The Necessary Architecture of Self-Regulating Teams

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SYNOPSIS
In this paper we present the meaning of self-regulation in Self-Regulating Teams (SRTs) and show the importance of self-regulating teams in a Learning Organisation. We show the contribution that SRTs could make to the process of an organisation that aims to become a Learning Organisation. In this paper we adopt a cybernetic approach to describe the role of SRTs and to identify the necessary conditions for SRTs to work at all. We show how Gordon Pask's Conversation Theory could be applied to self-regulating teams and present how 'Learning Conversation' could provide the framework for successful organisational evolution through team self-regulation. We conclude by stating the implications of our analysis.

Keywords: Learning Organisation, Self-Regulating Teams, Conversation Theory, Cybernetics, Double-loop Learning.

1. THE MEANING OF SELF-REGULATION IN SELF-REGULATING TEAMS

1.1 What are SRTs?
A Self-Regulating Team (SRT) is a work group given responsibilities for meeting objectives and the authority to take appropriate actions, without detailed management control. That is, a Self-Regulating Team assumes management functions in addition to carrying out its specific tasks. These functions embrace their day-to-day work at both a planning level and an implementation level. Control to such a team evolves from inside the team rather than from its external environment.
In designing and implementing SRTs, the role of management is to clarify the teams' goals and objectives, clarify the framework within which the work is to be done and to provide the support the team needs to achieve their goals.

1.2 Criticisms
SRTs have been characterised as a source of ambiguity about who really manages a set of activities (1). This could be the result of a "Self-Regulating" team which has unclear responsibilities, is unsure about its control levels and ultimately to whom it reports. In

effect, it is not the SRTs that are the sources of ambiguity but the management of the organisation that employs the SRTs that is responsible. An organisation must be ready to employ SRTs. Ambiguity always derives from non-clarity of objectives and only top management is to blame for this non-clarity.

Some organisations are perfect candidates for SRTs (2). They have a supportive culture and their management welcomes constructive change. Corporate officers and top managers determine the company culture and evolution. A company culture - the totality of its environment, social norms and management behavior - is top management's expression of itself. Other organisations are not good candidates for SRTs; they are not 'ready' to implement SRTs. A number of those organisations however proceed in restructuring their business in SRTs and more than often they fail to achieve any benefits.

Such criticisms are not unique to SRTs; one can find that Total Quality Management (TQM), Just In Time (JIT), Business Process Reengineering (BPR), and almost any management concept has suffered from such criticisms. In all these cases the criticisms are usually only valid when the concepts are not properly understood and thus badly implemented. For example, if a company employs SRTs as a way to eliminate middle managers (while improving morale and productivity) then the attempt will almost surely fail; the failure will also lead to cynical criticisms. Generally, if you apply SRTs (or TQM, JIT, BPR, etc.) as an end in itself (or employ them for the wrong reasons), you will fail to realise any benefits. SRTs (as any such concept) has to be used as a means to an end.

One may ask, 'what would that end be?' It is this question that we address in this paper. We argue that SRTs are the means to make processes of an organisation self-regulating. Only when the processes of an organisation become themselves self-regulating, the organisation becomes effective.

2. THE IMPORTANCE OF SRTs IN A LEARNING ORGANISATION

2.1 Why Self-Regulating Processes (SRPs)?

Two business concepts, inherited from the Industrial Revolution business practices, are (i) the need for hierarchical control and (ii) the need for division of labour. These concepts were thought necessary as an enabler for proper business control, where control was open-loop control (open-loop control is the situation when the control action must be completed before you can exactly assess the outcome). These concepts have been vigorously questioned in the current dynamic business environment. It is recognised that there is an inherent variability in any process which cannot be managed by open-loop control processes. Deming's 14 points on quality management are a recognition that open-loop control is not a sufficient basis for quality management in modern business. Of particular importance here is Deming's third point, "cease dependency on mass inspection" (3), the implication of which is to introduce negative feedback into the process for the *prevention* of defects. A consequence for taking this point seriously is to stop thinking in terms of hierarchical control and division of labour and to start thinking about processes which include negative feedback; building negative feedback to a process is what we require to make it a Self-Regulating Process. Self-regulation means being able to alter the process whilst running and this requires thinking. To have Self-Regulating Processes, the hierarchical control and division of labour concepts have to be abandoned and replaced by other concepts. First, workers must be responsible for implementing and interpreting the constraints placed upon their work. Their jobs must be constructed in such as a way that by making appropriate decisions dynamically workers control their local environment sufficiently to ensure

