Methodological Pluralism in practice: the practical application of various systems methods and techniques in the analysis and design of complex work systems.

David Bruce-Smith
GDSE, MAppSc.(Social Ecology)

Australian Taxation Office
E-mail: david.bruce-smith @ ato.gov.au

ABSTRACT: *Exploration of issues associated with the introduction and the application of various systems thinking methods and techniques in the analysis and design of complex work systems in a large public sector organisation. Action research approach to introducing and skilling people in the use of systems thinking techniques and in exploring the concept of methodological pluralism. Highlights significant issues and considerations associated with the practical application of systems thinking techniques. Insights into the benefits and dilemmas of encouraging methodological pluralism in the application of systems thinking methods and techniques.*

Keywords: Systems thinking, methodological pluralism, analysis and design of complex work systems.

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INTRODUCTION

This paper briefly explores some of the issues and learning associated with the introduction and application of various systems thinking methods and techniques in the analysis and design of complex work systems in a large public sector organisation. In particular the paper presents an argument for the benefits of methodological pluralism, both in skilling people in systems thinking techniques and in leading to greater systemic and holistic appreciation of problem domains which, in turn, influences more informed management decision-making practices.

CONTEXTUAL BACKGROUND

Between late 1997 and 1999, I was engaged as Design Manager in the Business Systems Segment of the Large Business and International Division of the Australian Taxation Office (ATO). The purpose of the Business Systems Segment was to identify and design appropriate business and work systems to support the achievement of planned business outcomes. In this context the terms "business system" and "work system" were used to describe a broad holistic notion of purposeful work systems incorporating business processes, legislation and policy frameworks, client interfaces and requirements, information technology applications, management practices, work practices etc.

This notion of "business system" represented in the ATO a significant departure from more traditional approaches to computer systems application projects. As such, we needed to find and apply a range of analytical and design techniques that we could use to address the systemic nature of the outcomes we sought. Our work required exploratory approaches, and from the beginning, in December 1997, we used a critical learning heuristic framework and a collaborative action research/ action learning process with which to focus the work of our project team.

Similarly, we needed to skill business systems analysts working in the Business Systems Segment to use these techniques. In doing so we established an expectation in our own minds that the business systems analysts would need to have far greater appreciation of the systemic nature of work than the limited and reductionist perspectives inherent in the more common organisational approaches to the analysis and design of IT applications and business process.

RESEARCH ISSUES AND QUESTIONS

During 1997, senior and middle managers in the ATO were being encouraged through performance management role statements and competency models to be more "systemic" and "think systemically", however there appeared to be only extremely limited opportunities for managers to actually gain any insight or understanding about what systems thinking might be. Indeed many simply regarded the term systems thinking as yet another in a long list of topical management fads arriving in wave after wave upon our organisational shores from North America. While there may have been very small pockets of introductory explorations of systems thinking, there were no internal ATO training programs into the nature or application of systems thinking. There also appeared to be no conscious recognition that there may have been various "systems thinking" techniques, nor that different contexts and different problem domains required different approaches.

The major issue appeared to be that, for most managers, accessibility to learning about these relatively new ideas was extremely difficult. Further, for most people working in the traditional areas of organisational design, work and job design, or Information Technology applications development, there was no imperative for them to change from the traditional techniques they were already using. Problems were presented as, and were expected to be presented as, well-bounded statements in a language of linear processes and reductionist views of business transactions, devoid of any complications like systemic relationships and emergent properties. Similarly, even if anyone should choose to differ and explore a more systemic approach, management was far more likely to accept a solution that was bounded and expressed in the same language as that used originally to describe the problem, a behaviour which in itself is a very strong paradigm (e.g. reinforcing causal loop) to change.

Further, the existing project management methodologies and the financial management frameworks constantly reinforce a paradigm that insists organisational projects know the specific deliverables, project outcomes, estimated savings and benefits, and the exact cost prior to the project gaining approval and funding with which to actually start. The underlying world views inherent in project and financial management techniques by their very nature often exclude the application of more holistic and systemic approaches to problem solving and organisational improvement.

I was interested in how people in the workplace could:

❖ firstly, access and learn about the intellectual and theoretical aspects of systems thinking;
❖ secondly, could gain some experience in exploring and the various methods and techniques;
❖ thirdly, could choose the most appropriate technique and/ or techniques for their specific problem domain; and
❖ fourthly, apply the technique with both rigour and methodological integrity.

ACTION RESEARCH / EXPERIENTIAL LEARNING WORKSHOPS

Within the ATO I was part of a small informal network of ATO middle managers who were interested and in some cases actively exploring the applications of systems thinking in a range of work situations. Tapping into this network I invited 11 people to join me in 2-day workshop in November 1997, exploring aspects of systems methods and techniques. The context for the workshop was the design of a workforce planning framework, however the purpose was to explore issues associated with the accessibility of systems thinking techniques, from both an intellectual and a comprehension of texts perspective, and to also explore the practicality and usefulness of applying these techniques in an experiential learning environment.

