T306_4 Systems practice: managing sustainability

The Inquiring Process which is SSM

The Open University

Appendix A

The Inquiring Process which is SSM

Study Note: It would be advantageous to have Part 4 Section 2.2 which refers to this reading readily to hand as you work through it. You will need to refer to the original seven-step model of SSM (Figure 21) and the more recent iconic model (Figure 22) as you work your way through the reading.

The process overall

The usual general description of SSM dating from 1975 is that shown in Figure 21), in which it is presented as a seven-stage process. In the late 1980s the 1975 version seems rather bald, and in any case gives too much an impression that SSM is a seven-stage process to be followed in sequence.

The version of SSM to be used here is that shown in Figure 22. That figure describes a process which has recently been succinctly summarized by von Bulow (1989):

> SSM is a methodology that aims to bring about improvement in areas of social concern by activating in the people involved in the situation a learning cycle which is ideally never-ending. The learning takes place through the iterative process of using systems concepts to reflect upon and debate perceptions of the real world, taking action in the real world, and again reflecting on the happenings using systems concepts. The reflection and debate is structured by a number of systemic models. These are conceived as holistic ideal types of certain aspects of the problem situation rather than as accounts of it. It is taken as given that no objective and complete account of a problem situation can be provided.

Referring to Figure 22, we have a situation in everyday life which is regarded by at least one person as problematical. There is a feeling that this situation should be managed [in the broad sense discussed in Block 1 of T306] in order to bring about 'improvement'. The whats and hows of the improvement will all need attention, as will consideration of through whose eyes 'improvement' is to be judged. The situation itself, being part of human affairs, will be a product of a particular history, a history of which there will always be more than one account. It will always be essential to learn and reflect upon this history if we are to learn from the relative failure of classical management science, since that is surely due to its attempt to be ahistorical. In so doing it has limited itself to dealing only with the logic of situations. We are not indifferent to that logic, but are concerned to go beyond it to enable action to be taken in the full idiosyncratic context of the situation, which will always reveal some unique features.

Facing up to the problem situation are some 'would-be improvers' of it, the users of SSM. They consist of one or more persons motivated to improve the problem situation, either in the course of normal day-to-day work or as part of a highlighted study. Describing these people as 'users of

SSM' does not mean that they alone will 'do the study': SSM is intrinsically a collaborative approach, and sensible 'users' will involve other people in the process of problem [or opportunity] handling.

Given the situation and the would-be improvers of it, there follow two interacting streams of structured inquiry which together lead to the implementation of changes to improve the situation. Both may be regarded as stemming from both the perception of various purposeful actions in the situation ('tasks' in Figure 22) and various things about which there are disagreements ('issues' in Figure 22).

On the right-hand side of Figure 22 is a logic-driven stream of inquiry in which a number of purposeful holons [systems-of-interest] in the form of models of human activity systems are named, modelled and used to illuminate the problem situation. This is done by comparing the models with perceptions of the part of the real world being examined. These comparisons serve to structure a debate about change.

What is looked for in the debate is the emergence of some changes which could be implemented in the real world and which would represent an accommodation between different interests. It is wrong to see SSM simply as consensus-seeking. That is the occasional special case within the general case of seeking accommodations in which the conflicts endemic in human affairs are still there, but are subsumed in an accommodation which different parties are prepared to 'go along with'.

What has been described of SSM so far is a stream of thinking and debate which is essentially logic-driven. It uses the purposeful holons [systems of interest] as logical machines which can be used to question [what has been experienced as complex]. Some successful studies have done no more than this. But in general, though logic has a part to play in human affairs, we need also to pay attention to the cultural aspects of human situations, the aspects which make them specifically human. In recent years a second stream has been developed in SSM which interacts with the first, the logic-driven stream.

The 'cultural stream', on the left-hand side of Figure 22, consists of three examinations of the problem/opportunity situation. The first examines the intervention itself, since this will inevitably itself effect some change in the problem situation. The second examines the situation as a 'social system', the third as a 'political system'. In both cases the phrases within inverted commas are used as in everyday language, rather than as technical terms. And in the case of all three 'cultural' enquiries, general models are used which relate respectively to problem solving, the social process and the power-based aspects of human affairs.

It is clear that the logic-driven stream and the cultural stream will interact, each informing the other. Which selected 'relevant' human activity systems are actually found to be relevant to people in the situation will tell us something about the culture we are immersed in. And knowledge of that culture will help both in selection of potentially relevant systems and in delineation of changes which are culturally feasible. Here we need to remember that what in the end turns out to be feasible will itself be affected by the learning generated by the project itself: human situations are never static.

Changes implemented as a result of the use of SSM of course change the problem situation as originally perceived, and in the new situation the cycle of learning stimulated by the methodology can begin again. ... It is in principle never ending, and ending a systems study is an arbitrary act.

Overall, the aim of SSM is to take seriously the subjectivity which is the crucial characteristic of human affairs and to treat this subjectivity, if not exactly scientifically, at least in a way characterized by intellectual rigour.

The Stream of Logic-based Inquiry

If a user of SSM is adopting the approach in the day-to-day situation, then it is likely that he or she will feel that they know a lot about the situation and can get straight on the logic-based stream of thinking. In other cases, and especially in highlighted studies tackled by a team constituted for the purpose, it will be necessary to do some organized finding out. Approaches to this will be discussed as part of the stream of cultural inquiry. First we consider the logic-based thinking in which relevant systems are chosen, named, modelled and compared with perceptions of the real-world situation.

Selecting Relevant Systems

No human activity system is intrinsically relevant to any problem situation, the choice is always subjective. We have to make some choices, see where the logical implications of those choices takes us, and so learn our way to truly 'relevant systems'. In the early years of SSM development much energy was wasted in trying at the start to make the best possible choices. (This at least was better than the very earliest attempts to name *the* relevant system, in the singular!) Users of SSM have to accept this initial dousing in subjectivity, and though this is never a problem for those whose inclinations are towards the arts and humanities, it can be difficult for numerate scientists and engineers whose training has not always prepared them for the mixed drama, tragedy and farce of the social process.

Two kinds of choice of relevant systems can be made (Checkland and Wilson, 1980). In many cases there will be visible in the real world some organized purposeful action which could be reflected in the choice of a notional human activity system whose boundary would coincide with the real-world manifestation. This is the kind of choice made axiomatically in hard systems thinking, and it is often the only kind of choice with which unreflecting hard systems thinkers are comfortable. In SSM this kind of choice is referred to as a 'primary-task system'.

