A SYSTEMS APPROACH TO KNOWLEDGE CREATION

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This paper describes systems methods that have been developed to support knowledge creation in post-industrial business. The methods are appropriated from post-modern philosophy and assume a pragmatic position in regard to knowledge. Knowledge in business is viewed as guides for human action. Businesses build knowledge that is used to steer member's actions in managing, developing, coordinating, producing and implementing processes that produce products, services or further knowledge. New knowledge, as guides for action, emerges in organizational conversation. Two main forces precipitate this emergence: the individual subjects and the formative system they find themselves in. The utterances that make up conversation are seen as emergent phenomena whose occurrence enable or regulate further utterances.

Introduction

There are three sub systems within any organization as a knowledge system:

1. *The formative system*: this is the system that enables or regulates what can be said and thought by individuals within a specific business situation. The a priori matrix of concepts, procedures, patterns, and stakes that are in circulation are used to guide member's actions within the business.
2. *The conversation system* where the formative system and the individual subject meet. These conversations are either regulative or generative in nature. Regulative conversations have a priori elements that govern how the utterances of individuals are articulated and linked to each other. Generative conversations have as their stake the creation of new knowledge. They seek the development of new concepts, procedures, patterns and stakes.
3. *The individual subject*: as a system the individual has a set of a priori concepts, procedures, patterns and stakes that guide their utterances actions.

These sub systems are in dynamic interaction and as a whole form the organizations knowledge system. This system of elements that guide human actions and the human actions that in turn shape it is ultimately uncontrollable at a micro level. Interventions however can be made into the system with the aim of regulating and governing the conversations that guide the human system of actions. In appropriating aspects of post-modern philosophy into new systems methods for knowledge creation in post-capitalist business, this paper will argue for the relevance and usefulness of the above model and develop heuristics to support interventions aimed at specific areas of the knowledge system.

