Appendix D

Soft systems methodology

This article is an edited transcript of a talk given by Peter Checkland in 1996 and published in an OU Systems Society newsletter in 1998.

It is required reading for a number of reasons. The primary one is because I consider it to be an excellent example of critical reflection. The essence of the story is of someone trying to make sense of their early experiences of complexity and then setting out to do something about it by using systems thinking within an action-research framework. Checkland's particular set of experiences provided the main impetus for the development of the systems approach known as soft systems methodology. Professor Checkland formally retired from the University of Lancaster in 1997. This occasion led him to reflect on his involvement in the project to develop SS-methodology, or SSM as he refers to it.

I have been working with these ideas for a long time now and I was pondering as I was getting my slides together that our action research programme at Lancaster, out of which soft systems methodology came, is entering its 27th year [1996]. By now we would have abandoned systems ideas and tried something else if they didn't work in the area that we are interested in: which is doing something about messy, ill-structured, problematical situations of the kind with which managers, of all kinds, and at all levels, have to cope. I am still an enthusiast for systems ideas. What I was going to do in this talk, is re-live some of the 27 years of the history of that research programme and pull out the basic structures of thinking which led to the creation of soft systems methodology.

I will start by saying something very fundamental about systems thinking itself, and this comes from something which happened spontaneously. Walking through the village of Bolton-le-Sands, where I live, a few years ago, I passed the church in the middle of the village which has, at its entrance, one of these notice boards labelled 'The Wayside Pulpit'. Posters are displayed from week-to-week on the notice board, which offer improving thoughts to the passing citizens. A poster was displayed which offered me, and the fellow inhabitants of this village, this advice: 'Tackle the hard task piece by piece'. I was amazed, in the late 20th century in a village in north Lancashire, to see this serious piece of advice being offered. The origin of it is the great Rene Descartes. In 1642, in *The Discourse On Method*, he was a founding father of the thinking which led to the scientific revolution of the 17th century. This is the characterizing activity of Western civilization, which has made us the kind of people we are, doing the kind of thing we are doing this afternoon. As well as *The Discourse On Method*, Descartes had written a book called *De Mundo – Concerning The World*. In that book, he adopted the Copernicus model of the solar system, with the Earth travelling around the Sun. This was counter to the teachings of the most powerful political institution of his day, the church. He was a bit worried about what would happen when he published this and so he decided to collect together a few samples, and wrote a little introduction to the samples which he called *The Discourse On Method*. That is where the quote in my village church comes from. When faced with complexity, says Descartes, don't try and take it all on board. Chop it up into bits and tackle the bits, one by one: that is the way to deal with complexity.

So when I saw that that message had now just reached north Lancashire from 1642, I wished that I was a cruder fellow than I am, because I ought to have pulled out my felt pen, or my spray paint can, and changed the message. I would have urged people *not* to be reductionist as Descartes was suggesting. The point is that if you read *The Discourse On Method* carefully, Descartes never realizes that he is taking as given an important assumption, which it is actually worth questioning. His assumption is that you can extract a piece from the whole and study it, and that it will be the same piece when you have extracted it as when it is a part of the whole. This is a dubious assumption, and that was brought home to me by chance some years ago when my younger daughter, who is a doctor now, but was a medical student then, had come home from university one weekend. I happened to say to her: 'What have you been doing lately Kath?', and she said, 'Oh, this last week we have been doing the hand'. 'Doing the hand,' I said, 'how do you do the hand?' 'Well,' she said impatiently, 'in the lab they had a box full of hands and we all took one, and we have spent several days dissecting the human hand, starting with one that has been removed from a corpse.' It is obviously the case that you can find out a lot about the human hand, starting with one that has been separated from the body, and it is equally true, is it not, that it isn't quite the same bit when you have removed it from the body, as when it is a part of the body? It seems to me that systems thinking is simply the body of ideas which takes that thought seriously and tries to develop non-reductionist, more holistic ways of thinking about complexity. That is what we tried to do in the research programme that I am talking about at Lancaster.

I went into university teaching as a second career. I had been in ICI as a manager for 15 years and before that I had been trained as a scientist. Those were for me very interesting transitions, from scientist to technologist and then to manager, before I entered a new career. I learned quite a lot from making those transitions and I certainly have no regrets that I have had that sequence of experiences.

