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Contextual Inquiry as a Critical Perspective in Research

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Abstract: Human systems create problem spaces that are ambiguous, uncertain and constantly changing. This requires researchers to find approaches to inquiry that can be used to explore inconsistent and ill-defined phenomena. Much analytical work is done without in-depth consideration of context. This means that important dimensions are lost – rigour in investigation is prioritised over relevance. Research must be able to engage with inquiry into contextual dependencies at multiple levels. We experience the world individually, creating our own unique understandings. Furthermore, our experiences of context change continually and different individuals' experiences of the 'same' context vary widely. A relevant resolution in a situation requires attention to contextual dependencies, but what makes it relevant and from whose point of view? Thus, a mindset is needed that recognises uniqueness and accommodates for a creative process of discovery, which needs to be conceptualised. This paper discusses contextual inquiry as a critical perspective in research.

Keywords: contextual inquiry, critical perspectives, systems thinking

1. Introduction

Human systems create problem spaces that are ambiguous, uncertain and constantly changing. This requires researchers to find approaches to inquiry that can be used to explore inconsistent and ill-defined phenomena. In organizational life, people often find it difficult to cope with the challenges posed by uncertainty. This paper discusses an approach which is intended to facilitate increased capability to deal with complex and uncertain problem situations. The approach described supports engaged individuals and groups to pursue investigations intended to create rich knowledge bases for resolving perceived problem spaces while accepting their inherent ambiguities (Bednar, 2000; 2009). The author believes a combination of systematic and systemic approaches to critical reflection and inquiry may yield a more developed appreciation of relevant problem space. Critical systemic thinking and continuous reflection on experiences yield valuable insights to develop complex problem spaces and hence inform subsequent choices. A reflective approach to research will include recognition that reliance on binary logic is inadequate when reasoning about human-centred problems – human beings do not approach every choice in life by asking 'Yes or No?' 'True or False?' and yet, at times, we discuss organizational issues as if this were the case. In life, we more often respond to complex situations by saying 'It depends', i.e. we recognise the impact of multiple levels of contextual dependencies that are relevant to our choices and which are not susceptible to binary logic (Bednar, et al, 2006).

The ambiguity, complexity etc of our chosen research space and our acitivities in it might be obvious to us on many levels. But how valid is such an assumption when we look at the situational choices and contextually dependent decisions we make? What does it mean to inquire into a research space, to "do research" or to investigate a problem space populated by human actors? Suppose we were to ask ourselves the following question: How is "knowledge management" applied in practice? Then imagine that we had a readily available case study on a project in knowledge management in a particular business. We might decide that it would be sufficient (and interesting enough) to draw upon that one case study and use it as a description of an example of knowledge management in practice. In this case we can then ask ourselves the following question: When we study the case study - what are we going to look for? The following answers might appear to be obvious to us.

- we need to get hold of necessary information

- we need to find important information

- we have to analyse and evaluate

- we need to get the facts

As we go through these "obvious" propositions it becomes more and more obvious that they are not so obvious anymore. Indeed we can simply disqualify the first proposition about necessary information. It is not obvious what is to be defined as "necessary information"? How do we know what

is necessary? The same problem is recognizable in the second proposition – how do we know what is important? It is like going to the supermarket and ask the assistant to give us "the necessary groceries" or "the important" ones – without defining what makes any groceries necessary and important. How can we define what is necessary and what is important? Is it so obvious that we cannot be bothered? One way is to ask ourselves if there is anything in the description which we have available that we can interpret and use. We are looking for hints and descriptions in the case study material which might be usable (for us as analysts) to determine what (if any) definition of knowledge management might have been used by the authors of the case study. It may be that there is a description of a definition of 'knowledge management' as a concept – still this does not necessarily mean that there was any knowledge management practised in accordance with the definition. Additionally even if there was a definition of knowledge management in the case study – is that definition relevant to our study? Is it relevant just because it is included as part of the case study? It is not obvious why that would be the case. Then a further issue would be that what does it mean to apply knowledge management? Is there a description (in the case study) of how the definition is linked to experiences in practice? If there is a description of how it is linked – are there examples given to substantiate the argument which we can make sense of? Even if there is a description which includes examples of how experiences from practice substantiate the presented definition of knowledge management – does this mean that it is a fact that knowledge management has been applied? It is not clear that a description, even if it is a logically coherent one, would be some kind of guarantor of objectivity and factual truth / or to demonstrate a causal link? And even if there was a complete certainty about the integrity of the research – does this mean that knowledge management has been practised? What if there are several definitions of what "knowledge management" may or may not be – then it is not anymore obvious that whatever has been practiced will necessarily fit into all definitions (and why should it? as it depends on the terms of our study?). It is also not obvious that any particular definition used by the authors of the specific case study we are studying is relevant to our own investigation and inquiry into how knowledge management is applied in practice.

