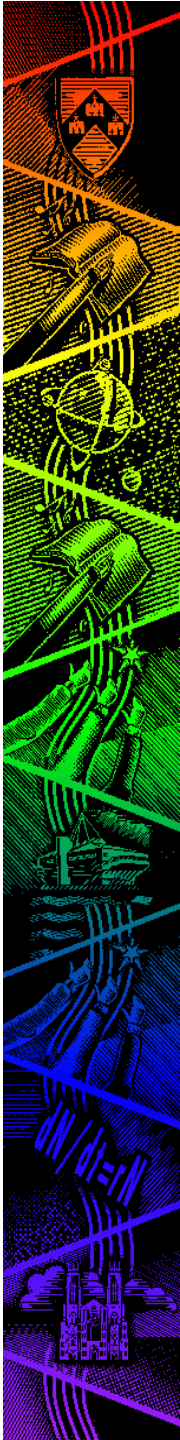
Content of Participation

- One objective of the process of participation is the gaining of relevant knowledge and information by the participants.
- Without the knowledge to make informed decisions users might be at a disadvantage and subject to influence from more powerful groups.
- True participation means equal knowledge and, it might be argued, equal power for all groups. Training and education of users is therefore a very important aspect of ETHICS.



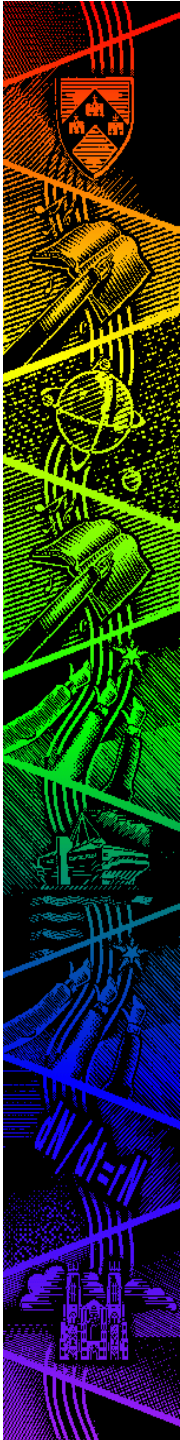
Processes of Participation

- Participation usually involves the setting up of a steering committee and a design group or groups.
 - The steering committee sets the guidelines for the design group and consists of senior managers
 - The design group makes design decisions about the new system including:
 - Choice of hardware and software
 - Human-computer interaction
 - Workplace re-organisation
 - Allocation of responsibilities.
 - The design group also includes systems analysts, although their role is not the normal one of analyst and designer, but one of educator and adviser.



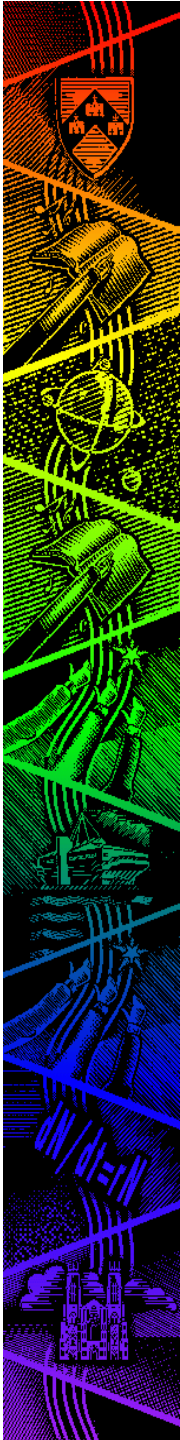
Steps in Mumford's ETHICS

1. Why change?
2. System boundaries
3. Description of existing system
4. Why do these particular areas exist?
5. What should their responsibilities and functions be?
6. To what extent do their present activities match what they should be doing?
7. Diagnosis of efficiency needs
8. Diagnosis of job satisfaction needs
9. Future analysis
10. Specifying and weighting efficiency and job satisfaction needs and objectives
11. The organisational design of the new system
12. Technical options
13. The preparation of a detailed work design
14. Implementation
15. Evaluation



