

Action Research for Change and Development

Edited by
ORTRUN ZUBER-SKERRITT
*Centre for the Advancement
of Learning and Teaching
Griffith University, Brisbane*

Avebury

Aldershot · Brookfield USA · Hong Kong · Singapore · Sydney

2 Towards action research systems

RICHARD BAWDEN

Abstract

Action researching is a particular way of critically learning about events in this world in order to change them. It combines theory with practice into a critical process. The intent of this article is to explore some connections between learning theory and research praxis. The style adopted is both narrative and illustrative rather than analytical or critical. The models are presented in illustration and in the tradition of models for debating changes in the world. The particular perspective taken presents action researching as an experiential, systemic and critical process which involves people working together to improve complex problematic situations.

A quick word on format

I am a visual person, happiest when portraying my world via little pictures. In this paper I want to share some of the little pictures of my world with you, not as models which describe the way the world actually is, but as models to use as a basis for arguing about how we might change the world.

The context

This paper is more an odyssey than a treatise. Yet hidden beneath its apparent superficiality are dozens of rigorous theories, philosophies and years of experiences which have informed the models that illustrate the tale.

As an agriculturalist I believe that it is critically important that we amend our current practices, for much of what we are doing is clearly leading to the degradation of our social and physical environments both locally and globally. I say agriculturalist; it would be more accurate to present myself currently, as an action-researching social ecologist - someone trying to make better sense out of his complex and dynamic world in order to treat it better. I seek to *find out* about my world such that I can *take informed action* in it. The process of learning is a synthesis of finding out and taking action. I am finding out how to improve my competency at improving complex situations and how to help others to find out how to do things in ways which will lead to more sustainable developments in our relationships with each other and the rest of our world. As what we DO in this world is determined by the way we SEE it (Maturana & Varela, 1972), there will need to be some significant changes in the way we go about our "seeing" and our "doing" if we are to improve our current situation.

On knowing

Learning is the process at the heart of my "seeing and "doing" (Dewey, 1910).

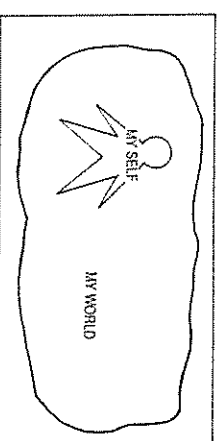


Figure 2.1 Me and my world

Here I am (Figure 2.1), surrounded by a world of infinite complexity. A world which and to which, I can adapt such that we might better suit each other and all the others that share the same world (Bronowski, 1965). In essence, I learn in order to become a better manager of the systems of which I am part. My family, my organisations, my community, and the environments in which all of these sets of relationships exist, all deserve much improved treatment from me. Because of all of its apparent complexity, I can only deal with certain issues or phenomena at a time. (Figure 2.2)

I take a "goblet" of issues from the vast "ocean" around me as the ocean, in its totality, is beyond my comprehension. Yet, as I shall argue later, I can still enquire into the goblet with the same systemic, holistic, organic perspective that I would use to investigate the ocean itself.

I find out about my world in order to take action in it: Learning is the fundamental process of human adaptation (Kolb, 1984) or co-adaptation, as we shall see later. In addition to the synthesis of finding out with taking action, this experiential approach to learning can also be viewed as a synthesis of the

concrete and the abstract; of facts with theories, of matter with mind, of the objective with the subjective. In process terms then, I do my finding out in both concrete and abstract contexts, and I take action in both contexts too! It is important to emphasise the integration of these "activities". They are but different aspects of the same process linked by the tension of difference into a "glorious unity of opposites" (Bertalanffy, 1968) - a magical loom with ever-flashing shuttles. Learning can thus be construed as a dynamic process: a flux between sensory experiences of the world and their mental abstractions - between experiencing and making meaning of these experiences, between sensing and making sense! (Figure 2.3)

The uniqueness of our experiences, of the way we go about making sense out of them, and of our resulting actions, makes our learning very personal. Indeed the very world we are learning about is also intensely personal (Kelly, 1955)! You and I differ not just in our conceptual interpretations of the world but also in our very perceptions of it. Each of us "sees" a different world. It's not just that we differ in our interpretation of the same reality: There cannot be a same reality for any two or more observers (Maturana & Varela, 1988). The universe is a multiverse because it is observer-dependent!

Each of us goes about "seeing" our "reality" through our own "little window on the world"; a weltanschauung of value-laden, psycho-cultural, experience-modified knowledge or beliefs or assumptions which shapes the way we handle issues in our world. (Figure 2.4)

It reflects the personal disposition which we bring to bear as we go about our learning. It dictates our perspective on the world, or at least the bits we are looking at, as we start our enquiries. What we will find out, is thus in part predetermined by the perspective we adopt (Ben Eli & Probst, 1986).

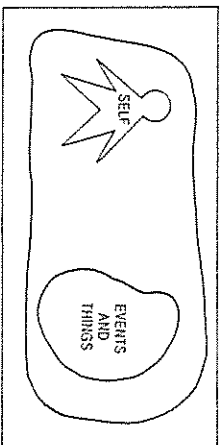


Figure 2.2 My worlds within and without

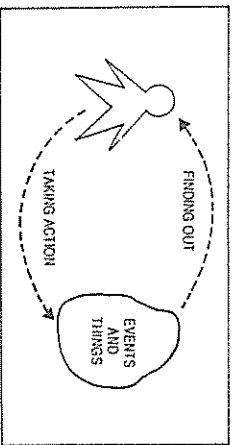


Figure 2.3 The experiential learning flux

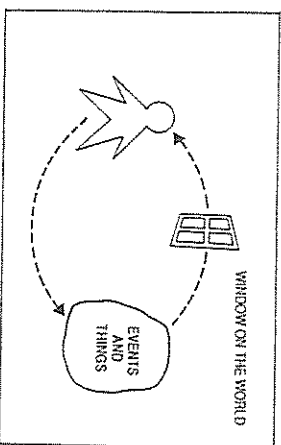


Figure 2.4 A window on the world

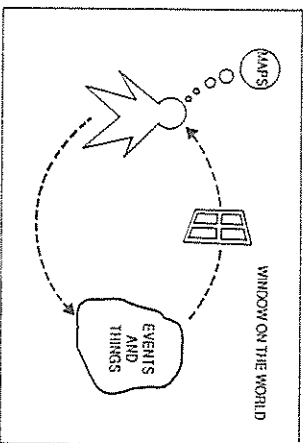


Figure 2.5 Making sense as 'mapping'

Thus the way we go about our learning will influence that which is eventually learnt. Indeed the way we go about our meaning-making, and the meaning perspective which it reflects, will dictate the issues we address in the first place. (Figure 2.5)

We select the issues we want to examine, and this process of selective observation is further refined by the very way we try to make sense out of, or construe those observations and thus the specific constructs which are the outcome of our construing (Bannister & Fransella, 1971). We assimilate our observations into patterns in our minds, in ways which are unique to us as individuals (Piaget, 1970).