This paper discusses contextual inquiry as a critically-informed perspective in research. To allow for (and to enable) a relevant engagement in context a digression into the necessity for immersion in action research is needed. A necessary foundation for contextual inquiry is immersion in / experience of appreciated problem spaces in context. This can only be facilitated by those people who are already engaged in the particular situation of interest. In order to be well-equipped to create relevant and useful resolutions, a researcher must be an engaged party, i.e. this method is intended to support action research.

The author explores important conceptual underpinnings. A focus on individual uniqueness emphasises empowerment of individual engaged actors to be their own analysts – not the passive recipients of generalised descriptions made by others 'on their behalf'. Individuals, and the communities within which they interact, are seen to be co-dependent rather than hierarchical. Individuals are not simply emergent, unique systems but multiple and 'schizophrenic' systems. Communities arise out of relationships between such emergent systems. Thus, conceptualised systems relevant to the community emerge from consideration of interactions among engaged individuals. Whilst any community can be viewed as a relevant system, individuals need to remain visible within it as autonomous systems in their own right, rather than as submerged elements. Individual people continually create and recreate their own views of 'reality' through unique sense-making processes. When individuals perform particular roles within context, the roles do not define the individuals but rather the individuals are redefining their roles through practice. Relevance requires consideration of situatedness. To be able to discuss these multiple levels of contextual dependencies, a language is needed. Such language uses conceptual tools and abstract structures. Skills in use of techniques must be combined with understanding of language/metaphysical perspectives. Thus, we do not only need to consider emergence as a concept, we need different ways to visualise emergence. Since experience of life is dynamic, in order to talk about experience, tools must make it possible to describe open, dynamic, complex and multidimensional systems with changing boundaries. Techniques are required to support inquiry and dialogue in an open, complex problem space, e.g. mind mapping and rich pictures. A relevant toolset is not, however, sufficient in itself. What is also needed is an ability to organize use of such techniques in a systemic fashion, including a possibility to incorporate application of models based in paraconsistent logic. Examples of research inquiring into complex problem spaces can be found in a range of domains such as education, systems development, digital forensics and knowledge management. This paper starts with introducing action research and problems of boundary settings, it then discusses individual

sense-making processes related to learning and knowing before issues of systems thinking and emergence are presented. After this selected aspects of a framework for contextual analysis is presented. The paper concludes with a section referring to example problems of reductionism with pointers towards alternative reflections and strategies for contextual engagement and systemic analytical reflection.

2. Background

Action research was defined by Lewin (1948, p.206) in the following terms: "a spiral of steps, each of which is composed of a circle of planning, action and fact-finding about the result of the action". No outsider, however well-qualified, can substitute her expertise for the contextual knowledge of submerged individuals. Professional researchers or consultants may well have an important role to play in supporting the process of inquiry. However, only those who are already historically engaged in an appreciated problem space can develop a relevant inquiry into it, and ownership and control over the process properly rests with them (Friis, 1991). This point is reinforced by Ulrich (2005, p5) when he discusses a need for boundary critique in considering relevant systems for inquiry. He suggests:

> *"… when it comes to boundary judgments, we basically meet as equals. Everyone can question the boundary judgments of others with equal right. This opens up a chance for everyone to acquire a new critical competence, one that is independent from any special knowledge or argumentative skills beyond those available to a majority of ordinary people"*