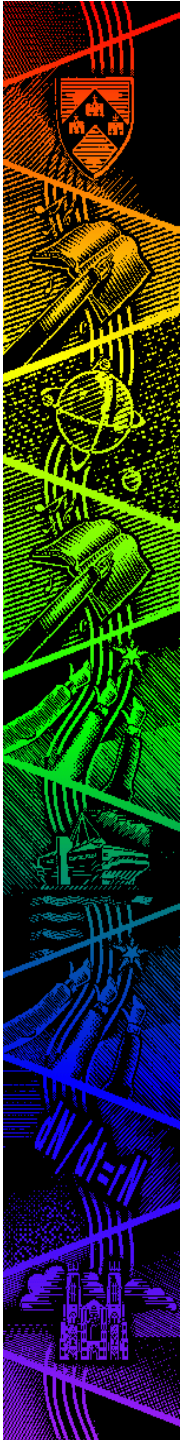
Soft Systems Methodology (SSM)

- Formal methods begin with a problem statement; Checkland argued that fixing the problem too early makes it difficult to see different, and possibly more fundamental, problems.
- Soft Systems Methodology is concerned with:
 - Defining the problem.
 - Subjective issues (People and Organisations - the Human Activity System).
 - People's World Views and assumptions (Weltanschauung).