As an individual in this world, I am constantly in the process of transforming the facts I gather from the world about me, into constructs (Glaserfeld, 1984). The outcomes of my "seeing" them are the explanations, hypotheses or interpretations which I propose as "theories" which I then set about testing, using the "little bag of tricks" I have mastered for doing such things. (Figure 2.6)

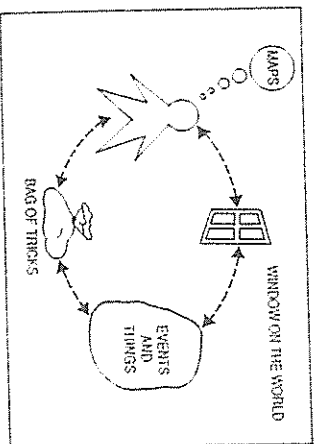


Figure 2.6 The recursive cycle of experiential learning

What I do in the world is thus determined by the theories I construct from my experiences in it. My actions in the world are informed by the meanings I attribute to the world in which I am active (Polanyi, 1958). Actually these actions fit into two categories. Having developed certain notions about what I see as happening around me, I am keen to (a) test the validity of those propositions (as a scientist); and/or (b) do things to change what is happening (as a technologist) (Checkland, 1981). Either way, I am subjecting both my knowledge and what I do with that knowledge, to the scrutiny of critical public review.

In this way we have generated a model of experiential or action learning as an ever-recurring process which has me "cycling" and "recycling" between four different but highly integrated phases. I investigate "the facts of the matter", turn these into "familiar patterns in my mind" (Bergland, 1985), translate these into appropriate "models for action", and "take action" to do something about the original "facts of the matter". It would be naive of course to suggest that I am free to interpret and do with my world, whatever I will. All of this will be set in a socio-historical-ideological-cultural context of which I should be critically conscious (Bruner, 1983). Action learning brings the private and the public aspects of knowing, knowledge and action together (Revens, 1982). Each will influence the other and it is in this way that public or social knowledge accumulates. In this manner, ways of knowing and ways of acting can be shared, put to critical review, and amended. It is clear that perspectives and values and *weltanschauungen* and dispositions, need also to be shared, if private meanings and actions are going to be publicly useful. It is also clear that the whole process occurs within a political economy and is charged with issues of power, potential control and regulation (Freire, 1973, 1987).

In learning, I start by immersing myself in concrete experience. I take careful observations and reflect on these as I go. I convert my observations into abstract concepts, and I finally take "experimental" action to test out my constructs. Each phase in this cycle, demands different talents of me. It is the spectrum of varying abilities that I bring to this collection of activities, that in large part endows me with a particular, idiosyncratic style of learning. (Figure 2.7)

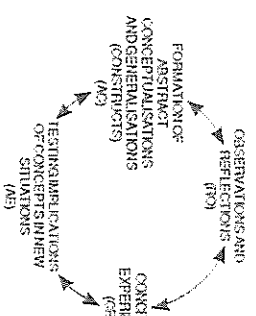


Figure 2.7 The four stages of the experiential cycle

To use the language of others: In investigating the "facts of the matter" I firstly need the ability to *diverge*, to spread the net of my initial enquiry as broadly as I judge it to be appropriate. I then need the ability to *assimilate* the divergent knowledge that I have gleaned about the issue I am investigating, into familiar patterns in my mind. The meanings or insights that I generate through this patterning process I now use to *converge* into models for testing. And finally I need to be able to *accommodate* the use of these models in ways which are useful to me in achieving action (Kolb, 1984).

Of course, in practice, things never go this smoothly. In practice, I jump about all over the place; sometimes going backwards, sometimes forward and sometimes I just get stuck and go no further. Most times I find that I really enjoy some of the phases of the cycle, much more than others. And as it is the activities that I enjoy that I am usually best at doing, my idiosyncratic style gets reinforced more and more.

Indeed the more I learn in my own particular way, the more I am unlikely to change it for another (Bawden, 1989). And what is true for me is also true for you. This increasing intransigence to change one's learning style has a profound significance for anyone who hopes to help others change the way they do things. Changing "doing" means changing "seeing" which means changing "learning" which means changing "styles"; new ways of knowing. To become a more effective learner, each of us needs to address our style! We then need to seek out and master new techniques that help us to diverge/assimilate/converge and/or accommodate in better ways (Kolb, 1984). This, and the better integration of all four activities, thus present foci for learning how to better learn. In this manner, each of us can indeed change the particular biases of our own style, but it should be stressed that experience suggests that this is no easy feat. A strong case can be made for educators to place as much emphasis on mastery of these different ways of knowing as on particular bodies of knowledge! (Figure 2.8)

A recapitulation

Before moving on to explore the relationship of learning with researching, and in particular of action-learning with action-researching, it is probably

worthwhile to pause at a model which attempts to bring together all that has preceded us to this point.

There could be grave disputes about the propositions contained in this model, but bear with me for a while, remembering that these models do not purport to illustrate the way the world is: The model below (Figure 2.9) stays within the tradition of models for debating changes that we might make to the world and processes within it. It aims to inform, not explain.

Throughout the text so far, I have presented experiential learning as if it were the only way we go about our learning; the only process by which we adapt to our worlds. Clearly this is not so, for if it were, then if nothing else, schools would do things very differently from what it is that they currently do!

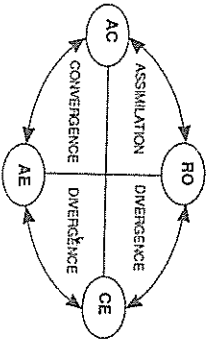


Figure 2.8 The Kolbian/Lewinian recursive cycle

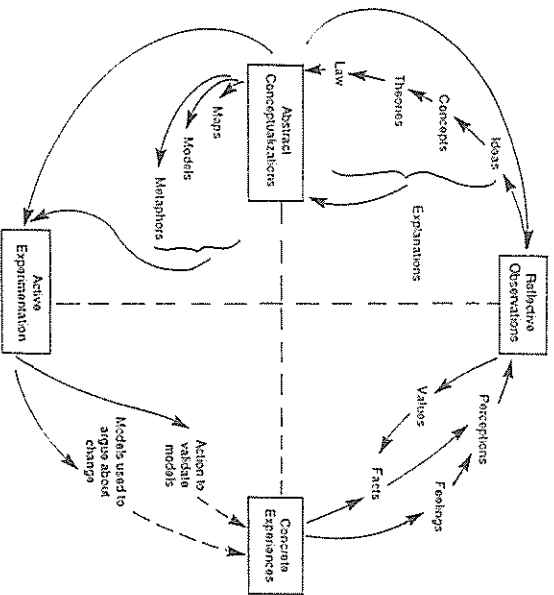


Figure 2.9 A model for debate about the process of learning

Experiential learning (learning for *being*) can be contrasted conveniently with both *propositional learning* (learning for *doing*) (Reason & Rowan, 1981). As a scientist I need to become familiar with the propositions of others; to access the great ideas that other scientists have already generated about the nature of the world. Such public, propositional knowledge is stated in the form of facts, theories, principles and laws. I also find it useful, just as an actively learning human being, to find out what others around me know about our world.

I also need to learn how to know how to do all sorts of things, from reading and writing, to feeding myself and riding a bicycle. And as a scientist, I need to know how to do my science. Knowing how to do all of these things is practical knowledge. Each type of knowledge is generated through a particular way of knowing. And we have not finished yet.

Much of what we know has nothing to do with the sort of logical, rational, reasoned, scientific knowledge which comes from propositional or practical learning. Each of us also has a store of knowledge which we have gained in non-rational ways; our intuitions, our aesthetic likes and dislikes, our cultural beliefs and traditions, and so on (Rogers, 1961).

