A FRAMEWORK FOR MANAGING COMPLEXITY IN HIGHER EDUCATION

Anne ESKOLA
JAMK University of Applied Sciences
Finland
anne.eskola@jamk.fi

ABSTRACT
This theoretical paper depicts the changes in the context of higher education with the help of complexity theory and the Cynefin framework. The framework is developed with the intention to offer perspectives to explore complex systems in knowledge work characterized by uncertainty and lack of cause-effect relationships. There is an ambitions national project in Finland aiming at changing the work life in Finland the best in Europe by 2020, because work life in Finland has encountered many reforms lately, and these changes have increased the demand level of work, which in turn requires changes from higher education and its outcomes.

INTRODUCTION

There is a national project (Työelämä 2020, 2013) in Finland aiming at making Finland the most educated nation by year 2020. The program also aims at improving the quality of work life in Finland - to make it the best in Europe by year 2020. At the same time, the country has encountered a long financial recession where the state budget money spent in education has been cut. Improving the quality of education and work life at the same time as cutting the financing of education has put the institutions of higher education in a difficult – if not impossible – situation. In sum, higher education institutions are required to produce more results and better results with less money. This paper discusses the challenges the universities of applied sciences have faced in this complex situation denounced by conflicting requirements, and the paper also suggests a theoretical framework to help in sense making of the situation.

The Finnish higher education systems consists of first cycle university degree (bachelor's degree), the second cycle university degree (master's degree) and postgraduate studies (third cycle) that lead to a licentiate or a doctoral degree. The universities offer all three cycles. The universities of applied sciences offer either bachelor's degrees consisting of 3.5-4.5 years of full-time study including a mandatory period of practical training and master's degrees requiring 1-2 years of part-time study. In addition to educational tasks, the universities of applied sciences have an important position in regional development in terms of research, development and innovation.

The higher education sector is going through changes concerning both their financing and their administration. This has required a change in legislation. The first phase of renewals started in the beginning of 2014 concerning the change in the financing model. The financing of universities of applied sciences used to come from municipalities, but in the new financing model, it comes from the state budget. Due to these changes, the universities of applied sciences lost one fifth of their financing between years 2012-2015. The new financing model is based mainly on the amount of degrees produced and on the pace of proceeding of studies. 85% of money comes based on outcomes in education and the rest 15 % from outcomes in research and development activities. (Salminen, 2013.) From the beginning of year 2015, all universities of applied sciences have operated as corporations under public law. Operations as an independent legal person are supposed to give the universities of applied sciences a more independent status and more flexibility. This has also implications to the leadership model and decision-making of the schools. However, despite the corporal structure, the universities of applied sciences operate as non-profit organizations.

The evaluation criteria for universities of applied sciences are the quality, effectiveness, efficiency and the economic soundness of operations. To fulfill the targets the universities of applied sciences among other institutions of higher education have been urged to lengthen the work careers by cutting the time spent in higher education studies and by introducing new learning environments, new ways of learning and new ways of teaching. Alasoini (2011) states that it has been recognized on national level that developing the quality of work life conditions and productivity support each other. Differences in the production level are created mostly inside working communities by the way that work is done. Recognizing this change requires renovation and innovation. There is a guest for new practices in working, new kinds or work life skills and ability to utilize the possibilities offered by (digital) technology to enhance the quality and effectiveness of teaching and research and development in universities of applied sciences.

Traditional management research considers organizations as machine-like mechanisms that can be controlled (Morgan, 1996). It is common for traditional management theories to assume that organizations need some kind of hierarchical management. Indeed, these kinds of management models function well in the context of physical

production, for instance. However, they seem to be ill suited in knowledge-oriented economy like educational institutions. (Uhl-Bien et al., 2007.) The change of paradigm from traditional management towards complexity theory in defining the context of organizations has changed the ways of working and organizing. Redefining organizational practices means moving away from mass production efficiencies, hierarchical organization and central control and introducing flexible, learning organizations that constantly change and solve problems through interconnected, self-organizing processes. (Daft & Lewin, 1993.)

SHORT INTRODUCTION TO COMPLEXITY THEORY

Complexity theory grew out of systems theory in 1960's. Complexity theory – including the concepts of chaos, emergence and self-organization – has been considered one of the most revolutionary products of the 20th century having influence on science, technology, economics, finance and social sciences among others. Complexity theory suggests that organizations tend to self-organize themselves to a state where they regulate themselves. Any complex systems, such as organisms, societies or the Internet, have emergent properties that cannot be reduced to the mere properties of their parts. The behaviour of these systems is unpredictable and uncontrollable, and it cannot be described in any complete manner. (Heylighen, 2009.)

