

Clayton, L. (1984) *Systems Theory*

SYSTEMS THEORY

This paper discusses the assumptions underlying general systems theory as an approach to science, organizations, groups and individuals. It then discusses what distinguishes systems theories about organizations and individuals from causal theories. Finally it offers some examples of how the structure of systems can be analysed and how the process of systems can be observed and recorded.

A systems approach is a way of thinking rather than a well articulated theory or a concrete or tangible form.

Smith (1983) says:

If one were to take a "cross sectional" view of the history of scientific thinking, it could be described as exhibiting two major and opposing philosophical polarisations: on the one hand there would be the pole of holism, on the other the opposing pole of atomism. Holism and atomism are not "philosophies" in the sense of being thoroughly elaborated and coherent systems of thought, but rather they can be seen as two extreme and opposing tendencies in the scientific study of phenomena. Simply stated holism is the tendency to begin the study of phenomena from the level of whole units of reality, whereas atomism is the tendency to divide those units into "separate" parts to a greater or lesser degree.¹

So in science there are two opposing tendencies in thinking. Whereas a holistic premise is that the parts cannot be understood in isolation from the whole, the atomistic premise is that the parts can best be understood when considered in isolation from the whole. This latter approach leads to scientific analytic method in which the procedure is measurement by "experimentally holding constant all units or parts of a given complex event or entity except one pair at a time".² The causal relationships between the pair are measured. The holistic pole uses an opposing method which could be called analogic method in which hypotheses are developed about the relations between things rather than the things themselves. However wholes and parts in an absolute sense do not exist anywhere so that Smith argues that the logical point is that whole and parts are interrelated concepts and that the philosophy of science needs a conceptual theory to mediate between holism and atomism. He proposes that general systems theory studies the interdependence of parts and wholes. He says that "a system is a hypothetical conceptual model for describing how parts and wholes interrelate".³

Why is it important that in the social sciences forms of thinking and practice are being revised in terms of general systems theory? Fritjof Capra in an address to the Transpersonal Conference in Bombay in February 1982 said that new concepts in physics have brought change from a mechanistic approach to a holistic ecological view of the world. Other scientific disciplines including psychology have fallen behind in the revision of their view of scientific phenomena. He said that in the study of sub atomic phenomena scientists began to face a crisis in that the old forms of thinking in Cartesian Newtonian scientific thought no longer explained the reality which they observed. The reality was that particles are not made up of matter but of dynamic patterns continually changing into one another, a continual dance of energy. They are not separate objects isolated from one another

1. Smith (1983) p. 13.

2. Smith (1983) p. 14.

3. Smith (1983) p. 14.

but a complex network of events and inter correlations of energy. The dynamic patterns form stable relationships which build up the notion of solid structure. Capra said that in his opinion in a global interconnected world "we need an ecological perspective. We need a new vision of reality. A systems view of life, mind, consciousness and evolution is a natural extension of the new views of physics."¹ In describing systems theory he says that the term is misleading since there is no theory but an approach, a perspective, a language. Systems theory looks at the world of living organisms in terms of relationships and organisations. Systems are integrated wholes which cannot be reduced to parts. The basic systemic properties are destroyed when a system is divided into parts. A systems approach emphasises patterns of organisation.

Capra discusses several patterns of organisation in life. These include:

- a) the hierarchy of systems.
- b) The living organism is a self organising and self regulating system.
- c) Regeneration & renewal e.g. birth and death, are principles of self organising systems.
- d) Adaptation to environmental change is a principle of systems.
- e) Mind and life are organizing principles in systems e.g. the mind is the dynamics of organisation and the brain is the structure by which this is carried out.
- f) Structures are in continuous movement.
- g) Structures maintain an overall pattern of organisation and appearance of stability.

Capra sees all matter as functioning by systemic principles. Capra connects the principles which govern living self-regulating systems with tenets of Eastern wisdom. Hence he postulates that life, mind, consciousness are the forces which regulate living organisms, maintaining them in dynamic equilibrium.

