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Not avoiding the question of complexity

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Abstract

This paper gives an account of progress made in a study commenced during 2004, and previously reported. The theme is contextual analysis in requirements shaping practice. The context is organizational development within a relatively new University department. The Strategic Systemic Thinking Framework is used as the basis for inquiry. The paper outlines the process followed in carrying out the study and draws some preliminary conclusions. Points covered in these conclusions relate to problem ownership, roles of analysts and scalability of investigation.

Keywords: Contextual Analysis, Contextual Dependencies, Complex Systems, Systemic Thinking.

Introduction

We are carrying out a study in which our chosen *theme* is contextual analysis in requirements shaping practice. We have chosen to apply a *framework* for Strategic Systemic Thinking or SST (Bednar, 2000). The idea is to create a knowledge base upon which decisions can be founded relevant to a problem space. In this instance, inquiry related to introduction of an information system into the organizational setting of a University Department. The origin of this project is described elsewhere (Bednar, 2004). This paper describes progress made in the study since that previous account.

The framework is used to support analysts in their efforts to apply reflective practice and to try to break free from preconceived ideas. The SST framework draws on systems thinking, research in information systems development methods, and relevant theoretical material such as the theory of autopoiesis (Bednar 2004). The framework is applied as a learning tool for investigation of a problem space by the organizational actors themselves with the support of external analysts. Use of this framework supports creation of an organizational learning system which has potential to recreate itself. This may be described as a system which is autopoietic, i.e. it continuously redefines its boundaries and thus closes itself in order to be self-perpetuating. Autopoiesis is a phenomenon described and defined in work by Maturana and Varela (1998), in a context of living systems.

In a complex world, science has taken to simplifying what can be dealt with by applying systematic reduction. We have shifted the emphasis from rigour, in potential to replicate findings, to coherence and relevance of methods used to investigate a problem space. If a process is well-described it is possible that an interested third party might be able to follow what was done, and in what context it was done. A dialogue could then be developed as to validity of what was investigated and of such a process of investigation - what Checkland (2004) referred to as *recoverability*. An underlying aim is to develop a coherent implementation from a theme of an investigation using a framework in action, supporting reflective practice.

This study is intended to act as a prelude to further theory development and practical investigations, to support analytical practice, linking academic work with real world practice. Thus, as well as supporting the organizational requirement shaping activity, the project is also currently a test bed for future applications of the SST framework. One of the objectives of this investigation is to promote reflection over required support for development of skills needed by internal analysts. Another is to develop initial thoughts on scale-up of the combination of internal/external analysts in a working situation.

In this paper we will give a brief introduction to the SST framework and its contextualisation. There follows a short summary of research presented in Bednar et al (2004). Current findings are then discussed with examples.

Overview of the framework

This paper describes the activities and processes comprising our investigation. The study has a number of complementary aims: to investigate a possible problem area using the SST framework (Bednar, 2000) in practice; to provide support for a new University department in striving for excellence; and to develop skills in preparation for possible future collaborations with a number of industrial partners.