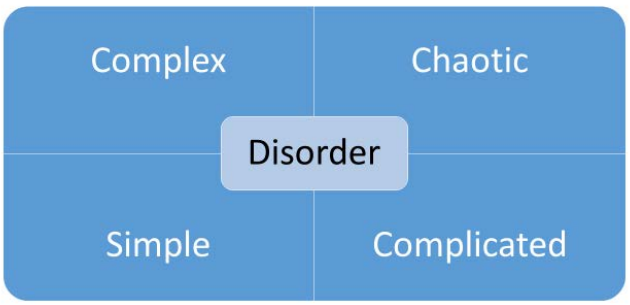
Complexity theory posits that systems begin as collections of individual actors who organize themselves and create relationships that form in response to positive or negative feedback. New structures and behaviours then emerge as the actors act and react to each other – creating value because of individual interactions. The emergent result is often more than, or qualitatively different from, the sum of individual actions. (Haffeld, 2012.) Feedback loops serve as the driver for the evolution of the system. Positive feedback moves individual actors or groups of actors closer to a goal perceived to be important while negative feedback suppresses change and drive the system towards equilibrium. (Mason, 2008). This kind of non-mechanistic approach and resistance to reductionism made a worldview different from the traditional scientific approach. By the 1980s, researchers at the Santa Fe Institute attempted to unify some of these core concepts into a model known as a complex adaptive system (CAS). While this model shares commonality with elements of all the preceding theories, the nature of complex adaptive systems is an entity itself and still an evolving construct. (Alhadeff-Jones, 2008.)

CYNEFIN FRAMEWORK

Kurtz and Snowden (2003) and later Snowden and Boone (2007) developed the Cynefin framework as a sense-making tool for strategic decision making in business problems and situations. The conceptual thinking draws from knowledge management and complexity science. The framework challenges the assumptions of order, rational choice and intent (Massy, 2005). The Cynefin framework offers a perspective of complex systems characterized with uncertainty. The framework is based on the idea that many problems in management are caused by the mismatch of management style and organizational environment. The objective of the framework is to reach consensus to reduce the unknown domain. (Ahmed et al., 2014.)

The Cynefin framework is described in figure 1. The quadrants represent types of situations that organizations typically face and need to manage. The ordered domains are called simple and complicated; the unordered domains are called complex and chaos. The fifth are is the domain of disorder. Unorder does not mean lack of order in the model, but instead it describes emergent order. The Cynefin framework is not a categorization framework that implies that the most desirable situation is in the upper right corner. On the contrary, none of the domains is better than the others. (Kurtz & Snowden, 2003.)

Figure 1: The Cynefin framework



Different contexts in the Cynefin framework are described as follows by Kurtz and Snowden (2003) and Snowden and Boone (2007) as follows:

1. A simple context is the realm of known where the cause and effect relationship is known and repeatable

and where it is possible to determine, based on facts, a correct action or right answer for each situation in advance. Repeatability allows the use of predictive models and it is possible to operate based on routines and standard operating procedures. A simple context represents the domain of best practice that are derived from past experience.

2. A complicated context is the realm of known unknowns. It is also predictable but more varied because the cause and effect are separated over time and space. However, it is possible to move from this domain to the simple domain if only enough time and resources can be used. There are clear relationships with multiple answers but all these challenges can be tackled using analysis, scenario planning and systems thinking. It requires expertise and communication between experts. This is the domain of learning organization and good practice.
3. A complex context is the realm of unknown unknowns and the domain of emergent practice. It is the domain of complexity theory. Complex is something that situates between order and disorder exhibiting predictability in some and unpredictability in other aspects at once. Complexity theory studies how patterns emerge through the interaction of many agents. A complex context is one where the cause and effect relationships are not known and where there is no predictability. This is why categorization or analytic techniques are not available. Information is unstructured and related but people do not know how. Taking decisions cannot be based on knowledge or analytical approach but instead, the actions are based on emerging patterns, experimentation and increased interaction. The management is based on facilitating because this space requires multiple perspectives. It is possible to evaluate the adequacy of actions only in retrospective because emerging patterns are such that they can be perceived but not predicted.
4. A chaotic context is more turbulent, complicated, surprising and challenging than a complex context. The cause and effect relationships cannot be defined. Every piece of information is a fragment with no relationship to any other. Applying best practice is what probably what precipitated chaos and there is nothing to analyse nor will patterns emerge. In a chaotic context people need strong contention, authoritarian intervention and crisis management to reduce the turbulence. Novel practice and innovations come to the force in a chaotic context and it is possible to enter this domain on purpose in order to open up new possibilities.
5. Disorder is a context where an organization ends up from any of the above-mentioned contexts when it is unable to recognize its context. It is a domain to understand conflict among decision makers looking at the same situation from different points of view. In this kind of situation people tend to pull it towards the domain they feel the most comfortable. That is why it becomes important to reduce the size of the disorder domain and to achieve consensus among decision makers – both on the situation and on the most appropriate response.

MANAGING IN COMPLEX CONTEXT

The Cynefin framework provides pointers on how to study complex systems (der Walt & de Wet, 2008). It can be utilized for contextualization. Most decision-making situations in organizations take place in a complex context. In this kind of context management practices include, among others, the improvement of communication, the promotion of new ideas, tolerance for difference and the constant observation of the organizational context. (Snowden & Boone, 2007.) Indeed, it is as interesting to investigate the possibilities concerning moving between the different domains of the Cynefin framework as to think of the present domain because a move across boundaries requires a shift to different way of understanding and interpretation – and thus a different leadership style. The simple and complicated domains are the domains of order where the most important boundary for sense making is what can be used immediately because it is known and what needs time and energy to be found out but is knowable at the end. In the complex and chaotic domains, knowability is less important but interaction is important – that is, what we can pattern in complex domain and what needs to be stabilized for patterns to emerge in chaotic domain. (Kurtz & Snowden, 2003.)

