# Integrating the "Hard" and "Soft" Sides of Systems Thinking – A Case Study in New Zealand Local Government

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## ABSTRACT

*During 1999 a medium sized City Council was faced with major challenges as a result of its Long Term Financial Strategy (LTFS). Initial work indicated that if the required developments, primarily in terms of infrastructure requirements, were to be met then the Council was going to be faced with unacceptable rises in debt and rates. As a result a major project was initiated which had as its major focus a sustainable reduction in operating expenses of $2,000,000 per annum. For a number of reasons the Council did not want to take a narrow cost-cutting approach. What it wanted to do was use the project as a mechanism for taking a fundamental look at the organisation, using the consulting team as 'coaches' providing staff with the knowledge and skills to undertake the work themselves. This coaching takes place within three areas; process improvement, change management and systems thinking.*

*Faced with complex issues and a client that wanted to take a systems perspective an approach was developed which combined Soft Systems Methodology with that of System Dynamics. This paper describes the framework that was used to integrate the two approaches and the work that resulted from it.*

*Key Words: Local government, soft systems methodology, system dynamics*

## INTRODUCTION

Over the last few years there has been considerable debate within the systems field about the merits of one approach over another. More specifically there has been a divide between the so-called 'hard' and 'soft' approaches[i]. Checkland specifically calling his methodology 'Soft' Systems Methodology to differentiate it from the hard approach he saw as the mainstream of Operations Research.

For practitioners this is, I believe, an untenable position, which will ultimately limit the contributions of the field. This paper expands upon this assertion to argue that the world in which practitioners operate is both 'hard' and 'soft' and any attempt to give one approach primacy over the other is nothing short of naïve. Ackoff puts it very well when he states:

> "Universities propagate the false impression that reality is divided up into the same parts as they are. As a result, they are responsible for the impression that there are physical problems, chemical problems, biological problems, psychological problems, social problems, economic problems, philosophical problems, and so on and on through more than 100 disciplinary categories. There are no such problems"[ii]

Furthermore:

> "These adjectives (hence the disciplines) describe the point of view of the person looking at a problem. They tell us nothing about the problem itself"[iii]

When we look at all the variants within the systems field we are presented with a similar picture, critical systems, viable systems, soft systems, system dynamics and the so on. Applying Ackoff's perspective, they tell us more about the viewpoint of the person promulgating the approach than they do about the world they are trying to understand. Each is but one viewpoint into a complex system. Whilst they can be discussed separately they cannot be separated within the domain of systems practice.

Central to the 'soft' critique of the 'hard' is Checkland's assertion, "that whenever we develop human activity system holons relevant to real purposeful action, it is important to envisage a number of different worldviews…".[iv] On the other side of the debate the 'hard' critique of the 'soft' is based on the inability of the human mind to intuit the behaviour of complex systems. As Forrester states, "Evolutionary processes have not given us the mental skill needed to interpret properly the dynamic behaviour of the system of which we have now become a part.[v] Forrester's words have also being substantiated in a number of papers[vi][vii]

This paper describes one attempt at trying to respond to the needs of a client in a way that acknowledges the positions of both Checkland and Forrester. In doing so it makes no claims about offering the overarching

framework that I believe is so necessary, but simply one person's experience of trying to create something that works and yet remains true to both perspectives.

## BACKGROUND TO APPROACH

This section describes the issues being faced by Mid-Town City Council and the role that Systems Thinking played alongside other interventions taking place at the same time.

During 1998 and 1999 the Council was faced with the unwelcome news that current projections indicated that if they were to implement the initiatives already planned they would be faced with a large increase in rates and an even larger increase in debt. As part of the analysis, undertaken by a large accounting firm, there was a recommendation to engage in a programme of process improvement. To achieve this an internal team was set up under the guidance of external consultants. These consultants although not heavily involved in the systems field saw a need to bring in some systems education to ensure that the initial thinking and choosing of the areas of intervention, took place within a broader understanding than standard process improvement approaches might bring about. The challenge was an interesting one. Firstly this was not to be an "Introduction to Systems Thinking" course. Whilst the conceptual and theoretical underpinnings of the field were important they were secondary to providing practical knowledge and skills that could be used. However, as the City Manager had on a number of occasions stood up and stated that; "The changes we bring about will not be sustainable unless we learn to think differently", there was an opportunity to do more than simply provide a toolkit.