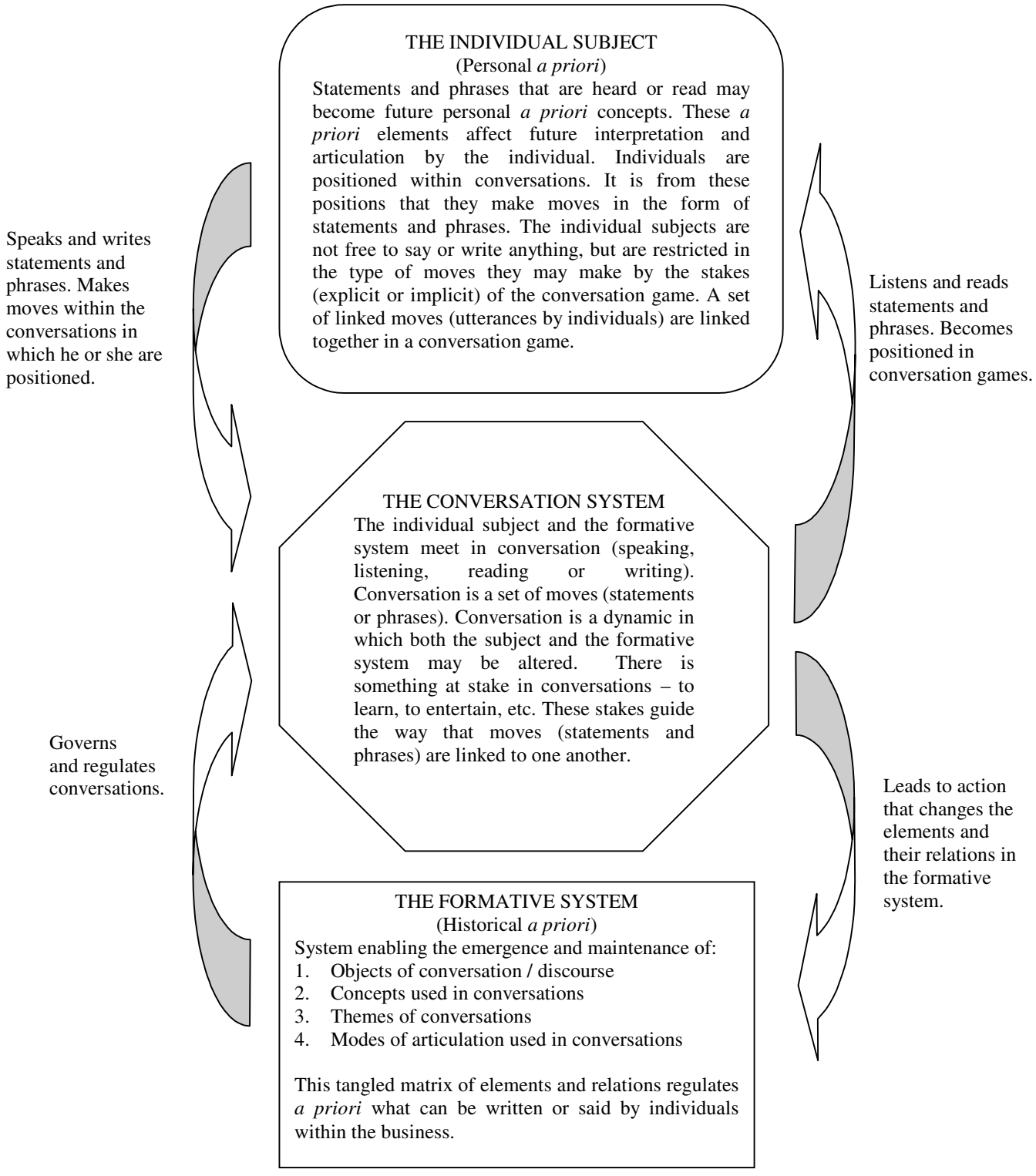
THE INDIVIDUAL SUBJECT
(Personal *a priori*)
Statements and phrases that are heard or read may become future personal *a priori* concepts. These *a priori* elements affect future interpretation and articulation by the individual. Individuals are positioned within conversations. It is from these positions that they make moves in the form of statements and phrases. The individual subjects are not free to say or write anything, but are restricted in the type of moves they may make by the stakes (explicit or implicit) of the conversation game. A set of linked moves (utterances by individuals) are linked together in a conversation game.
Speaks and writes statements and phrases. Makes moves within the conversations in which he or she are positioned.
Listens and reads statements and phrases. Becomes positioned in conversation games.
THE CONVERSATION SYSTEM
The individual subject and the formative system meet in conversation (speaking, listening, reading or writing). Conversation is a set of moves (statements or phrases). Conversation is a dynamic in which both the subject and the formative system may be altered. There is something at stake in conversations – to learn, to entertain, etc. These stakes guide the way that moves (statements and phrases) are linked to one another.
Governs and regulates conversations.
Leads to action that changes the elements and their relations in the formative system.
THE FORMATIVE SYSTEM
(Historical *a priori*)
System enabling the emergence and maintenance of:
1. Objects of conversation / discourse
2. Concepts used in conversations
3. Themes of conversations
4. Modes of articulation used in conversations
This tangled matrix of elements and relations regulates *a priori* what can be written or said by individuals within the business.

Figure 1: Conversation, individual subjects and the formative system

The individual subject

Kant (1786) is interested in the a priori concepts that enable us to have knowledge: the principles that allow a synthesis and bringing together of particulars so that we may know. In this sense he takes a systems approach and builds a descriptive model of the components and workings of an individual as a knowledge system. There are three fundamental components of this system that interact and in so doing enable us to produce knowledge. Sensibility allows us to receive initial representations as objects. Understanding enables the individual to think about the objects sensibility has given them as concepts. Reason makes use of principles to arrange and organize understanding's concepts.

A clear distinction is made between understanding and reason. Understanding enables "the unity of appearances by virtue of rules" reason enables "the unity of rules of the understanding under principles" (*ibid*. b358). Reason is not applied directly to sense data as understanding is, but attempts to arrange the concepts produced by the understanding into an *a priori* rational *unity or system*. The systemic nature of reason is highlighted by Kant claiming that, "If we review our knowledge in its entire extent, we shall find that the particular business of reason is to arrange it into a system, that is to say to give it connection according to a principle" (*ibid*. b672). Reason's task is to provide systems principles through which understanding's concepts may be connected and organized into wholes. It allows the individual knower to make sense of the multitude of different concepts of objects that are produced through the a priori conditioning of the understanding. An individual's representations can contain three general relations. Firstly they can relate to one as a subject, secondly to objects as appearances, and thirdly to objects of thought in general. For each of these relations reason requires an unconditioned systems idea representing the "synthetical unity of all conditions" (*ibid*. b390). The idea of pure reason containing the unity of relations of representations in the subject is the 'soul' (psyche) and "is the concern of psychology" (*ibid*. b391). The 'world' as an idea of pure reason represents "the sum total of all appearances" and is "the concern of *cosmology*" (*ibid*.). Finally, Kant (*ibid*.) argues that the whole (idea of pure reason) containing "the possibility of all that is capable of being thought" is 'god' and "is the concern of all *theology*".