Much analytical work is done without in-depth consideration of context. This means that important dimensions are lost – rigour in investigation is prioritised over relevance. Research must be able to engage with inquiry into contextual dependencies at multiple levels. The two ideas presented here, context and ambiguity/uncertainty are important as the relevance in context is dependent on any ambiguity / uncertainty being taken into consideration when discussing the problem space of interest. We experience the world individually, creating our own unique understandings. The ability to deal with ambiguity and uncertainty is directly related to the human experience of relevance. Enforcement of scales of truth and falsehood / falsity? - for example with the help of probability theories etc. lead to enhanced rigour but are not helpful when it comes to human efforts to determine relevance. Selection from alternative processes requires human decision makers to interpret experiences, make sense of context and to create an understanding of these alternatives. Selection becomes a creative sense-making process which is contextually dependent and not predetermined. Researchers who inquire into complex situations must also create some kind of scale for evaluation of results, which will be constantly changing to match dynamic human contexts. What does it mean that something is 'best' and from whose point of view and for what kind of purpose and best in comparison to what? It is vital that inquirers appreciate risks that arise if temporalities that are contextually dependent are treated as objective, static facts. Such a misapprehension could lead to ideas of a future that can be treated in this same way.

It has often been observed that the most systematic efforts at decision-making in complex situations can still result in poor choices. Many research efforts have been made to seek for explanations of this. For example, it is sometimes suggested that inadequate decisions lacked 'buy-in' from key stakeholders. However, where decision-making is truly collaborative, 'buy-in' is unnecessary (see for example discussions by Mumford, 2003). Only those who have been excluded from the decision making process in the first place need to be asked to 'buy-in'. When decisions are made on a basis of interpretation of data that has been forced to fit a prescribed scale of truth and falsity, then contextual dependency has been excluded from that interpretation. It follows that relevance to the perspectives of engaged individuals will be lost in the process. Our experiences of context change continually and different individuals' experiences of the 'same' context vary widely. Any resolution in a situation requires attention to contextual dependencies, but researchers need to ask explicitly what makes this relevant and from whose point of view? Thus, a mindset is needed that recognises uniqueness and accommodates for a creative process of discovery, which needs to be conceptualised. This paper discusses an approach known as the framework for Strategic Systemic Thinking (Bednar, 2000). This is a method for building an appreciation of uncertainty as part of problem resolution, by supporting inquirers to explore their understandings of multiple levels of contextual dependencies. Participants are supported to create and share their individual understandings of a perceived problem space.

3. Learning and knowing

Theories created through individual sense-making processes will be influenced by contextual dependencies arising from her/his unique individual experiences and environment (Bednar, 2000). The distinctiveness of each appreciated situation results from construction of meanings that individuals attach to it. There is no particular reason why consensus should arise among the different engaged actors in a situation, since every individual's sense-making builds upon unique previous life experiences individual to her. Indeed, as the Infological Equation demonstrates (Langefors, 1966), information is created in the course of inquiry through unique interpretations of available data. For this reason, individuals within a group context need support to create a collaborative endeavour of inquiry. This will involve creation of a productive learning spiral through reflection upon sense-making, and creation of collective 'systems' for sharing understandings.

It is possible to identify different orders of learning, based on cycles of experience and reflection on experience (Bateson, 1972). Higher orders of learning involve reflection on the sense-making processes themselves, so that a learning cycle transforms into a learning spiral (see also Bednar and Welch, 2007; Bednar 2009). In this way reflection on sense-making can be seen as an exercise in practical philosophy. As individual learning is a creative process of sense-making and reflection, then context is clearly important. Any unique individual's view is based in reflection on her particular, contextual experiences (Bateson, 1972). Examination of contextual dependencies as part of inquiry must therefore be important.