Assumptions of Systems Theory

Systems theory then is an holistic way of observing phenomena. When systems theory is applied in a practical situation clearer definitions and assumptions have been synthesized from a number of sources.

1) Seiler (1963) accepts the following definition of a system: "a system is a set of objects together with the relationships between the objects and their attributes".² Although the objects and their attributes may be described the emphasis is on the complex web of relationships between objects and their attributes. If we take a staff team, for instance, the team has a purpose and is made up of a number of individuals who are selected because of a given background and experience. They accept a position on the team because of various motivations. As the team begins

1. Capra (1982) Audiotape
2. Seiler (1963) p

to form and work together, there are various formal expectations and requirements which provide a structure for the job tasks, activities, attitudes and beliefs. These are defined by the service to the client and administratively by the philosophy within the department or organisation within which the team functions. As the team forms and works together various informal patterns of interaction, activity, attitude and belief emerge as the particular group of people forms a unit or whole. Systems theory observes and takes into account the multiple factors which influence the functioning of the team as a whole unit. It assumes these multiple factors are dynamically interrelated.

2) A system has a boundary which is defined by its purpose. Boundaries shift. For example when a member of a staff team moves from one location to another they enter and leave various systems. At a regional office they find one system with a set of persons who have required functions, carrying out one task. At an institution they will find a different set of persons sometimes with different labels or job descriptions. In administrative or management meetings they will find another set of persons with yet another function, task and purpose. It is the task of administrators to have an overview of various systems and of the functioning and interrelationships of the systems within the organisation. They may shift boundaries of systems in order to achieve a task more effectively. As a team member enters and leaves various systems it is necessary for them to be aware of the differing roles they are taking. They need to inform the system in order to develop their role and they need to receive feedback constantly. Lack of clarity in systems creates confusion and conflict.

3) A system is made up of parts or sub-systems. It is easy to lose contact with the larger system by identifying with or forming a sub-system. We like to enter systems where it is most comfortable for us to be and we like to define ourselves by identifying where we are most comfortable. For instance when staff teams are formed it is comfortable to avoid conflicts about dependency and counter-dependency, about authority and power that are inherent in the formation of a group such as a staff team. In order to avoid conflict we identify with persons of like-minded theoretical outlook and form a sub-system. This may be healthy for the team if it leads to specialisation of function which enhances the goal of the team. It may also lead to isolation, suspicion, competition and fear which create regression within the system and inefficient or ineffectual outcome in terms of the goal of the team.

4) The parts of the system are interdependent. Change in one part of the system will create change in other parts of the system. For instance when team members redefine their role, other parts of the system will adjust, in some instances with confusion and chaos. In order for change to be effective it must relate to the purpose of the system thus fostering cooperation and creativity. There is also a period where information giving is vital to the establishment of new procedures and styles of functioning.

5) The whole is greater than the sum of the parts. Many resistances to change occur because the whole is greater than the sum of the parts so that the whole tends to maintain an old equilibrium.

6) Any system is a sub-system of a larger system or supra systems. It is also true that change takes place within the equilibrium established by the larger system. Before real change can occur and be lasting the supra system must approve the philosophy and plan for change.

The State Cabinet for instance is the supra system determining planning in government departments. However their plans for change must be implemented in sub-systems which by their nature, resist change.

7) Systems maintain their own homeostasis or equilibrium. It is a dynamic homeostasis or moving equilibrium. The homeostasis or equilibrium of a system provides stability and therefore resists change. It is also dynamic so that it is in a continual state of transformation in order to meet its goal and to reach higher levels of adaptation.

8) Feedback is the means by which the system adjusts and changes. Feedback links consist of formal evaluation in relation to goals. It also consists of informal unwritten communication. Verbal information giving and receiving is therefore important.