the production of perfect work. Second, all information that a worker needs to produce perfect parts should be available to that worker at the time required. Finally, wherever possible, decisions relating to the quality of work should be made by the people doing the work at the time the work is done. The focus on processes rather than on tasks has a basic consequence of shifting the focus from individual worker to teams. The tasks of individuals are enlarged so that the worker is part of a team responsible for a Self-Regulating Process. When we cease to focus on slicing and dicing tasks we see the role of the worker has changed to that of a thinking member of a Self-Regulating Team.

Today's business environment is often characterised as 'dynamic'; the only thing that remains unchanged is change itself. In cybernetics terms, the environment is dominated by 'variety'. The law of requisite variety states that only variety can destroy variety (4). The law implies that the degree of self-regulation in a team should match the variety of the environment in which it operates. In other words, a process should be as self-regulating as necessary for it to control the variety (change) present in its environment.

Team members of a self-regulating team that supports a self-regulating process, need to be treated as thinking and learning members of a team and it is this need that gave rise to the concept of Learning Organisation: the organisation that provides rich learning opportunities to its members.

2.2 What is a Learning Organisation?

A learning company is an organisation that facilitates the learning of all its members and continually transforms itself. This implies the use of negative feedback. Action in the Learning Organisation always has two purposes (5): (i) to resolve the immediate problem, (ii) to learn from that process.

The characteristics of a Learning Organisation include a learning approach to strategy, a participative policy-management, enabling structures (creating opportunities for individual and business development), evolution of the boundary workers as environmental scanners (to collect information from the outside of the company), a learning climate which promotes self development opportunities for all (ibid.).

A Learning Organisation is an organisation skilled at creating, acquiring, and transferring knowledge, and using these skills to modify its behaviour. Some believe that a major component of any effort to improve organisational performance involves learning and, like most organisational processes, learning is achieved by design, not by chance (6). If learning is achieved by design, then there must be an 'architecture' to support it. A Learning Organisation learns through Self-Regulating Teams who in turn are part of Self-Regulating Processes; an architecture to support both SRPs and SRTs is necessary in order for a true Learning Organisation to be fully realised.

3. A CYBERNETIC APPROACH TO THE LEARNING ORGANISATION

3.1 The essence of the cybernetic approach

The crux of cybernetics is looking for stability in organisations for "that 'which is stable' can be described; either as the organisation itself or some characteristic which the organisation preserves intact. That 'which is stable' may be a dog, a population, an airplane, Tim Jones, Tim Jones' body temperature, the speed of a ship, or indeed, a host of other things" (7). What matters is not all the rich detail of a dog, a ship, etc., but the *necessary architecture* which can be understood independently of the particulars that makes the stability possible. We will be looking for the necessary architecture for SRTs, in their correct form, to exist and be successful.

3.2 The necessary 'architecture' of SRTs

Consider a very simple system whose architecture is one of procedures which do something to a domain; essentially an open-loop control system. "Such a system could be standard database program working on some records or a clerk who is enslaved to act as an automaton in following rigidly to a rule book. Any such system works only when its procedures match exactly what needs to happen. The program computes nonsense if the data in the records is not in the right form; the official sends a letter to a dead person. An obvious improvement on such a system is where feedback of information about the effect of the procedures on the domain is taken into account by the procedures to modify their effect. This improvement changes the design of the process, in other words, we can improve the effectiveness of a process by changing its design and adding a feedback loop" (8).

If a room has an open fire, its temperature can not be stable in the face of variations of fuel (logs or coal) consumption and outside temperature. The only way you can maintain a stable temperature in the room is to introduce a negative feedback controller where temperature is *set* and the system looks for discrepancies between the set temperature and the actual temperature. Based on this comparison, the system takes a 'control action' which reduces the discrepancy between the actual and the desired set temperature. As there is a single feedback loop between the environment and the controller, we can call this a single-loop system.