Consider the charity organization Oxfam, subject of an early study using SSM, aimed at improving the operation of its management committee. Oxfam can be observed providing relief, providing aid, running retail shops and begging. It would be possible to name relevant systems based on these actions ('a system to provide relief', etc.), and we might in the real world anticipate finding functional divisions of Oxfam which map these choices. Or an overall relevant system with the four named systems as subsystems could map the organization boundary of Oxfam as a whole. This would be a primary task system for Oxfam with each subsystem being itself a choice of the same kind. But within Oxfam, as in any organization undertaking a portfolio of different tasks, there will always be debate about its core purposes and about the fraction of resources which should

be devoted to each. From this consideration we could make the second kind of choice of relevant system. We could name as relevant such conceptualizations as 'a system to resolve disagreements on resource use' or 'a system to define information flows to and from the management committee'. Here we would not necessarily expect to find institutionalized versions of such systems in the real world. In SSM these are called 'issue-based relevant systems'; in general their boundaries would not map on to real-world organization boundaries.

Experientially it has been found important to make choices of a range of both 'primary task' and 'issue-based' systems if the thinking in the study is to be of the mind-opening variety. [Selecting 7 +/- 2 is not bad at the naming stage; then select a subset for root definition/CATWOE modelling.] For example, a study in the UK Government's Central Computer and Telecommunication Agency, one relevant system was based on the Agency mission statement, which yields a primary task system whose boundary would map the organizational boundary of the Agency as a whole. One issue-based choice was of 'a system to reconcile the conflicting demands made by the Agency, and by its 'customer' Government Departments, on the Agency's Departmental Liaison Officers'.

The distinction between primary task and issue-based relevant systems is not sharp or absolute, rather these are the ends of a spectrum. At the extremes, primary task systems map on to institutionalized arrangements; issue-based systems, on the other hand, are relevant to mental processes which are not embodied in formalized real-world arrangements.

Working with both kinds of relevant system frees the thinking, but perhaps because of this an initial tentativeness about choice-making is often observed. There is a fear perhaps that the initial choices made will inevitably have a blinkering effect on subsequent thinking, causing hesitation or even freezing. Helpful at such times (and not to be neglected in general) can be a conscious lifting of the thinking to the level of metaphor. For example, the problem situation addressed will always contain many relationships between parties A and B. The authors have often found it useful to think of a number of metaphors for an A-B relationship and reflect these on to the real situation to stimulate thought. Is the relationship between A and B like that between: policeman/robber, parasite/host, husband/wife, mistress/lover, master/slave, judge/accused, equal partners, brother/sister, mother/child, organism/virus, etc., etc.? This can get the thoughts moving.

Davies and Ledington (1987) report the interesting case of an engineer who pleaded that he was incapable of developing metaphors but in the end gained much by thinking of a project he was engaged in as similar to a car. Was it an old banger, a sporty model, a family saloon etc.? This led to consideration of roles related to the metaphor (mechanic, car salesman etc.) and to speculation about such relevant systems as ' a system to sell an old banger as a classical model', a thought which could then be rephrased in the language of the real situation. Richie (1987) gives another example of the value of temporarily shifting to the level of abstraction which metaphors represent. Davies and Ledington (1987, p.184) argue that this kind of abstracting has been found useful in using SSM in studies characterized by:

> ... conservative thinking, premature judgement of solutions and politically difficult situations.

This describes most problem situations in our experience!

Naming relevant systems

In the development of SSM it was quickly found necessary to pay attention to the formulation of the names of relevant systems. These had to be written in such a way that they made it possible to build a model of the system named. The names themselves became known as 'root definitions' since they express the core or essence of the perception to be modelled.

A root definition expresses the core purpose of [a] purposeful activity system. That core purpose is always expressed as a transformation process in which some entity, the 'input', is changed, or transformed, into some new form of that same entity, the 'output'. Figure A1 sets out a prescription for formulating a transformation process, and gives an example in which a public library is conceptualized in several different ways according to different worldviews. This simple notion is astonishingly misunderstood not only in the everyday world and among careless users of SSM, but also, alas, in the systems literature.

It is worth quoting some inadequate expressions of the input-output idea. This is done not to pillory their authors but because learning from mistakes is a good way to learn. In an expression of a health care system Passos (1976) gives 'knowledge', 'facilities and equipment', and 'manpower' as inputs and 'population served' and 'health care needs met' as outputs! This is a jumble, but various defensible answers could be constructed from these ideas. Thus if the input were 'health care needs' then the given output of 'health care needs met' would be acceptable. If 'facilities and equipment' were chosen as input then 'used facilities and equipment' would be technically correct as an output. If the output is to be something like 'population served' then we would express this as 'population with health care needs' transformed into 'population with health care needs attended to'. Or perhaps Passos means 'need to define population served' transformed into that need met. In another health care example Ryan (1973) considers a nursing care system. She has 'nursing assessment' transformed into 'nursing orders', which could be a legitimate account of a transformation carried out mentally by people directing nurses. Unfortunately she also has 'observe, infer, hypothesize' transformed into 'prescribe, schedule, inform'! The error here is to name the input and output as verbs instead of entities. Actions do not get transformed into anything;