When I was a scientist I was a physical chemist of the most austere and mathematical variety. There I was in the physical chemistry lab in Oxford studying something called the rotational fine structure of the vibration-rotation bands of the high-resolution infrared spectra of small molecules in the gas phase. Descartes would have been really proud of me! You could not get more reductionist than that, and when I was examined on this work, Sir Harry Melville, who was a distinguished British chemist of the day, changed my life. (I don't know whether you believe that there are moments after which, as a result of chance happenings, the rest of your life is different, but I can think of a few such moments in mine, and Sir Harry Melville created one.) He asked me a question to which I had never given a moments thought. He said, 'Who will read the paper that comes out of this research?' This was alarmingly easy to answer because I could literally, at that time and in that field, name 4 or 5 people around the world who might actually read the paper and get past the title on it. That caused me furiously to think and I thought: there must be more to science than this, and I resolved to get away from Oxford as soon as possible.

I went into science-based industry and joined ICI at a time which was really interesting because a new technology was being created. Carothers in the USA had invented some new stuff called nylon and Rex Whinfield at Accrington, not far from here [Manchester, UK], had invented some new stuff called polyester. These polymers melt at about 265 degrees Celsius

and if you hold the melt at around 300 degrees Celsius, they can then be pumped through small holes to make man-made fibres. It was the start of that industry, I found it very interesting to be part of it.

After being a technologist in that industry for a number of years, I then became a manager in ICI. But that was more mysterious than the transition from scientist to a technologist, and in those days management education was extremely primitive. Apart from going on a few in-house courses that ICI would announce in the form of 'come to a two-day course on discounted cash-flow modelling', there wasn't any management education. You just made mistakes and learned from those and watched other people and gradually found ways of doing what was reasonable for you. I remember when I made that transition to being a manager I discovered that there was a literature that I was unaware of called 'management science', sitting there on the shelves in the library. I thought naively, wow! good. Here am I, an ex-scientist, now a manager, who has a whole literature awaiting me called management science. This must be just what I need. I went eagerly to that literature and found it totally irrelevant to everything that I was doing from day-to-day as a manager at ICI. I really couldn't understand why, or how, the people who developed this stuff had so managed to pass by the problems which I experienced as a manager. I took that problem with me when I left ICI after 15 years, an experience which I fully enjoyed as a really interesting career.

I took another problem with me from ICI. It has always been a well-managed company and if the rest of British industry had matched the economic performance of ICI since the Second World War, we wouldn't have had the series of economic crises which this country has been through. On the other hand if you are in it, if you are a member of it, you cannot help but notice that the organization as a whole, as a single entity, often manages to behave in a rather dinosaur-like fashion, as if crashing ponderously through the undergrowth directed by a tiny brain. And yet all the people who make up ICI are on the whole very intelligent people. It seemed to me that that organization – and I think this is a problem for all large organizations – lacked mechanisms for learning corporately. It lacked language for capturing its learning as a single entity, passing on that learning to other people and new generations of people in the organization.

I wondered whether systems ideas didn't have a role to play in that. I had got interested in systems ideas because a number of times in my ICI career I had found myself a project manager. The project manager in such an industry is responsible for getting some new development technically right, making sure that any inventions involved are protected by patents, making sure the marketing plans are sensibly made, and making sure it looks as if the finances indicate that this will be a wealth generator rather than an overall cost. It was through systems ideas in project management that I got interested in systems ideas, and I then left ICI to join this new department at Lancaster, which called itself 'Systems Engineering'.

But it wasn't most people's idea of systems engineering. There was indeed expertise in that department of chemical engineering, control engineering, and statistics, and some of the first work done in the department would now be thought of as 'hard' systems engineering. But Gwilym Jenkins, the statistician who founded this department, always read the word 'engineering' in the broad sense of the word. You can engineer a meeting with someone, you can engineer the release of hostages, and it was that

broad sense of the word engineering that Gwilym intended to drive the work. When I was recruited into that department the research task, which was suggested to me, sounded a good idea. That research task was to find out, in action research in real situations, whether the methods of hard systems engineering, the methods you would use to optimize the output from a petro-chemical complex, could simply be transferred into the human situations which managers try to cope with. That is what we set out to do in the action research programme.