9) Regression occurs in systems at times of insecurity, change, lack of direction, and when unconscious forces rather than conscious goal directed activity is dominant in the group process. Bion (1959) postulates basic assumption behaviour in groups. Basic assumption behaviour reflects unconscious assumptions about the purpose of the group. Bramley (1979) discusses the relevance of Bion's theory to group learning situations. Kernberg (1978) relates group process to organizational regression. Kernberg states that "the first requirement for effective functioning of an organisation - including its leadership - is the adequate relationship between the organization's overall task and its administrative structure; the task has to be meaningful rather than overwhelming".¹ He says that "a breakdown in the effectiveness of work created by various internal factors and relationship between the organisation and its environment induces regressive group processes first, and regression in the functioning of the leadership later".² It is by the observation of group process in small groups and in organisations that the presence of regression in the system becomes clear. In most systems this is the case where staff relate in their own interest to maintain their own power structures rather than to co-operate in the achievement of the work task.

Further Assumptions of Systems Theory

The above assumptions relate to the structure rather than the process of a system, to the principles of organization rather than how it works. Durkin et al (1981) discussed and refined systems theory in relation to small groups over a period of ten years and have developed a process model of systems theory. In their summary statement of the new model they state that "all of life, from cell to society, is based on a dynamic self-organizing process called autonomous living structure. Living structure generates, maintains, evolves and finally dissolves its own autonomy".³ They have elucidated several principles by which living systems function.

"(1) Living structure describes its own autonomy by closing informational boundaries around it, thus distinguishing itself from its environment and other living structures." Thus a person keeps secrets and divulges only that information which fits the situation. A family maintains privacy and presents a combined image to the world. A staff team retains confidential information and sifts the information which it

1. Kernberg (1978) p. 4.
2. Kernberg (1978) p. 5-6.
3. Durkin (1981) p. xlx

will give to other systems.

"(2) Living structure transforms its own structure by opening its boundaries to the flow of matter/energy between itself and the environment, as well as itself and other living structures who open it". Thus a person develops physically, emotionally, intellectually, cognitively by opening the boundary to food, caring and nurturing, and to learning from people and events. A family proceeds through the stages of the life cycle opening and closing its boundaries to receive new family members and to mourn family members who leave. An organization changes in relation to its clients. Businesses respond to the needs of consumers. A staff team learns and modifies its approach as it mediates and advocates and negotiates when it represents the client to larger systems.

"(3) Living structure generates operational configurations based on opening and closing operations working in complementarily which achieve wholeness, self regulation and progressive transformation". Piaget's concept of cognitive development is systemic. It views intelligence as a progression from one equilibrium to another. Progress is made by disturbance of the present equilibrium by opening the boundary to new knowledge. Erikson's concept of development through the life cycle is systemic. Natural life crises present age appropriate issues for the person thus disturbing the equilibrium. Through the process of boundary opening the person builds a life experience. Trauma or lack of sufficient security may produce sufficient disequilibrium that boundary closure is difficult. Some mental illness and social dysfunction are signs that a person has not achieved sufficient boundary closure. A staff team is constantly in process of change and self regulation. If the process of self regulation becomes too defined and constricted by rules and regulations or by the search for the ideal, then the process of change and self regulation is stultified.

"(4) Living structure utilizes boundarying operations to create hierarchical divisions within itself. Living wholes and parts freely redefine themselves through autonomous boundarying operations". Thus a person under stress or trauma narrows attention and functions to survive. A family develops a more defined authority structure as children join the family and grow. A staff team needs to spend time developing its leadership structure and process. It needs to open itself to change as experience and interest with the team changes.

Systems Theory Applied

Some form of analysis of systems and system change is required in order to apply systems theory. Any framework for analysis has its limitations and is simply one view of the system.

(1) Organizational Systems:- Clayton (1980) provides a model for the analysis of the formal aspects of the system such as philosophy, goals, assumptions, and structure of the organization. This is then translated into behaviour which is required by the formal structure. A comparison is then made with the emergent behaviour and structure of the organization. The resultant consequences or outcomes provide feedback to the system.