Lewis argues that knowledge is created when the individual "can frame the data of sense in a set of concepts which serve as guides for action" (1926 p.243). The a priori concepts that are used by an individual to frame the sense data given to them are influenced by their need or interest at that time. Individuals have the potential to reflect on the usefulness of the a priori concepts they have assumed, and to assume new concepts. Knowledge is constructed through a process of trial and error learning in which individuals interpret situations through one conceptual pattern after another. Their practical success or failure leads them to adapt their concepts which then guide them to act in ways that are more likely to best serve their purposes. Lewis (1929 p.267) is critical of pragmatism that is used in the justification of belief by superficial individual desire. He argues that important ends, that are required for long term satisfaction of needs,

should take precedence over individual desires. Such overriding ends include intellectual consistency; economy; completeness of comprehension; and simplicity of interpretation.

The process of creating and improving knowledge is not simple since "any set of basic concepts has vested interests in the whole body of truth expressed in terms of them, and the social practices based on them." (*ibid*. p.269). An individual's knowledge needs to somehow fit into the network of external concepts and systems ideas that are in use within their work or social situation. The mind deals with increasing complexity by imposing new systems ideas of order into it. These new ways of arranging simplify the chaotic reality in more and more powerful ways. Skolimowski (1994 p.103) expresses his thesis in ancient Greek terms: "Logos is continuously organizing the chaotic cosmos" we may express the same notion as *systems ideas are continuously organizing the chaotic cosmos*. An individual's reality-making process continues using a certain logos until that framework is unable to cope with the ontological complexity at which time a new logos emerges which has more powerful ways of simplifying.

The formative system

The section interprets the philosophy of Foucault (*The Archeology of Knowledge,* 1972) in order to develop a model of the knowledge formation system at work within a business. It provides a radical opposition to the individual-centred view presented above. The formation of the objects, concepts, themes and modes of articulation used in business conversation are described. An inquiry frame is developed that helps map these elements and relations, which make up a business's system of knowledge formation. This section describes 'the formative system' component of the knowledge systems model. The inquiry framework is labeled Knowledge Systems Diagnostics (KSD) and aims to uncover an organization's "rules of formation" (Foucault 1972, p.38). These rules make possible the creation and maintenance of knowledge within an organization. Foucault (1972) approaches knowledge from a position which sees discourse (a group of statements) as having regularities and patterns which enable or constrain the emergence of new ideas and concepts. This view is radically different from the individual-centred approach of described above, which focuses on the individual mind as the primary component in knowledge creation. This section argues that individuals occupy certain positions within a matrix of rules, which enable them to articulate statements. This knowledge matrix contains the rules of formation of objects, concepts, and themes, as well as the positions which individuals may occupy in conversations. Appropriating Foucault's (1972) approach allows us to view organizational change as a shift in the knowledge matrix rather than the shifting of individual minds.

In order to understand and appropriate Foucault's (1972) approach one needs to clarify his use of certain important terms. Foucault (*ibid*. p.107) describes *discourse* as "the group of statements that belong to a single system of formation". There is a system of elements and relations that enables statements to come into existence; a discourse is a group of statements that share the same formative system. This focuses the analysis of knowledge specifically at the formative level, that is at the level just before the individual says something. At the level, that enables individuals to think, talk or write about, this or that. The concern is not with what things said may mean, but with how statements are

able to come into existence and remain in circulation and disappear. A statement is "the modality of existence proper" to a group of signs (*ibid*. p.107). Foucault makes it clear that statements are *not* to be viewed as units of grammar (sentences), or units of logic (propositions). Statements are seen as articulations that exist because of a series of conditions that function at a certain time and place. It is from this perspective that the usefulness of Foucault's ideas in organizational knowledge diagnostics can be appreciated. *What are the conditions that enable certain statements (spoken or written) to be articulated and to survive within a business, while others are smothered or never articulated?*

