

DEVELOPMENT OF SOFTSYSTEMS THINKING

A Process of Experiential Learning

by Rashida Siddique

ONE of the traumas facing humanity during this final quarter of the twentieth century is the feeling of powerlessness, often taking the form of an inability to make meaningful interventions in public and/or private life. Ironically this impotence arises from the increasing complexity of modern life, despite the apparently successful growth in knowledge and technology.

Underlying this impotence is a lack of confidence in the knowledge acquired during the formal processes of education and the informal ones of experience. Unlike the Renaissance, when one could be familiar with all major areas of knowledge, we now seem capable of only mastering a narrow range of potential knowledge available to us.

Our social phenomena, consisting of dynamic relationships between individuals and groups, is affected by this powerlessness, and it is here that we can identify many areas of major concern. Addressing these social concerns is proving far more problematical than any rational discourse on social inequalities could convey. Whether this difficulty is peculiar to our times or constant throughout history is unclear.

We are born into mysterious and complex world, we are aware of it (see figure 1). As a result we seek to understand perceived reality and to learn how to be better at developing our understanding. Knowledge, or our understanding and our method of understanding, is therefore part of us as human beings.

Since the rise of positivist natural science in the seventeenth century we have become separated from our knowledge (figure 2), this has increased our sense of powerlessness. Knowledge is treated as though it has an existence of its own, independent of the inquirer.

Our modern approach to gaining knowledge has been largely shaped by the work of Descartes. Descartes can be described as seeing the three concepts of reductionism, repetition and refutation as the only means of guaranteeing true and certain knowledge. For the last three hundred years natural scientists, implicitly following Descartes's concepts and confident in their sense of certainty, have believed that they can define what we need to know, and are therefore at liberty to dictate how we learn. This has resulted in the inquirer's alienation and produced the teacher-dominated education that we have suffered, the individual's own experience no longer forming the basis of their education.

Another effect of Descartes

philosophy, particularly that of reductionism, has been to pare down what we can 'legitimately' know, what can be easily divided into discrete and simple units. From the application of reductionism, biology can be explained as being 'nothing but' chemistry which can, in turn, be explained as being 'nothing but' physics. Knowledge has thereby lost much of the rich experiential tapestry which is of particular interest.

It was Bertalanffy (1969) who showed that in biology reductionism ignored many of the organisms qualities that were of prime interest to biologists. These qualities, or emergent properties, can only be found when dealing with the whole living organism, not when it has been dismembered on the scientist's cutting board.

The same effect can be seen in the study of human social settings. When we apply the basic scientific method of reductionism, we ignore the parts that are difficult to compartmentalise, namely the emergent properties, and thus the issues which leave impact most upon us. By ignoring the emergent properties, reductionism, far from assisting us in addressing these issues, has often exacerbated them. Even in business organisations, success in dealing with problems has, at best been questionable.

In attempting to understand and intervene in organisations a number of methods, such as Operation Research and System Engineering have been developed. Repeated failures after applying such methods meant that other ways of approaching problems had to be found.

The Department of Systems at Lancaster University experienced similar difficulties in applying Systems Engineering to complex social issues within organisations. It became apparent that failures stemmed from the assumption of a goal seeking metaphor for a social group. Viewing society as conforming to functionalist (goal-driven) models, Systems Engineers would engineer the situation in order to optimise the given objective. Whether this objective was fully endorsed by everyone in the situation was never questioned, and it is hardly surprising that the results of Systems Engineering studies often failed to live up to expectations.

The Department of Systems used an action research programme (figure 3) to address problems such as these. In this way the Department's experiences were used to establish theory which was then used to guide the subsequent experience. Neither experience nor theory was taken to be prime, and hence

what is known and the way it is known are two sides of the same coin.

Reflection on the past failures, and the limitations of reductionism, resulted in a new approach to dealing with organisational problems. This was developed at Lancaster under the leadership of Professor Peter Checkland. This approach known as Soft Systems Methodology (referred to as SSM) and based on the holistic concepts of systems, treats organisations as being idiosyncratic social groups. Each situation that is studied is unique and therefore must be allowed to dictate the direction and results of its study. Furthermore anyone wishing

the Lebenswelt (life world). Vickers likened the Lebenswelt to a two stranded rope of events and ideas, each affecting and inseparable from the other. His point is that the standards which inform the judgements are themselves the product of the previous operation of the system itself in a never ending process.