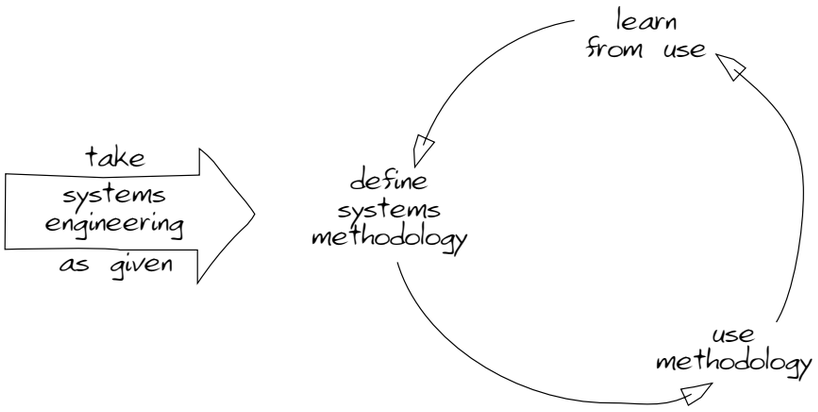

Figure D1 Strategy for systems research at Lancaster

This model makes sense, after the event, of what happened to us. I use this model to try and make sense of the experiences we went through. This model says that if you define how you are going to use the systems ideas in some systems methodology, then you can go and use it. If you are lucky you can learn from that use. In principle that learning could of course be the source of the definition. And as soon as you make that a closed system, it is technically a system in which the elements create the system itself.

When you close that loop, you have created a logical paradox. All systems of this kind are logical paradoxes when written out on paper because the cycle, as I have drawn it, couldn't ever get going. The definition needs the learning, the learning needs the use, but the use needs the definition. So technically the cycle couldn't ever operate, it's a logical paradox. But of course, in real life you don't let a logical paradox hold you up. You just kick the door down.

So what we did was to break into that cycle by saying: 'We will take hard systems engineering as our approach. We will try to use it in management problem situations, and we will see what happens.' What happened was that the methodology came apart in our hands. We found ourselves unable to use it, we found ourselves making a complete hash of it. But we tried to pick ourselves up and learn from what was happening to us, and we found ourselves re-defining the systems engineering that we had started from. The re-definition was sufficiently radical that the approach came to be called something different, namely soft systems methodology (see Figure D2). Then in the last 10–15 years we have learnt again, not having thought it out in advance, that the kind of models that we build there are an excellent way into work on information systems, where much of the emphasis of our work has been in recent years.

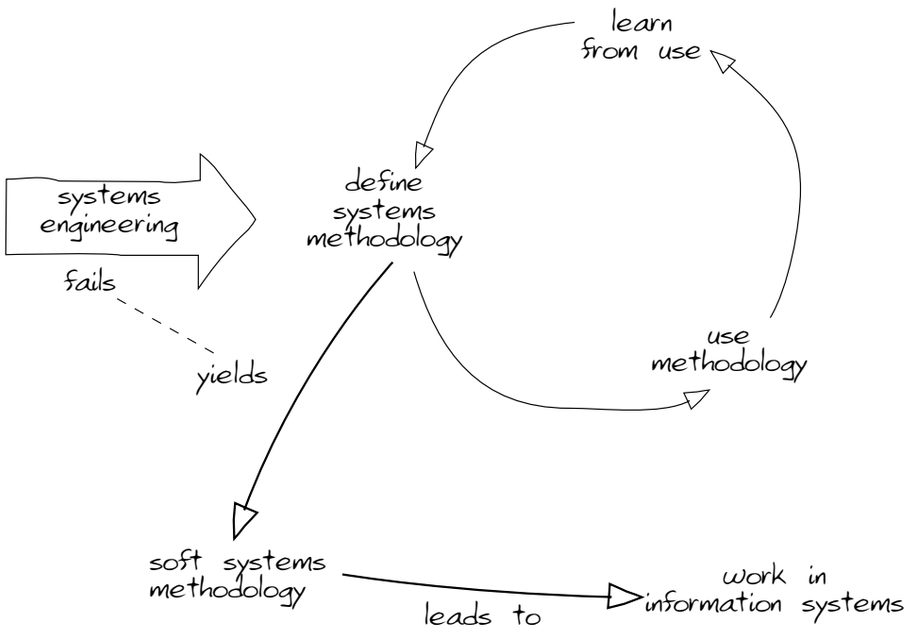

Figure D2 The outcome of systems research at Lancaster

I'll describe very briefly the kind of experiences we were having when we tried to use systems engineering in management problem situations, and failed to do so. One of the first experiences I had at Lancaster came about when David Farrah, who was a director of the British Aircraft Corporation, said to us: 'the Concorde project is a mess'. Everybody knew that because it was a big issue in the newspapers at the time and successive British governments in the 1970s were very serious about cancelling it. In which case, the French said they would sue for more millions than it would cost to carry on with it. David Farrah said: 'Just come into the project with your systems engineering approach and see what useful advice you can give to us'.