All of these distinctions add to the richness of the process we call learning. Because of their differences in emphasis, in philosophies and in methods, they provide useful perspectives to guide strategies for education and research and I will expand on that notion a little later. Let me merely reinforce the position of multiple ways of knowing, by presenting a model which illustrates how each might be considered as inter-relating with the others - again in a glorious unity of interdependent, interpenetrating opposites. (Figure 2.10)

Meanwhile, back to our experiential model which thus far has had a peculiarly two dimensional feel about it. I now need to expand on this.

In this model I have consistently discriminated between polar opposites as different but integrated aspects of the same function of learning and relating to each other through a tension of difference or a dialectic: thus concrete and abstract, and action and reflection. I am going to add a third dimension with its own pair of polar opposites, *integration and separation*, to the experiential process and convert our two dimensional cycle into three dimensional "spiral".

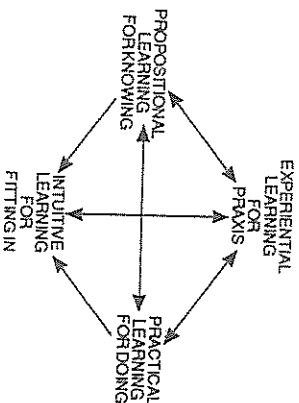


Figure 2.10 A system of inter-related ways of knowing

I am going to suggest that in enquiring into our world, integration and separation represent two fundamentally different aspects of the same reality. The former holds that the world is one and can only be truly discovered through methods of learning which respect and reflect this wholeness (holism). The latter position (reductionism) holds the whole (system) you lose out on some of its vital properties (Bertalanffy, 1981). The latter position (reductionism) holds the opposite point of view: that the whole is much too complex to be studied in its entirety and any attempts to do so will fail to give an accurate explanation of it. Anyway it is assumed that when you add together all of the knowledge of the parts of the system gleaned in isolation, the characteristics of the whole system re-emerge.

Let me posit that just as one can exhibit a divergent, assimilative, convergent or accommodative style of learning so this can be qualified, "in the third dimension" (Bawden, 1985) by the distinction between a systemic or reductionistic style. (Figure 2.11)

If we want to deal with complexity then we have to develop ways of seeing the world in all of its complexity; of treating each "goblet of ocean water" as if it were a whole "ocean" (albeit in miniature). We have to develop ways of finding out about the mass of inter-relationships which exist between the different components of systems, as well as finding out about the relationships which exist themselves. And we have to find out about the relationships which exist between the whole system, and the environments in which it exists (Bateson, 1979). We have to do all this kind of finding out so that we can appreciate the nature of the complex situations in which we are operating, and the impact on the whole when we manipulate the parts! It is a critical consciousness of the whole and for the inter-dependency of its parts that provides the perspective for systemic ways of thinking and acting (Wilden, 1972).

Let me now attempt to provide a synthesis of these two key notions of (a) experiential learning and (b) systemic perspectives as I change my focus from learning to researching and especially from action learning to action researching. The issue, central to this thrust, is that of "professional practice". As an agriculturalist, I am concerned with knowing how to do 'things agricultural'. In my vision, 'things agricultural' are beyond mere plants and soils and animals. Agricultural development, in my view, concerns basic relationships between people and both their bio-physical and socio-cultural environments.

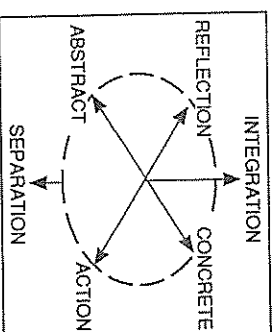


Figure 2.11 The third dimension (reprinted from Bawden, 1987)

The particular weltanschauung that I bring to this systemic view of agriculture, includes a belief that the way things are currently being done is in critical need of fundamental transformation. I believe what is being sought in terms of short term productivity gain, threatens the integrity and the long term viability of both the human and physical environments in which such growth is being sought. Short term agricultural development is leading to long term rural under-development in too many instances.

As an agricultural practitioner, as well as an educator of tomorrow's practitioners, I have had to rethink what constitutes my practice. I have had to critically question what I understand about my world and what I understand about how I understand my world. Armed with this new critical consciousness, I and my colleagues about me, set out to design new models for more sustainable agriculture, and new models for learning more about more sustainable agriculture. In essence we have finished up rethinking the whole nature of agricultural practice from on-farm husbandries to sophisticated research to education and extension.

As practitioners, how best do we intervene in systems in ways which are ethically sound and environmentally and socially responsible? How do we learn our way through complex and dynamic situations in ways which are socially desirable and culturally feasible and sustainable (Douglass, 1984)? How do we conduct scientific research into things and issues agricultural, in ways which are going to result in sustainably improved situations?

Following my earlier logic, there are going to be a number of different ways by which we will conduct our agricultural research some of which will be long in tradition whilst others are brand, spanking new. Of the latter, none is more novel than systemic action research.

Researching is learning and learning is researching

Researching is learning with the special intention of adding to public knowledge. We research in order to explain and share propositions about the nature of our world or to interpret issues within it (Medewar, 1969). This might be for the sheer intrinsic satisfaction of knowing, or for the purpose of predicting future events or behaviours, or for using as a guide for ways of dealing with the world and the people in it. It might even be so that we can engage in better informed debate!

Action researching is learning with the special intentions of achieving social action whilst concomitantly adding to public knowledge (Lewin, 1951).

This profound distinction can be clarified by examining research as critical problem solving. Experiences or phenomena can be framed as problems to be solved (the tradition of science) or as situations to be improved (the tradition of technology). We can then set about researching into them using different techniques according to the perceived nature of the problem or situation. Different combinations and sets of different techniques then constitute different research methods. Although, to be more accurate, methods are really more than just sets of techniques.

Methods are set within philosophical frameworks which reflect, amongst other dimensions, notions of the way the world is, the nature of knowledge, and the very disposition and ethical framework which the researcher brings to bear (Oliga, 1988). We can talk of the systematic methods of experimental,

positivistic, reductionistic, deterministic natural science. We can refer to the methods of post-positivist, empirical, constructivist, interpretative social science (Reason & Rowan 1981). We talk of methods of problem solving or decision making and taking. All of these can be conceived as a variation in method on the same basic theme of the experiential (experience-based, problem-based, issue-based, action-based) process of learning.

To illustrate this point we can compare and contrast a (reductionist) scientific experimental method with a (systemic) participative action research method, noting the similarities as they relate to the underlying process. (Figure 2.12)

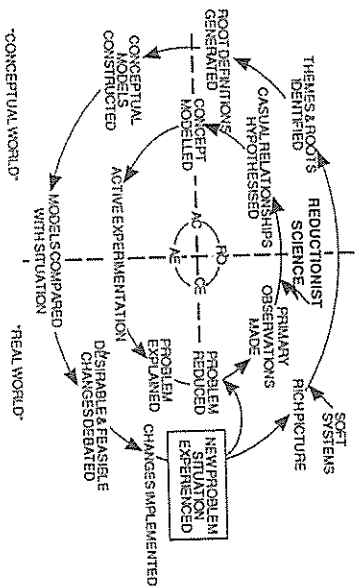


Figure 2.12 Two research methods as learning

Implicitly there are some profound differences between these two research methods in assumptions about (a) the nature of "reality" and the way in which the "real" world is organised (ontological assumptions); and (b) the nature of knowledge and of knowing (epistemological assumptions). The differences will also reflect dimensions such as the purpose of carrying out the research in the first place, the impact of the outcomes, the prevailing weltanschauungen of those who use the respective methods (dispositional assumptions) and the ideologies and political economies which prevail in the environment in which the research is being carried out.