Learning and knowing are inextricably bound within the same creative process. Bateson suggests that information may be defined as 'a difference that makes a difference', existing only in relation to a mental process (Bateson, 1979, p. 99). This process is what leads to an individual 'knowing'. Bateson describes a hierarchy of different orders of learning. At level zero, the same criteria will be used and reused without reflection. Learning here is specific and involves no change – the same response is produced to iterations of the same 'inquiry'. All other learning, according to Bateson's hierarchy, involves some element of experimentation and reflection. Orders emerge according to types of errors and the processes by which a revision is achieved. At Level I, learning involves reflection over a set of alternatives within a repeatable context; Level II represents reflection based on revision of context, and so on. An alternative but somewhat similar view comes from Argyris and Schon, who distinguish between single- and double-loop learning. The latter involves reflection on learning processes in which individuals may attempt to challenge prejudices and assumptions arising from their experiences (Argyris, 1990; Argyris and Schon, 1978). Through life experience, individuals form their own particular goals, value, plans and heuristics. Vickers terms these 'appreciative settings' that guide everyday practice (Vickers, 1970). Argyris and Schon (1974, pp 6-7) considered these in their distinction between espoused theories (how individuals describe their own goals and values) and theories-in-use (those reflected in their actual behaviour). For these authors, the key role of reflection is to surface and illuminate the latter. When individuals experience an immediate problem, i.e. need to close a perceived gap between expected and actual experience, they harness their sense-making processes within contexts of existing 'settings' without questioning their appropriateness. This is termed single-loop learning. However, if individuals challenge received wisdom and critically appraise assumptions previously applied, double-loop learning occurs (1978, pp 2-3). The resulting process creates a productive learning spiral, which is at the heart of any successful organizational innovation.

The Infological Equation (Langefors, 1966, mentioned above) suggests that individuals create information, i.e. their unique understandings, by examining data in conjunction with pre-knowledge they have gained from reflecting on experience during a previous time interval. Information, and 'knowing' derived from it, cannot therefore be seen as commodities that may be transferred from one individual to another. Nor can they be stored in 'repositories' as containers of objective meaning. Similarly, it is through collective sense-making processes, constructing new understandings and meanings, that organizations, their goals and cultures are created and developed. Like individual learning, organizational learning can be perceived as a creative process (Senge, 1990). Thus, recognition of individual uniqueness emphasises empowerment of particular engaged actors to control their own inquiry, rather than receive uncritically generalised descriptions made 'on their behalf' by outsiders. Communities within which these individuals interact are therefore seen to be co-dependent rather than hierarchical; and conceptualised systems relevant to the community emerge from consideration of interactions among those engaged individuals. Any observation must be made from the point of view of a particular observer (Maturana and Varela, 1980). Thus, anyone wishing to

inquire into a situation must continually align and re-align herself with perspectives of engaged participants. For example, meaning shaping in particular situations can be described through comparisons of different actors' perspectives within given structural criteria, or 'circling of realities'. This refers to a necessity to acquire a number of different perspectives (in time-space) in order to be able to get a better and more stable appreciation of an actor reality (Bednar and Welch, 2007). Such an appreciation must include dimensions of both 'heart' and 'mind'; both cognitive and affective zones (Ciborra and Willcocks, 2006). The author believes that perspectives which transcend 'common sense' understandings in organizational life can be encouraged to emerge by application of methods focused on individual uniqueness and contextual dependency. The perspective put forward in this paper emphasises self-awareness of human individuals, and highlights opportunities for emancipation and transparency, rather than clarity and precision, in research. A researcher taking such a perspective will recognize that there are uncertainties and ambiguities inherent in socially constructed everyday world views (see discussion by Radnitzky, 1970).

4. Emergence

In any community viewed as a relevant system for inquiry, individual people need to remain visible as autonomous systems in their own right, rather than as submerged elements. Individual people continually create and recreate their own views of 'reality' through unique sense-making processes. When individuals perform particular roles within a context, those roles do not define the individuals but rather the individuals are redefining their roles through practice. A focus on relevance rather than rigour in research requires that investigators consider situatedness (Bednar, 2009).