In addition, the work started at a time when they had already instigated three pilot projects aimed at bringing about some 'quick wins'. These were chosen largely on the basis of the consultant's estimate of potential gain. Thus the team was already engaged in the analysis work as part of three process improvement pilots when they first introduced to systems thinking.

## DESIGNING THE APPROACH

The starting point for the design was the central idea that Systems Thinking offered a unique process of inquiry. It was a different way of thinking. Whilst there are many tools to choose from, the fundamental position of Systems Thinking, in all its guises, is that it offers a way of thinking that takes account of the whole and the interdependence of the parts within it. Whilst an admirable stating point it does not, of itself, provide a coherent approach that would have practical applications. So, having asserted that Systems Thinking offered new ways of thinking what were they?

One way of answering this question was to build an approach around the central concepts of Systems Thinking, namely feedback, interdependence, wholeness and the like. However, this did not provide a coherent approach to real-world problems. A second approach was to stick to the methodology of Soft Systems Methodology (SSM) or System Dynamics (SD). However, neither was broad enough to capture the range of issues being faced by the client.

The client was interested in an approach that would not only allow systemic analysis but also enable the proposed changes to be systemically coherent. SSM is not of much uses here as the principle of accommodation does not help work through the choice of options. . As Lane and Oliva (1998) point out, "…if the list of changes resulting from the use of SSM is associated with a desire to have some dynamic coherence…then SD can make a contribution".[viii] On the other hand, whilst the rigour of SD is of great help in designing and evaluating options for change, it doesn't offer much when you were grappling with issues about the role and purpose of Local Government. Furthermore, SD doesn't offer much to ensure that multiple perspective were brought into the discussions about the choices that had to be made when trading off debt, rates and services. Trade-offs that were not limited to financial consequences. Both approaches were needed, but both needed to be present as a coherent whole. The result was an overall framework for the programme, which was called "The System of Inquiry"(Figure 1).

The framework that was used is in form essentially that developed by Checkland in his original description of SSM[ix]. It was used as the starting point as it is structured enough to give comfort and guidance to people who are wanting to apply Systems Thinking to practical problems, yet not confining itself to any particular set of tools. Although it roughly follows Checkland's original formulation of SSM it has embedded within it some structures that Checkland himself may be unhappy with.
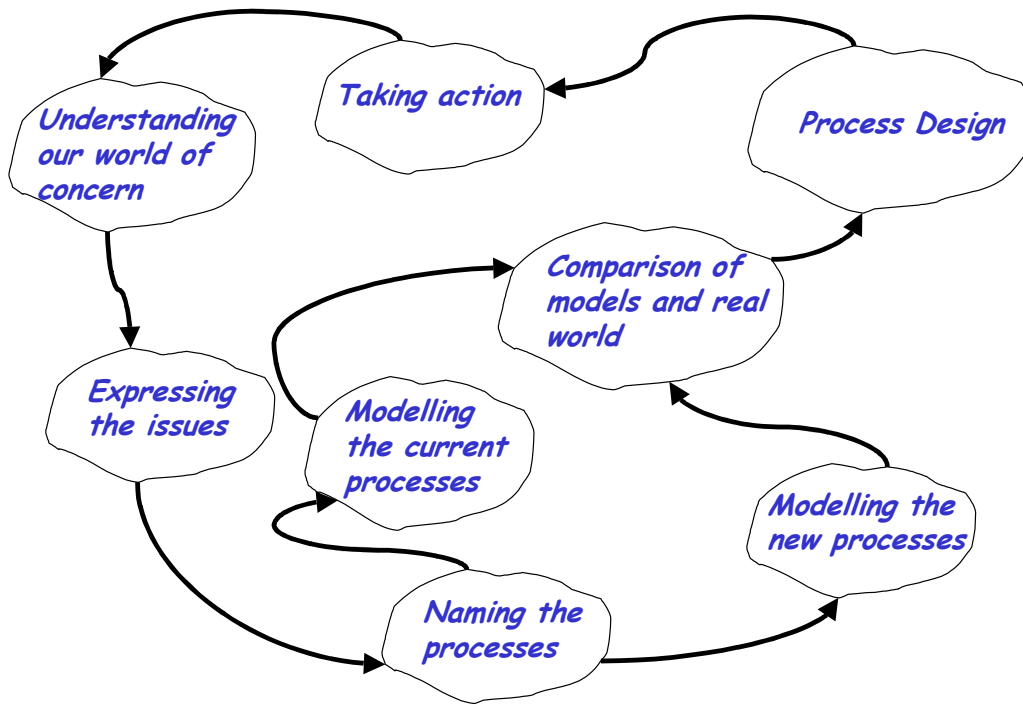
Figure 1: The System of Inquiry