Foucault (*ibid*. p.15) distinguished between two types of knowledge 'connaissance' and 'savoir'. In this work these are referred to as first and second order knowledge. First order knowledge concerns "the relation of the subject to the object and the formal rules that govern it" (*ibid*. p.15). It is at the level of concepts and systems ideas that an individual's actions are guided, at the level of a discipline or body of know-how. Second order knowledge refers to "the conditions that are necessary in a particular period for this or that type of object to be given to connaissance [first order knowledge] and for this or that enunciation to be formulated" (*ibid*. p.15, brackets mine). KSD provides a framework for inquiry into the second order knowledge that is operating within an organization. This inquiry produces a description of the system of formation that enables the emergence and articulation of statements of know-how (first order knowledge) by individuals within an organization. Business knowledge is seen as a system containing two key components: a system of formation and bodies of knowledge. KSD's term 'body of knowledge' is synonymous with Foucault's 'discourse', and depicts a group of statements (things said or written) that share a common system of formation.

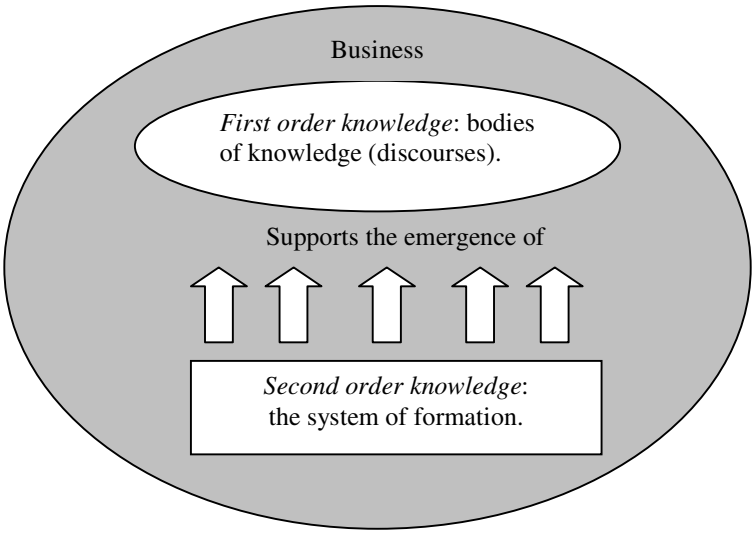

Figure 2: A business knowledge system

Foucault (*ibid*.) approaches first order knowledge by probing what makes a body of knowledge a unity. He does this by shifting his inquiry to the second order and searching for common rules of formation that give rise to it. KSD follows this and assumes that the

unity that makes up a body of knowledge within an organization does not rest in its coherence at the first level, but in the system of second order conditions that enables statements to be made within it. Foucault (*ibid*. p.38) defines *rules of formation* as the "conditions of existence (but also of coexistence, maintenance, modification, and disappearance) in a given discursive division" (body of knowledge). Foucault (1972) divides systems of formation into four interrelated areas:

1. The formation of objects of conversation;
2. The formation of statement modalities;
3. The formation of concepts;
4. The formation of strategies or themes.

Each of these divisions is organized into three elements that interact in the formation process. KSD inquires into each of these in order to develop a map of the rules of formation that are supporting a business's first order bodies of knowledge. A framework of questions that focus on the three elements and their interrelations within each formative area is provided to guide inquiry.

The conversation system

Conversation is the medium in which the individuals as knowers meet the formative system. This section describes conversation as a system consisting of individuals in certain positions, their utterances, and the stakes that make the flow of utterances meaningful. In keeping with the appropriation of post-modern philosophy into systems methods, the description appropriates a conversation model from Lyotard's (1984, 1988) works. The meeting of individual worlds and the formative system is a dynamic that integrates the intentions of individuals and the local rules and relations guiding the formation of concepts and systems ideas. What is at stake in the conversation regulates these two forces. This stake limits the possibilities of what individuals can say at any point in the conversation. However, individual utterances are only reasonable against the current flow of utterances. The flow of utterances forms the theme of the conversation. Any utterance has to link to this theme or run the risk of being judged irrelevant. In most business conversations, the formative system provides the stakes and themes that regulate the range of possible utterances available to any individual knower. Individuals can however change the stakes and themes of conversations by linking new systems ideas and concepts into the conversation. Individual utterances are moves within a game. The stakes and themes regulate the game. Conversations as systems are complex because individuals both play, and are played by, the game.

