

HOW TO USE DIALOGUE AS A PRACTICAL WAY TO START APPLYING THE PRINCIPLES OF COMPLEXITY THEORY TO A TRADITIONAL ORGANISATION

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There have been many articles written about chaos and complexity theories and how they apply to organisations, but there is little written about how a traditional organisation can actually start to apply these theories.

Stacey (1997) argues that you can view the organisation as two interlinked systems. The legitimate system is described by the organisation chart, rules and procedures, while the shadow system is a web of personal networks. He believes that it is the shadow system that has creativity, the capacity to evolve and go through transitions and that the shadow system impacts the legitimate system over time. However, he does not give much assistance in relation to using these insights. The thesis of this paper is that the use of dialogue, as described by Bohm (1989) and Isaacs (1993) is a possible methodology for giving the shadow system a “head start”. A place for different minds to meet and evolve together.

Introduction

There have been many articles written about chaos and complexity theories and how they apply to organisations, but there have been very little written in relation to how an organisation can actually start to apply these theories. The thesis of this paper is to describe a workable way for an organisation to start applying chaos and complexity theories through the use of the discipline of dialogue. However, dialogue has to be seen as something bigger than a tool to facilitate Argyris’s “double loop learning” to ensure it uses the principles of chaos and complexity theory. The paper starts with an overview of chaos and complexity theory and how it applies to organisations. It continues with a description of dialogue and how the application of dialogue can help an organisation actively apply learnings from chaos and complexity theory. It concludes by highlighting some implications for an organisation heading down the dialogue path as well as future research questions.

Today’s Dominating Paradigms

Many authors like Stacey (1997) and Tetenbaum (1998) argue that today's dominant view of how an organisation function is based on thoughts going back to Newton’s

mechanistic model of the universe and to Darwin's model of evolution by competitive selection.

The core of Newton's thinking is the law of motion, which suggest the world is a well behaved machine and therefore the relationships between cause and effect are simple and linear. The belief is that if you would just know enough about the existing conditions, you can accurately predict what is going to happen next. This mechanistic worldview can also be found within organisations. It has lead to a focus on how to predict and control ones surroundings. Organisational success depends upon creating a stable system that can generate predictable result. If there are any deviations, it is up to management to correct the situation and reestablish a new equilibrium. As a result we have seen organisations focus on imposing order from above through command-and-control leadership, as well as the use of visioning and strategic planning. For instance, the purpose of the once highly popular scientific management approach, (Taylor, 1911) was consistent with ensuring efficiency, regularity and predictability.

Stacey (1997) argues that the neo-Darwinian philosophy believes in life evolving through a process of random mutations combined with competition. The change in one species will impact the overall system and competition will select those systems with the greatest chance of survival. This belief relies heavily upon chance. The systems that happen to have the characteristics required by a change in the environment is the one that survives. When this view gets applied to organisations, it is usually modified so that managers can choose successful mutations in advance and be ready to implement these mutations when the time is right. Hence there is also a belief in predictability, which brings this view close to the Newtonian way of thinking.

Chaos Theory

Today's chaos and complexity theories have emerged from studies in a wide range of disciplines like mathematics, fluid dynamics, physics and meteorology. The definition of chaos theory, as originally formulated in mathematical physics, is "The qualitative study of unstable aperiodic behavior in deterministic nonlinear dynamical system" (Kellert, 1993). This expression sounds more difficult than it really is. Aperiodic simply means that the system never settles into a regular sequence of values, which means the system can never reach true equilibrium. A dynamical system is a system that changes over time (Devaney, 1992). A dynamical system can change either in a linear or nonlinear way. If it is linear, it changes in a "straight line". An increase in x will always cause a proportional increase in y. A nonlinear change does not follow a straight line. A change in x will cause different changes in y depending on previous events. Feedback is therefore a vital aspect of chaos theory. A tiny change in the system can sometimes create dramatically changes in the future. The most referenced example is the "butterfly effect" were a flapping of the wings of a butterfly in the Amazons could cause a hurricane some weeks later in the US (Lorenz, 1963).