First of these is the explicit nature of modelling. In the work we undertook, and in the initial training, extensive use was made of SD to provide the language for modelling and simulation techniques. However, these models were always presented as 'voices in the conversation' adding other viewpoints to the debate. Not better because the employed computer wizardy but equally valid.

Secondly, whilst naming the processes acknowledges that there are many possible worldviews there is a point where we choose. We choose the worldview that will guide our modelling and improvement efforts. For example, within Local Government in New Zealand there is a range of views regarding the role of Local Government. At one extreme is Papakura City Council who believe that the market provides the most efficient means to deliver services and should be allowed to do so. Furthermore, Council should limit itself to ensuring these services are delivered efficiently and not get involved in broader issues. Christchurch City Council on the other hand see themselves as having a major social role to play and as such get involved in delivering a range of services well beyond core infrastructure. Establishing the worldview of Mid-Town City Council was a significant task to be undertaken and the lack of a coherent worldview proved to be one of the major issues hindering progress in the first few months.

This inquiry process provided a clear path to follow, and a mechanism to help focus attention on different issues. Initially the concern was ensuring the team obtained a rich understanding of the multiple realities that existed. Beginning with an acknowledgement that the team was dealing with a complex mess, furthermore a complex mess inhabited by people, the fundamental premise was that there will always be more than one way of perceiving the world and many possible ways of moving forward. Therefore, the focus was on 'understanding our world of concern', 'expressing the issues' and 'naming the processes' to capture the multiple realities in rich pictures and maps which illuminated both the social and political domains as well as the activity basis of the system. Many concepts and tools helped this process. For example, the concept of 'mental models' so central to SD was extremely useful at this stage. However, interpersonal skills are key to successfully exploring different worldviews and/or mental models and the work of Argyris and Schon was very pertinent offering more substantial theory and practice to guide in the exploration of worldviews and mental models[x].

On the basis of this rich understanding they focused their effort and in doing so moved into areas where the methodologies of SSM and SD overlap. It is here that, consistent with the SD approach, we explicitly state the purpose of the process improvements we are undertaking. This was done by developing reference behaviour patterns and initial models that captured the key elements of the process under consideration from each of the worldviews that the team wished to explore. These models were generally in the form of Causal Loop Diagrams or Stock & Flow models.

In modelling our current and future processes and comparing these models with the real world we are engaging in a conversation which revolves around the making and testing of hypotheses. Why do we believe the world works the way it does and how can we test out whether or not this is a valid view to hold? At this stage the tools

of SD become invaluable, helping, in Checkland's language, '…to structure an exploration of the problem situation being addressed".[xi] In contrast to Checkland however this approach did not view the use of SD models as 'hard', except in the common use of the term, and uses the language as a very powerful means of eliciting the different worldviews, regardless of whether or not the model is simulated. Using SD models in this way is consistent with both SSM and SD. The model is a construct that reflects a particular view. Being a model it is a simplification and the process of choosing what to put in and what to leave out reflects our worldview of what is important to the issues. However, even if the model is a construct of our mind it is a construct that can be used to help us take action in the real world. This taking action may, or may not result in accommodation. What does happen however, by the very act of building the model and choosing to take action on the basis of it, is an explicit commitment to a set of acceptable worldviews. Some views cease to be acceptable any longer.

In looking at desirable and feasible options the team engaged in designing and testing alternatives. With the tools of SD they were able 'test-drive' proposals and assess whether or not they held up under different conditions or scenarios. SD tools are of great value in testing and challenging the thinking processes, whether or not the models end up being simulated.

## WORK IN PROGRESS

This section tells the story of how "The System of Inquiry" was used as a key framework for inquiry within the overall process improvement initiative.