As SSM evolved through experience it came to treat knowledge in a particular manner. In the following diagram, SSM's model of knowledge (epistemology) is conveyed.

In this model R is repre-



Figure 1 Our role as sentient inquirers

to understand situation must learn their way to insights within the situation. No longer can objectives of a social group be taken as given; they must be openly debated, just as the Weltanschauungen (or underlying world views which make objectives meaningful) must be identified and likewise discussed. Attempting to effect change social groups thus be-

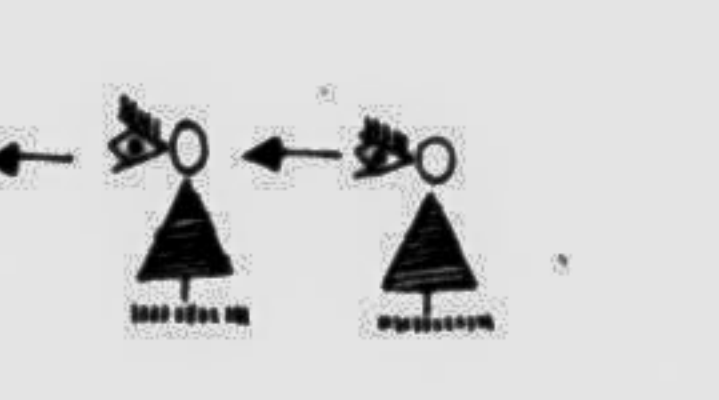


Figure 2 The perceived alienation of the inquirer from the known.

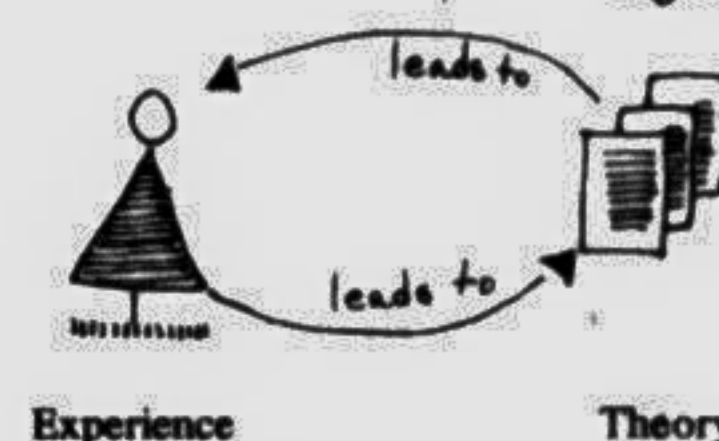


Figure 3 An action research model - a groundlessness between experience and theory (after Checkland, 1984)

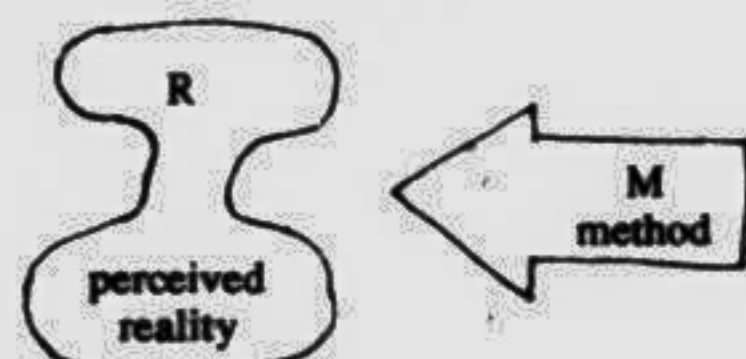


Figure 4 SSM's epistemological model (after Checkland, 1984)

comes a process of experiential learning governed by the situation.