A simplified variant of the Strategic Systemic Thinking framework was developed for this pilot project. A relatively new University Department was considered to provide a convenient problem area within which the foundations for practical application of the framework could be explored.
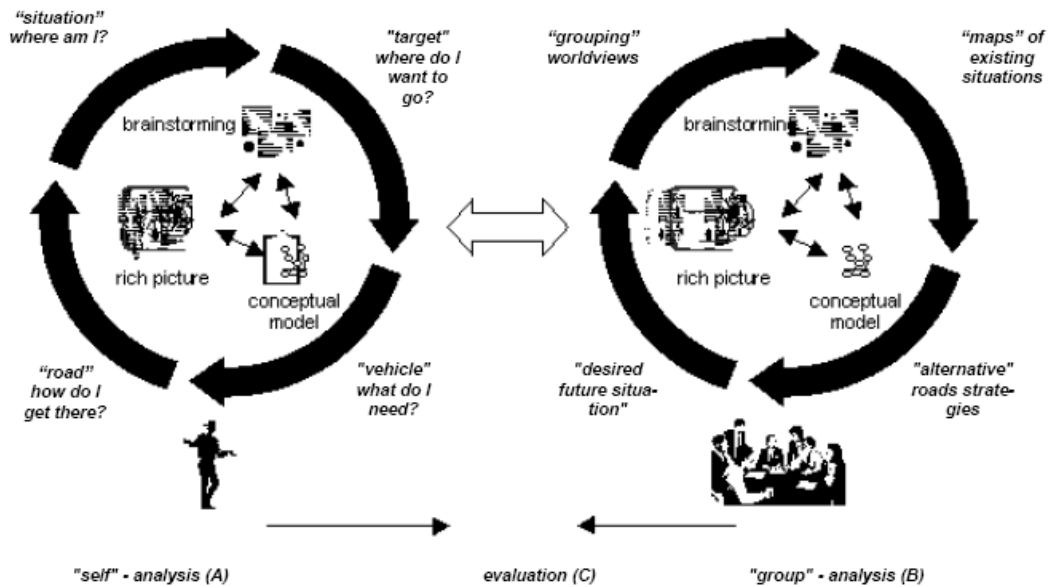
A Description of the SST Framework

Figure 1.0 Model of the SST Framework

Simplification of the Framework

The analysts and observers were chosen and a plan for the investigation was created and agreed upon. Roles for the investigators were decided. The initial plan was in outline:

- Create a simplified version of the framework
- Develop an initial plan of the process
- Pilot the plan and discuss any modification necessary
- Carry out the plan after modifications
- Reflect upon practice during and after the study

The project team was made up of internal and external analysts and observers (see figure 2.0).

A simplified version of the SST framework was developed by the team in order to promote enhanced usability for the particular context of this study. In developing the plan for the study each of the analysts independently developed their own interpretations of the framework. This included issues such as specifying guideline questions (see table 1) derived from the problem space. SST in general was applied by the analysts to specify a version of SST for the investigation. SST when specified was then applied in context of the investigation, starting with a pilot. While it is possible to commence work in any aspect of the framework, for the purposes of this particular study it was decided to view the process as commencing with Analysis A.

Contextualised questions
Q1: a) How do I teach my subject (e.g. mentoring / problem based / research focused . individual vs. group / interaction vs. communication etc.)? b) What is happening – teaching / learning? Why do I think this is so?   *Context:*   *What is your education practice…. From your point of view, in your practice at the moment for your roles as a professional in your current situation? (This describes the current situation).*
Q2: a) What would I like to do? What are the expectations on me? What is possible according to the current situation (department / subject / students etc)? What do I miss? b) What am I willing to do (to make a change)? What assumption am I basing this on?   *Context:*   *What is your aim (for the future)…..from your point of view in your practice at the moment for your role as a professional in your current situation? (This describes the ideal future situation).*
Q3: a) Skill I practice – teaching (behaviour). What is possible? What do I miss? b) How do I interact with students for the purposes of teaching?   *Context:*   *In relation to question 1, your current practice, describe the resources, competencies and possibilities you currently have available to you. In relation to question 2, the (ideal) future practice, describe the resources, competencies and possibilities you would need, over and above the ones you already have.*
Q4: a) How shall I set the strategy to be able to use my competence? What is the relation and cooperation with other lecturers / admin etc? b) What might I need to make things possible? Why (or when or under what circumstances) would these changes (or lack of them) be trustworthy?   *Context:*   *How would you achieve this, or what plan could you see to achieve this? (How can you change your practice, or transform it to achieve this?).*

Table 1. Specified guideline questions

Analyst roles
Internal analysts were selected from the client organisation. Ideally the analyst should be non-threatening, and therefore should not be an authority figure, but at the same time the support of management is needed to provide an incentive for change.