Dave Thomas, the chap I was working with on this, was a 34-year-old engineer who had been working in Canada, as I remember, and was doing a masters course as a way of getting back into employment on this side of the Atlantic. Dave Thomas and I went to Filton and found that what was happening at that stage in Concorde was that the French had aircraft 001 in Toulouse and the Brits had 002 in Filton in Bristol. These were the pre-production aircraft, which hadn't flown yet. But in the big shed in which they were building it at Filton, it looked like a complete aircraft. It was years late, and it had already cost millions more than anticipated.

Dave Thomas and I thought this was pretty straightforward. Thinking like systems engineers we said: what is the system of concern? It is the creation of this aircraft. What are its objectives? The objectives of that system are to create that aircraft within a certain time, at a certain cost, meeting a particular detailed technical specification under at least a couple of constraints: one, that it doesn't damage the environment unacceptably, and two, that it has to get the air worthiness certificate from the Civil Aviation Authority or else the public won't be allowed to fly in it. So we thought we could quite explicitly define the objectives of the Concorde project in those terms, and we sketched out what we would have to do in some rudimentary models if that was the system that you were wishing to operate in the real world.

It took us some time to appreciate that we just couldn't get anywhere with those kinds of models. We couldn't engage the attention of the engineers actually involved with the Concorde project with that sort of model. It was after the first few weeks down at Filton when we came to realize the major significance of the fact that this was the Anglo-French Concorde project and was created at a time when President De Gaulle of France was vetoing British entry into the Common Market; and one of the motivations behind the project from the British side was to try and convince the French that perfidious Albion could be reasonable partners in a major technological enterprise which was going to prevent the Americans being the world leaders in at least one advanced technology. The politics of the Concorde project were an integral part of it. You couldn't separate those out and just think about it as an engineering project because the politics affected everything that was going on in the project.

We realized how difficult it is to formulate objectives in human situations. In the technically-defined problems for which systems engineering was developed, then of course objective-defining is part of the game; and if your job is to optimize a plant's output then you can very precisely define the objectives for such a plant. In any human situation this is a very difficult thing to do, where multiple overlapping objectives are the norm.

Another example, at a very different scale, is from near here [Manchester]. Here was a small carpet manufacturer run by the managing director. The organization was sufficiently small that he knew all about the technology, all about the marketing, all about the finances. It was his show, and he said to us: 'I know that I ought to be thinking ahead, thinking strategically, whatever that means, and I don't. I just live from day to day; so I want you to make me a plan'. We first started to look at his production processes to think about production planning, rather more professionally than he did. But we found that every step of the way, whatever we tried to do, he was resisting us, he was fighting us. We eventually made sense of the situation we were in there by seeing that this chap had a real fear when asking us to come and look at his company. That fear was that his company might become more successful and more profitable, and we gradually realized the significance of the fact that he disappeared three afternoons a week to play golf. He saw this little firm as a way to preserve a particular lifestyle which he was perfectly satisfied with. He didn't want to take more money out of the business and he was smart enough to see that if the company was more successful and grew, it would change its nature and that would change his life. He was content to hang on to his life as it was. So in a sense when he said, 'I want you to make me plan', what he really meant was: 'I want to plan this company so that nothing ever happens, and that it just goes on exactly the same as it is because I am perfectly satisfied with it.' Again we were realizing that just thinking about this as a manufacturing operation and a marketing operation and so on wasn't actually going to get to grips with the complexity of that human situation.

A further example from the public sector. At the back of Lime Street Station in Liverpool was a poor part of the world: grotty housing, high unemployment, low educational standards, a drugs culture; a real rough part of the world. In the middle of that community was the Bronte Centre, a community centre that was funded by John Moores, the Liverpool millionaire. He was putting £40 000 a year into the Bronte Centre. And there we were, approached by three young lads with degrees in social science, who were running the Bronte Centre and who had lost all sense of

what they were trying to do there in that community. They asked us to help them re-think what the role of the Bronte Centre could be. When we got immersed in that we realized that we had to think not only about these three young lads who were running the Bronte Centre, we had to think: 'Well, how does it look from John Moores' perspective' – he doesn't want to throw away his £40 000 a year. 'How does it look from the perspective of the Liverpool City social services department?' – whose work often interacts and overlaps with what the Bronte Centre was trying to do. What does the world look like if you are born and brought up in that community? What might your aspirations be in the midst of this community? That was another example in which the simple starting point in hard systems thinking – what is the system of concern and what are its objectives, what kinds of techniques are available to engineer the system to meet the objectives – was not enough. That just didn't have a suitable relevant subtlety and complexity to cope with the actual subtlety and complexity of human affairs as managers deal with them.