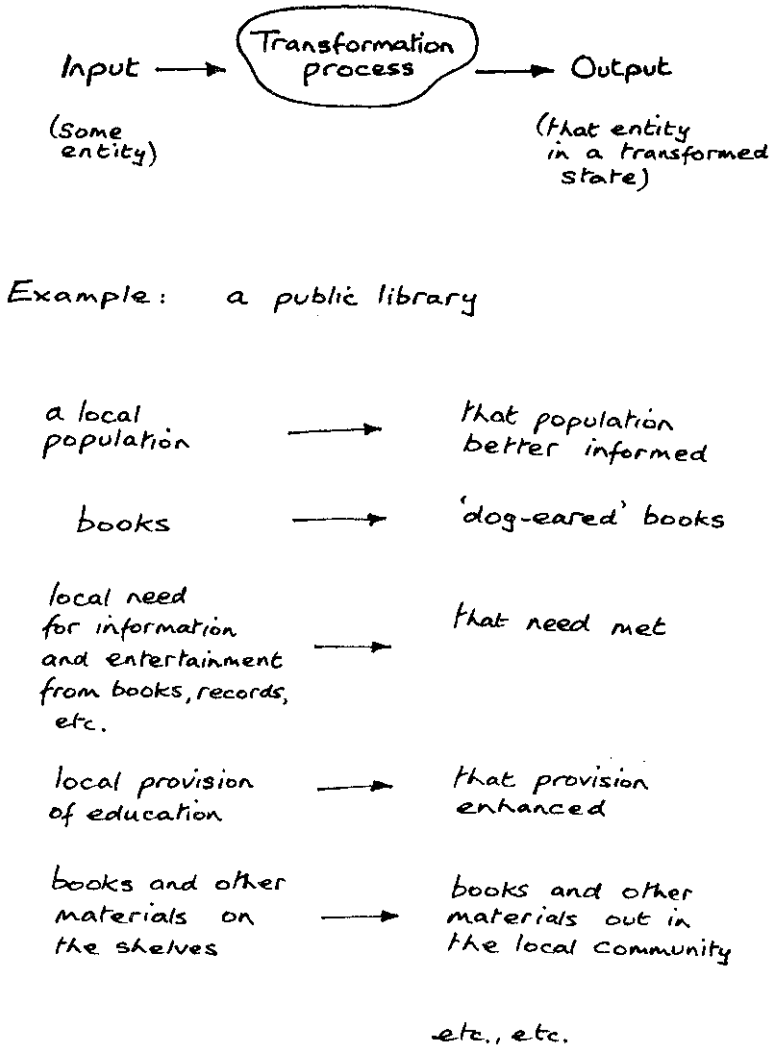

Figure A1 The idea of 'transformation process'

they may lead to conclusions or other actions, but 'lead to' is a different concept from 'are transformed into': a causal sequence is not the same as a transformation. It is vitally important always to express inputs and outputs as entities: the concept of 'transforming' demands it. Finally, Easton (1961) provides a bad example at an abstract level. He suggests that for a political system the inputs are 'demands' and 'support' and that the outputs 'decisions and actions'! To be technically correct in systems terms, his concept would have to be expressed as 'need for decisions on demands having a degree of support' into 'that need met by a decision-taking process'.

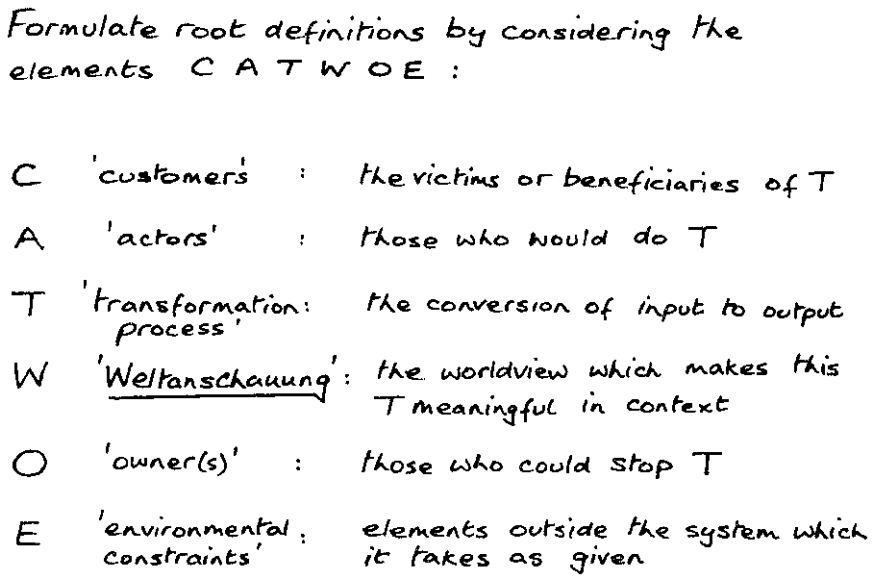

Figure A2 The CATWOE mnemonic

An input-output transformation is, on its own, too bald to be modelled richly, and root definitions came to be written as sentences elaborating the core transformation. Smyth and Checkland (1976) researched historical definitions and suggested that well-formulated root definitions should be prepared by consciously considering the elements shown in Figure A2 The elements make the word CATWOE, and much experience has shown this be a most useful mnemonic.

The core of CATWOE is the pairing of transformation process T and W, the Weltanschauung or worldview which makes it meaningful. For a relevant purposeful activity there will always be a number of different transformations by means of which it can be expressed, these deriving from different interpretations of its purpose.

The other elements in CATWOE add the ideas that someone must undertake the purposeful activity, someone could stop it, someone will be its victim or beneficiary, and that this system will take some environmental constraints as given. A root definition formulated with attention to these elements will be rich enough to be modellable. Each one does not have to be explicit in the definition, but if they are to be omitted that should be a conscious act.

The structure of CATWOE implies that the simplest version of a root definition would be 'a system to do P' where P is a particular transformation process. This leaves the system itself to select a means of doing P (there may be several available); it would freely choose a 'how' for the 'what' defined by P. Or it may be felt useful to constrain the system to a particular 'how', so that the next most complicated form of root definition will be 'a system to do P by Q'. Now, the existence of O in CATWOE implies the concern of someone (or some group) who could stop the activity of the system if it were not meeting their aspirations. This implies that a 'full' root definition's core transformation would be *'a system to do P by Q in order to achieve R'*, where the T will be the means *Q*, *R* is related to the owners' longer term aims, and there must be an arguable connection which makes *Q* an appropriate means for doing *P*. In general it is useful to write root definitions with the *PQR* formula in mind.

Note: In the original of this reading the notation PQR introduced in the paragraph above was referred to as XYZ. The original has been changed to be consistent with contemporary usage.

Modelling relevant systems

Root definitions and CATWOE are the source of the purposeful systems of interest known as 'human activity systems'. The modelling language is based upon verbs, and the modelling process consists of assembling and structuring the minimum necessary activities to carry out the transformation process in the light of the definitions of the CATWOE elements. The structuring is based upon logical contingency: 'convert raw material', for example, is contingent upon 'obtain raw material', and this dependent relationship will be shown by linking the activities with an arrow from 'obtain raw material' to 'convert raw material'.

Consider the following simple root definition:

> A householder-owned and manned system to paint a garden fence, by conventional hand painting, in keeping with the overall decoration scheme of the property, in order to enhance the visual appearance of the property.

Do-it-yourself enthusiasts might not feel it necessary to conceptualize such a system before getting on with the job, but it will serve to illustrate the process of model building without any problems arising from the sophistication of the task named! This definition follows the schema: do P by Q in order to achieve R, with P as 'paint the fence', Q as 'conventional hand painting', and R as enhance the visual appearance' of the property. CATWOE is as set out in Figure A3 and presents no problems. Now we have to assemble the minimum necessary activities to meet the requirements of the root definition and CATWOE. It is usually useful to bridge the gap from definition to model via an informal pictorial representation of the concept of the definition. Although this is hardly necessary here, it is done in Figure A3. Clearly the main activity in the model will be 'paint the fence', and this will be surrounded by other activities which fit with CATWOE. In general, we aim to express the main operations to bring about the transformation (in the light of CATWOE) in a handful of activities. The guideline is: aim for 7 +/- 2, this coming from Miller's celebrated paper in cognitive psychology in which he suggests that the human brain may have a capacity which can cope with about this number of concepts simultaneously (Miller, 1968). If this seems sparse, there is no problem: each activity in the model can itself become a source of a root definition to be expanded at the next resolution level.