Some approaches to systemic inquiry describe a human activity system as a mental construct derived from an interrelated set of elements, in which the whole has properties greater than the combination of component elements (Checkland, 1981). When such a model is adopted, individual uniqueness is subsumed in perceived emergent properties of a conceptualised, whole system. Even when relevant systems are considered as a duality - system to be served and a serving system (e.g. Checkland and Holwell, 1998), individuals remain invisible. As discussed above, there is a need for inquiry to explore multiple levels of contextual dependencies, in order for unique individual perspectives to be surfaced. An alternative model (de Zeeuw, 2007; Bednar, 2007), conceives an organizational system as an emergent property of interactions among unique individuals within a particular context, and their unique sense-making processes. When considered in this way, it is possible to perceive some individuals themselves to have emergent properties of their own which can be larger than (e.g. outside of) those of one particular organizational system seen as a whole. Consider, for instance, a university wishing to employ academic staff and recruit students to read for doctorates. Suitably qualified people may be employed to give lectures, provide supervision, etc. i.e. form part of the system for providing tuition to students. However, a particular professor who is internationally renowned for his interesting research, the quality of his publications and his many contacts within a community of practice may attract PhD students to the University, irrespective of the other facilities it offers. It is his membership of many systems that represents emergent properties transcending those of the teaching system of which he is perceived to be an element. This alternative view of emergence is not, of course, the same as a non-systemic, fragmented view which focuses on individuals but fails to perceive an emergent system arising through their interactions, and hence ignores the impact of norms, values, expectations, communicational acts, etc. on individual sense-making processes (Hay, 2007).

5. Tools for contextual inquiry

The following section describes an application of a framework for contextual inquiry, the Strategic Systemic Thinking (SST) framework (Bednar, 2000; 2009). This forms an exploration into the nature of open systems thinking and how systemic identities are maintained and generated within a specific human activity context. Many research methods focus upon simplification – breaking down complex situations into their component parts in order to achieve clarity. However, SST attempts instead to support human researchers to deal with 'complexification' and acceptance of uncertainty, despite apparently insuperable epistemological problems associated with such a view. Particular emphasis is placed on a multiplicity of individual sense-making processes and ways these are expressed within complex situations. SST can support groups of organizational actors to explore contextual dependencies, and is intended as a vehicle to support them to grapple with escalations in complexity. An essential principle of the SST framework is that participants should own and control their own inquiry, supported (but not substituted) by a facilitating professional analyst.

There are three aspects to the SST framework: intra-analysis, inter-analysis and value-analysis. It is possible to begin at any point in the framework – the aspects are not sequential but may be used in an iterative way, moving from one analysis to another repeatedly and in any direction. A range of tools and techniques are available to participants as they seeking to explore and create their worldviews. These include: rich pictures, brain-storming, mind-mapping, diversity networks, drama transfers, role-playing – all supporting creation, visualization, and communication of mental models and narratives. Each of the three aspects of the framework has a different focus. The purpose of intra-analysis is to enable creation of an individual process for structuring a problem. This analysis aims to create and capture a range of narratives from participating stakeholders by supporting visualization. Inter-analysis is the aspect of the inquiry which represents collective reflections over alternative ways forward. The aim is to have a dialogue and to reflect upon ranges of narratives derived through intra-analysis. The purpose is not to achieve consensus or to establish common ground, but to produce a richer base upon which further inquiry (and possibly decision-making) could proceed. Grouping of narratives takes place through consideration and discussion of those individually created. The results might be considered to form a knowledge base relating to problem spaces under investigation. A critical and reflective approach in considering these results is needed to ensure a basis for 'good' decision-making and to avoid unintended, negative consequences for actors and organizations concerned. While the analyses represent inquiries into what is unknown (at least explicitly), evaluation could be said to be an examination of the 'known' – what has been learned from analyses in a socio-cultural context. Actors carry out examinations of values influencing and constraining the analyses, and consider prioritization from political and cultural perspectives.