As we shall see later, the importance of this weltanschauung, particularly in the context of the disposition of the researcher, is crucial as far as action research is concerned (Carr & Kemmis, 1986).

Each of the two methods of researching enquiry mentioned overleaf are appropriate under particular, and very different circumstances.

To quote an agricultural example: if one wants to find out about the plant nutrient which is limiting growth to such an extent that there is no obvious pathology in its absence, then the researcher needs to conduct experiments under rigorously controlled environmental conditions. The experimenter cannot participate with the nutrients in their "dance" in plant nutrition, nor is it sensible to attempt to examine the effects on the "dance" of a multitude of factors working at once. The experiment must be conducted in a reduced and highly controlled world observed from afar by the observer! If, on the other hand one

wants to actively explore with rural communities how they might design their own, more sustainable futures, then the method of enquiry needs to be participant-observer and the complexity of the situation must be embraced. There is no other sensible way to proceed.

On methodology

The choice of research method between these two vastly different situations will be easy to make. Yet this is not the only issue about methods of enquiry with which the researcher must concern him or herself. As suggested already, as researchers, and as educators of the researchers of the next generation, we must question the philosophical and scientific - or meta-scientific - frameworks in which we conduct our research irrespective of the methods of enquiry that we use. I must be critically conscious of the assumptions about science and truth and the ways of the world, that pervade throughout each stage of my approach. I must be as concerned with the science, and with the study of my methods - my methodology if you will - as with the science that I bring to bear on the issues in the first place (Oliga, 1988).

Of particular importance, will be the disposition I bring to the enquiry: my state of mind about the state of the world about me (Ulrich, 1988)! As an agriculturalist I am concerned with bringing theories from a wide range of physical, biological, ecological and social sciences to bear on a spectrum of very different types of problems and issues. My choice of the particular method of enquiry that I need to use in a given situation, therefore merits particular attention.

In addition to knowing how to go about improving a wide variety of problematic issues in agriculture, I must know how to go about improving my ways of knowing how to improve problematic issues in agriculture! As I need theories about agriculture to inform the actions I need to take to change the situation to hand, so I also need theories to inform the way I go about generating the first set of theories and practices. And I must be able and willing to critically examine my entire set of beliefs about the world, about the theories I hold about the world, about the theories I hold about the way I go about my practices for dealing with the world, and about the state of the world itself (Habermas, 1984, 1987).

Let me try to capture the essence of what we might see as this "double loop" of learning through *method* and *methodology* (Argyris, 1976).

As we go about our business of using our methods of enquiry into issues pertinent to our professional expertise, so we must also go about the business of enquiry into our enquiry (Churchman, 1971). All learning in this context, involves two sets of experiences and theories: There is the "first order" issue relating to the situation we are exploring, and there is the "second order" issue relating to the way we are enquiring into the "first order" issue. We must find out, find out about finding out; take action to improve the situation; and take action to improve our action taking! In addition to bodies of knowledge relevant to the particular issues into which we are enquiring, there are bodies of knowledge about bodies of knowledge. As there are theories about the world, so there are theories about how we create our theories. We use both sets of theories to inform our practice as praxis. (Figure 2.13)

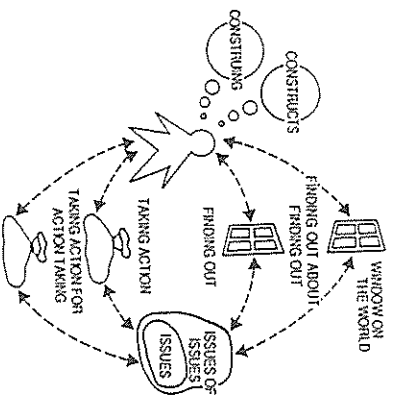


Figure 2.13 A double-loop model of a learning system

And we must make sure we go public with what could otherwise stay as private. Like a restless electron, we seem to hop about from one quantum level of learning to another, firstly engaged in learning about the issue to hand and then switching to learning about learning about the issue to hand. Effective learning results from bringing rigorous and critical order to these apparently chaotic shifts in focus (Ploman, 1985).

We have to become conscious of the various activities involved in this multi-dimensional model, and we have to master techniques appropriate to use at each of the "stages" of the double-looped cycle of learning - we must become reflective practitioners (Schön, 1983).

In our "first order loop" we must learn to:-

- involve ourselves directly and fully, in experiences which are frequently complex, dynamic and just plain messy.
- we must be prepared to investigate such experiences from as many different perspectives as possible.
- we must be able to pattern our observations into meanings, into theories of explanation or interpretation as a basis for informed action. And in so doing, we must be able to access the bodies of public knowledge - the banks of scientific theories which already exist - which would be most relevant to the issue to hand.
- we must be able to put these theories into action, in ways which are suitable for either their testing or for the creation of change.

And concomitant with such rigour at the level of the "first loop" we must learn to shift to the "second order loop" (the meta loop) and question:-

- the relevance of the way we are going about gathering "the facts of the matter" as they relate to the situation and whether the questions we are asking are indeed relevant to the issues at hand.
- the characteristics of the particular weltanschauung or meaning-perspective or disposition or "knowledge constitutive interest" we are bringing to bear as we proceed with our methods of enquiry.

- the way we are thinking, our conceptual patterning, our construing and the thoughts we have on thinking, theories of our processes of theorising and their meta-theories, and all the while we must be accessing the bodies of public knowledge on the bodies of public knowledge.
- the way we are going about the way we are going about our learning!

The rigorous experiential or action learner, is one who is able to make conscious, critical shifts within and between these two "cycles of learning" such that there is a sensible and informed sequence in the whole process of enquiry. The same is true for the action researcher with the additional imperative of dealing with critique; both personal and public. There is the critical disposition of the researcher to the issues under review, the social and natural order in which they exist, and the adequacy or otherwise of the theories being used to inform the actions. Furthermore there is the issue of public critique of the outcomes of the research as both knowledge and action. And there is the issue of the public purpose for the research and the critical disposition of the researcher(s) involved. Having said all that, and probably conveyed the impression that this is all very orderly and controlled and systematic, I want to emphasise the dynamic recursiveness of the process which constitutes its systemic wholeness (Checkland, 1981).

Switching to systems

I guess it is not too difficult to envision the set of relationships that I can build with my physical environment as a system of inter-related things. A system comprising me and the things around me. And equally it is not difficult to discriminate between such a set of things and the surrounding environs. But there is also a more subtle interpretation of systems in this context of me relating to my environment.

In addition to the relationships that I have developed with the tangible things around me, I can also posit a set of relationships which exist between me and a set of intangible issues plus their mental abstractions as constructs that exist only in my mind (Vickers, 1968). In other words, the process of learning itself is a system that connects or "couples" me with issues in my world - a system which is determined by the issues I am addressing and through which I am united with others in a dynamic "ecology of mind" (Bateson, 1972).