SSM viewed society in a manner captured by Sir Geoffrey Vickers' concept of Appreciative System, in which Vickers perceived society's behaviour as one of maintaining sets of relationships preferring this to an image of goal seeking. He did not reject the goal seeking model outright, seeing it as a special case of relationship maintenance. He described social phenomena in terms of appreciations, judgements actions and the flow of

sented as the complex and mysterious perceived reality; M as the mental processes or method which the observer uses in inquiring into R; X as the concepts the observer uses not holding that reality should, could or would match them. The power of the conceptual world is therefore utilised in a creative manner, freed from the impossibility of coming up with one 'right' description of reality. SSM therefore holds that there is a multiplicity of perceptions and experiences of reality and conclusions are reached as a result of learning

from experience within to create and use within M to derive their description of R.

SSM maintains that systems exist only as a concept useful in the process of inquiry. Unlike Systems Engineering, SSM does not hold that systems exist in reality, but rather that 'system' is used in a way of thinking about reality. It is a useful intellectual device for ordering our thoughts while situated in a certain manner and holding to the epistemological model of knowledge in figure 5 SSM is represented as a systematic process of inquiry, in the following manner.

The key characteristic of SSM is that it learns its way to

The changes are not prescribed by an expert, the interventionist, though is part of the struggle, finds changes. It is also important to note that SSM recognises that learning is not a once-and-for-all activity, once changes have been effected than the situation is altered and so learning must continue in order to account for the new circumstances.

'Soft' Systems Thinking Explained

The following is a description of SSM Checkland's guidelines. The method for each of SSM's stages and the sequence stages are entered is dictated by the needs of the people within the situation.

The problem situation is taken as it is found. Problems, in reality, do not come in

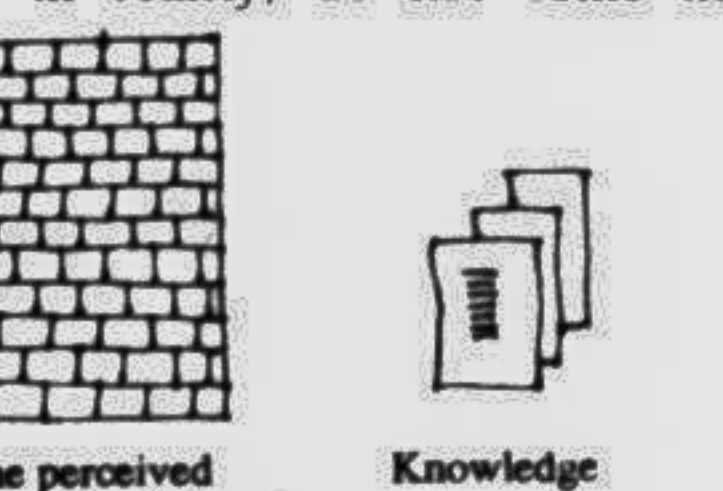


Figure 5 SSM as a process of cyclic experiential learning (Checkland, 1984)

neatly defined forms and often the first expression of a problem marks broader and more significant problems. Taking a problem statement as 'given' by the client, effectively limits the interventions achieved.

Situation Expressed

In the situation expressed stage three analyses are car-

ried out, a systems analysis, a social systems analysis and an analysis of power. Firstly, however, and indeed throughout the study as more is learned, the people doing the study express perceptions of the situation as a gradually enriched picture. This exploratory activity visually represents aspects of the situation, and especially relationships within it, that

attract the inquirer's attention. This picture is primarily of use to the people undertaking the study and is of use in clarifying their perceptions.

Analysis 1, a systems analysis, involves the notional assignment of people to the three roles of Problem Solver, Problem Owner and Client with consequences, in terms of potential problem issues, considered.

Analysis 2 is a social systems analysis to identify the roles, norms and values which reflect the expectations of people within the situation.

Analysis 3 considers the commodities of power in the situation, what forms they take, how they are obtained, preserved, exercised and passed on. 'Power' is used more broadly here than just the power of direct authoritarian control.

From these analyses themes are selected, by the problem solving team, for further expansion and debate. From these themes notional, human activity systems are identified. These are systems of purposeful activity thought relevant to exploring the problem situation but not 'perfect' description of the situations, hence the systems being notional. These systems form heuristic metaphorical devices used in debate later in the cycle, they are perfect descriptions of what is. When passing from situation expressed into the 'below the line' (figure 5) root definition stage the user moves into the purely conceptual world that is they are no longer describing the real world but are creating descriptions that are applicable as metaphors about the real world.