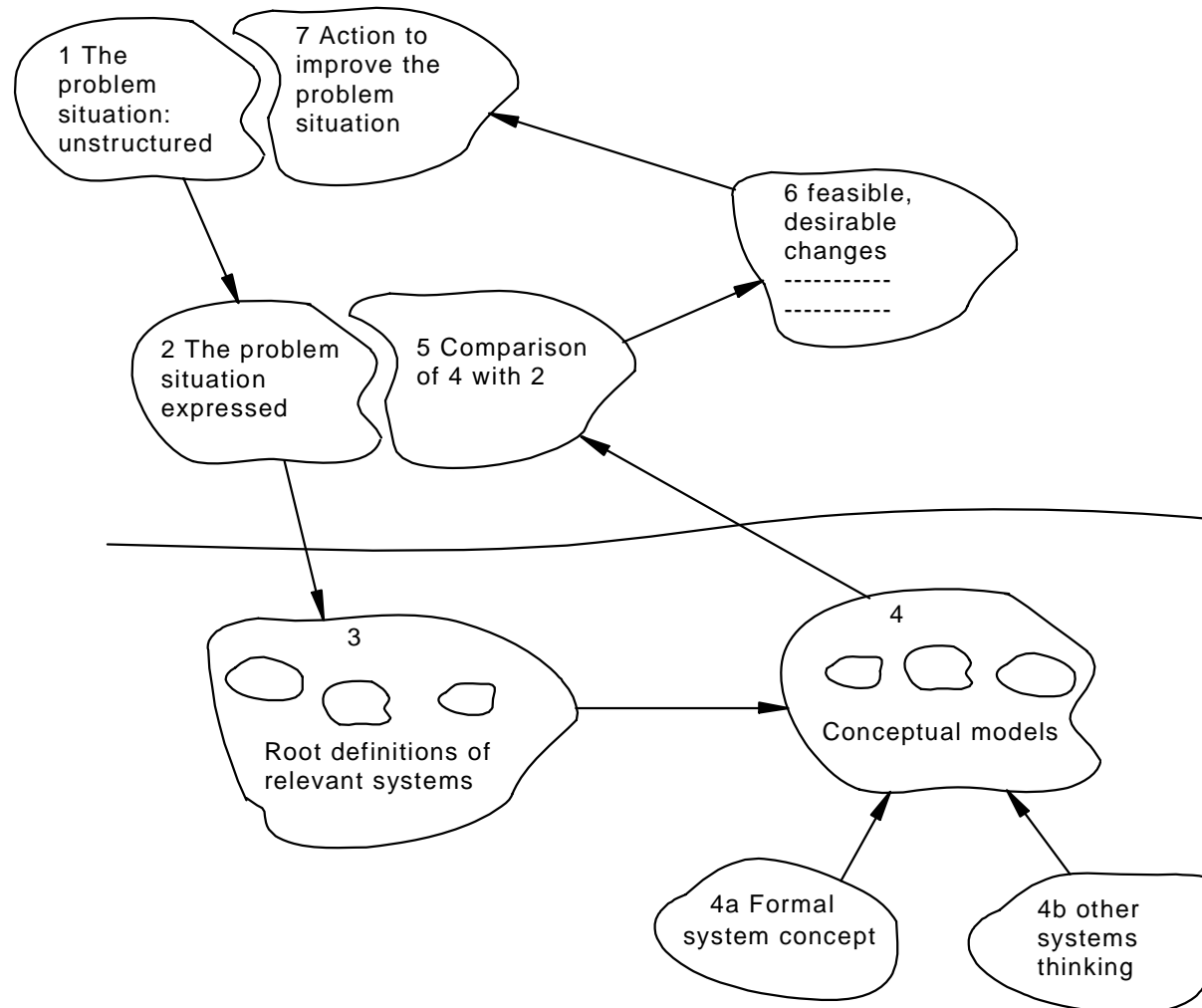


Soft Systems Methodology (SSM)

- SSM was developed by Peter Checkland at Lancaster University using ‘action research’. He describes it as:
 - A systems based methodology for tackling real-world problems in which known-to-be desirable ends cannot be taken as given. (Checkland, 1981)
- The “systems” referred to above is are systems in General Systems Theory, which tries to deal with reality as an indivisible whole – hence the term holistic methodology.