I came across a good example recently of just how difficult it is to formulate objectives in human affairs. This example came from a conference I attended to set up a European Evaluation Society. (There is a growth industry in evaluation as an academic area these days.) This conference in the Hague was addressed by Piet Dankert, a Dutch politician with much experience of the EEC. He declared that it was absolutely vital for Brussels, in the context of the Common Market, to formulate good methodology for evaluating all of the things that they do. His example of just how difficult it is to set objectives is in fact something we have all heard about – the Common Agricultural Policy (CAP) of the EEC. He pointed out to us that if you go back to the Treaty of Rome and see what it says about the CAP, then the objective of the CAP is to increase agricultural productivity, which is a perfectly clear, unequivocal objective. But carry on reading the Treaty of Rome and it adds that its objective is also to safeguard jobs in the industry. Carry on reading another paragraph of the Treaty of Rome and its objective is also to obtain the best possible deal for consumers. It is obvious why the CAP is such a mess in the EEC: progress on any of these will make it more difficult to achieve progress on any of the others. The Treaty of Rome says that there are three equal objectives for the Common Agricultural Policy. I thought this a nice example of how incredibly difficult clear objective setting is in human affairs.

So: when we were finding that the thinking we started from didn't work in real situations, we had to do some fundamental rethinking of systems ideas. We went back and tried to understand the systems literature, and, as was being discussed when I arrived just before lunch today, Systems is a funny subject because it turns up in everybody else's literature. There are systems thinking geographers these days, lots of them, and other geographers who don't use the systems language. There are systems thinking economists and systems thinking sociologists and psychologists and so on. It is a language that can be used within anybody else's area, which means that it is virtually impossible for anybody to keep up with the totality of the systems literature, since it is there as a meta-language for use in any other area whatsoever.

If you absorb as much as you can of this literature, and especially the literature that is about systems as such, then I think you will find that there is a single core image at the centre of it, which is that of the adaptive whole. It seemed to me useful to ask what language you need to talk

about an adaptive whole, the system S, which can adapt and survive within a changing environment which is delivering shocks to it. In order to talk about that metaphor or image you have to have, in terms of this entity S, firstly, processes of communication and control so that it can find out what is happening to it both from the environment and internally, and you need available control action in order to adapt if the environment is changing. And any observer of this entity, S, observes that it may well have a layered structure in that the system may contain other subsystems which may contain sub-subsystems and so on. Or, this system may only be regarded as a subsystem of a larger system and so on. And finally, you have got to be able to talk about the entity, the adaptive whole *as a whole*, and it must have properties as a whole that are meaningless in terms of parts which make up the whole. That is the core systems image and this rich idea has been developed by lots of different people in different fields.

Ecologists are interested in the kind of whole entities which nature creates; if they can develop the concept of a natural system, a whole created by nature, then that may be relevant to understanding what goes on in swamps and forests and the biosphere of the planet. Engineers work with the idea that they can create wholes which have emergent properties, and designed systems can be either physical or abstract. Thus, these simple few words cover huge areas of human activity in which systems ideas have been seriously developed.

When we were thinking through this in terms of why can't we use hard systems engineering in management problem situations, we thought: 'Well, this is all very interesting but it hasn't got much to do with the price of eggs as we are experiencing it in the kind of situations that we are in'. Though I cannot exactly, in hindsight, recover the moment (if there was a moment) in which there occurred to us the thought which got our thinking moving ahead, that idea was a very clear one: 'Well, whether it is in the Concorde project or the carpet manufacturer or the Bronte Centre in Liverpool, all of these management problem situations do at least have one thing in common. All of them contain people trying to take purposeful action'. And trying to act purposefully rather than by instinct or randomly thrashing about (though there will never be any shortage of that in human affairs) is a key characteristic of being human. So we said: 'Let's take purposeful activity as a systems concept. Let's imagine a set of activities joined together to constitute a purposeful whole which we called a human activity system. If we can develop that system idea in the way that ecologists develop concepts of the kind of whole which nature creates, then maybe we can use that to understand what goes on in the real world in companies, government departments, the NHS, sports clubs, drinking clubs, in fact in any area of human affairs characterised by purposeful activity.'