Generative conversations aim to create new stakes, themes, concepts and systems ideas that may be developed into new knowledge as guides for future action. The majority of business conversations are regulative. They limit what can be spoken or written by any individual. In contrast, generative conversation attempts to escape the regulatory forces of the formative system by encouraging creative individual moves that link concepts and systems ideas in new ways, thereby enabling the emergence of new stakes and themes. In pursuing these purposes, this section is motivated by the issues of post-modern

philosophy that have been identified by Jackson (1991, p.299) as having "important implications for systems thinking and practice". Jackson highlights four issues:

- *Logic and order* – Post-modernism questions their feasibility in systems;
- *Progress* – Performance and emancipation are considered potentially dangerous traps;
- *Power* – Is ignored or simplified by systems thinking, but central to post-modernism;
- *Language* – Is assumed transparent by systems thinking, but is assumed deceptive by post-modernist philosophy.

Lyotard's key philosophical work is *The Differend* (1988). He reconceptualizes conversation by focusing on the phrase as a unit of analysis. This is essentially a move against Wittgenstein's (1953) humanistic assumptions that give individuals the power to dominate language games. Lyotard balances the power of the individual by focusing on the pragmatic nature of the phrase. *This paper interprets a phrase as a conversation system-state*. Over time, conversations move through a series of phrases. Phrases present a universe consisting of instances: an addressor, addressee, a referent and a sense. The addressor and the addressee are not independent of the phrase – it is not a message passing between them. The phrase is a system-state, a constellation that "is defined by – as it, in fact, defines – the situating of its instances (addressor, addressee, referent, sense) with regard to one another" (*ibid*. p.193). The phrase is "is not a grammatical – or even linguistic entity . . . but a pragmatic one" (*ibid*. p.193). Phrases, "which are moves in language games" (Lyotard 1993, p.21), may include gestures, music and signals. The instances of a phrase are simplified as follows (Lyotard 1988, p.14):

- Referent: what a phrase is about, a pointer to 'reality';
- Sense: what is conveyed, expressed and signified about the referent;
- Addressee: that to which the sense of the referent is addressed;
- Addressor: that from which or in the name of which, the sense is addressed.

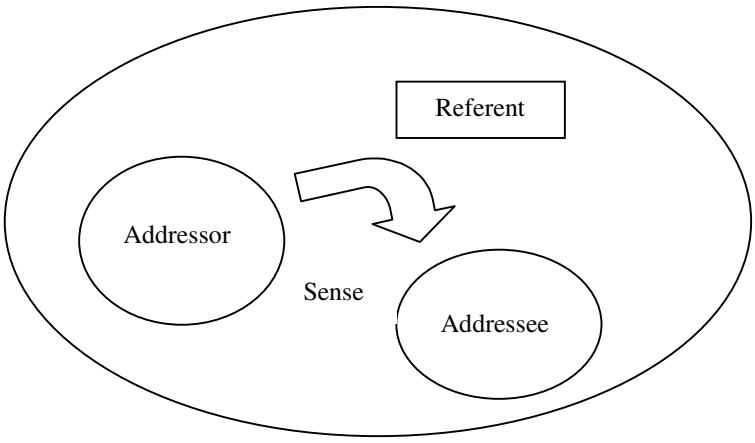

Figure 3: The phrase universe and its instances as a conversation system-state

The interrelationships of the instances are arranged in the phrase universe. There may be none, one or many of each of the instances in a phrase. In presenting his thesis, Lyotard

(1988, xii) outlines a structure in which a phrase – as a constellation of instances – is constituted according to rules. These rules make up regimens such as "reasoning, knowing, describing, recounting, questioning, showing, ordering, etc". One cannot translate a knowing phrase into a questioning phrase. However, phrases from different regimens can be "linked one onto the other in accordance with an end fixed by a genre of discourse" (*ibid.*). These stakes link phrases as pragmatic conversation system-states in teleologies. Different conversations have different stakes – "to know, to teach, to be just, to seduce, to justify, to evaluate, to rouse emotion, to oversee" (*ibid.*). Phrases are linked in terms of these ends. The conflict and agonistics of language games now occur "not between humans or between other entities; rather, these result from phrases" (Lyotard, 1988, p.137).