In preparation for the workshop I allocated the participants into pairs and assigned each pair a specific method and/ or technique, as well as providing each pair with a workforce planning related problem domain for which I thought the method/ technique would best be suited. Thus, each of the systems techniques of soft systems methodology, viable systems diagnostic, causal loop analysis, systems dynamics, and a social ecology systemic appreciation (a technique I had developed during the last 18 months) (Bruce-Smith 1996) were to be explored in the workshop. In planning the workshop I also spoke to each of the participants in detail about the workshop, sharing ideas, listening for suggestions and gaining each person's input and commitment to using a specific technique to explore a particular problem domain.

Prior to the workshop participants were provided with some general pre-reading relating to the nature of purposeful systems (Packham (Ed.) 1991), plus extracts from Senge (1994) and Hames (1997). In addition to this general reading, specific pairs were provided with readings related to the method and/ or technique that they would be using. Thus, one pair read Flood and Jackson's (1991) "Chapter 5: Viable Systems Diagnosis (VSD)", and another pair read both Checkland & Scholes' (1990) "Chapter 2: The Developed Form of Soft Systems Methodology" and Flood and Jackson (1991)

"Chapter 8: Soft Systems Methodology" etc. Further reference texts and articles were available during the workshop for participants to peruse, graze, read and/ or discuss.

The workshop room was physically arranged so that pairs could work on whiteboards spaced evenly around the walls and then, periodically, people could face into the centre of the room to share learning and to engage in presentations, discussions, debate etc. This arrangement also meant that at any one time, people could look up from what they were doing and see the different methods and techniques being used to tease out the various problem domains on different whiteboards.

The outcomes of the workshop were both encouraging and thought provoking. Encouraging because people genuinely tried to address their specific problem domains with the assigned methods/ techniques and, in doing so, while struggling with new concepts and nuances of language, they quickly became familiar with basic concepts and with the practicality of applying the techniques. Encouraging also because as a group we quickly demonstrated the enormous insight that methodological pluralism gave us in examining different perspectives and domain of the subject matter i.e. a workforce planning framework.

During the two days soft systems provided the first draft of detailed work processes and decision-making criteria as well as the management and work practices required to support a sustainable workforce planning framework. With Viable Systems Diagnostics we explored the organisational communication and information flows at various levels of recursion, including ATO, LB&I and Segments within LB&I. VSM also provided great insight into the requirements of leadership in being clear about organisational purpose and identity as well as policies and management discipline required to make workforce planning actually work. System dynamics was used to explore and develop a model to simulate flows and relationships between variables including recruitment, aging workforce demographics, rates of retirement and resignations, lead-times to develop people with appropriate skills, knowledge and breadth of experience. Causal loop analysis was used to explore a range of dilemmas and relationships, and demonstrated the validity and/ or fallacy of aspects of various assumptions and relationships associated with historical and current approaches to workforce planning in the ATO. Our social ecology inquiry provided insight into cultural aspects of diverse work communities within the ATO and identified the nature of the change program required to support the introduction of a workforce planning framework. Collectively, the five techniques provided an extraordinarily rich understanding and multi-perspective appreciation of a workforce planning framework for ATO LB&I.

On the other hand, I personally found aspects of the workshop thought provoking because it became apparent to me by mid-morning of the second day that a few participants had trouble applying the theoretical frameworks and were simply drawing "bubbles and arrows" and linear processes on a whiteboard, convinced in their own minds that what they had produced represented a systemic analysis. This was particularly the case with the pair who had explored the use of causal loop analysis, and to a lesser extent of the pair who pursued a social ecology systemic appreciation.

I should add that this workshop was conducted in a spirit of collaboration, action research and shared learning, and that everybody's observations and reflections on all results and findings were encouraged and acknowledged. We did not criticise nor praise one another on the basis of the degree our individual command of the subject matter; rather as a group we explored what may make the technique more accessible and/ or understandable.

Key Issues and Insights

Key issues and insights arising from this workshop included:

1. While the various methods and techniques are all referred to loosely in the ATO as "systems thinking", they are actually fundamentally different, with different purposes, languages and nuances, and need to be specifically selected and applied to appropriate contexts, types of enquiry and problem domains;
2. Without some practical experience and possible expert guidance, the group considered that SSM, VSD, and causal loop analysis were all difficult to a understand and apply from simply reading a relevant text;
3. From the group's brief exposure to the "hard system" approach, that of System Dynamics, and from our observations of the two skilled participants using the technique we considered that System Dynamics required a prolonged time to learn and a great deal of expertise and competence to use;
4. Adopting a worldview that incorporated methodological pluralism into our approach provided us with extraordinary insights and different perspectives of a subject area-in-focus. Through our

discussion about the range of insights and outcomes from each technique we gained an even greater emergent understanding and deeper appreciation of the systemic nature of workforce planning and its relationships and links into many other aspects of strategic management, work systems and organisational design;

5. Discussions about degrees of difficulty and questions of rigour led us to pose the questions:
   ❖ Could everybody learn to be a "systems thinker" and to successfully and competently use a range of methods and techniques?
   ❖ Did everybody *need* to be a systems thinker?
   ❖ What sort of organisational commitment and investment were we going to need if we truly wanted people in the ATO to develop expertise in systems thinking?