The three early aspects of "The System of Inquiry" were all about what was referred to as "Obtaining a Rich Understanding". This is increasingly becoming one of the tenants of good process improvement within the Council. That is, before one starts meddling about with what already exists let's get a rich understanding of what is going on, what the issues are and ensure we do so by incorporating as many perspectives as is possible.

In practice the initial work was about establishing the nature and role of local government (our world of concern), the key issues being faced by the organisation as it attempted to fulfil its role (expressing the issues) and establishing the key transformations taking place within the organisation (naming the processes). Here the tools of SSM became very useful. The team developed a number of rich pictures and undertook analysis at both the activity level and the social/cultural levels. They explored how the very act of naming something expresses a particular worldview and heavily influences the options and approaches perceived as being viable. This approach also enabled them to develop a framework for the process improvement work by developing a model that captured the key transformations that needed to take place for the Council to fulfil it's vision. The first iteration simply mapped out what the team saw as the major systems operating with the Council (figure 2)
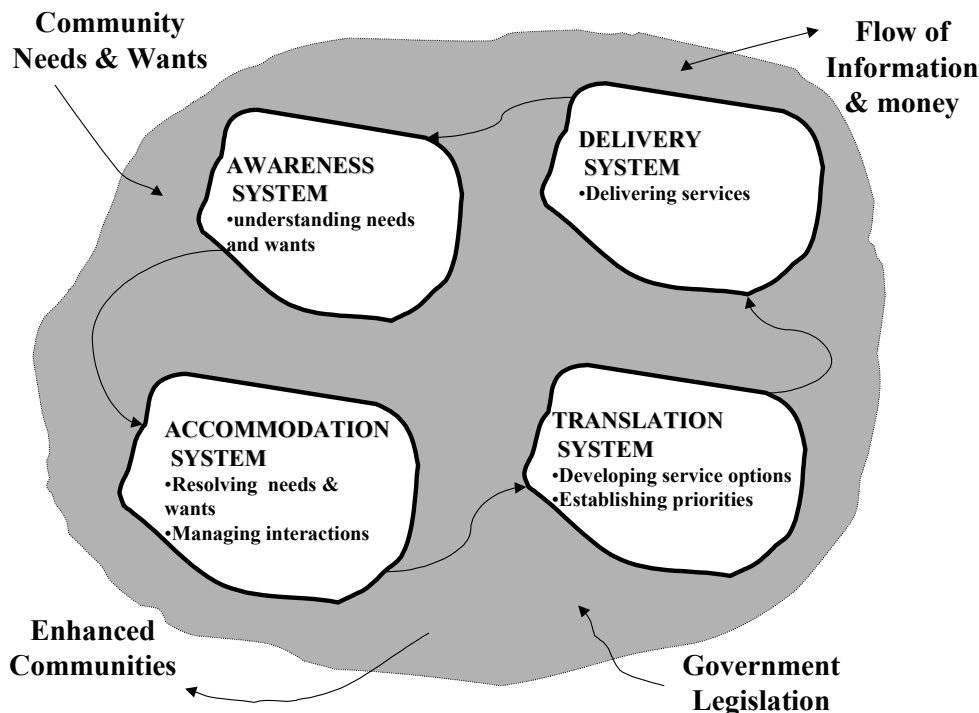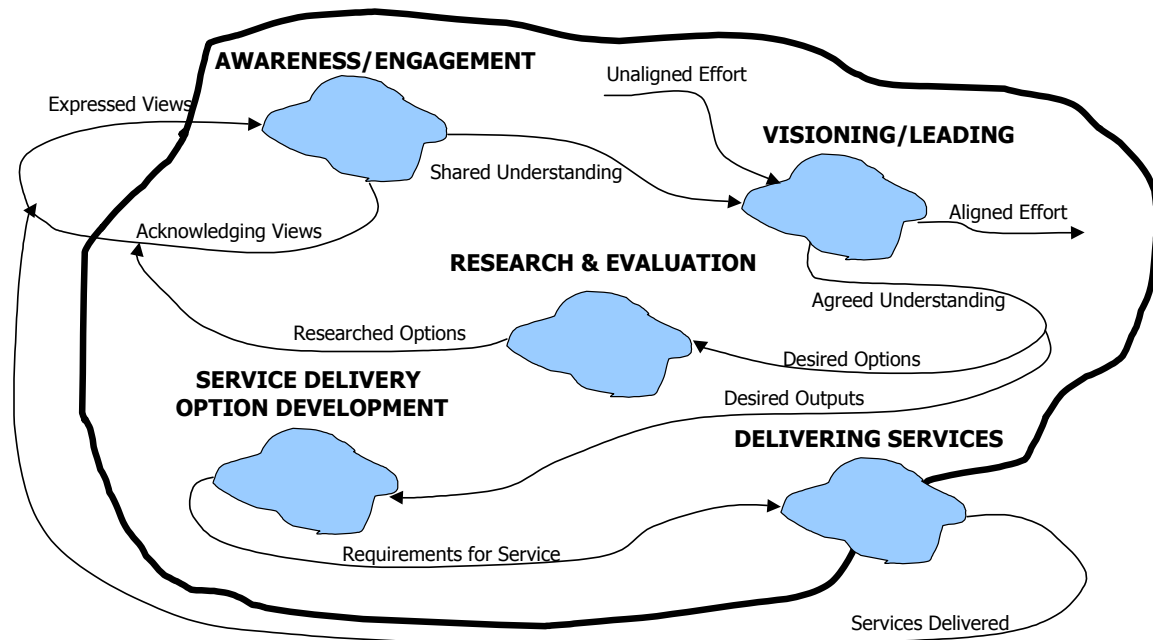