Phrases have to be linked, "…to link is necessary; how to link is contingent" (*ibid.* p.29). The necessity of linking is ontological; the necessity of there being a next phrase "is a presupposition for 'objects', for their 'witnesses' and so on" (*ibid.* p.66). This is the cornerstone of Lyotard's approach to discourse: one must link phrases – human reality depends on it. A 'differend' occurs where phrases cannot be linked, where individuals' worlds encounter one another. It often occurs when different language games or bodies of knowledge meet. It is "a case of conflict, between (at least) two parties, that cannot be equitably resolved for lack of a rule of judgement applicable to both arguments. One side's legitimacy does not imply the other's lack of legitimacy" (*ibid.* p.xi). The differend is that state where feelings are not yet communicable. This may demand the creation of a new link across conversation system-states. It is important that the differend is not 'smothered' by litigation; we should rather search for idioms that can express them (*ibid.* p.13). In organizations the differend may be a creative source of new knowledge. This source of new idioms and knowledge is wasted if it is not respected, and if strangled could lead to alienation of people and mere compliance, such as in businesses where there is a "monopoly on procedures for the establishment of reality (*ibid.* p.4).

Lyotard argues that even in modern institutions "the limits the institution imposes on potential language 'moves' are never established once and for all (even if they have been formally defined)" (1984, p.17). He identifies two different kinds of progress in knowledge: firstly, "a new move (a new argument) within the established rules" and secondly, "the invention of new rules, in other words, a change to a new game" (*ibid.* p.43). These are comparable to the notions of first and second order change (Watzlawick *et al*, 1974). First order change emanates from solutions that are logical within the current context of rules. Second order change occurs when the context of rules itself is changed. In order to support the creation of new knowledge within organizations one needs to escape the limits of regulative conversation that assume certain stakes and restrict the kinds of moves (utterances) allowed. Such an intervention must free individual subjects to collaborate in the formation of new stakes, patterns and themes. In providing structural support for generative conversations, the purpose is to increase the probability of participants making creative moves. This bottom-up approach lets the links and relations emerge into themes and stakes. It focuses on relations between utterances and allows new concepts, systems ideas and stakes to emerge. This is in contrast to traditional regulative systems approaches that start with the systems purpose and logically deduce the required

parts and relations. This open, bottom-up approach encourages participants to explore "the possibility of no longer being, doing, or thinking what we are, do, or think" (Foucault, 1984, p.46). The heuristics are arranged here into five steps.

Step one: Becoming aware of games

The strategy, goals, and objectives that govern organizations also regulate phrases and linkages. Participants become trapped in regulated conversations, which to some extent shape how they think, speak and act. There is a way out of this trap. When attempting generative conversations, it is first necessary to explain the idea of conversation as a game. This enables participants to see the nature of regulative conversation and to avoid becoming trapped in it. Watzlawick *et al* (1974, p.99) identifies Wittgenstein (1956, p.100) as the first to point out the fact that once one becomes aware of the game one is in one "can no longer naively go on playing". Once there is an awareness of the regulative nature of normal organizational conversation, steps can be taken to free oneself.

Step two: The linking rule

The strategy is to replace one game with another. Generative conversation is a game in which one's ability to link phrases is the stake. Instead of letting traditional business goals unconsciously govern the linking process, one can consciously link in any desired way. Generative conversation attempts to create new knowledge. It is creative and divergent, and it builds new relations between previously separate bodies of knowledge. There is only one rule in generative conversation and that is *always link to the previous phrase*. This stops the occurrence of phrases that link to some higher regulatory business stake. It is possible to link to any of the four instances: the addressor (AD), the addressee (AS), the referent (R) or the sense (S). Some examples of linking are:

- applying another S to the same R;
- applying the same S to a different R;
- linking a new R to the current R;
- unpacking the detail of a S or R;
- describing the containing R;
- describing the history or future of a R;
- linking the R to the history or future of an AD or AS;
- re-describing a S or a R through metaphor;
- Switching a S from a R to an AD or AS.

Step three: The guides

The following guides are presented to participants before beginning a generative conversation. Each is in italics, followed by a supporting explanation.

Generative conversation is a game in which we play with ideas, not against each other.