These two types of systems represent two different traditions of systemic thinking and practices. We can say that in one approach it is:

- The system which determines the nature of its problems or issues; whilst in the second approach, it is:
- The problem or issue which determines the nature of the system.

In this way we can refer to a shift in systemicity from the nature of the object under enquiry, to the nature of the enquiry itself (Checkland, 1981). Under these circumstances it makes sense to refer to the creation of learning systems. And this is an insight which is key to understanding the rest of this saga as we switch topics again, this time to examine professional praxis in researched and researching systems. The former relate to those systems which are observed by an observer who makes every effort to remain objectively remote from the system being studied. In the latter case, it is impossible for the researcher to be

anything other than a participant-observer. Indeed, it is the activities of the participant-observer joining with other participant-observers, that enables the system to become a researching system in the first place! Thus we have the case of the professional researcher learning about the world in order to be more informed in his or her actions, and the researcher helping others to enquire into their own worlds as a basis for better informed actions all round (Bawden, 1989).

In the first category of researcher, we have three different types of practitioner depending on which parts of the system, or which particular system is being researched. In the second instance, there can only be one type of practitioner, as he or she is always part of the system under review and the form of enquiry is axiomatically systemic.

Each of the four types of practitioners has an important role to play in influencing the way the world is eventually treated by those who live in it. Each type reflects different practices, different theories which inform such practices, and different epistemologies in which the different theories are grounded. Each of the four types of practitioners has an important role to play in influencing the way the world is eventually treated by those who live in it. Each therefore deserves attention from the point of view of their education and preparation. I submit however that there is an urgent need to particularly address the education of professional agriculturalists of the fourth type; given (a) the nature, scale and immediacy of the need for new ways of doing things for more sustainable agricultural practices to be developed, and (b) the dearth of practitioners with relevant competencies.

What follows is a closer look at the four types of professional practitioners commonly encountered in agricultural endeavours. Whilst the examples emphasise the researcher, there are many other types of practitioner that fit the models. Thus one can apply all four types to teaching, or extension, or social work or even medicine.

Experimentally researched systems and action researching systems

The case below (Figure 2.14) is that where the "expert researcher" is one who enquires into the magic of the natural world. This is the physicist, the chemist, the biologist, the production scientist; well qualified in his or her discipline to investigate bits of the physico-biological world but with little disposition to examine the relationships that exist between their "parts of the natural world" and others, nor their parts of the natural world with the parts which constitute the social world. And what is true for the "natural scientist" is as true for the "social scientist".

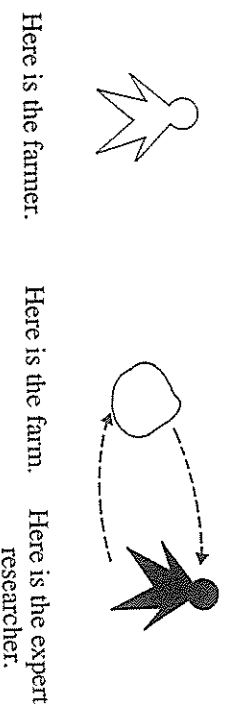
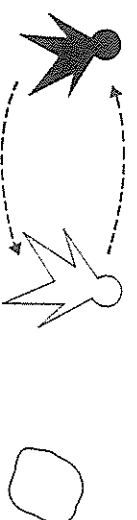


Figure 2.14 The researcher as a technical expert : researching things

Here is the social expert. Here is the client. Here is the client's world.

Figure 2.15 The researcher researching on people



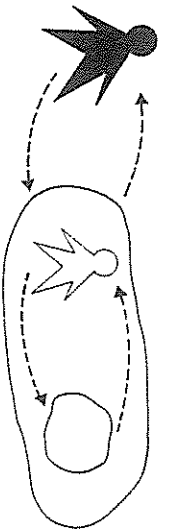
In the two cases above (Figures 2.14 and 2.15), each researcher has focussed on specific parts of the whole system of relationships which couple the farmer client with the world of his or her farm; on the natural part (or part of the natural parts!), or on the psycho-social part (or part of the psycho-social parts). The research can certainly be conducted via a *systematic* method of scientific enquiry, reflecting an underlying process of action learning. Yet *systemic* it is not. Or more correctly, the method does not exploit the inherent systemicity of the underlying experiential learning process.

The fundamental paradigms of both natural and social scientific research as portrayed in the examples above, have remained virtually unchanged for the past 100 years or so. They reflect a belief in reductionism: that if one knows enough about the world fragmented into its component parts, one can put them all together in the end and understand the whole.

Our next example of research takes a somewhat different line. Any whole differs from the sum of its component parts in ways which are unpredictable from the study of its parts. The (hard) systems researcher thus takes as his or her mandate, the study of whole entities. The relationships between the parts are now afforded more attention even than the parts themselves.

The system under study might be seen as a natural ecosystem or as a social system and as such, each will attract a different type of hard systems scientist. The adjective 'hard' refers here to the nature of the system in having clearly definable characteristics such as boundaries, inputs, outputs and major processes or functions which lead to transformations.

Unlike the first two models of research, the object of the enquiry here, is a whole system. In similar vein to the two predecessors however, the researcher still sees herself or himself as an objective observer of the object being researched (Figure 2.16). This is a researched system. A common situation which occurs here is that whilst we now have a system under study, the study itself is often more systematic than systemic. Too often the system is considered as a Black box - a purpose for the manipulation of the system is chosen, and without too much concern for the nature of the relationships either within the system or between the system and its environment, the whole system is changed to accomplish the agreed ends. Emerging approaches in this tradition include the so-called Farming Systems Research and Development method. Many of the research approaches of ecologists, economists and systems engineers also fit this 'hard' tradition.



Here is the systems analyst. Here is the system being researched.

Figure 2.16 The researcher as a systems analyst

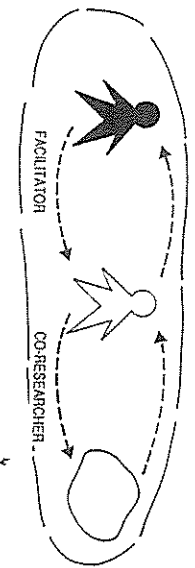


Figure 2.17 A structurally coupled action researching system

All of this preamble brings us at long last to the focus of this entire submission: the action-researching (soft) system. As will be evident from the little picture above (Figure 2.17), our researcher now becomes an integral part of the system itself.

This model reflects that to which I now personally aspire as a practitioner committed to creating better social ecologies. I see myself as a systemic action researcher, actively participating with others in the critical exploration of complex and dynamic issues which relate to the relationships between people and their physical and socio-cultural environments. Our purpose together is to seek desirable and feasible improvements to complex, problematic situations, where not only are the answers unknown but the questions themselves, problematic. In the absence of known worlds we aim to "bring forth new worlds together". My strategy is to help to enrich the environment, and the system to organise itself in ways which will encourage the whole complex to "learn" or "research itself through" the issues which it faces (literally, those issues which determined the system's existence in the first place). As an action-researching practitioner, I share systemic methods and methodologies with my co-enquirers, as we attempt to learn our way through the issues that constitute our issue-determined system.

This is a model of critical, systemic, action-researching praxis.

It is *critical* because (a) its processes and outcomes are subjected to critical public review; (b) the disposition of the researchers is such that they seek improvements in situations through transformed social actions; (c) the researchers are conscious of the need to critique everything as they go along, from the nature of the world to start with to the science of the science being

employed in explanation; and (d) the system, through its activities, makes a significant difference in leading to a better world (Habermas, 1974).