Root Definition

The root definition stage defines what these human activity systems do, the Weltanschauungen that make them meaningful, who benefits, owns and carries on the particular system and what constrains the activity. Both human activity systems and root definitions are simply consumable tools to assist the learning inquiry into the situation, not would be description of the world.

Conceptual Model

The conceptual modelling stage takes these root definitions and draws up a model of the minimum set of activities that are logically necessary for the notional system to function. The conceptual model and the root definition do not represent a precise picture of 'what is' or 'what should be' but from the heuristic device used to fuel the Hegelian dialectic carries on in later stages.

Comparison

During the comparison stage the people involved in

the study move back into the real world and compare the conceptual models and root definitions to the situation. This is done by asking a question such as 'How would you respond to a system such as this and the activities involved? This questioning is intended to identify issues for debate in order to create a better understanding of the situation or induce change in it.

Changes

The changes stage involves the people within the situation carrying on a dialectical debate. This is based on their responses to the models and root definitions as well as to the results of the three analyses (from situation expressed). These inputs to the debate are not definitive statements about the situation; rather it is the debate which develops an understanding of the social group and their concerns and draws out suggestions for desirable and feasible changes from within the situation.

Implement Changes

The final stage, implement changes, involves action to bring about changes which the people within the situation have identified as being both desirable and feasible. Additionally, or alternatively, it can involve an integration of the learning that the people involved in the study have acquired as a result of their experiences.

SSM is a process of inquiry that accepts social phenomena as being idiosyncratic. It accepts situations as being immensely rich with many ways of describing them. To intervene or purely understand the situation inquirers must therefore 'learn their way to insight' on the basis of their experiential learning within the situation and according to the dictates of the situation under study.

SSM therefore reunites the knower with known by being guided by the situation. SSM improves sentence by giving guidance to, and being shaped by, the process of knowing.

SSM is not a prescriptive method, it is logical set of activities that can guide inquiry into a situation. A unique method is created for each study undertaken based on the learning within the study, stages are mixed and entered according to the insights gained during the study. The stages of SSM are not as discrete as the above description may imply. Many stages can be going on concurrently. SSM is therefore dependent on both the inquirer and the situation being encountered.

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Education for All Remains a Dream

by D K Joshi from New Delhi

CHINA has already gone much ahead of India towards the goal of education for all by the year 2000. This is admittedly one of the major factors for its faster economic and social growth than that of India. Free and compulsory education up to the age of 14 is considered the key requisite for economic and social advancement of a developing country.

According to Unesco, the Chinese illiteracy rate is only 27 per cent compared to 52 per cent for India. Total primary school enrollment in China is 135 million while in India it is only 98 million.

China was liberated in 1949. It is estimated that in 1990 between 70 and 75 per cent of children completed primary education in China while in India the figures ranged from 50 to 55 per cent.

The overall adult literacy rate has risen in China from 20 per cent to 78 per cent while in India it has risen from 16 per cent to 52 per cent. China, with a larger population, has only 18 million illiterate adults; India has 250 million. Unesco says China has taken a pragmatic approach on the primary education timetable and has set different target dates for different parts of the country according to their status of development.

The eastern coastal and developed urban areas have already achieved the target and other urban or developed rural areas will do so by 1995. The remaining 25 per cent of the

population in hilly and backward areas will have the benefit of primary education by the year 2000.

India had set 1990 as the target date for universalising primary education up to grade five and 1995 for elementary education up to grade eight. But the deadline has slipped and new dates have to be set. As 916 million out of the

February 4, 1993, that primary education up to the age of 14 years is a fundamental right, has given a new urgency to the problem.

President Shankar Dayal Sharma, himself an educationist, has assured 'free and compulsory education of satisfactory quality to all children up to 14 years' and 75 per cent of the districts in the country will be covered under the National Literacy Mission by 1996-97. Finance Minister Manmohan Singh has substantially enhanced the outlay for education in the current year and announced a new scheme for the improvement of primary education in poorer districts.