Chaos theory models are also bounded and deterministic, which means an underlying pattern of order can be found. A few equations can describe seemingly random events. Waldrop (1992) describes how Reynold was able to simulate bird-flocking behavior through having bird-like objects called "boids" flying across the computer screen. Just

like real birds, the boids formed into flocks, flowed smoothly around objects and merged together again in a constantly changing formation. These behaviours were created using only three rules: (1) fly in the direction of other objects, (2) try to match the velocity with neighboring boids and (3) avoid bumping into things. This is the beauty of chaos theory; simple deterministic equations can generate complex and random outcomes. All in all, “chaos” is in many ways a misnomer and may be better described as in Prigogine and Stenger’s definition (1984) as the study of complex and dynamic systems that reveal pattern of order out of seemingly chaotic behaviours. Take for instance the creation of snowflakes. They are always recognizable through its six-sided shape, but each snowflake is at the same time unique. Similarly, each human is different, but we recognize one when we meet one. Stacey (1992) calls this “bounded equilibrium”.

Complexity Theory

Complexity theory is according to Johnson and Burton often used interchangeably with chaos theory. However, in reality it is a collection of theories that use similar concepts to chaos theory, but they loosen some of the strict restrictions like being deterministic. This makes complexity theory much more applicable to organisational theory. A system within complexity theory can “learn” or change the rules as times moves on. In this theory, determinism and free will can coexist. (Begun, 1994). The systems are deterministic in that the driving forces of systems can be specified, but at the same time they have free will in that their futures depend on unpredictable shifts. This shifts often happen due to self-learning.

The use of complexity theory, instead of chaos theory, addresses one of the major criticisms of applying this type of thinking to social systems, which is that social systems are not deterministic because they have a free choice and can learn over time. However, it does not address another major concern that some authors, like Johnson and Burton (1994), have in relation to social systems having much more complex rules and behaviours than other adaptive systems. More research is required in this area to see if the complexity of the rules will impact how the self-organising systems work and evolve.

Self-Organising Systems

Complexity theory takes us into the territory of self-organising systems. The most common approach is for researcher in this area to conceptualize all of nature and its many subsystems as complex systems (Stacey, 1997). These systems consist of many autonomous agents that interact with each other according to their own principles and rules. For instance, the brain can be seen as a complex adaptive system with the neurons as the agents. Other examples include flocks of birds, colonies of termites, in fact the whole ecology of species on earth including our own organisations. Even the human mind can be viewed as a complex adaptive system according to Stacey (1997). In this case the agents can be seen as the imaginal symbols we use. The world is build up be nesting systems. What is a system at one level will be an agent on a higher level.

Researching these types of systems have revealed some major insights. At low levels of energy/information flow, and when each agent is connected to and interacting with only a few other agents, the system displays the dynamics of stability. It behaves very much like the Newtonian way of thinking, a small disturbance will soon be corrected and the system returns to a predictable behavior. However, if the level of energy/information flow is very high and each agent is interacting with a very large number of other agents, the system becomes explosive and there is a real possibility it will disintegrate when it comes up against a constraint. This system amplifies any deviation instead of damping it.

The real insight is, however, that at some critical level of energy/information flow and connectedness between the agents, the system reaches a transition phase where new forms can emerge. For instance, when low levels of heat are applied to a particular gas, the molecules moves in random ways, but when the energy levels are increased to a critical point, the molecules spontaneously self organize so that they point in the same direction. A laser beam is born as a result. A new form of stable behavior has emerged out of the disorder. Wheatley (1992) explains the concept in simple terms: "Life seeks order in a disorderly way... mess upon mess until something workable emerges."

We can apply the same way of thinking to living and adaptable systems. These systems are still complex and consisting of many agents, but with one major difference, the rules and principles that are used by the agents evolve overtime as the system learns.

Experiments and computer simulations have demonstrated that these adaptive systems also behave as the previous described laser beam. They have the same three states of dynamic stability, dynamic of disintegration and between them a phase transition. The phase transition is just at the edge of disintegration, therefore the expression "the edge of chaos". In this phase, the system is capable of evolving into new forms, and it uses self-organisations as the way to achieve it. However, there are researchers like Johnson and Burton (1994) who questions if these findings will hold true for human systems which have very complex rules of interactions and conscious, purposive actions compared to most performed experiments and simulations. There have been successful simulations of some human systems like the stockmarket by the Santa Fe Institute (Caulkin, 1995). However, as previously mentioned, this is an area that will require further research.