This is sufficient to show that some form of negative feedback is necessary for stability (in this case of a state). But a single-loop system, as we will show below, is not a sufficient architecture of an SRT if we are to achieve functional stability.

4. A CYBERNETIC APPROACH TO SRTs

4.1 Apply Pask's Conversation Theory to SRTs

Pask was one of the first to make plain the distinction between the process of learning and the process of learning to learn. For learning, single loop mechanisms are not sufficient. The problem with a simple thermostat (as described above) as a model for learning would be that although the thermostat can reduce the discrepancy between actual and desired set temperature, it can not choose or question the appropriateness of this set temperature when the circumstances change. For a thermostat to be able to do something like this, it must have a second feedback loop which could control the temperature setting according to some evaluative criteria. In such case, the thermostat would be a double-loop system. Organisational learning should be based on such double-loop systems; Pask's Conversation theory is a spelling out of what double loop learning is.

4.2 Conversation Theory

The architecture of learning in Pask's theory, is that of a Learning Conversation (9, 10). Pask shows that the minimal architecture of something that can learn is that of a Learning Conversation and this architecture has a double loop structure. According to Pask, and cybernetics generally, something that learns would have richer detail and perhaps a more complex architecture, but it could not have less than the Learning Conversation architecture. In other words, a Learning Conversation is the minimal condition of a learning system.

A Learning Conversation has two orders of processing - issues of what is to be done are expressed and resolved by the first order processes and issues of why what is to be done is correct and proper are expressed and resolved by the second order processes. The two levels, first order and second order, behave as follows (see Figure 1). The first

order processes act upon the environment and are able to execute control actions through the feedback they receive (first feedback loop). Similarly, the second order processes act upon the first order system through the feedback they receive from it. This way they are able to execute control actions in order to regulate the behaviour of the first order system. Pask shows how a Learning Conversation is capable of evolving and changing itself, as a self-regulating process (ibid.).
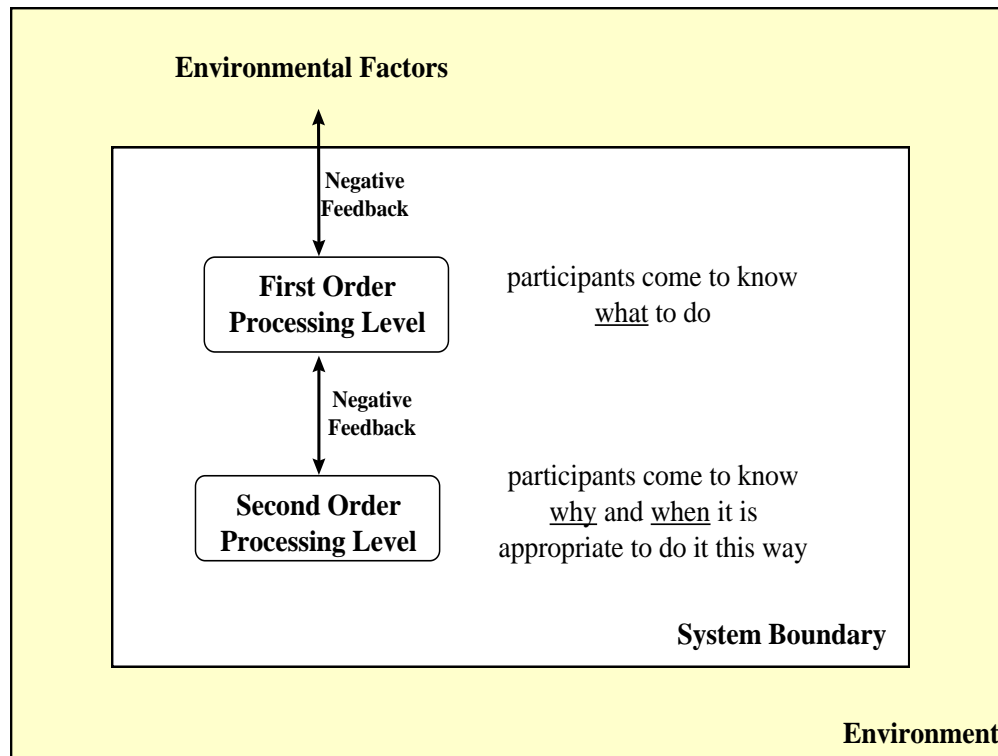
Environmental Factors