The core activity 'paint the fence' will be contingent upon obtaining the necessary materials, and this will be contingent upon deciding the colour in the light of the overall decoration scheme of the property and taking a decision on the scope or extent of the task, since this is an amateur effort. These considerations yield the operational subsystem shown in Figure A4. Because this is a *system* [*of interest*] we need, as always with such constructions, to add also the processes of monitoring and control which embody the guarantee that the entity could in principle survive in a changing environment. [For example, notionally, if the paint were to run out near the end (an amateur may not calculate the amount needed correctly) we might modify the definition of the scope of the task and treat it as finished as long as the result could count as 'a painted fence', and as

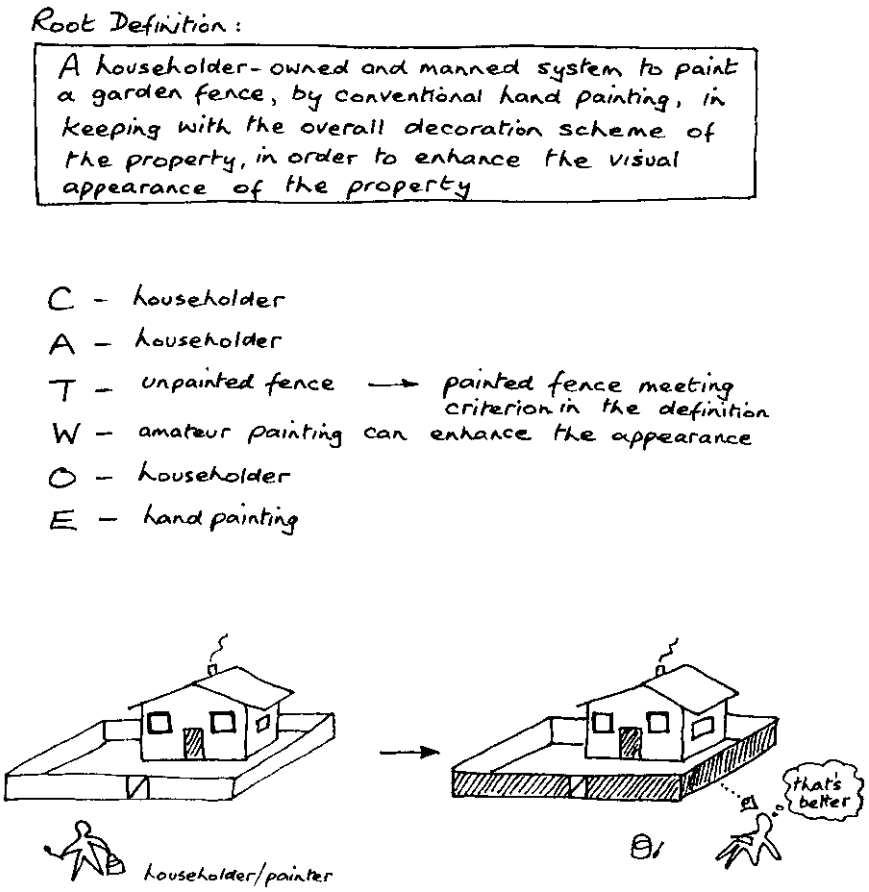

Figure A3 A root definition, CATWOE and pictorial representation of a fence-painting system

long as it meets the system owner's aspirations.] Figure A4 shows a general form for a monitoring and control subsystem, but this aspect is so important in the use of SSM that it is worth saying more about it.

Logical analysis of the notion of a transformation shows that any conversion of input to output would be judged successful or unsuccessful on three different counts (Forbes and Checkland, 1987). A first dimension checks whether the means chosen actually works in producing the output. A second then considers whether the transformation is being carried out with a minimum use of resources. Finally, a transformation which works and uses minimum resources might still be regarded as unsuccessful if it were not achieving the longer term aim, the aim expressed by R in: do P by Q in order to achieve R. The three criteria need three names. In SSM we now use the 3 Es':

- efficacy (for 'does the means work?')
- efficiency (for 'amount of output divided by amount of resources used')
- effectiveness (for 'is T meeting the longer term aim?')

and in general a model builder ought to decide what the criteria would be for the efficacy, efficiency and effectiveness of the system modelled. This adds a useful richness to the later comparison between the model and perceptions of the real world.

[Here we may remark that our definitions are clearer than those of the 3 Es' which [UK] public servants refer to in reviewing whether a public service gives value for money. They ignore efficacy and define *economical*

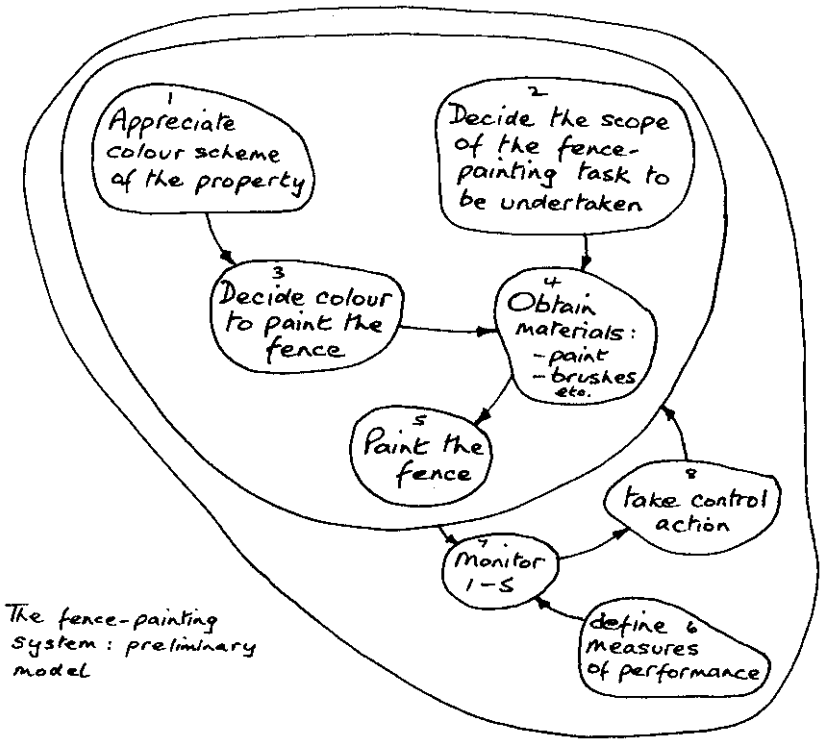

Figure A4 A first model from the root definition in Figure A3

as meaning acquiring appropriate resources at lowest cost. This then overlaps with their definition of *efficient* as meaning producing a maximum output for a given use of resources. Their *effectiveness* definition matches ours.]