According to the worldview of self-organising systems, there are many systems on many different levels, and they are all interacting with each other. If what is a system on one level is an agent on another level (eg the brain nests in a mind who belongs to a group which belongs to a society) as one system learns, it will have an impact on the other systems. The new behavior will trigger a response from the other systems as they learn and respond to the new behavior. The result is that the agents co-evolve with the system and in doing so they effect the system they are a part of. This view of the world does not take away the freedom of choice, but it does imply that the price we pay for this freedom is an inability to foresee the long-term outcome of the choices we make (Stacey, 1997).

Self Organising Organisations

There are very few examples of organisations that are truly built on the principle of self-organisation. The most frequent talked about example is Visa. Visa is described as being built on a biological instead of a mechanical metaphor. Visa has grown more than 10.000% since 1970 (Tetenbaum, 1998) and is a trillion dollar business operating in more than 200 countries. Despite its size and growth, you don't know where it is located, who owns it or how it is operated. Dee W. Hock, founder and former president of Visa International, calls Visa and the Internet “chaords”, which he claims are seamless blends of the principles of chaos and order, competition and cooperation (Caulkin, 1995).

However, the great majority of the world's organisations are build according to traditional models. How can these organisations start to use the insights generated through the application of complexity theory? How can they apply the concept of agents and self-organisation within their rigid organisational structures?

Stacey (1997) has suggested one model that tries to provide insights into those questions. He conceptualizes the organisation as two parts, the legitimate system and the shadow system. The legitimate system is the hierarchy, bureaucracy and officially approved and shared ideology at the time. The shadow system is the network of personal, social and emotional relationships that underlies and intertwines with the legitimate system. The shadow system is according to Stacey a self-organising system. No one can tell us who to network with and you can not control the network since it requires cooperation from those you network with.

The shadow system can serve as a learning community and the location of the organisation's narrative and tacit knowledge. Nobody fully understands their organisation's shadow system, nobody is in control of it and everyone contributes to it through their interaction in the local network. A change in this system will over time bring about changes in the legitimate system.

If the shadow system is a self-organising adaptive system, how can an organisation create the right conditions for this system to be “at the edge of chaos” and become a creative drive for the organisation? I propose that the formal use of dialogue is a workable approach for an organisation to move in this direction. I will describe the discipline of dialogue and how it applies to self-organising adaptive systems.

The Need for Dialogue

If we believe the human mind is a complex and self-organising system, with imaginal symbols as it agents, we need to create an environment where these agents can interact in a creative way. As described earlier in this article, the optimal conditions require the right level of energy/information flow and the right amount of connectidness and diversity, which will bring the system “to the edge of chaos”.

However, this is clearly very stressful for the individuals and will produce a lot of anxieties that are not contained through the organisation's normal procedures and structure. Something else has to be introduced or the system will either disintegrate

into what Bion (1961) calls basic assumption behavior in which the group escapes the work tasks through acting out a shared fantasy like fight/flight or pairing, or the system will be blocked by the triggered organisational defenses. These types of defenses are described in detail by Argyris (1990).

The individuals who “live on the edge of chaos” have to have reached a certain psychological maturity to be able to hold the discovered ambiguities of our existence. According to Klein (1975) we need to be able to operate in the depressive position. In this position we can love and hate the same object and see good and bad in the same situation. If we cannot stay in the depressive position, we will tip over into the schizoid-paranoid position. This position is a form of mental disintegration and will trigger neurotic defenses that will make any form of genuine inquiry impossible.

For the organisation to start “living on the edge of chaos” we need individuals who can live with ambiguity and an environment that can contain the triggered anxieties. Winnicott (1971) describes this environment as the “transitional space” where “transitional objects” can be played with and manipulated. He believes that adequately contained spaces enable teacher and learners, analyst and patient to play together (French 1997). If the teacher, facilitator or analyst can not fulfil the role of containment, the mutual play of learning can turn into coercion. I believe the same is true for dialogue

I believe the process of dialogue is one way of “living on the edge of chaos” while containing the triggered anxieties. The process allows inquiry and the play of imaginary symbols, as well as providing a safe container for triggered anxieties. The next part of the paper will describe dialogue in more detail and how it links with “living on the edge of chaos”.