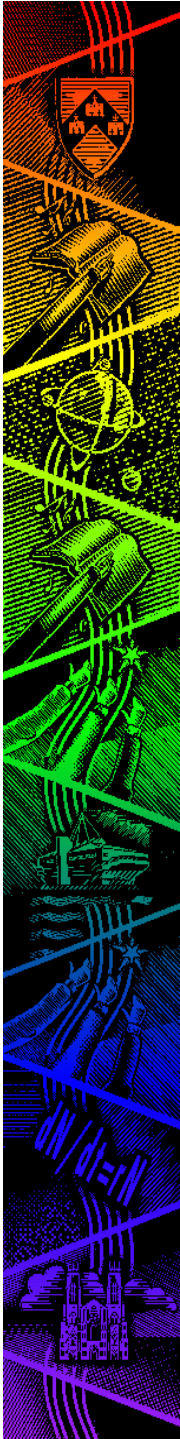


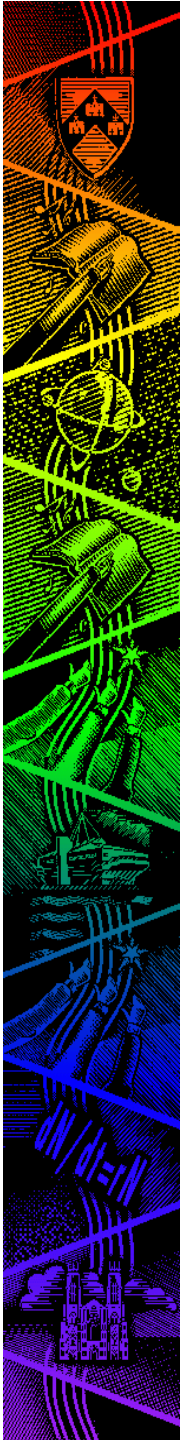
The Seven Stages of SSM



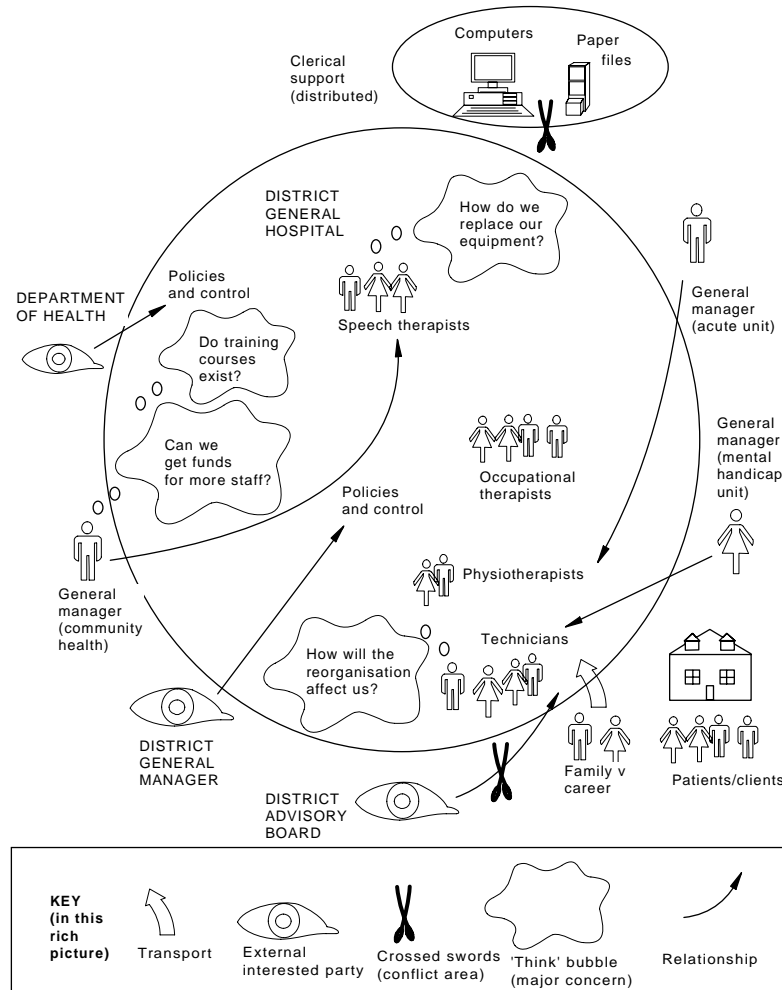
Stage 1 and 2

- The first two stages are concerned with finding out about the problem situation.
 - (1) The problem situation: unstructured
 - There will be many views that the analyst can take regarding the problem situation and it is important to get as wide a range of them as possible.
 - The analyst will attempt to structure of the problem situation in terms of physical layout, reporting structure and formal and informal communication patterns.
 - (2) The problem situation: expressed
 - An informal picture of the problem from stage 1, is expressed on a more formal way (a Rich Picture)





Rich Pictures



Stages 3

- Stage 3 is about giving clarity and structure to the problem situation
- (3) Root definitions of relevant systems
- After constructing a rich picture, a root definition is developed using CATWOE
 - A root definition is a concise, tightly constructed description of a human activity system which states what the system is
 - CATWOE = Customers, Actions, Transformations, World, Owner, Environment