For the model being built here, the criteria for SSM's '3 Es' would be those given in Figure A5. It is clear, however, that effectiveness is at a different level from efficacy and efficiency, and it is often useful to indicate this in the final model. This is done for the fence-painting model in Figure A5, which shows a complete and defensible conceptual model from the root definition shown in Figure A3.

In this particular model it is likely that the question of what is contingent upon what causes no problems. However, in teaching model building of this kind to undergraduates, Woodburn has found that the abstract notion of 'contingent upon' or 'logically dependent upon' can cause difficulties. He has found it useful in deciding which way to draw the arrows in models of human activity systems to get the modellers to ask whether a particular activity yields an output (matter, energy or information, etc.) which is a significant input to any other activity: if so then the latter is contingent upon the former (Woodburn, 1985).

In the case of the model in Figure A5 there is no need for discussion of this kind, and in general it is always wise to draw a version of a model in which the arrows show simply contingent dependencies, even if it is also felt useful in the particular instance to prepare other versions in which material or abstract flows between activities are indicated.

The value of sets of models of the type shown for the fence-painting system, based on different worldviews and different Ts, is now well established in SSM. Only occasionally have other types of systemic model been used. Apart from using such ready-made models as the cybernetic

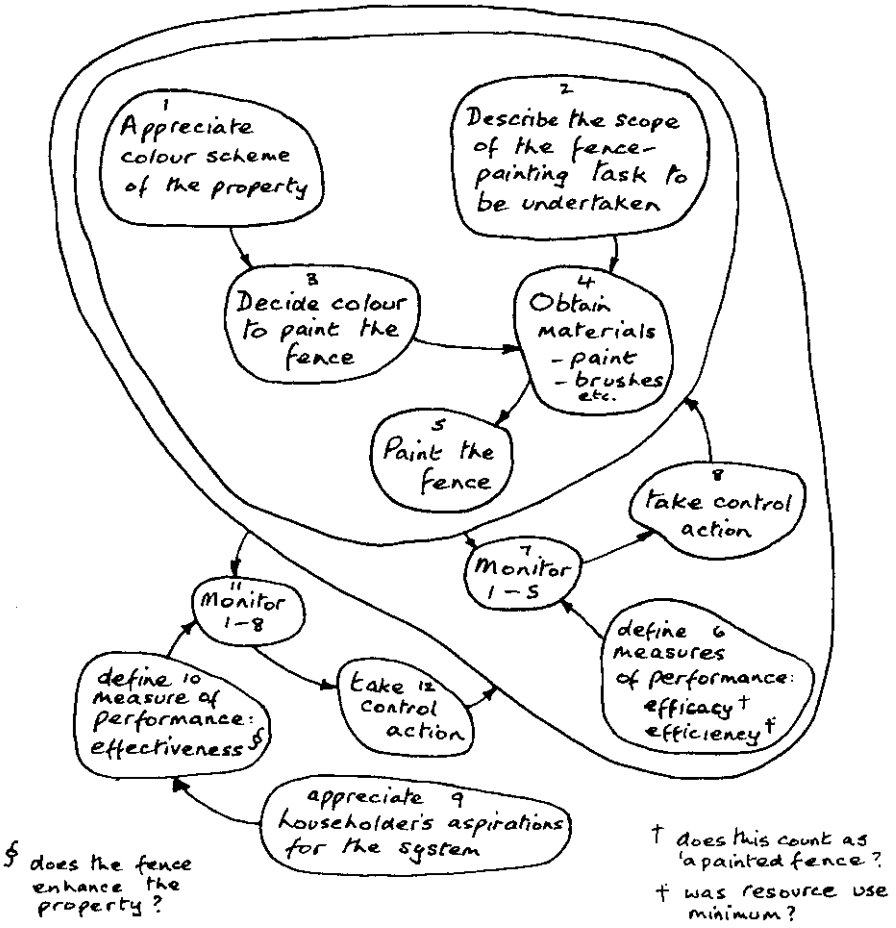

Figure A5 The final model from the root definition of Figure A4

'Viable System Model' (Espejo and Harnden, 1989) one possibility is to make more complicated models. These may involve more than one T in various relationships, such as a parasite/host relation, or a syndicate of equals, or an imperial T dominating subject Ts.

Use of more complex models is really a resort to the conscious use of metaphor more formal than the informal use in naming relevant systems described above. The positive aspect of the use of more complex models is that it might enrich the debate when models are compared with the real world. The negative aspect is that the increased complexity of the models might lead to our slipping into thinking in terms of models of parts of the real world, rather than models relevant to debate about change in the real world. There is of course nothing to stop our building models on the basis of a single T and then using the debate itself to tease out the possible forms of relationships between them.

Once a model of a purposeful system of interest exists in a form like that in Figure A5, then it may be used to structure inquiry into the problem situation. However, before using the model as a tool in this way, most modellers will probably be asking themselves if their intellectual construct is adequate, or 'valid'. Since the model does not purport to be a description of part of the real world, merely a system relevant to debating perceptions of the real world, adequacy or validity cannot be checked against the world. Such models are not, in fact, 'valid' or 'invalid', only technically defensible or indefensible. Whether or not they can be defended depends upon each phrase in the root definition being linked to particular

activities and connections in the model; and each aspect of the model should be capable of being shown to stem from words in the definition. It is a worthwhile discipline to check that this is so, since credibility (and participants' confidence in the process) can be diminished if some smart person in the situation points out a basic logical flaw in the model. Whisper it abroad, though, that it is not unknown for useful progress to be made in real situations using models which might not meet the stringent requirements of the present authors!

For some years use has been made of a general model of purposeful activity known as the Formal System Model (Checkland, 1981, pp. 173–177) against which conceptual models of activity systems could be checked. It was expressed as a set of entities (boundary, subsystems, resources, etc.) and later expressed by Atkinson and Checkland (1988) as an activity system. However, its use has declined in the last decade, CATWOE has virtually eliminated it, and in any case its language tended to blur the distinction between the real-world language of problem situations and the language of systemic thinking *about* the real world, a distinction it is vital to maintain.