Dialogue

The purpose of dialogue (Isaacs, 1993) is to establish an environment which facilitate genuine inquiry. It is a setting in which people can allow a free flow of meaning and vigorous exploration of the collective background of their thoughts, their personal predispositions, the nature of their shared attentions and the rigid features of their individual and collective assumptions. The belief is that something new can emerge if we can start to see how we create our own rigid structures in our minds and learn to suspend our judgment, while collectively exploring our thoughts and assumptions through different individuals eyes.

Isaacs (93) describes dialogue as a discipline of collective thinking and inquiry, a process for transforming the quality of conversation and, in particular, the thinking that lies beneath it. A slightly easier and alternative definition he uses is “dialogue can initially be defined as a *sustained collective inquiry into everyday experience and what we take for granted*” (Senge et al 1994). It is important to highlight that the word “thought” has a very wide meaning. Bohm et al (1991) writes: “We are using the word “thought” here to signify not only the products of our conscious intellect but also our feelings, emotions, intentions, and desires.”

These definitions highlight the key aspects of the dialogue process. First of all it is a **collective** inquiry process. Bohm (1989), who is one of the major thinkers behind the process of dialogue, believes a “larger pool of meaning” is only accessible to a group. It is therefore recommended that dialogue has a relatively large number of participants 20-40 (Isaacs, 1992). Schein (1994) claims he has conducted successful dialogue sessions with 60 people and that he has heard about sessions containing 100 individuals. The process works better if the participants come from different backgrounds and operate from different roles. Ideally, you want your whole system you are inquiring into participating in the process. These requirements are perfectly aligned to the complexity theory, which suggest you need diversity and high level of connectedness for you to enter the phase of transition or reach “the edge of chaos”.

Secondly, the focus is on everyday experience and the inquiry into a whole system. It is not a problem-solving tool with a very strict focus. Again we find similarities with complexity theory, where the focus is on the whole, not the individual parts.

Thirdly, dialogue is based on the assumption that we have mental models in our minds that we take for granted. Isaacs (1993) states that “human beings operate most often within shared, living fields of assumptions and constructed embodied meaning, and that these fields tend to be unstable, fragmented, and incoherent”. Bohm et al (1991) believe that the pervasive incoherence in the process of human thought is the essential cause of the endless crises affecting mankind. The poor use of our capacity for abstraction is blamed for this fragmentation of our mind. We need to use our capacity for abstraction to deal with complex issues and deal with everyday life. However, we often forget our thoughts are abstractions and treat them as facts, forgetting how these opinions and facts were created in the first instance. Senge (1990) calls this tendency to generalize with a lightning speed the “leaps of abstraction”. If our mental models would change, we would see things differently. Dialogue is a way to collectively help each other to see issues from different perspectives and see if something new can emerge. The mental models fit well with the concept of the human mind as a self-organising system with imaginary symbols as its agents. Dialogue will help the imaginary symbols reach the phase of transition!

Dialogue requires a sustained effort over a long time period, sometimes years, to achieve any transformation. First of all it will take time to build the individuals skills and awareness levels required for true dialogue. Secondly, you can not put a timeline on dialogue. You need to spend time to reach the phase of transition and you can not guarantee that you will get a workable output. Things will take its own course, just like a truly self-organising system.

Dialogue requires genuine cooperation to be effective (Isaacs, 1993). This is according to Stacey (1997) also true of an adaptive and self-organising system. If the mind is as an adaptive self-organising system with imaginary symbols, dialogue provides the setting for these symbols to combine in new ways and create a new system (in this case a view of the world). For this to happen, the members will need inquiry skills and be able to deal with the created anxieties. The aim of dialogue is to get the participants “to know the thought when they have it”.

Implications

The dialogue discipline, as discussed, has very strong similarities with adaptive self-organising systems. It can therefore be used as a vehicle for letting the shadow system experiment with reinventing the systems the organisation belongs to. It ensures a “safe” environment where we can hold the anxieties in relation to creative play. This is extremely important since this type of learning can not take place without triggering different types of anxieties. Isaacs (93) describes a series of “crises” that a group participating in dialogue experiences. The first is “the initiatory crises” which happens when the participants realize they cannot force dialogue to take place. This is followed by “the crises of suspension”. This happens when points of view which used to make sense, no longer does. The group feels that they do not know where they are headed. If the group can get through these crises, they start inquiring at a level where the conversation takes new forms and the energy that has been trapped in rigid and habitual patterns of thoughts and interactions are freed up. New ways of thinking can emerge. However, even at this level, there are crises. Isaacs (1993) calls it “the crises of collective pain”. It happens when the group sees the self-created limits of human experience.