Figure 2. Major Systems within Mid-City Council

As they explored this further however and became a lot clearer about the significant transformations taking place



they were able to map out a more complex model that helped illuminate current issues being faced by the Council and provide a framework for choosing areas of intervention. This model became known as the "Lakes Model" (figure 3) and has become a touchstone that is used to assess the focus and validity of key processes within the organisation.

Figure 3. The Lakes Model

The value of the "Lakes Model" is that it captures, in a set of linked transformations, key aspects of Local Government that were not being explored in the initial process improvement thinking. It incorporated into one model aspects of the activity system as well as the social and political context within which the activities take place. The key transformations of the Lakes Model are:

- Awareness/Engagement, which transforms expressed views into shared understandings.

- Vision/Leading, which transforms shared understanding into agree understandings and unfocused effort into focused effort.

- Research & Evaluation, which transforms desired options into researched options. A process which informs the awareness/engagement transformation.

- Service Delivery Option Development, which transforms desired options into requirements for service.

- Service Delivery, which transforms requirements for services into services delivered. These services then change the world in which the community is living and so influences their expressed views.

It should be noted here that the team went out if its way avoid the use of language that could relegate the transformation to an existing perspective, hence the avoidance of terms like consultation and decision making. The language used aimed to capture the essence of what the process was about.

These transformations became the basis for exploring organisational processes and a means for assessing whether or not the process was as effective as it could be. For example, did the management and political leadership of the Council have effective awareness/engagement processes which developed a shared understanding of community concerns and furthermore did the management and political leadership have effective mechanisms for translating these shared understanding into agreed understandings. The answer too often was no. The Lakes Model became therefore an effective challenge to current practice and also provided a guide to the direction that change needed to take place.

During this initial phase the team also developed a number of Causal Loop Diagrams of specific issues they wanted to unravel in more detail. They also developed a number of stock/flow maps as a means of exploring both the activities taking place and the mental models of the decision makers. Possibly to the horror of both SSM and SD adherents the team used any tool that would help them obtain a rich understanding. The only

criterion was that it had to capture the "whole". Very subjective, but it at least kept them open to new perspectives.

**CONCLUSION**

At the time of writing the first phase of work is coming to completion and proposals for significant change in the core practices of Council are being considered. Furthermore, the team is now using "The System of Inquiry" to explore the effectiveness of the team itself and what it can do to learn from what has occurred during the first year. This is including tools from both SSM and SD. The labels of "soft" and "hard" are seen by them as meaningless, and in direct conflict to what Systems Thinking in all its variants proposes.

As such "The System of Inquiry" has provided a framework within which to work, which doesn't create artificial barriers between hard and soft. It does not put rich pictures and dynamic simulations at extreme ends of some academic debate. It also, I believe, remains true to the essence of SSM, acknowledging that all perspectives are partial and reflective of one's particular worldview. It also acknowledges the cognitive limitations we are all faced with and the resulting insights and challenges that the use of SD can provide.

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