Finally, concerning model building, we may remark that the '3 Es' for judging the in-principle performance of a human activity system cover only the most basic idea of transformation. They can be supplemented with other considerations of a broader nature if it seems appropriate in a particular field. For example, considerations of *ethicality* and *elegance* would bring in ethics and aesthetics, incidentally making the '3 Es' into the '5 Es'! Atkinson (1989) has suggested the use of Seedhouse's ethical grid (1988) as a means of thinking about the ethical dimension of studies using SSM.

This discussion has covered the core method of conducting the first part of the logic-driven stream of SSM, and it has also indicated some experientially derived variants. To avoid confusion these are disentangled in Table 2.1.

Table 2.1 The core method of the SSM logic-driven stream of thinking and some variants

Core method within SSM	Possible elaborations
Name relevant systems, both 'primary task' and 'issue-based'.	Use metaphors to examine relationships in the situation, or other aspects of the situation. (Davies and Ledington, 1987)
Formulate root definitions meeting the CATWOE requirements; think of the schema: a system to do P by Q in order to achieve R.	(See (b) below)
Build models based on one T, '7±2' activities in an operational system, and a monitoring and control system using criteria for efficacy, efficiency and effectiveness.	(a) Use more criteria than the '3Es' (e.g. add Ethicality, Elegance) (b) Use more complex model structures entailing several Ts in various relationships (e.g. parasite/host or syndicate) (Atkinson and Checkland, 1988)
Make the links in the model indicators of which activities are contingent upon which other activities.	Develop flow versions of the model (abstract or concrete flows), or use this to decide on dependencies. (Woodburn, 1985)

Comparing models with perceived reality

Models are only a means to an end, which is to have a well-structured and coherent debate about a problematical situation in order to decide how to improve it. That debate is structured by using the models based on a range of worldviews to question perceptions of the situation.

Checkland (1981) describes four ways of doing the comparison (informal discussion; formal questioning; scenario writing based on 'operating' the models; and trying to model the real world in the same structure as the conceptual models). Of these the second has emerged as by far the most common. The models are used as a source of questions to ask of the real world; answering those questions initiates debate, which may be conducted in any way which seems appropriate to the particular situation. It may be carried out by a group of people gathered in one place at one time to have discussion, or carried out in one-to-one interviews or dialogues spread over a period of time. It is impossible to generalize. In a study related to decision support systems the debate took place at one meeting between Scholes and the initiator of the study; in the reorganization of the Shell Group's Manufacturing Function all 600 members of the Department, as well as many managers from Shell Operating Companies, were given the opportunity to make their contribution to the debate over a period of months.

What we can say by way of generalization is that this mode of comparison by model-defined questions can usefully be got under way by filling in a matrix like that shown in Figure A6. The right-hand column is then a summarizing source of ideas for change in the situation or new ideas for relevant root definitions.

The second most common way of setting models against perceived reality is one which is less abstract than the matrix approach. It consists of notionally operating a model, doing its activities either mentally or on paper, in order to write a scenario which can then be compared with some real-world happenings. For example Dave Thomas, working with Checkland on the study on the Concorde project, took a model developed from the idea of 'a system to create the aircraft to meet a particular technical specification within a certain time at a certain cost' and operationalized it on paper, with respect to the air intake structure, a part of the Concorde engines. The resulting narrative was then revealingly compared with the actual history of the creation of the air intake structure for the first two pre-production aircraft. (None of the design and manufacturing documents concerning the structure in question was found to have any mention of cost!)

No matter how the models are used for a comparison with the real world, the aim is not to 'improve the models' – as management science enthusiasts sometimes tend to think – it is to find an accommodation between different interests in the situation, an accommodation which can be argued to constitute an improvement of the initial problem situation. But getting to that accommodation, and to the motivation to action which is an equal concern, requires cultural knowledge. That will have been being gained in parallel with logic-driven modelling work just described. It is to this overlapping stream of cultural inquiry that we now turn.

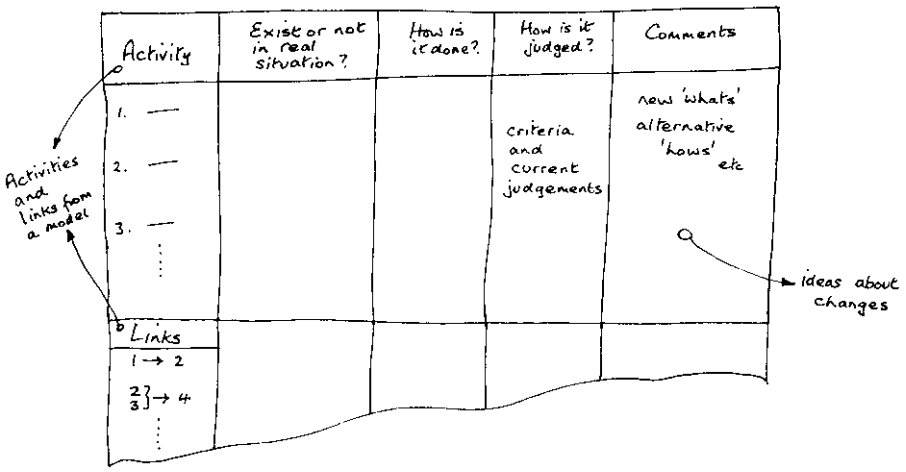

Figure A6 A matrix for comparing a conceptual model with a real-world situation

The stream of cultural inquiry

One of the reasons why Figure 22 is a better representation of SSM in action than Figure 21 is that, in the latter, finding out about the culture in which the work is being done-which will be crucial to its success-is apparently lost in 'Stages 1 and 2' of the approach. This can give the impression both that the finding out can be done once and for all at the start of a study, and that it is of relatively smaller importance than the formulation of root definitions and the building of models. Both impressions are wrong. Figure 22 emphasizes that finding out continues throughout a study, right up to its (arbitrary) end, and that it is equal in importance to the logic-driven thinking.

That this is the case stems from the acceptance that although facts and logic have a part to play in human affairs, the feel of them, their felt texture, derives equally (or more) from the myths and meanings which human beings attribute to their professional (and personal) entanglements with their fellow beings. For example, when the authors made career moves, Checkland from industry to university, Scholes from the Civil Service to industry, they both found themselves learning new facts and new logics. These were concerned respectively with the logics of the creation of knowledge and the creation of wealth. But more compelling was the need to learn new myths and meanings. Checkland discovered, for example, that some senior members of his university were very unsure about the *propriety* of the Department of Systems' gaining access to its research object, namely real-world problem situations, via the business operations of a university-owned limited liability company.