So in this sequence of our history of doing this work, that was the first of what, with hindsight, I can pull out and identify as four, for us, big thoughts, 'big' because they are thoughts that got us moving, got our thinking going and left us feeling that we were making progress. But then we quickly realized that we had to do some more thinking, which was to understand how seriously human beings always take purposeful activity. Acting purposefully is one of the things that makes us human. If you and your partner were cuckoos instead of being human, but still had human attributes, next spring you would probably say to your partner: 'Hey, this is getting boring being cuckoos; this spring for a change let's see what it is like to build a nest and raise young cuckoos'. No cuckoo has ever been

Four 'big' thoughts for us

1 *Treat linked activities as a purposeful system*

2 *Declare worldviews which make purposeful models meaningful (there will be many)*

3 *Enact SSM as a learning system, finding accommodations enabling action to be taken*

4 *Use models of activity systems as a base for work on information systems*

Figure D3 Four thoughts which moved the research forward

observed doing that, cuckoos are apparently programmed to do what cuckoos do, to follow cuckoo-like behaviour. We appear to have the chance of deciding to do things and then changing our mind and doing something else instead. We can act purposefully in a willed way, and I think that that is very central to what makes us human and that that is why human beings take purposeful activity so seriously. So whenever you get people to describe purposeful activity, they never give you a basic, neutral, simple account of it. They will always give elaborate interpretations of it.

The example which I always use for this comes from work we did for the Home Office on prisons. This was to do with answering the question, 'What information systems do you need in the management of a prison?' But of course the answer to that question depends on what do you mean by a prison, since the information systems are going to serve that purposeful institution; and you cannot design a system which serves unless you know what it is you are going to serve. So you have got to answer the question: what do we mean by a prison? This is a good example because it is such a dramatic one. As soon as someone says 'it's a punishment system', someone else says 'no, it's a re-education system' and the next person may look at it from the other way around and say 'it's a system to protect society'. When Douglas Hurd was home secretary [a UK government minister] he understood all the research which showed that a prison doesn't work, and he used it to make an excellent speech, in which he used to say that what we do in this country is we catch the incompetent thieves and we send them to jail; they learn a hell of a lot while they are inside and they come out as more competent thieves. Though we didn't intend it, the minister used to say, our prisons are wonderful universities of crime. Well, all of these are plausible ways of saying what is a prison, and different people will be more inclined to one view than another. But of course any actual prison represents a complete complex mix of these and other concepts, unfolding through time.

When we went to Gartree maximum-security prison, in Leicestershire, and talked to prison officers, they were more or less in dismay. Given the crisis in the penal system, they saw the prison as a potential riot. They saw their management activity as reduced to making sure that the situation didn't blow up next week with the prisoners up on the roof throwing the tiles off, waving banners to the TV and generally breaking up the place, as they did at Strangeways, Manchester a few years ago. Of course, that is interesting from the information systems project point of view because the kind of information systems that they were seeking were essentially intelligence gathering systems so that they really would know what is going on inside this prison and could think ahead and make sure there wasn't a riot there

next week. So the list of concepts is never-ending depending on the range of people that you talk to. What you never get though is anybody who says 'it's a human warehouse', which is probably the most basic account. If researchers from Mars, who didn't know human culture, wanted to know what was going on in this building called 'a prison' and sat outside long enough, they would observe people being taken in and they would eventually see those same people being let out and they would say 'this is some kind of human storage system'.

So what we had learnt is that we couldn't ever build a model *of* a prison, the complexity was way beyond us. What you have to do is build a number of models each from a declared worldview. That was the second of the four big thoughts. Furthermore, these models wouldn't be pretending to be models of a bit of the real world as systems engineers' models do. They would simply be *devices* which encapsulate, as a logical machine for acting purposefully, a particular way of seeing this particular activity. It seems to me that from that thought flowed the shape which the approach we then took – we couldn't have done anything else. Here we were, going into problem situations, thinking of some purposeful activity models that might be relevant. We found ourselves with a set of such models, using them in the so-called comparison stage, *to question the real world*. And that questioning of the real world using these models would set up a structured debate, the purpose of which emerged as finding the accommodations in that situation which would enable action to improve the situation to be taken. The whole thing is a learning system.