From my perspective the question became one of how were we going to successfully, and in a relatively short time frame (say 6 to 12 months), introduce and skill business systems analysts to undertake the work required for the LB&I Business Systems Development Project. In addressing this question, the Project Manager, Sally Pegler, and I spent considerable time researching and thinking about this issue. As we formed the project team we also commissioned a formal training audit, including a training needs analysis, and established that we had a team with a wide range of expertise, experience and qualifications particularly in the domain of management, computer systems development and computer support to ATO business activities.

What we needed, in addition to these already impressive array of skills and abilities, were business systems analysis who could use a range of systems thinking methods and techniques, and a community of practice who could converse in the language of systems thinking about issues relating to the analysis and design of work systems.

EDUCATION & TRAINING PROGRAM IN SYSTEMS THINKING

In April 1998, I approached Professor Richard Bawden at the Centre for Systemic Development, University of Western Sydney, Hawkesbury. Richard Bawden had recently developed a leadership program based on a systems thinking approach and was offering this program on a commercial basis to business and other organisations. Richard was passionately interested in how adults learn to learn and believed that to think systemically people needed to *be* systemic.(Bawden et al 1998)

I explained my need to skill business systems analysts and outlined some of my experiences in this area. Richard listened politely, smiled, and said, "Of course, people cannot learn about systems thinking in non-systemic ways! You need to read Marcia Salner's article (1986) on epistemological development and contextual relativism!" (or words to that effect). That said, we sat down and together developed a learning partnership between the ATO and the Centre for Systemic Development. Over the next 6 weeks, Sally Pegler and I from the ATO, and Richard Bawden and Bruce McKenzie from UWS, designed a new program specifically for the LB&I Business Systems Development Project. This program was based partially on Richard's leadership program but was designed with the specific purpose of introducing ATO business systems analysts and other project staff to the notions of personal learning systems, general systems thinking, soft systems methodology, critical systems thinking, and viable systems methodology. The program also included a thematic exploration of various intellectual, behavioural, personal and ethical aspects required for leadership in the design of complex work systems. And for good measure, we also included introductory sessions on chaos and complexity theories.

The program was conducted over six months between June and November1998, for 27 ATO staff and was facilitated principally by Professor Richard Bawden, Bruce McKenzie and Dr. Roger Packham from UWS, Hawkesbury. The "Leadership in the Design of Complex Work Systems" program comprised an initial 3-day workshop in Sydney in June 1998, an initial works-based learning project, a 5-day residential workshop at UWS, Hawkesbury, in September 1998, a second work-based learning project and a final 2-day workshop in Canberra in November 1998.

The outcomes for the ATO from this program were profound.

Many of the 27 business systems analysts and project staff who commenced the program in June with a mixed degree of enthusiasm and scepticism, were by August 1998, using a new language and set of techniques by which to interpret the environment and undertake the analysis of work systems. As a design manager I observed a blossoming of SSM rich pictures, CATWOE analyses, or rather "TWOACES" analyses, an enhancement by Richard Bawden (1998), root definitions, ideal systems, and discussions around emergent properties, learning systems, sub-systems, supra-systems, as well as meta-learning processes, world views and epistemologies. Following the 5-day residential workshop in September 1998, there was a very real change in how people spoke of and interpreted organisational designs and information flows and communication systems when viewed through a

window of Viable Systems Methodology. People had begun to see the world through more informed and trained eyes and we now observed many of our business systems analysts exploring the design of work systems using Critical Systems Thinking models and techniques. Later evaluation and feedback from the participants highlighted such aspects as Critical Awareness, Ulrich's 12 Questions (1996), Midgely's (1996) insights into boundary judgements and Methodological Pluralism as providing our business systems analysts with insightful and powerful tools by which they might tackle some of the complexities of design in a large hierarchical and bureaucratic public sector organisation. Though there was obviously a great deal more to learn and the need to gain experience in using these methods and techniques, there was also a very real sense of an enhanced and evolving analytical and design capability within the project team. In addition, there was a strong sense of being part of an active and cohesive learning community, the members of which now shared a new language and a new set of insights and windows with which to view the world.