(The myths underlying this attitude changed quickly and dramatically in later years under the stimulus of cuts in Government grants to universities!) Scholes, moving to ICL from Whitehall, found himself learning the myths which drive a reward-seeking culture after many years in what at the time he experienced it, was the punishment-avoiding culture of the Civil Service. If we are going to intervene in human affairs and grapple with their full complexity, we had better have available some ways of inquiring into the 'systems' of myths and meanings which constitute what we mean by a culture.

Rich pictures

A characteristic of fluent users of SSM is that they will be observed throughout the work drawing pictures and diagrams as well as taking notes and writing prose. The reason for this is that human affairs reveal a rich moving pageant of relationships, and pictures are a better means for recording relationships and connections than is linear prose. The significant number of figures in this text is witness to that fact.

Representing root definitions pictorially is one example of the use of pictures in SSM but the best known is the policy of representing the problem/opportunity situation in the form of so-called 'rich pictures'. There is no formal technique or classic form for this, and skill in drawing is by no means essential (though it's not a hindrance!) in the production of pictures which are found to be very helpful. [These have been discussed in detail in Block 1 and in T552.]


T552

Analysis of the intervention

Early in the development of SSM it was found useful to think of an intervention in a problem situation as itself being problematical (Checkland. l981, pp. 238-240). It was found useful to think of the intervention structurally as entailing three roles. The role 'client' is the person or persons who caused the study to take place. There will always be a real-world answer to the question: Who is in the role client? And it is a question worth asking because it is wise to keep in mind (but not be dominated by) the client's reasons for causing the intervention to be made. In the role 'would-be problem solver' (and it could be whoever is also 'client') will be whoever wishes to do something about the situation in question, and the intervention had better be defined in terms of their perceptions, knowledge and readiness to make resources available. Finally, and of crucial importance, is the role 'problem owner'. No one is intrinsically a problem owner. The 'problem solver' must decide *who to take possible 'problem owners' to be*. There will always be many possibilities. The list should include, but never be limited to, whoever is in the roles 'client' and 'problem solver', and this list is the best source of choices of relevant systems in the logic-driven stream of inquiry. It will be noted that making the 'problem solver' one possible problem owner' often means that the first relevant system looked at is 'a system to do the study'. The first model built is often a model of the structured set of activities which the problem solver(s) hope to turn into real-world action in doing the study. This requires seeing 'the problem solving system' as part of the problem content.

This role analysis, now known as 'Analysis One' in SSM, is always relatively easy to do and is very productive, especially through the list of possible problem owners. For example, in a study of policing vice in the West End of London based on SSM, some immediately obvious possible 'problem owners would be: Parliament, the courts, the general public, the police, organizers of the vice trade, providers of its products, purchasers of its products, its potential recruits, their families, social service departments, local hospitals, local residents, respectable West End traders, etc. How to use models deriving via relevant systems from these choices of problem owner would depend upon who was undertaking the study and who caused it to occur: the client. Flood and Gaisford (1989) describe just such a study which they claim used SSM, but their account does not distinguish clearly between 'client' and 'problem owner'. This illustrates a problem for

SSM, one which is endemic in all applied social science. Because the technical terms of any explicit approach will use words which have meanings in everyday language (in SSM technical terms include 'client', 'problem solver', 'problem owner', 'relevant system' 'comparison' etc.) it is important in using the approach to use its language with unusually careful rigour.

'Social system' analysis

Rich pictures will continue to be drawn and amended throughout any use of SSM, and new occupants of the roles 'problem solver' and 'problem owner' in Analysis One may emerge in the course of a study, so these are not once-and-for-all analyses. Neither is a study of the problem situation as a 'social system', using that phrase in its everyday language sense. What the phrase conveys is not easy to pin down, though we all have an intuitive feel for it. The social science literature does not easily yield a usable model, and it has been found necessary to develop one experientially for use in SSM's 'Analysis Two' (Checkland, 1986).

The model which has been used in the last five years derives ultimately from the work of Vickers (1965) but is drastically simpler than that of the model of what Vickers calls 'an appreciative system' which Checkland and Casar (1986) derived from all his writings. To be usable 'on the hoof' throughout a study, a model has to be very simple indeed: the problem is to find a simple model which is not too simplistic.

The model in question assumes a 'social system' to be a continually changing interaction between three elements: roles, norms and values. Each continually defines, redefines and is itself defined by the other two, as shown in Figure A7. By 'role' is meant a social position recognized as significant by people in the problem situation. Such a position may be institutionally defined ('classroom teacher', 'team captain', 'shop steward') or may be defined behaviourally ('licensed jester', 'nutter', 'solid citizen'). A role is characterized by expected behaviours in it, or *norms*. Finally, actual performance in a role will be judged according to local standards, or *values*. These are beliefs about what is humanly 'good' or bad' performance by role holders.

This model has been found to be widely applicable and very useful as long as it is accepted that the account of the 'social system' it leads to is never either complete or static. For example, in a highly sophisticated but functionally organized engineering company, in difficulties over project management, the important recognized roles were essentially *professional* ones. To get on in the company you needed to be, for example, a highly

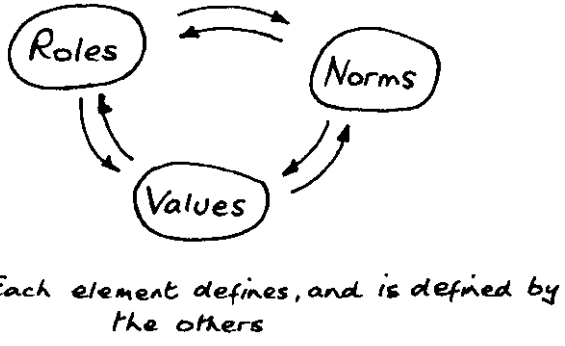

Figure A7 The model used in Analysis Two or 'social system' analysis

skilled hydraulic engineer, *in the eyes of the peer group*. The values were ones from the world of professional engineering, and technical excellence was prized above all other qualities; it was the kind of company which was ready to make technically excellent products which no one wanted to buy. Part of its project management problem was analysed to be due to the fact that its inappropriate 'Rolls Royce' values were only reluctantly shifting to more realistic commercial ones.