By then, we had realized that the models were quite different to the kind of models which management scientists make. If you are an operational researcher, if you want to improve the productivity of a particular machine, then you make a model of the processes of that machine and it is a model of that bit of the real world. You then use various techniques to optimize that model and hopefully translate the results of that back into real life. Here our models are merely devices and we have realized in recent years that the language commonly used is completely unhelpful to us. We try at Lancaster now not to keep thinking of them as systems. You see that for us the word system is completely, totally, spoilt from its use in everyday language. In everyday language we use the word 'system' all the time. We talk about the legal system, the health care system, the education system and so on, as if system is a label for something in the world, and that is indeed the assumption of the systems engineer. The systems engineer says that the world can be seen as a set of systems, some of which don't work very well, and that the systems engineer can come along and make them work better. We were moving radically away from that and we really ought to give up the word 'system'. I have been trying to promote a number of alternatives that have been suggested in the systems literature. The one that has actually caught on a little bit is the one I have used most: Arthur Koestler's word – holon. In his book about the built-in self-destructive tendency in human beings (*The Ghost in the Machine*), Arthur Koestler has an appendix in which he develops the notion of a holon as a whole entity which is at the same time both in principle autonomous in its own right but also capable of playing a role in a larger entity. So in Koestler's terms a word is a holon which is autonomous in its own right, carrying a meaning as a word, but can also have a part to play in a larger holon which is a sentence. We ought to refer to our models as 'holons' because the word systems always invokes in peoples heads the notion of something out there in the world. I think it was very unfortunate, in fact

(you can say this with hindsight), that one of the very first OU Systems courses ever to be developed was Systems Behaviour which looked at air-traffic control systems, etc, but used the everyday language sense of the word system. And similarly with all the OU work on systems failures, as soon as you start talking about systems failures, you are making the 'hard' assumption that the world contains systems. That makes for interesting problems for OU Systems students, it seems to me! [D1].

So, we had learned that our models were merely devices to enable us to structure a debate in which we are looking for the accommodations between conflicting views which enable actions to improve the situation to be taken; and the whole process is in principle a never ending one.

The other aspect of soft systems methodology that many people get wrong is that they say the purpose of this debate is to find consensus. Now our experience is that true consensus is very rare in human affairs, and that what you actually have to work with in human affairs are the accommodations which enable the situation to move forward. The accommodations are the arrangements you make with your brother to live together in the same family even though you don't see eye-to-eye sometimes. The accommodations are the things that managers have to find in their organization to enable it to undertake corporate action. I have been trying to emphasize this in recent years, and have found a lot of people find the notion quite tricky. The example I use to illustrate it on a macro-scale is a political example from macro-politics and it is from what happened just after the end of the Second World War in Europe, when Berlin was in the middle of the Russian zone as it then was and the city itself was divided into the American zone, the British zone, the French zone and the Russian zone. The Russians did not like this, they did not like the West being in part of Berlin in the middle of the eastern zone of Germany. But they had agreed to it at the end of the Second World War and they had allowed certain routes down the motorways by which the Western sectors of Berlin could be supplied. In 1947, the Russians decided to put the screws on by saying they were closing all the autobahn routes to Berlin and this placed the West in a terrible dilemma. The response, famously, was the development of the Berlin airlift. This was a triumph for management science I should say, since the logistics of supplying a whole major city by air were very complex and it was a terrific achievement to do it. At the height of the Berlin airlift, there were aeroplanes landing at Templehof airport every minute or so and that was the rate at which the planes had to fly in to keep Berlin supplied. Now there is a situation which is a titanic struggle between what was then the Eastern Bloc and the Western Bloc at the height of the cold war. It was by definition a fight; it was actually also a political accommodation in the sense that in the West, the Western military planners considered, and thank God rejected, the idea of mounting an armoured column and fighting their way down the autobahn to Berlin. The Russians, for their part, could easily have shot down the planes in the airlift, which they never attempted to do.

So here is a situation which is by definition a conflict, but also contained an accommodation in that neither East nor West were prepared to make that situation in Berlin the pretext for a Third World War which could see the end of human life on this planet. So that to me, on a very dramatic and very stark scale, is an illustration of the situation that we all of us have to manage in everyday life, both in our families and in our

[D1] To avoid the trap Checkland refers to, we employ in this course 'system of interest' rather than 'holon'.

professional lives as managers. We have to find the accommodations which don't eliminate the conflicts but which contain them in a way that enables action to be taken. It would probably be a very bad thing for any organization which found itself with a consensus. You need conflicts to make sure that the thinking is alive and that the possibility of change is always being regenerated.