SST can be explained as involving groups of people to act as researchers into their own problem spaces under guidance of expert analysts as external facilitators. Inquiry using SST includes examination of their activities and specific use of methodologies, rhetoric and strategies to construct local arguments and findings. SST is considered complementary, rather than alternative, to more traditional approaches to inquiry. However, there may be conflicts relating to 'unproblematized' assumptions of ontological beliefs and logical empiricism - unquestioning beliefs in 'objectivities and truths'. Other assumptions may also arise which are incompatible with the underlying philosophy of SST, e.g. communication models that focus on a 'sender-receiver' perspective. To give a simplified example relating to information systems development, a traditional approach to inquiry might ask what *a company* wants to achieve with its information and communication system. On the other hand, a contextual inquiry would ask what the *people* who will use the system want to achieve, and what roles and specific purposes their activities might have in organizational contexts. What makes their unique situation recognizable *for them*? What specific role do they give to information in the context of the organization and its business? This inquiry is to be seen as investigation by users themselves into their own assumptions and needs within the space of an open information system. This is a bottom up perspective on organization, information and (technical) communication systems. Systems are envisaged, which are shaped with the intention to serve specific organizational actors and their needs – from their own points of view.

To be able to discuss multiple levels of contextual dependencies, a language is needed to facilitate use of conceptual tools and abstract structures. Skills in use of techniques for inquiry are not sufficient, without understanding of language/metaphysical perspectives. Thus, we need not only to consider emergence *as a concept*, we need to create different ways to *visualise* emergence. Since experience of life is dynamic, we can only discuss our experiences using tools that enable us to describe open, dynamic, complex and multidimensional systems with shifting boundaries. The author has developed a model of four-valued logic for use in creating dialogue in different aspects of the SST framework, in order to develop *diversity networks* as a base upon which better informed decision-making can be grounded.

When inquiring into a collective problem space, it is important to examine the aspects of choice available to participants. It is important that participants recognise an awareness that they are asserting beliefs about truths, rather than truths themselves, i.e. that they are exercising judgement. As suggested above, when asked for an opinion, an individual may often give the answer 'it depends'. If we explore this response further, we can discern four alternative variants (see Table 1). The key difference between them relates to the character and degree of certainty represented by each.

The underpinning logic implies that choices need to be made for each separate alternative, and that any assertions made are not assumed to be valid under all conditions, or out of a specific context.

Each assertion requires a decision. Each decision is chosen by means of an attempt to assess risk of being 'wrong', taking into account fit between assumptions of context and possibility of generalisation.

Table 1 A model of four-valued logic: Variants of individual judgement

Assertions of negative belief
"I do not believe that a resolution for this problem space can be achieved"
Assertions of possible belief
"I believe there it may be possible to resolve this problem space, but I don't currently know how"
Assertions of positive belief
"I believe that a resolution for this problem space can be achieved"Assertions of no belief
Assertions of no belief
"I can offer no opinion whether or not a resolution for this problem space can be achieved"

6. Persistence of reductionist approaches

There is evidence to suggest that many, or even most 'projects' intended to bring new information systems into use are currently doomed not to achieve their intended objectives (see discussion in Bednar and Welch, 2008). It appears that in many cases organizational actors are well aware that their efforts will fail and yet persist with projects to their conclusion (and possible oblivion) even where value is actually destroyed for the organization. Hickey (in Mumford et al 2006) pointed out in this context that organizations frequently reinvent solutions to problems because they fail to learn the lessons of past mistakes, or because they fail to reflect. The author considers it preferable to promote an organizational culture in which mistakes are tolerated as a valuable source of learning, in which uncertainty and complexity are embraced rather than feared. In such a culture, individuals abandon pride and stubbornness in favour of creativity and flexibility, and in are encouraged solve difficulties together. It is therefore discouraging to read advice to would-be managers of such projects that advocates adherence to paradigms for inquiry that do not emphasise productive learning. Williams' suggested advice on "How to increase the success rate of IT projects" (2007, p.20) is one such example. His advice ignores the perspectives of the individual actors who are stakeholders in any project. Some of his suggestions are discussed below, juxtaposed with alternative strategies incorporating phenomenology and hermeneutics.

▪ 1. Ensure robust and consistent approach to approval of business cases;

Alternatively, developers could inquire into *relevance* of systems through engagement of end-users and boundary critique (Ulrich, 2005; Bednar, 2009).