It is *systemic* because (a) the actors and the issues they face are coupled through appreciative relationships (Vickers, 1968); (b) the process of the researching or learning consists of dynamic, dialectical relationships between the concrete and the abstract, between reflection and action, between theories and practice, between method and methodology; and (c) the human activities that comprise the system together interact with the environment in ways which influence it.

It is *action researching* because the following four outcomes are placed in the context of, and are subjected to the critique from, public knowledge:

- (1) The practice of the practitioner researcher is improved.
- (2) The understanding of the practice by the practitioner is improved.
- (3) The situation in which the practice is practiced, is improved, and
- (4) The understanding, by the practitioner, of the situation in which the practice was practiced is improved.

So the fifth outcome of any action-research project (the output of any action-researching system) is the critical response of a sceptical public. I can illustrate this by returning to my little picture of the double-loop learner and by labelling the areas of the outcomes.

The double loop researcher submits method and methodology to critical review. (Figure 2.18)

As this learning is being done in collaboration with other learners in a system organised to address a particular issue or set of issues, then the learning by the system itself becomes researching through interactions of the system with its (public) environment. In other words, the researching system must be so coupled with its environment that it can subject its outcomes to those environments for critical response. (Figure 2.19)

The presupposition here is that (a) there is a public to which the outcomes can be subjected for review, and (b) the public is sufficiently informed to be able to provide a sensible critique!

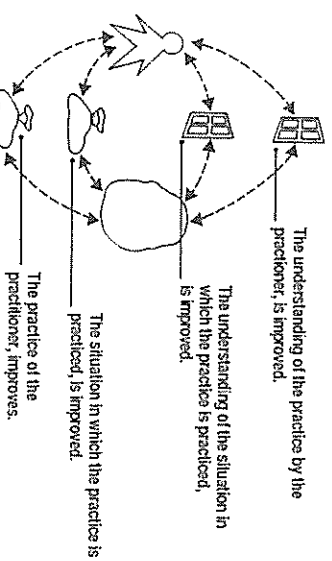


Figure 2.18 The outcomes of action research

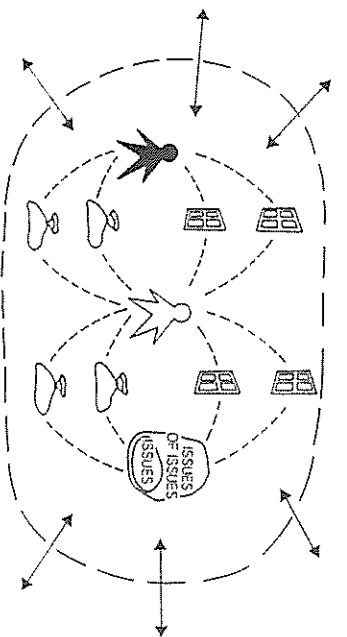


Figure 2.19 The critical action researching system

The system will change as a result of its own learning/researching activities as will the environment(s) with which the system interacts. The nature and scale of these changes will vary as a function of a whole variety of factors including the effectiveness of the learning, the disposition of the learners, and the intent of the learning/researching system for the impact of its changes. It is sometimes claimed that *action research* aims for reform within systems, whilst *participative research* aims to transform the whole system/environment interaction (Brown & Tandon, 1983). Others claim that there are different "levels" of reformation/transformation at which *participative action research* is aimed (Whyte & Hamilton, 1964).

We might be involved merely in learning how to allocate resources more effectively. Or we might be concerned with "higher order" issues concerned with the management of complexity. We might be concerned with helping others come to terms with conflict within their groupings (Ulrich, 1988), or we might act in order to emancipate individuals and groups from oppression by those more powerful than themselves (Freire, 1972; Rogers, 1983).

It is praxis, because the practitioner must elevate his or her methods of practice into a critical context or framework which embraces wisdom, ethics commitment and responsibility. Praxis is practice which is informed by critical theories and achieved through the conscious commitment to methodological enquiry.

Both critical action and critical knowledge therefore flow from action-researching systems (Carr & Kemmis, 1986). And it is not just the actions and knowledge of the nominal action-researcher/practitioner that improves. By the logic offered, all actors involved as collaborators (as inter-connected sub-systems or components) within the system, as well as those in the environment that interact with the system itself, are envisioned as practitioners. Indeed the major focus of sustainable development is to help each and everyone who wishes to participate in any development, to become a better practitioner - a more effective action learner, if not researcher. This perspective then allows the claim that action research cannot be anything other than research into one's own practice. Yet such research can lead both to a radical re-appraisal of the way one goes about dealing with the world as well as with emancipation from the

constraints which might have stopped one from changing one's ways of going about dealing with the world in the first place! Given the plurality of issues that one can confront in an endeavour as complex as agriculture, it is clear that there are advantages in bringing a plurality of research methods to bear on its situations; but better the integration of such approaches than their fragmentary application in isolation from each other. Under such circumstances one can envision a sort of cascade or spiral of inter-connected methods of enquiry and of their associated methodologies.

Exploration of problematic situations would "cascade" down from initial concerns with issues of emancipation and the management of conflict, to issues of a more technical nature concerned with the management of resource allocation. One might posit that the four "levels" illustrated in the model represent a descending spiral of enquiries into: paradoxes, performances, problems and puzzles! An enquiring system into ethics, efficiencies, effectiveness and explanations in turn, but as one (Ackoff, 1988),

Each "level of enquiry" provides a perspective and a clearer focus of intent for the subsequent level and each lower level provides insights for higher levels. And this model again reinforces the notion of systemicity in the methods of enquiry, particularly as it exploits the dialectic tension of difference between the various methods with their often opposing assumptions about the nature of the world, and about the nature of knowledge about the nature of the world.

Action-researching systems can thus give impetus to researched systems and to reductionist research initiatives just as experiential learning can turn to propositional or practical learning as the occasion arises. In the model below (Figure 2.20), I have confined the "spiral" to four "levels" or types of methods of enquiry. Clearly many other possibilities exist with both "higher order" and "lower order" amendments: There are methods and methodologies both beyond reductionist science at one extreme and soft systems enquiry at the other, at least as they are envisioned here. This is an open-ended spiral we are talking about here!

Whatever the initial nature of any action researching systems, they are created to make a difference where such differences might well include the development of different ways of finding out about issues and situations in the world.

Thus far I have concentrated on the idea of action-researching systems as somewhat informal affiliations between people, based around issues of mutual concern. I would now like to briefly extend the notion into more formal relationships between people and organisations of people.

Organisations as researching systems

Consistent with the earlier stated distinctions between two types of systemic traditions, organisations can be conceptualised systemically in two ways: Firstly as an entire system where the boundary of the organisation itself is the boundary of the system, and secondly, as a set of loosely coupled issue-based, action-researching systems. Ideally the former cascades out of the latter, providing new insights into what and why and how the organisation is trying to achieve what it espouses. The flux between these two systems approaches can be seen as providing important new knowledge about how a particular organisation is evolving. From the promulgation of such "private knowledge"

into the "public" arena important new principles and theories can also be formulated as interpretations of more general patterns of organisational evolution and transformation.