Negative Feedback

First Order Processing Level

participants come to know
<u>what</u> to do

Negative Feedback

Second Order Processing Level

participants come to know
<u>why</u> and <u>when</u> it is
appropriate to do it this way

System Boundary

Environment

Figure 1: The Learning Conversation

4.3 The cybernetic approach to the Learning Organisation

From a cybernetic point of view, it is better not to think of the Learning Organisation as a strategic guiding vision but rather to think of *any* organisation, which is both responsive and flexible to change, and capable of evolving as a Learning Organisation. By 'initially responsive' we refer to the first order processing level and by 'continuously flexible to allow evolution' we refer to the second order processing level. It is a question of whether an organisation is more responsive at level 2; and responsiveness can only come from the Learning Conversation architecture.

Thus, to fully realise a Learning Organisation the Self-Regulating Teams which perform the Self-Regulating Processes must be part of Learning Conversations. To achieve functional stability, the minimal architecture of an SRT should be a double-loop system engaged in Learning Conversations with other double-loop systems.

In particular, there are three points that follow from this insight: (i) the participants of a Learning Conversation must question not only what it is to be done (level 1) but why what is done is appropriate (level 2) and be encouraged to perform that continuous questioning, (ii) the 'what's, 'why's and 'how's should be explicitly recorded and modeled, and (iii) these records and models should not be the tools of only senior

management but also those of the Self-Regulating Teams. Being a Learning Organisation implies that the organisation continuously compares itself with what it could be. This is the core of learning and growth.

5. SUMMARY AND CONCLUSION
In this paper we have shown that the notion of Self-Regulating Teams only makes sense within the context of Self-Regulating Processes and that Self-Regulating Teams are not an end in themselves but rather a means to an end. This end is to make processes of an organisation self-regulating. The notion of self-regulation implies the notion of learning which is institutionalised as the Learning Organisation.

A Learning Organisation learns through its SRTs (working in SRPs). The necessary architecture of this learning is double-loop as we have articulated through Conversation Theory.

We conclude, that Self-Regulating Teams engaged in Learning Conversations infuse Self-Regulating Processes with learning. Self-Regulating Teams are the foundation of Self-Regulating Processes and are the medium through which an organisation learns.

REFERENCES
1. Davenport, T. (1993) *Process Innovation: Reengineering Work Through IT*, Harvard Business School Press, Boston, Massachusetts.
2. Hicks, R. & Bone, D. (1990) *Self-Managing Teams*, Kogan Page, London.
3. Deming, W.E. (1986) "Out of Crisis", MIT Centre for Advanced Engineering Study, Cambridge, Massachusetts.
4. Ashby, R. (1964) *An Introduction to Cybernetics*, University Paperbacks, London.
5. Pedler, M., Burgoyne, J.& Boydell, T. (1991) *The Learning Company; A Strategy for Sustainable Development*, McGraw-Hill, Berkshire.
6. Henderson, J. & Lentz, C. (1995) "Learning, Working and Innovation", *Journal of Management Information Systems*, Vol.12, pp. 43-64.
7. Pask, A.G.S. (1961) *An Approach to Cybernetics*, Hutchinson, London.
8. Johnson, L. & McDonnell, J. T. (1994) "The Strategic Option of Becoming a "Learning Organisation" as Articulated in Cybernetic Theory", *Int. Journal of Systems Research and Information Science*, Vol. 6, pp. 115-124.
9. Pask, A.G.S. (1975) *Conversation, Cognition and Learning: a cybernetic theory and method*, Hutchinson, London.
10.Ogborn, J. M. & Johnson, L. (1984) "Conversation Theory", *Kybernetes*, Vol. 13, pp. 7-16.