Finally, it needs to be said that the nature of the social system is not likely to emerge in response to direct questions. Direct questions will probably receive as responses the official myths of the situation. Instead, the SSM user needs, mentally or actually, to open a file labelled 'Analysis Two'. Subsequent to every conversation, interview, or perusal of documents, etc., the exchange experienced needs to be reviewed for what the analyst can infer with regard to roles, norms and values.

'Political system' analysis

'Analysis Three' in the stream of cultural analysis accepts that any human situation will have a political dimension, and needs to explore it (Checkland, 1986). As in the case of Analyses One and Two, this is done via a general model, in this case of 'a political system'. (Again, this phrase is used in an everyday language sense.)

This is not the place for a deep discussion of the nature of politics, but, for the practical purposes of Analysis Three, politics is taken to be a process by which differing interests reach accommodation – a view which may be supported with reference to the literature of political science. (See, for example, Lasswell and Kaplan, 1950; Miller, 1962; Crick, 1962; Dahl, 1970; Blondel, 1978). The view derives ultimately from Aristotle, whose *Politics* argues that what he means by politics are the processes by which order is maintained in a polis (for Aristotle, the Greek city-state) which is an aggregate of members who will have different interests. Accommodating those interests is the business of politics, and the concept will apply to a company or work group or a sports club as well as to a city or a nation state. Finally, the accommodations which are generated, modified or dissolved by politics will ultimately rest on dispositions of power. So politics is taken to be power-related activity concerned with managing relations between different interests. As such it is endemic in human affairs, and there will be few purposeful acts which do not have a political dimension. In the late 1980s, for example, there was a long-running public debate concerned with whether or not there should be sporting links with South Africa. In this debate in the UK, those who supported such links constantly cried 'Keep politics out of sport' as if the two were separable. They made a category mistake. If, say, the England rugby team were to have gone to play the Springboks, this would have been perceived as, and hence would have been, a political act in support of apartheid. There is an unavoidable political dimension to sport, just as there is a political dimension to theatre, to management, to sexual relations, to health care provision or, indeed, to any human affairs which entail taking deliberate action.

In Analysis Three, political analysis is made practical by asking how power is expressed in the situation studied. Following a suggestion developed by Stowell in action research using SSM in a medium-sized manufacturing company (Stowell, 1989), we ask: What are the 'commodities' (meaning the

embodiments) through which power is expressed in this situation'? How are these commodities obtained, used, protected, preserved, passed on, relinquished? Through what mechanisms?

In the last five years very many 'commodities' of power have been observed in different situations. Examples include: formal (role-based) authority, intellectual authority, personal charisma, external reputation, commanding access (or lack of access) to important information, membership or non-membership of various committees or less formal groups, the authority to write the minutes of meetings, etc.

In one study in an organization which was rethinking its future after the death of its charismatic founder, a standard half-joking classification of people in the company was into 'KTs' and 'NKTs'. This referred to those who 'knew Tom' and those who had 'never known Tom'. The fact of having been in the company in the days of the charismatic Tom was used by the KTs as a commodity of power in this organization: the organization joke was very serious, as they usually are.

Answering the power-oriented questions in Analysis Three enriches the cultural appreciation built up in Analyses One and Two, and all three complement the work on selecting, naming and modelling relevant human activity systems going on simultaneously in the logic-driven stream of thinking. Working with SSM, in the 'ideal type' methodology being described here, entails carrying out simultaneously the two streams of thinking and action set out in Figure 22. They complement each other and should unfold through time interactively. It is especially important never to regard Analyses One, Two and Three as finished; and delicate judgements are usually required concerning the public visibility of Analysis Three.

This sensitivity of Analysis Three to public exposure does not imply that SSM is just the methodology Machiavelli needed for giving advice to his Prince! The sensitivity stems from the fact that politics is ultimately concerned with power and its disposition, issues not usually faced overtly in human dialogue. There is a natural reluctance to be blunt about the crudities of power, and there is a sense in which the real politics of a situation, not publicly acknowledged, will always retreat to a tacit level beyond whatever is the explicit level of analysis. Given the concept of politics outlined above, if the results coming from Analysis Three are all bluntly made public, then those results can themselves easily become a potent commodity of power in the 'real' politics of the situation. There is potentially an infinite regress here in which the politics of the situation forever escapes open analysis. So it behoves users of SSM to be circumspect about the use of the cultural inquiry, and especially Analysis Three.

Making Desirable and Feasible Changes

Whether SSM is being used by an individual to help tackle his or her everyday work, or whether it is the adopted methodology in a highlighted study, its aim will be to do something about a situation regarded as in some way unsatisfactory. The two streams of thinking and action in SSM converge on a structured debate concerned with defining changes which would help remove the dissatisfaction. But beyond definition of the changes, the SSM user looks for implementation of them.

This implementation is, of course, itself 'a problem situation', and it is not unusual to use SSM to tackle it. We may conceptualize and model systems to implement the changes, and do that according to several relevant Weltanschauungen. Finally we may pinpoint 'a system to make the changes' whose activities can then become real-world action. We can set about doing the activities of that final model, in the real-world situation.

The changes themselves are usually described as 'systemically desirable' and 'culturally feasible' and it is worth dwelling briefly on these phrases because if they are understood, SSM is understood.

The models of purposeful activity systems built within SSM are selected as being hopefully relevant to the problem situation. They do not purport to be models of the situation. It is because of this that any changes coming out of the debate initiated by comparing the models with the real situation are (only) arguably desirable, not mandatory. They are systemically desirable if these 'relevant systems' are in fact perceived to be truly relevant.

Implementation of changes will take place in a human culture, and will modify that culture, at least a little, and possibly a great deal. But the changes will be implemented only if they are perceived as meaningful within that culture, within its worldview. A Western observer's proposal to a remote culture that they abandon tribal rain dances on the grounds that they manifestly do not work in controlling the weather, will be ignored in a culture for which the dances are meaningful. [Indeed, Western thinkers have had to invent a distinction between 'manifest' and 'latent' functions of such rituals in order to cope with such observations within a Western intellectual framework (Merton, 1957).] What is perceived as 'meaningful' by a particular culture might range from a tiny incremental change to a major revolutionary one-it is not the amount of change which determines its feasibility, but whether or not it is seen to be *meaningful*. Hence the changes introduced by SSM have to be culturally feasible in the sense that they have to be regarded as meaningful within the culture in question.

Thus the two criteria for the changes sought by SSM are 'systemically desirable' and 'culturally feasible'. Understanding that this is so provides a test of whether or not the distinction between hard and soft systems thinking is understood. Someone intellectually locked within the 'hard' paradigm, believing the world to be systemic, will imagine that changes have to be systemically feasible and culturally desirable!

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