Davis (1978) uses a decision determinants analysis to assess how successfully change will be adopted in an organization. He has devised eight factors which he describes broadly as (a) obligation : motivation or felt need to take new action (b) information availability of alternate courses of action (c) resistance : negative consequences of a chosen pattern of

change (d) yield : anticipated positive consequence of the pattern of change (e) circumstances : prevailing conditions which stimulate awareness of the need for change (f) timing of change (g) values : the attributes of the organization, its coping styles, expectancy and values related to change (h) ability : resources available to carry through the pattern of change. Davis suggests ways in which change can be facilitated in systems. He comments for instance that one of the factors which is critical in successful change is to have a group of opinion leaders, staff members who will remain positive towards the change when conflict emerges. The innovators are likely to be authentic people who have high respect amongst fellow employees and who have contacts outside the organization.

(2) Inter group and intra group process : Some form of observation of group process is necessary for a team to collect information upon which to base systems intervention in groups. Bramley (1979) applies group process theory to small learning groups. She articulates Bion's theory of basic assumption and work behaviour in a group and gives examples of how this theoretical framework can be applied in tutoring situations. Madow (1980) discusses communication in a health system which has several treatment facilities. The paper describes a theoretical basis for understanding organizational task and the group process. He expands upon the group process which occurs when inter-agency meetings are established. He says that representatives from different agencies come with the expectation that the intergroup will fail. Group fears develop. Morale is low and people become largely concerned with avoiding responsibility. Group process phenomena interfere with group tasks so that group time must be spent on developing group cohesion. Systems issues and solutions need to be discussed. The outcome can be collaborative effort.

(3) Client systems. Perhaps the best example of the way in which many approaches can be applied in analysing systems is in the family therapy field where multiple frameworks have been devised. The Australian Journal of Family Therapy and The Journal of Family Therapy contain many articles relating to systems theory in family work. For instance Douglas (1981) related a systems framework to behavioural family therapy.

A larger overview of the multiple systems in society is taken by the community Psychologists. Andolfi, Stein and Skinner (1977) examine a systems approach to the child, school, family and community in an urban area.

Each staff team as it develops and uses a systemic approach will choose the frameworks for analysis which best fit the area in which they are working. In this way they will translate a systems approach into achievable and manageable behavioural interventions. Some conflicts will remain unsolved and change may be limited yet each team and each team member can use their energy towards maintaining a vital organisation.

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BIBLIOGRAPHY

- Andolfi, M, Stein D & Skinner J. A systems Approach to the Child, School, Family and Community in an Urban Area. American Journal of Community Psychology, 5:1 1977 pp 33-34.
- Bion, W.R. Experiences in Groups, New York, Basic Books, 1959.
- Bramley, Wyn. Group Tutoring London : Nichols Publishing Company, 1979
- Capra, Fritjof. Audiotape : The New Vision of Reality February 1982, Bombay, India.
- Clayton, L & G.M. Physcodrama in Armstrong D & Boas P. (eds.) Experiential Psychotherapies in Australia Bundoora Vic : Pit Publishing 1980.
- Davis, Howard R. Management of Innovation and Change in Mental Health Services. Hospital and Community Psychiatry, 29:10, 1978, pp 649-658
- Douglas, J. Behavioural Family Therapy and the Influence of a Systems Framework. Journal of Family Therapy, 3, 1981, pp 327-339
- Durkin, James E (editor) Living Groups New York, Brunner Mazel, 1981
- Kernberg, Otto F. Leadership and Organizational Functioning. Organizational Regression. Int. Journal of Group Psychotherapy Vol. XXVIII, 1978, pp 3-25
- Madow, Michael R. Communicating in a Community Mental Health System. Psychiatry 43, 1980, pp 324-332
- Seiler, J.A Systems Theory in Organizational Behaviour Homewood Illinois, Dorsey Press, 1963
- Smith, Alan G. Holistic Philosophy and General Systems Theory : an overview for occupational therapy. Journal of the New Zealand Association of Occupational Therapy, 34 : 1, Winter 1983, pp 13-18.