▪ 2. Apply industry best practice for portfolio management;

A concept of 'best practice' ignores both the individual perspectives of actors engaged with the system and organizational uniqueness and desire for competitive advantage. A better alternative might be reflection upon inquiries into contextual dependencies by stakeholders, to promote resilient and sustainable, rather than robust (rigid), decisions (Checkland, 1981; Nissen, 2002; Bednar and Welch, 2008; 2008b).

▪ 3. Undertake regular, formal reviews of projects to ensure requirements specifications are based on business case assumptions that are still valid;

This advice suggests that 'requirements' pre-exist and merely need to be elicited. An alternative would be to support engagement of all stakeholders in inquiry into business cases, encouraging them to challenge their own assumptions and explore multiple levels of contextual dependencies in relation to their professional roles. By this means, engage in creation and shaping of requirements to establish a knowledge base for development of meaningful and flexible systems (Friis, 1991; Stowell and West; 1995; Bednar and Welch, 2008; Bednar and Welch, 2008c)

▪ 4. Ensure continued independent and objective review of IT investment;

Alternatively, an evaluation of situated usefulness might be undertaken, through an inquiry owned by the actors themselves (Vickers, 1970; Friis, 1991), including continual, relevant and situated reflection

over systems in use by the stakeholders concerned. There is also a need to consider returns on investment in terms of indirect and intangible benefits or costs, as well as the direct costs of technical implementation.

- 5. Ensure sufficient management teams are in place to take tough decisions;

Organizations could ensure instead that management capability is developed to facilitate effective decision-making by users/stakeholders themselves (Bednar and Welch, 2008b), taking into account shifts in management thinking in recent years, away from control and towards facilitation of organizational activity (Sandberg and Targama, 2007).

Individuals are not simply emergent, unique systems but multiple and 'schizophrenic' systems (see also Gregory Bateson's, 1972, discussion on Triptych). Communities arise out of relationships between such emergent systems. Techniques are required to support inquiry and dialogue in an open, complex problem space, e.g. mind mapping and rich pictures. A relevant toolset is not, however, sufficient in itself. What is also needed is an ability to organize use of such techniques in a systemic fashion, including a possibility to incorporate application of models based in paraconsistent logic. Examples of Contextual Inquiry as a valid research approach has been found to be relevant in a range of domains such as education (Bednar, Eglin and Welch, 2007), systems analysis and development (Bednar and Welch, 2007; Bednar, 2009), digital forensics (Bednar, Katos and Hennell, 2009; Bednar and Katos, 2010) and knowledge management (Bednar, Welch and Katos, 2006).

References

Argyris, C. and Schön, D. (1974) *Theory in practice: Increasing professional effectiveness*, San Francisco: Jossey-Bass

Argyris, C., & Schön, D. (1978) *Organizational learning: A theory of action perspective,* Reading, Mass: Addison Wesley

Bateson, G. (1972)*. Steps to an Ecology of Mind*. Chicago University Press

Bateson, G. (1979). *Mind and Nature: A Necessary Unity (Advances in Systems Theory, Complexity, and the Human Sciences).* Hampton Press

Bednar, P.M. (2000). 'A Contextual Integration of Individual and Organisational learning perspectives as part of IS analysis'. *Informing Science, Vol.3, No. 3, 2000*.

Bednar, P.M., Welch, C. and Katos, V. (2006). Four valued logic: supporting complexity in knowledge sharing processes.' *Proceedings of 7th European Conference on Knowledge Management*, Corvinus University, Budapest, Hungary, September 2006.

Bednar, P.M. and Welch, C. (2007). A Double Helix Metaphor for Use and Usefulness in Informing Systems, in H-E Nissen, P.M. Bednar and C. Welch (editors), *Use and Redesign in IS: Double Helix Relationships? A monograph of Informing Science: the International Journal of an Emerging Transdiscipline*, 10, 273-295.

Bednar, P., Eglin, R. and Welch, C. (2007). 'Contextual Inquiry: A systemic support for student engagement through reflection,' *Interdisciplinary Journal of Knowledge and Learning Objects, IJKLO*, Vol.3 2007, pp 45-55.

Bednar P. and Welch C. (2008). *Contextual Inquiry and Requirements Shaping* . In Barry, C., Lang, M., Wojtkowski, W., Wojtkowski, G., Wrycza, S., & Zupancic, J. (eds) (2008) *The Inter-Networked World: ISD Theory, Practice, and Education.* Springer-Verlag.