The purposes of the roles are summarised below (figure 2.0).
- External analyst: Adopts a mentoring role and is knowledgeable and able to advise on methods.
- Observer: Is knowledgeable in the method and may assist the team to reflect.
- Internal Analysts (in this case there were two internal analysts with different roles):
  - Facilitator: Facilitates and supports the process of investigation.
  - Investigator: Is the primary interviewer.
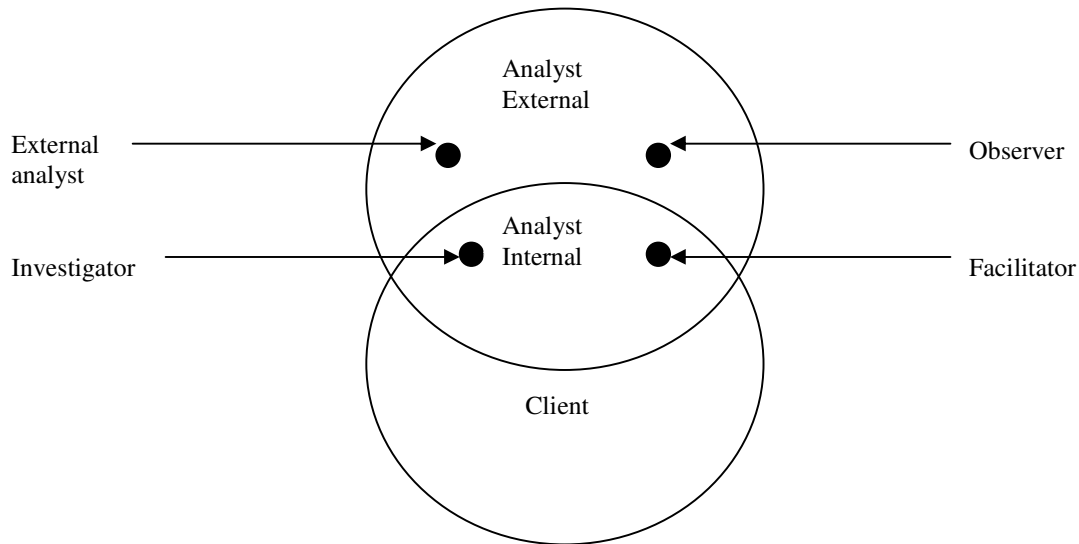- Client: Represents the stakeholders in this investigation.

Figure 2.0 Relationship between the analyst and the client

The pilot

Analysis A – Intra Analysis

The purpose of Analysis A is to enable individuals to create a personal map of perspectives on the situation, including both aspirations and reflections on dynamics and resources.

In developing this pilot study it was necessary to create an interview structure. Each of the analysts independently developed their own interpretations of guideline questions derived from the problem space. Questions may be described as being in two parts: questions relating to the situation and to contextualised dynamics. A process of discussion and negotiation among internal and external analysts enabled a set of transformed questions to be developed (see Appendix 2). These formed the basis for interviews in Analysis A.

The individual interview format and structure for Analysis A was agreed between the external and internal analysts. One analyst would interview all the participants and an observer who was not an internal or external analyst would be present to observe and aid the development of the process. The interviews would be recorded and transcripts made.

A protocol was devised for the interviews:
- A common preamble,

- o So that each participant gets a similar, relevant and contextualised introduction to the process covering the aims of the interview and possible length.
  - General interview questions
    - o Length of time in education/industry? As a gauge of experience.
    - o How useful that they thought the process would be? To gauge attitude to the process.
  - Anonymity
    - o It was thought important to explain the purpose of the interviews and who would have access to the information. This was to encourage the participants to be honest and give full answers to the questions.
  - One interviewer for everyone
    - o This was an attempt to give each interview a similar thread and provide coherence to facilitate Analysis B - creating a grouping of views.
  - Semi-structured interviews
    - o These interviews were semi-structured, in that open questions where asked and the interviewees were allowed to answer the questions as they wished, with only confirmation questions form the interviewer.
  - Four open-ended questions transformed through the SST framework.
    - o This was a crucial step in the process. As mentioned above, each of the analysts reflected critically on the contextualisation of the questions, and collaborated in evaluating them.
  - The outputs would be recorded.
    - o Descriptions of the interviewee's perspectives would be created through generation of rich pictures with support from the investigator. The dialogues would also be recorded onto tape and transcribed.