It is not at all difficult to envision formally constituted groups of people of like purpose, as action learning (Lockett & Spear, 1980), or even action researching systems. Indeed there are some extremely cogent reasons for so doing. One could go as far as to suggest, that whether they are aware of the fact or not, successful organisations are successful precisely because they exhibit all of the characteristics of action learning/researching systems.

- They have well developed ways of developing relationships between all of their "actors", indeed the organisation sees itself as a system of "appreciative relationships" between all who participate in the system's activities.
- They are critically conscious of the need to maintain the integrity of these sets of internal relationships.
- They are equally conscious of the paramount need to couple themselves with their environments.

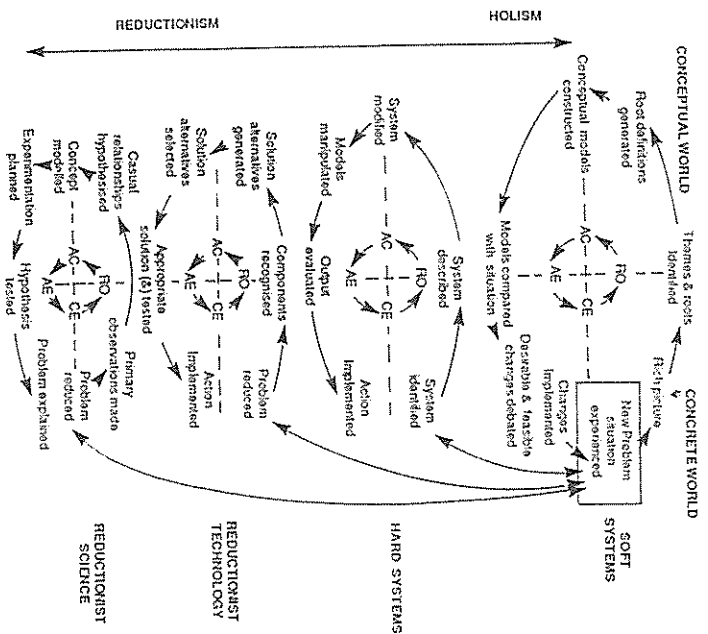


Figure 2.20 A "spiral" of researching systems (reprinted from Bawden, 1985, 51)

- In appreciating all of these varied relationships, they do what they can to assure that their activities are congruent with the "needs within" and the "needs without".
- Rather than merely react to internal and/or external changes, the organisation attempts to co-evolve with its environments.
- The organisation is constantly addressing issues across a whole spectrum of complexity from technical matters to matters of ideology, political economy and power: from the reform of operations within the organisation, to the transformation of the strategic relationships between the system and its dynamic environments.
- The activities of the organisation show a balanced awareness of its own past history, present performance and future persistence.
- In such activities, there is a well-founded structure to allow and encourage everyone in the organisation to participate.
- There is furthermore, a critical awareness of the need to allow and encourage all of the participants in the organisation's activities, to develop the necessary range of knowledge and ways of knowing to ensure their continuing participation as things evolve.
- There is a pervading disposition of critical consciousness and mechanisms galore to encourage and allow critical review of all that is happening, both within and without.

In sum, the organisation is conceived of as an action-researching system, with a disposition of critique of all that it does within and without. It is structured in ways which enable and encourage the development and maintenance of its own systemic integrity (Beer, 1985). And it is organised in ways which encourage and enable all participants to learn how to improve their situations across a whole spectrum of foci from operation effectiveness to strategic re-direction of the entire system. It is vital that such learning be both encouraged and shared and in this way the system is endowed with a dynamic learning milieu or culture. The human components of the system learn and, through sharing, the system itself learns. Management is facilitation of these processes of individual and group learning. With a clear respect for past experience and for what has been learnt in this way, the system nevertheless is clearly directed towards some vision or other of a better future. It sets out to create an improved social ecology where the basis for such improvements lies in a collective ethic - a culture which pervades all that is done and which reflects the general view of what is in the best public-cum-environmental good. In other words, just as an internal milieu of learning can be created within the system, so can the system, through its interactions with its environments, help "bring forth" a culture of learning without. This is as true for commercial businesses as it is for universities.

It is in this manner that new ways of learning about the world spread through it. This is how learning, which embraces new assumptions about the way the world is and about the nature of knowledge, as well as explicit new weltanschauungen or worldviews about how the world could and should be treated, can create "turning points" in civilisation (Ackoff, 1974). And this in turn suggests, how development can be construed as proceeding in discontinuous "spurts" or "waves", leading to new eras which are characterised by ways of enquiry and weltanschauungen which differ from those of earlier ages.

The next wave

I would argue that we are in the midst of a shift in eras at the moment: We are on a new wave, with learning occurring in many different areas of human endeavour all swirling around issues of ethics and the sustainable treatment of the world. New methods and methodologies for enquiry are being brought to bear in this emerging context under a rubric which has been called "the science and praxis of complexity".

As an example let me quote our work on Australian agriculture. Reflecting on developments over the past 200 years, we have suggested a "four wave" model of evolution, with each wave adding new perspectives for development and embracing new ways of enquiry (Bawden, 1987). The new wave does not subsume the old, but complements it by sharply re-focussing the context in which agriculture is conducted. Such is the current case with the emergence of the concept of "ecological persistence": The practice of agriculture in ways which can be sustained without degradation of the physical and socio-cultural environments to which it is inexorably coupled. In the model below (Figure 2.21), production in the context of persistence differs very significantly from production in the context of unqualified productivity growth.

The challenge for agricultural scientists and educators alike, is to create new learning systems which will be influential in the-creation of extensive new learning cultures focussing on the complexity and ethics of persistence.

At Hawkesbury, we are addressing this challenge with work involving in particular, soft systems methodologies to create critical, action-researching systems.

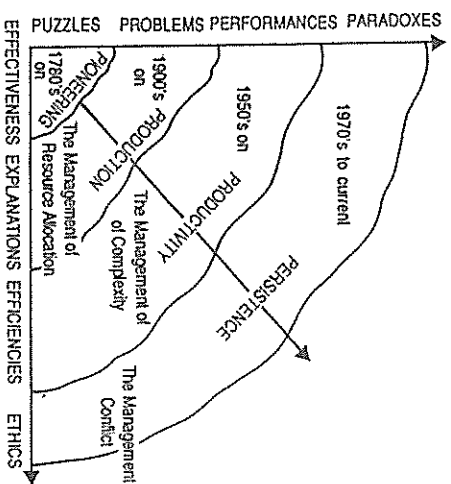


Figure 2.21 Waves of development of Australian agriculture

Conclusions

What I emphasise as we come to the end of this chapter, is that the whole aim of systemic action research is to create action researching systems which will endure. As a committed social ecologist, my aim in life is to help others think and act, and critically research, as social ecologists: People concerned enough about their relationships with other people and things in their environments to want to learn better ways of managing the complex relationships between them. And it is important to emphasise that the basis for improvements in the relationships between people and their environments (including, of course, other people) must lie in a collective ethic for what is in the public-cum-environmental good!

In this context I find opportunities for my craft in an unbelievably broad range of human endeavours. I work with farmers, with rural communities, with bureaucracies in the public service and with chief executive officers from the world of business. I also work with conservationists, with school teachers and with academics, and most importantly of all, with students, across a spectrum of habitats from kindergartens to PhD laboratories.