Anxiety is impossible to avoid if learning is to take place on these fundamental levels. It is therefore critical to manage anxiety to ensure it does not block learning, or to use the words of Schein (as quoted in Vince, 1996): “Paradoxically, anxiety prevents learning, but anxiety is necessary to start learning as well. Managing learning or a change process means managing these two kinds of anxieties”. Long and Newton (1997) further highlights the difficulties related to inquire into and challenge long held assumptions and emotions: “The starting point for significant change is the system internal to the thinker and learner, but first it must be brought into awareness. The history of psychoanalysis is about the difficulty of achieving a state of being that will allow a denied system of emotional experience to impress itself on the conscious mind”. These difficulties have led to dialogue being viewed as a powerful but slow process. According to Isaacs, the dialogue process often starts with spending time trying to understand what dialogue really means. It is a “safer” topic to use when learning the process as well as learning to suspend judgement and holding ambiguities, conflicting thoughts and emotions. Participating in a well functioning dialogue process will over time lead to personal growth, but it also means experiencing a lot of pain when the different “crises” as described by Isaacs (1993) are worked through.

Another benefit of dialogue is that it allows the self-organising system to evolve at its own pace partly protected from the harsh reality of competition. The ideas born, as part of the dialogue process will have had time to evolve, mature and gain support, **before** it has to be subjected to the normal competition within the organisation. However, there will still be enormous difficulties for any insights achieved in the dialogue process to be shared with an adopted by the formal process.

Dialogue, the way it has been discussed in this article, takes an organisation beyond “double loop learning” to generate “triple loop learning” (Isaacs, 1993). Double loop learning was coined by Argyris and focuses on inquiry into the context of an issue. For instance, single loop learning refers to trying to get the thermostat to a certain temperature, while double loop learning would question why we chose a certain

temperature. Triple loop learning would question why we even worry about the temperature. It is looking for whys and questioning of the context, not just improving the effectiveness of the existing system.

If the dialogue process inquires into the holistic systems we belong to, we could find that we want to substantially change the way we operate. It is not just a problem solving tool (Cayer, 1997). Dialogue has the potential to recreate systems, not just improve them within a defined context. It is a “relative safe” way to start to apply complexity theory to a traditional organisation, but it will trigger deep seated anxieties that have to be contained to stop the process from exploding or being blocked. The organisation needs to understand this and the need for long term time frames before they head down this path of encouraging the shadow system to reinvent itself.

Research Implications

MIT’s program for dialogue research has so far focused on understanding the process of dialogue. However, the proposed thesis of using dialogue as an active way for the shadow system to reinvent itself based on the philosophies of complexity theory opens up new directions for research. There needs to be a focus on how the process of dialogue impacts the shadow system over time and how any generated insights are shared with an adopted by the legitimate system. Some of the key questions to study are:

- How are the insights gained in dialogue transmitted and taken up in the shadow system?
- How are changes in the shadow system impacting the legitimate systems of the organisation?
- What will facilitate the transmission and adoption of the insights gained in dialogue to the legitimate system?

Research, based on the assumptions used in complexity theory, raises two added complications: What is our unit of analysis and the need for longitudinal studies. According to Begun (1994), the use of complexity theory forces organisation scientists to dwell on the question; "What is our unit of analysis?" As a result we have to explore:

- In what way is our unit of analysis similar or dissimilar to the unit of analysis in other sciences?
- What is the nature of interdependence between the different systems?
- How do we classify our unit of analysis?

The other key issue is the need for longitudinal studies. According to Begun (1994), cross-sectional studies do not make sense when you are studying dynamic systems heavily based on feedback loops. The focus of the study has to be on how the system changes over time, not detailed understanding of the relationship between different variables at one point in time. Therefore research in the areas of dialogue and shadow system require longitudinal studies. Longitudinal studies would ensure the real assimilation process would be studied instead of a sanitized construction after the fact.

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