During the pilot interview, the observer was present to provide material for reflection on process. Extracts from this material appear in table 2.

Extract from the observations on Process

1. The use of drawing to articulate views worked very well and became semi collaborative. The interviewee drew very rapidly and gave a commentary as he drew. The result was a complex set of visual images, into which the interviewer intervened with labels in consultation with The interviewee. It would seem that this is necessary to avoid a situation where the product is too noisy for interpretation afterwards. The drawing and tape transcript could become difficult to interpret once several days had elapsed and a number of other interviews had taken place, leading to a loss of richness.

2. The interviewer clearly felt that he should keep prompting to a minimum but when he did prompt it was productive and seemed to help The interviewee move on. Perhaps this is something that needs careful thought outside the interview situation. How far is prompting necessary to the dynamics of the analysis? Is there a distinction between prompting on process and prompting about context or content?

3. During the interview, the interviewer several times pointed out that it was possible to return to an earlier question and reiterate. The interviewee didn't do this, but through the questions. However, at the end he commented that he had strong feelings of wishing to go away and reflect and then repeat the whole process. Given that The interviewee was uniquely placed to reflect prior to the interview, we might expect that other participants will feel this more strongly still.

The interviewer responded by saying that there would be a further stage when he would feedback collective views to each participant and that this would be a time for further input. It suggests that the potential is there for further iterations of the cycle, as expected. How should these be distinguished in terms of process and outcome for the participants and analysts?

4. At the end, the interviewee also commented that he had a strong desire to hear the answers other colleagues would give to the questions, and to discuss the results. If this is a common response, it is likely that colleagues *will* go away and discuss the issues outside the context of the interviews. Thus, some interviewees will have reflected in depth on their answers and discussed them collectively before expressing them in an interview situation. How does this affect the analysis, if at all? Does it have implications for the timescale within which the interviews take place?

5. The interviewee drew a kind of mental map as he spoke in response to the questions. He added branches, annotations, symbols, etc. and drew at quite a rapid pace. However, The interviewee knew he would be doing this before the interview took place and, of course, visual images are part of his professional life every day. It will be interesting to see how other people take to this form of expression, e.g. someone who normally works with music or figures rather than visual images.

6. When The interviewee expressed a wish to reflect, the interviewer pointed out that he could have a copy of the drawings and subsequent rich picture. The interviewee responded that these would not be useful as they were not in electronic form. I could not interpret this and it would be interesting to draw this out further.

7. His final comment was that Questions 1 and 3 were easy to answer, whereas Q2 and 4 were much more difficult. It seemed that one source of the difficulty lay in separating two strands of thought: a vision of how things might be done, given carte blanche, and a wish list of the resources which would be needed for this to take place, e.g. software, university administration. Both The interviewer and The interviewee seemed to feel that the latter should be suppressed in favour of the former – why? Both are valid responses to the question and both are interesting.

Comments on procedure for the pilot made by observer

1. Preamble

It might be a good idea to have a protocol written out so that the explanation is always consistent. I think it was particularly difficult when the interviewee was The interviewee, as it felt so artificial, but it is easy to miss something out. Is there also a commentary that will need to be made at the *end* of every interview?

2. The use of A3 sheets for drawing

This appeared to work very well as a means of expressing views. The interviewee seemed to find it easier to add to the Q1 drawing in order to answer Q2, then started a new sheet and moved back and forth between them. The use of different coloured pens seemed to help him and could, I think, help to differentiate different parts of the answer for analysis afterwards. A range of colours would be useful therefore.