What we now have, then, is a process which is a learning process, and 'the system', in soft systems methodology is the whole cycle of learning in which we use the models to structure the debate about change.

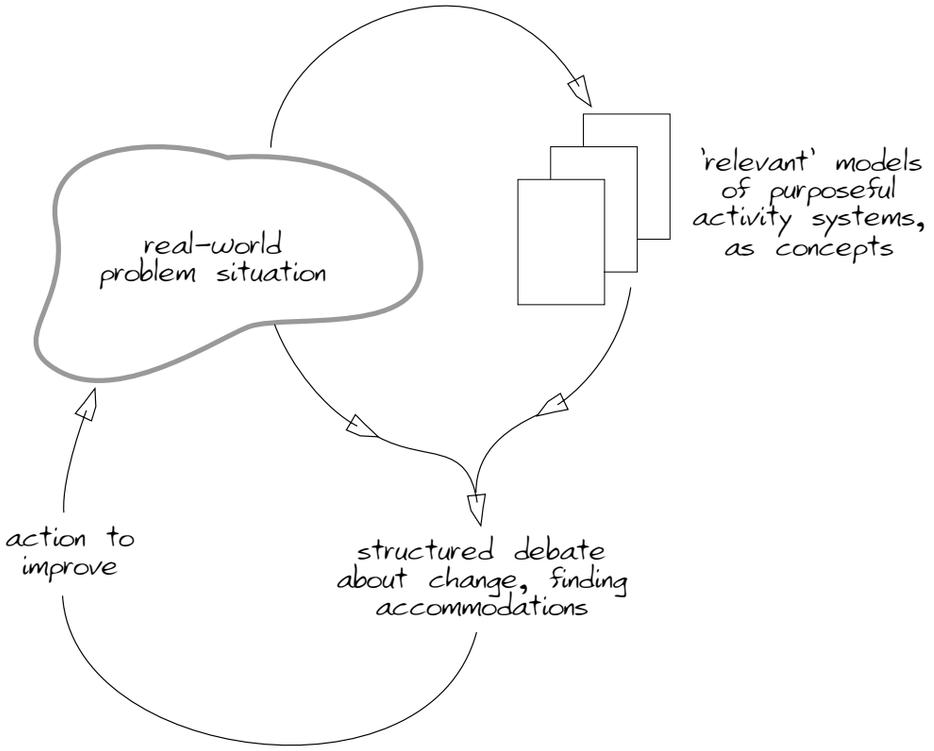

Figure D4 Soft systems methodology as a learning system

And then, although I won't dwell on it here, we have the fourth big idea, that activity models are a very good route to work on information systems. This is because for any purposeful model you can ask: if someone were to do this, if these activities were to be done in the real world, what kind of information would the doers have to have. And if they did them, what information would be generated and who else would find that information useful? So you can turn activity models into information models and the comparison can then be at that level within work on information systems.

So those are the four 'big' thoughts, thoughts which over this long period of time in the action research programme moved the thinking on again when we were stuck.

As for big thought number five, I don't yet know what it is, that is why it is blank in the diagram. This is just to indicate that there will *be* a big thought number five and I hope I haven't retired before I can fill it in; then there will be a big idea number six. Research is a never-ending learning process.

So that is the overall shape of our research; although much of our work is now done in the information systems field, I still see it as a special case of using soft systems methodology. I see the methodology as a broad approach to tackling real-world problematical situations, and I am therefore being very careful in the use of language. We always talk about problematical situations rather than problems. There is a whole sub-literature within management science which directly looks at problem-solving. When you examine that literature it is in fact a sub-set of the hard systems thinking literature and is always based on tightly defining 'the problem' at the start. But for managers that is what is difficult. What we were finding in those experiences of the kind I described at the beginning of the talk is that you can't easily answer the question, 'what are the objectives?'. This makes for managers a problematical situation. It is only in the occasional, technically-defined problem situation, such as, 'how can we optimize the output of this nitric-acid plant?', that naming the system and its objectives and engineering it to achieve them becomes possible. The general case is that you have to explore the many different perceptions of the world. Soft systems methodology is a coherent process which enables you to do that.