The practical benefits from this program to our project were demonstrated to both ourselves and the organisation in the project design report of October 1998. The report included:

❖ An exploration of the broader tax system and of (then) current ATO LB&I business systems capabilities using soft systems methodology;

❖ Hard and soft systems;

❖ The identification of systemic interventions using soft systems methodology, viable systems methodology, and critical systems thinking;

❖ The design of work systems, sub-systems and sub-sub-systems required to achieve LB&I business outcomes;

❖ The identification of key stakeholders, systemic relationships, boundary issues and proposed collaborative approaches and partnerships;

❖ The design of hard and soft systems sub-projects to develop the appropriate work systems, business processes, technology applications, business intelligence and knowledge management and communication systems, client focus, management practices, work practices, performance management, leadership and the behaviours required to support and sustain an evolving and dynamic learning environment.

ORGANISATIONAL ISSUES AND DESIGN PARADOXES

This approach to design using a methodological pluralism of systems techniques quickly highlighted a number of organisational issues and design paradoxes. These issues included:

1. Using systems thinking techniques in an organisational environment populated predominantly by linear and process-oriented thinkers proved to be a two-edged sword. From our project perspective, systems thinking methods and techniques gave us enormous insight into problem domains and into the potential design of systemic interventions that we believed would lead to achievable and sustainable improvements. Yet by doing so, we appeared to many others outside of the project to be greatly overstepping our project "boundaries". Further, by equally emphasising soft and hard systems in our project design and by not using a far more linear and rigid computer systems development methodology we were deemed by many senior and middle managers to be impractical, theoretical and basically "off with the pixies". I should add that in the ATO culture there is an undercurrent of anti-intellectualism, particularly in relation to anything outside of tax law, and that the criticism of being "theoretical" is used pejoratively to dismiss new ideas and anything that seems vaguely "too hard". The difficulty this presented us with was the need to communicate our ideas and systemic design proposals to a fairly wide audience, particularly senior and middle managers, who did not understand our new "systems language". We worked hard to find ways of communicating the design ideas in the language of traditional management lines of control and linear process-oriented work, without losing the notion of systemicity and emergence. This is a work of making meaning and translation that I suspect will continue for quite some time to come.

2. Similarly, the ATO has been encouraging managers and staff to "look outside the box" and to take far more systemic views of situations and problem solving. In my view, however many senior managers were totally unprepared for the underlying emancipatory worldview inherent in soft systems methodology, viable systems methodology and critical systems thinking. While the ATO is attempting to change, it is still a very traditional and hierarchical workplace in which decision–making and the ownership of ideas is considered to be the domain of the senior management. Our use of systems thinking approaches, particularly in not using just one technique, but in using many, represented what many senior and middle managers believed to be a threat to the status quo and to the known-order of hierarchical decision-making.

3. An associated issue was that by using these techniques we quickly began to surface a range of critical assumptions about the purpose, intent and strategic decision-making processes of the organisation. I am not suggesting that many of these assumptions may not have been surfaced by others before, they had. What we experienced during late 1998 and 1999, however was that the systems thinking provides insights and opportunities that highlighted a number of critical assumptions and strategic paradoxes that we believed needed to be addressed. The difficulty here was that there were no organisational forums that we could access in which such issues could be addressed. Further, after the Federal Government announcement in November 1998, the ATO rapidly came under pressure to deliver on Tax Reform in a very short eighteen months. This led an environment in which transactional and process-oriented design solutions were seen as highly desirable, and that by raising systemic questions and surfacing strategic paradoxes we were at risk of being regarded as not being "team players". We knew from experience that this sort of label could quickly lead to our exclusion from the very design forums that we wished to influence. Over time we have used a soft systems approach as well as critical thinking analysis to give us insight into how to approach this situation.

4. One emergent issue from all this was that the very business systems analysts that we had endeavoured to skill in systems thinking became, to varying degrees, frustrated and disillusioned by the organisational response to the project design proposals, and to the difficulty of discussing systemic and emancipatory approaches with colleagues and managers who had not had the same learning opportunities. The challenge for business systems analysts in using these techniques is to also understand the nature of leadership and personal judgement that needs to accompany the application of systems thinking.

CONCLUSION

The practical application of the concept of methodological pluralism in the analysis and design of work systems in the ATO has proved to be extremely insightful and beneficial, at both an individual and an organisational level. Combined with Bawden's (1998) educational approach of getting people to learn how to learn and Salner's (1986) notion of contextual relativism in systems thinking, methodological pluralism has been a particularly powerful concept in introducing people to the range of systems thinking techniques and potential applications. These techniques included soft systems methodology, viable systems diagnostics, causal loop analysis, critical systems heuristics, and general systems theory, the use of which represented a radical departure from more traditional organisational approaches to the design of business processes and information technology applications. The practice of methodological pluralism has become an essential and profound component of our professional work as systems analyst and designers. Our learning continues.

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