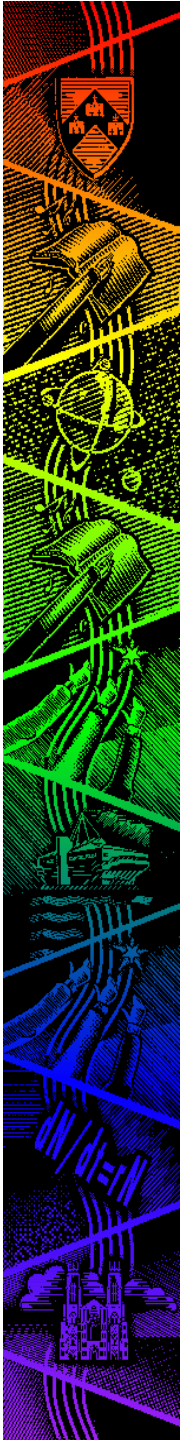
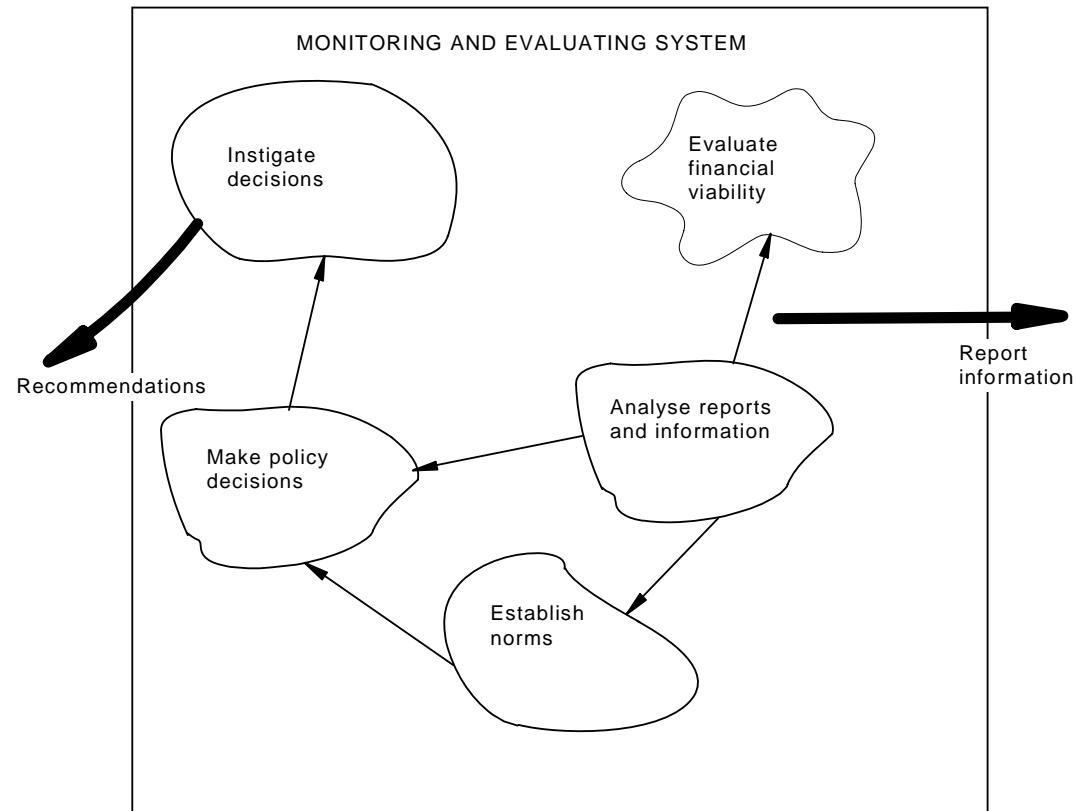


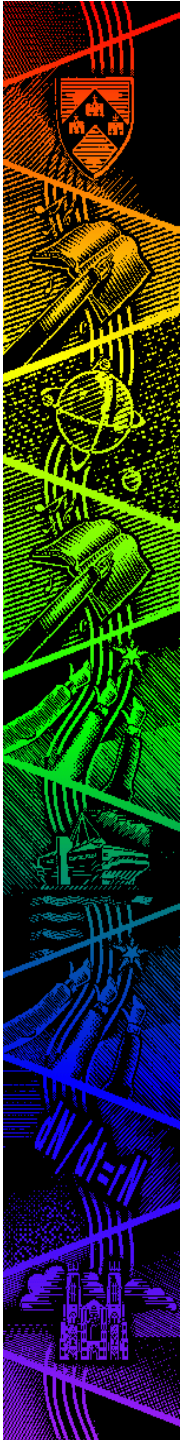
Stage 4

- Stage 4 is about modelling the problem situation
- (4) Building conceptual models
- When the root definition is well formed, a conceptual model is developed.
 - This helps the analyst decide what they might do as against what the system actually is – expressed in the root definition