The national policy on education, revised in 1992, resolves that free and compulsory education will be provided to all children up to 14 years of age by the year 2000. It calls for decentralisation in educational decision making and emphasis on non-formal education for children.

As the percentage of drop-out rates is very high, for example 75 per cent for grades one to 10, the policy calls for giving incentives to the most deprived students. These include giving them free uniforms, books, scholarships, mid-day meals. The government also pledges to have a primary school within one kilometre for every village with a population of 300. Girls' education, too, gets priority in the policy document. Despite these promises the outlay on education is still low - 3.8 per cent of Gross National Product. The minimum experts have prescribed is six per cent. This is a reflection of the myopic perceptions of the country's ruling politicians.

A determined will to make India literate by 2000 will alone remove the stigma of this ancient country having the largest number of illiterates. Only then can it think of competing with China.

As the prime minister's special adviser Sam Pitroda puts it: 'Failure to educate millions of children each year is creating an excess baggage which is adding to the burden of future generations.'

— Gemini News

A "Miracle" in the Dominican Republic

by Jean-Michel Caroit from Santo Domingo

SCHOOL Year Lost, announced the newspaper headlines in the Dominican Republic at the beginning of summer 1991, after six months of almost continual strikes in the schools. Disputes between wretchedly paid teachers and their main employers, the state, were destroying the Dominican educational system.

Eighteen months later, the situation has completely changed and hope has returned. The strikes are over and the powerful Dominican Teachers Association (ADP) is one of the main forces behind the government's 10-year education plan, put into effect by the Education Minister, Ms Jacqueline Malagon, last December.

This 'Miracle' - to quote a young teacher whose faith in her profession has been restored - is the result of a broadly increased awareness by various social groups, from businesses to churches to professional organisations.

Rescuing Education

In a flurry of construction under president Joaquin Balaguer, schools had been built throughout the country. But, almost everything else had to be done or redone. The following figures give an idea of the difficulty of the task. A quarter of the population is totally illiterate, and more than 200,000 school-age children have dropped out of school.

teacher's average salary was less than the equivalent of \$100 a month and more were giving up the profession. In the past four years, over 1,000 of the country's 30,000 school teachers have risked their lives in leaky boats, trying - illegally - to get across to neighbouring Puerto Rico in search of a better life.



— UNESCO Source

tion which was eating away at Dominican administration. 'We've already come 95 per cent of the way,' he says.

Payoffs for things like the purchase of school equipment or the printing of school-books are becoming less and less frequent at the ministry. Thousands of people receiving monthly cheques without doing any work have been taken

voted to 'rescuing education.' The teaching profession has to be given a higher status, which means improving working conditions. Teachers salaries have been doubled to an average of 3,000 pesos (about \$240) and further increases are on the way. These adjustments are vital for the teachers' self-respect,' says Ernestine Cedano, principal of the Orfelina Pillier school at Higüey, in the eastern part of the country.

The whole process, inspired directly by the Jomtien Conference and UNESCO's Major Project in Latin America (see box on p. 8), is only beginning. Eventually, a much bigger task will have to be faced: reforming education, adapting it to society and, most important, getting children back into schools. The goal is to get all children between five and 15 in school by the year 2000 and to drastically cut the dropout rate.

School councils will be set up and parent-teacher associations revived to keep families and communities interested in the schools. Curricula will be overhauled, and the importance of science and technology will be recognised. Teacher training colleges will be restructured.

Funds have already become available to purchase cheap but good quality schoolbooks and other materials. Businesses, aware that training is a key to their own future competitiveness, are 'adopting' schools. The education ministry is hoping for more outside assistance, and an international donors meeting is scheduled in Paris in the next few months.

The ministry has also started a 'breakfast at school' programme, which it hopes to spread across the country. Every child will be given breakfast which should lure them off the street and back into school.

Everyone agrees that so far the plan is a great success. All the active elements in Dominican society today are convinced of the need to better educate future generations.



Despite a five-fold increase in school education India still has the world's largest illiterate population.

Millions of pupils in primary education (age 6-11)