This aims to reduce the amount of competition between players and focuses participants' attention on concepts and systems ideas. If the conversation is playful then there is less chance of defensive and limiting moves by participants.

Appoint a facilitator at the start to monitor the application of the rule. The facilitator only points out when a phrase is not linked directly to the previous phrase. This keeps the participants vigilant against using some higher level stake as a linking medium. It keeps the linking fresh and open to possibility.

There is no rush; regulative conversation occurs at speed. The regulation of conversation seems just to 'happen'. One has to slow the conversation system in order to become conscious of the regulative trap. One's first thought is usually a regulated one. Discarding the first thought enables creative linking.

Allow at least three seconds of silence between each phrase. This facilitates two things. Firstly, it breaks up reactive jostling between any two participants by allowing others to utter a link. Secondly, it allows for a listening to and respecting of the last phrase.

Watch the pull of habit and pattern. Be aware of the tension to link in a certain way. One can only escape the trap of regulation when one becomes aware of it. Stepping back allows participants to feel the tension of regulation.

Keep a notebook to jot down ideas so that they are not forgotten. Conversation only allows one out of many possible links to occur. Participants may be unable to make their linking utterance because someone else has already linked. Unless their thought can be directly linked to the one that has 'stolen' the slot it will be lost. Noting it down frees participants to concentrate on the current link. It also keeps a record of possibly useful concepts and systems ideas.

Questions can form part of the conversation but must obey the linking rule. This stops participants from using questions to judge the last phrase against some higher-level stake. A question is only valid if it links directly to the last phrase.

Make use of creative misunderstanding. This supports a free interpretation of phrases. If a participant misunderstands the sense of a phrase, he or she may make a creative link. In this case, the game continues with the next link even if it arose from a misunderstanding.

Listen, take a few breaths, think, link. This sequence allows the participant to realize the current conversation system-state before linking. Taking a breath after listening to a phrase makes it difficult for a participant to make a purely reactive link since it is unlikely that they will be able to talk while breathing in.

Remember, silence is a phrase. This is to remind participants that it is acceptable to have periods of silence. Silence as a phrase does present the theoretical difficulty of having to link to silence! Practically someone usually comes up with a link. If a group is totally

stumped and remains in silence for longer than three minutes, present a new phrase as a starting point.

Try to link multiple previous phrases. By linking the last phrase to multiple earlier phrases, participants can create new concept and systems idea combinations. As the conversation develops, this combination of the last phrase with previous phrases becomes easier.

The following '*LINKING*' acronym serves as an overall guide for generative conversations: ***L***isten to the whole phrase; ***I***nhale, take a few breaths; ***N***urse the current theme; ***K***erb your initial reaction; ***I***nvent ***N***ew moves ***G***ently. The only part of the acronym that needs further motivation is the 'nursing of the current theme'. This is to allow the emergence of new themes. New themes can emerge even when participants strictly respect the linking rule. This occurs when a referent or sense is present through a series of phrases (conversation system-states). The label of the referent or sense need not be the same, as different phrases may provide varying explorative re-descriptions.

Step four: Setting a broad context

Goals and focus regulate conversations. Generative conversation begins with linking and lets themes and stakes emerge as they may. It is a process of relating that supports the possibility of thinking and saying something new. It can be used as an underlying practice for any creative group process. A systems method may guide the group but all interactions are based on the linking rule. When generative conversation is attempted as a stand-alone approach, the starting context of the conversation needs to be as broad as possible. Being too specific in defining the issue of concern may exclude possible phrases and linkages.

Step five: Capturing new stakes and themes

If generative conversation supports other systems methods, then themes may emerge from the structure of the containing approach. In pure generative conversation, themes and stakes should be identified in later analysis of the conversation transcripts. The initial stake of any generative conversation is the ability to link to the previous phrase. In practice, the conversation develops lives of its own as themes first emerge and then begin to regulate further linking. *It is within these themes that the seeds of new knowledge reside, in the form of new objects, concepts and systems ideas*. Re-describing the themes and stakes as systems purposes enables the application of contemporary systems methods. They may then be explored using Checkland's (1991) idea of a root definition (a system to do *x* by *y* in order to achieve *z*) and accompanying activity system. The new theme could also be modeled as a viable (Beer, 1985) or dynamic system (Forrester, 1961). Describing the new themes and stakes as systems purposes helps to build a richer understanding of the new knowledge and its implications for human action.

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