A conceptual model





Stages 5 to 7

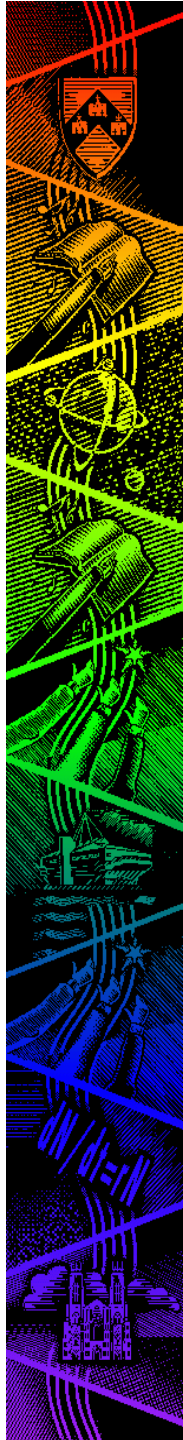
- (5) Comparing conceptual models with reality
 - debate about change should lead to recommendations for change

- (6) Assessing feasible and desirable changes
 - analysis of changes from stage 5 to identify those which are feasible and desirable.

- (7) Action to improve the problem situation
 - recommending action to help the problem situation.

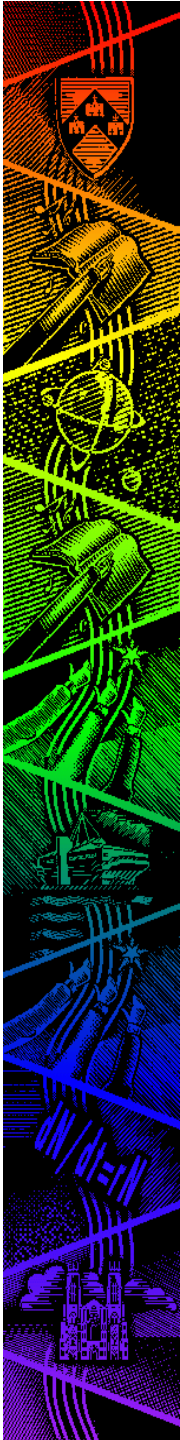
Strengths

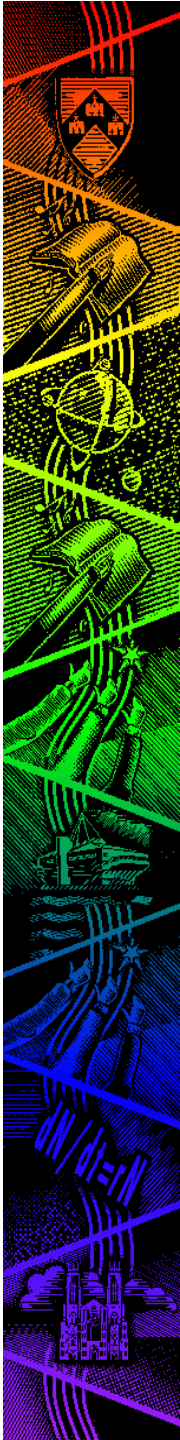
- Provides:
 - A transition between human world and systems world
 - A better (more transparent?) fit between systems and people
- Facilitates:
 - Resolution of unsolved problems or issues



Weaknesses

- Too:
 - Reliant on skill of analyst
 - Demanding of users time and energy
 - Descriptive without providing firm guidelines
- Does not deal with
 - Implementation issues
 - Project management issues
 - Issues of power (all users are equal; a consensus can be achieved, etc)





A Practical Example

- Ledington, P. and Donaldson, J (1997). Soft OR and Management Practice: A Study of the Adoption and Use of Soft Systems Methodology. The Journal of the Operational Research Society, 48(3), pp. 229-240.