Bednar P. M. and Welch C. (2008b). *'Resilience through systemic structuring of uncertainty.'* In proceedings of 2008 UK Systems Society International Conference. *Building Resilience: Responding to a Turbulent World*. Oxford University, UK, 1-3 September 2008.

Bednar, P. M. and Welch, C. (2008c). "Hypermodernist Travellers in a Postmodern World." *The Electronic Journal of Business Research Methods* Volume 6 Issue 1 2008, pp. 1 - 8, accessed online at www.ejbrm.com, 21 November 2008.

Bednar P. (2009). Contextual Analysis: A Multiperspective Inquiry into Emergence of Complex Socio-Cultural Systems. In Minati, G., Abram, M. and Pessa E (eds) (2009) *Processes of Emergence of Systems and Systemic Properties: Towards a General Theory of Emergence*. New Jersey: World Scientific.

Bednar, P.M., Katos V. and Hennell C. (2009). 'The complexity of collaborative cyber crime investigations'. *Digital Evidence and Electronic Signature Law Review*. Vol 6.. pp. 214-219.

Bednar, P., Katos V. (2010). 'Digital forensic investigations: a new frontier for Informing Systems'. In D'Atri A., and D. Saccà. (eds.) *Information Systems: People, Organizations, Institutions and Technologies*. Berlin Heidelberg: Springer Physica-Verlag. pp. 361-372.

Checkland, P. (1981). *Systems Thinking, Systems Practice*. Wiley

Ciborra, C.U. and Willcocks, L. (2006). 'The mind or the heart? It depends on the (definition of) situation. Journal of Information Technology, 21(3), 129-139

De Zeeuw, G. (2007). Problems of Individual Emergence (editorial). In De Zeeuw, G., Vahl, M. and Mennuti, E. (eds) (2007) *Systemica*, nrs 1-6, vol. 14.

Friis, S. (1991). User Controlled Information Systems Development – problems and possibilities towards Local Design Shops. Lund University Publications

Hay N. (2007). Image as a Therapeutic Catalyst. *The Systemist*, 29(1) 7-20.

Langefors B. (1966). *Theoretical Analysis of Information Systems*. Lund: Studentlitteratur.

Lewin, K. (1948) *Resolving social conflicts; selected papers on group dynamics.* Gertrude W. Lewin (ed.). New York: Harper & Row.

Maturana, H.R., Varela, F.J. (1980), "Autopoiesis: the organization of the living", in Maturana, H.R., Varela, F.J. (Eds),*Autopoiesis and Cognition: The Realization of the Living*, D. Reidel Publishing Company, Dordrecht,

Mumford, E. (2003). Redesigning Human Systems. Hershey: IRM Press.

Nissen, H-E. (2002). 'Challenging Traditions of Inquiry in Software Practice,' in Y. Dittrich, C. Floyd and R. Klischewski (editors), *Social Thinking – Software Practice*, Cambridge Mass: MIT Press, pp 69-90

Radnitzky G. (1970). *Contemporary Schools of Metascience*. Gothenburg: Akademiforlaget.

Sandberg, J. and Targama, A. (2007). *Managing Understanding in Organizations*. Sage

Senge P.M. (1990). *The Fifth Discipline: The Art & Practice of the Learning Organization*. Doubleday: New York

Stowell, F.A. and West, D. (1995). Client-led Design. McGraw-Hill

Ulrich, W (2005). A brief introduction to critical systems heuristics (CSH). *ECOSENSUS project website,* The Open University, Milton Keynes, UK, 14 October 2005, http://projects.kmi.open.ac.uk/ecosensus/publications/ulrich_csh_intro.pdf, accessed 1 February 2010

Vickers G. (1970). *Freedom in a Rocking Boat*. Allen Lane.

Weick, K (1995). *Sense-making in Organizations*. London, Sage.

Williams (2007). 'Make sure you get a positive return,' *Computer Weekly*, 13 November 2007, pp 18 & 20