What started out for me and my colleagues as an initiative in planning strategies for experiential curricula for students of agriculture, has been transformed into the design and development of action researching systems which are in critical co-evolution with their environments. Our graduates are neophyte action researchers, aiming to significantly alter the ways that things are done in contemporary agriculture to achieve more equitable and sustainable futures for those who live and work in rural communities.

Our future strategies include the vision of extending our activities beyond agriculture and rural communities into the world at large.

Acknowledgements

As always, it is a great pleasure for me to acknowledge the very significant contributions made by my Hawkesbury colleagues, faculty and students alike, to the development of the ideas and models above. In this context my particular appreciation is extended to Bob Macadam, David Russell, Roger Packham, Joe Zarb, Marcus Hodgson and Robert Woog. Three erstwhile colleagues John Drinan, Ian Valentine and Ray Ison also merit my particular thanks. I acknowledge further debts of gratitude to four American colleagues, Gary Hansen, Larry Busch, Dick Merritt and Kathy Wilson, who continue to markedly influence both the development of my ideas and the direction of my energies!

Finally I want to record my most sincere thanks to Ortrun Zuber-Skerritt, for inviting me to participate in the action-researching system to address action-researching that she designed and created at Bardoni!

References

- Ackoff, R.L. (1974), *Redesigning the Future*, John Wiley, N.Y.
- Ackoff, R.L. (1988), *Levels of Corporate Development*, *Systems Practice* 1, 133-135.
- Areyris, C. (1976), Single-loop and double-loop models in research in decision making, *Admin. Science Quarterly* 21, 363-375.
- Bannister, D. and Fransella, F. (1971), *Inquiry Man: The Psychology of Personal Constructs*, Penguin, Melbourne.
- Bateson, G. (1972), *Steps to an Ecology of Mind*, Ballantine, New York.
- Bateson, G. (1979), *Mind and Nature: a Necessary Unity*, Bantam Books, New York.
- Bawden, R.J. (1985), *Problem based learning: An Australian perspective*, in D. Boud (ed) *Problem Based Learning in Education for the Professions*, HERDSA, Sydney.
- Bawden, R.J. (1987), *Learning systems and technological change*, *Proceedings of the Centenary International Conference on "Technology: Education and Society: Future Direction"*, RMIT, Melbourne.
- Bawden, R.J. (1990), *Systems Agriculture: Learning to Deal with Complexity*, Kentucky University Press, Kentucky.
- Beer, S. (1972), *The Brain of the Firm*, Allen Lane, London.
- Beer, S. (1985), *Diagnosing the System for Organisations*, John Wiley, London.
- Ben-Eli, M.V. & Probst, G.J.B. (1986), *The way you look determines what you see or self organisation in management and society*, in R. Trappl (ed) *Cybernetics and Systems '86*, Reidel Publishing Company, Dordrecht.
- Bergland, R. (1985), *The Fabric of Mind*, Penguin Books, Australia.
- Bertalanffy, L. von (1968), *General Systems Theory*, Braziller, N.Y.
- Bertalanffy, L. von (1981), *A Systems View of Man*, (ed) P.A. Laviolette, Westview Press, Boulder, Colorado.
- Bronowski, J. (1965), *The Identity of Man*, Pelican, Victoria.
- Brown, L.D. & Tandon, R. (1983), *Ideology and political inquiry: Action research and participatory research*, *J. Applied Behavioural Science*, 19, 277-294.
- Bruner, J. (1983), *In Search of Mind - Essays in Autobiography*, Harper & Row, N.Y.
- Carr, W. & Kemmis, S. (1986), *Becoming Critical: Education, Knowledge and Action Research*, Falmer, London.
- Checkland, P.B. (1981), *Systems Thinking, Systems Practice*, John Wiley, Chichester, N.Y.
- Churchman, C.W. (1971), *The Design of Inquiry Systems*, Basic Books, N.Y.
- Clark, P. (1972), *Action Research and Organisational Change*, Harper & Row, N.Y.
- Dewey, J. (1910), *How We Think*, Heath, N.Y.
- Douglass, G. K. (ed) (1984), *Agricultural Sustainability in a Changing World Order*, Westview Special Studies in Agricultural Science and Policy, Boulder, Colorado.
- Fals Borda, O. (1979), *Investigating reality in order to transform it: the Colombian experience*, *Dialectical Anthropology* 4, 33-35.
- Freire, P. (1972), *Pedagogy of the Oppressed*, Herder & Herder, N.Y.
- Freire, P. (1973), *Education for Critical Consciousness*, Continuum, N.Y.
- Glaserfeld, Von, E. (1984), *An introduction to radical constructivism*, in P. Watzlawick (ed) *The Invented Reality*, W. W. Norton, N.Y.
- Habermas, J. (1974), *Theory and Practice*, Trans. J. Viertel, Heinemann, London.
- Habermas, J. (1984, 1987), *The Theory of Communicative Action*, Vols. I and II, Trans. T. McCarthy, Beacon, Boston.
- Kelly, G. (1985), *The Psychology of Personal Constructs*, Vols. I and II, Norton, N.Y.
- Kolb, D. (1984), *Experiential Learning: Experience as the Source of Learning and Development*, Prentice Hall Inc., New Jersey.
- Lewin, K. (1951), *Field Theory in Social Sciences*, Harper & Row, N.Y.
- Lockett, M. & Spear, R. (eds) (1980), *Organisations as Systems*, Open University Press, Milton Keynes.
- Maturana, H.R. & Varela, F.J. (1972), *Autopoiesis and Cognition - The Realisation of the Living*, Reidel Publishing, Boston, U.S.A.
- Maturana, H. R. and Varela, F.J. (1988), *The Tree of Knowledge*, Shambhala Press.
- Medewar, P.B. (1969), *Induction and Intuition in Scientific Thought*, Methuen, London.
- Oliga, J.C. (1988) *Methodological foundations of systems methodologies*, *Systems Practice* 1, 87-112.
- Piaget, J. (1970) *Genetic Epistemology*, Columbia University Press, N.Y.
- Pioman, E.W. (ed) (1985), *The science and praxis of complexity*, *United Nations University Proceedings of Symposium at Montpellier, France*, 9-11 May, 1984.
- Polanyi, M. (1958), *Personal Knowledge*, Routledge and Kegan Paul, London.
- Reason, P. & Rowan, J. (1981), *Human Inquiry: A Sourcebook of New Paradigm Research*, John Wiley & Sons, Chichester, N.Y.
- Revsans, R.W. (1982), *The Origins and Growth of Action Learning*, Charwell-Bratt, Bromley & Lund.
- Rogers, C. (1961), *On Becoming a Person*, Houghton Mifflin, Boston.
- Rogers, C. (1983), *Freedom to Learn in the 80's*, Merrill, Col. Ohio.
- Schön, D. (1983), *The Reflective Practitioner: How Professionals Think in Action*, Basic Books, N.Y.
- Ulrich, W. (1988), *Systems thinking, systems practice, and practical philosophy: a program of research*. In P.B. Checkland (ed) *Systems Thinking, Systems Practice*, John Wiley, New York, 137-163.
- Vickers, G. (1968), *Value Systems and Social Process*, Tavistock Publications, London.
- Whyte, W.F. & Hamilton, E., (1964), *Action Research for Management*, Irwin-Dorsey, Homewood, Ill.
- Wilden, A. (1972), *System and Structure: Essays in Communication and Exchange*, Tavistock Publications.