The order domain, i.e. the simple and complicated ones, represent an area where the connections between managers and staff are strong. There are structures that control behaviour like procedures and forms. On the other hand, the disorder domains, i.e. the complex and chaos, are such that the connections between managers and staff are week and control through structure usually fails. In complex and complicated domains, connections between staff are strong and stable group patterns can emerge. In simple and chaotic domains, connections between staff are weak and emergent patterns do not form on their own. (Kurtz & Snowden, 2003.)

The simple domain is characterized by a clear relationship between cause and effect. The decision model in this domain is to sense the situation, categorize it and respond. The response is based on best practice. The complicated domain is also characterized by cause and effect but there may be multiple right answers. The decision model is to sense, analyse and respond. This requires expert work and the response is based on good practice. The complex domain is unpredictable in a way that cause and effect can only be understood in retrospect. Answers are found

by experimentation and the decision model is to probe, sense and respond. This way practice emerges. (Kurtz & Snowden, 2003.)

The domain of chaos is such that there is no link between cause and effect nor are there any right answers. The decision model is to act, sense and respond as, for example, in crisis management. Crises often occur when weak signals have been omitted and there has been an unrecognized context change in the simple domain. It is a situation where best practice ceases to work and the system collapses catastrophically into chaos. In that kind of situation there are two different approaches: either the decisive, directive management control to re-establish the good practices, i.e. forcing the organization to move from chaos back to the simple domain, either to look for small patterns in the chaos that show the type of practice the organization wants to have. Managers can thus support these beneficial patterns and try to replicate them throughout the organization. This is a way to move from chaos to the complex and then the complicated domains. However, neither of these approaches automatically guarantees success. Finally, the domain of disorder is one where the domain cannot be defined or decided. (Kurtz & Snowden, 2003).

In a complex environment, the employees have to make an effort to collaborate. Thus, flatter hierarchies, decentralization of decision-making, self-organization, emergence, the empowerment of employees and the creation of new order are key characteristics of complex systems (Daft & Lewin, 1993; Mitleton-Kelly, 2003). In the case of a complex or occasionally even chaotic environment (Kurtz & Snowden 2003), which are typical for knowledge work (Donnelly, 2006) there is a need for other kinds of ways of working and ways of managing. The probe, sense and respond model becomes useful for the management (Kurtz & Snowden, 2003).

IMPLICATIONS FOR HIGHER EDUCATION INSTITUTIONS

Educational governance usually tends to be complex rather than complicated and its solutions are not necessarily replicable and transferable (Snyder, 2013). However, educational initiatives often attempt to dwell in the realm of the complicated when in fact they are operating in the realm of the complex (Duit et al., 2010). This means that problems are often solved by experts launching a solution they believe is whole, complete, widely replicable and easily actionable. However, complex problems cannot be captured with such linear approaches. (Morrison, 2010; Duit et al., 2010.)

Educational governance thus requires an approach that allows for changing initial conditions, the emergence of non-mechanistic phenomena and flexibility. Above all, it must allow for the fact that reductionism will not work – there will be no single right answer, no single approach that holds the key to successful implementation. Flexibility and feedback are necessary to manage successfully in a complex system, but doing so requires a fundamental reframing of the way we look at common problems in educational governance. Policies must move from one-size fits all solutions to iterative processes derived from constant feedback between all stakeholders and the barriers between design and implementation should be collapsed. The whole undertake becomes process-driven rather than outcome-driven. This requires strong leadership at all levels, and focusing on the complex interactions of the actors within educational systems, creating a broader view of educational systems as holistic organisms. It will also require an approach that allows key issues to be identified within complex systems so that the nature of educational systems does not lead to systemic paralysis and to the temptation of oversimplification. Viewing governance issues in isolation and seeking reductionist approaches targeting specific policy areas or pedagogical changes is unlikely to yield positive, sustainable change on a large scale. To be effective in a complex realm requires a fuller understanding of complexity itself. (Snyder, 2013.)

As the complexity of context increases, organizations must increase their own complexity to correspond the complexity level of their environment, because it takes complexity to defeat complexity (Uhl-Bien et al., 2007). Organizations in complex environments have consciously given up pursuing order and control and this is reflected in the ways of working and managing. They are operating at the “edge of chaos”, which is the balance necessary for adaptation and self-organization to occur. There are a number of positive features, such as flexibility, autonomy and robustness, that traditional mechanistic organizations lack. The positive qualities are aspects of the process of self-organization, where order is created out of disorder. These kinds of systems organize themselves to the state where they want to be and where they regulate themselves as to better cope with internal and external conflicts and this allows them to adapt to a constantly changing environment. (Heylighen, 2009).

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