I noticed that the drawing became collaborative – The interviewer adding labels in consultation with The interviewee. This will help with interpretation after the interview, which could not be left too longer after the event. This means that the tapes must be transcribed very quickly.

3. Time/conditions

The interview easily occupied an hour. It may be important that enough time is available – squeezing interviews into a gap between classes, for instance, might be less than effective. The interviewee already knew what to expect – other interviewees might require more time to think/articulate/reiterate.

It also appeared to be tiring in terms of the concentration required. Perhaps it would be a good idea to have water (coffee?) available. Some people might need to be in an area where smoking is permitted.

4. Freshness of views

The interviewee had prior knowledge of the questions that other interviewees may not have. The interviewer will hear many different views in the course of interviewing. Is it therefore necessary for the interviewer to be interviewed at an earlier stage? Does this matter?

5. Multiple analysts

Client might not have put up with an external analyst social capital.
Many responded because it was the particular internal analyst. It might be thought that participants know and trust the internal analyst and are happy to "*do him a favour*". For the purpose of anonymity the internal analyst would need to be trusted by the interviewees and this might involve some sort of canvassing for this post.

The interviewees were informed that all messages from the interviews would be coded to provide anonymity. They were told that the interview would last about 30 minutes or could take longer dependent on the interviewee and how long they wished to take when answering the questions. During the discussions rich pictures would be created. The interviewee was invited to reflect on and actively engage and contribute to the rich picture in progress. The actual rich picture was drawn on A3 size paper to facilitate clarity. For each of the questions discussed a new rich picture was created on a fresh sheet of paper. The rich picture was made using colour codes to distinguish them from the interviewer's own notation. A total of 9 interviews were held. Audio tape recordings of the interviews were made and subsequently transcribed. All interviews where carried out by one interviewer. Before the interviews commenced, the interviewees were also asked to comment on score out of 10:

- How happy they where to do the interviews?

- ▪ How useful the interviewee thought that the process they where about to embark on would be?

The interviewees where also asked the number of years that they had been in industry and/or education.

Analysis B – Inter Analysis
In this part of the framework, the aim is not to bring about a premature consensus but to explore the range of views created and expressed by participants. The interviews are systematically analysed in the following way. The internal analyst who conducted each interview represents it to the team using the Analysis A rich picture, the audio recording and his recollection of the interview.

For the purposes of this study analysis B was conducted in the following way. A meeting was held to develop a grouping of views by contributions and negotiation between all the analysts and the observer. The investigator delivered an overview of each rich picture, including his own understanding of the main ideas behind it. Where necessary he was able to refer back to his transcripts of the interviews and to reflect on any particular point raised in discussion. The other analysts and observer asked general questions to rediscover the original dialogue and explore what may have been meant when answering the questions. The team discussed and analysed what the unique attributes were in each rich picture.

Through this process a group view was created through critical reflection of the meaning of the rich pictures, by reviewing their similarities and differences and through negotiation between the external analyst, observer and internal analysts. This was in accordance with Analysis B (i) (Bednar, 2000), the "grouping of world views" where similarities and differences are noted in order to gain an insight into the range of perspectives expressed.

Approaching and recording the interviews in this way allows for opposing views to be recorded alongside common views so that none are discarded at this point. This might be considered one of the strengths of the SST framework in that it can incorporate diverse and sometimes contradictory views in a systematic approach. All views are incorporated into the group view and each is treated as viable to promote innovative thinking. It should be emphasised that this process is not a summary of the rich pictures.

Analysis B can then progress as this grouping of views is reflected back to the individuals involved. In this instance, feedback was to be carried out through individual consultations to avoid political interferences, including any potential for loss of face.

Figure 3.0 shows an example of a rich picture drawn up during an interview in Analysis A. Figure 4.0 shows a diagram used during discussions between team members in attempting to group world views in Analysis B.
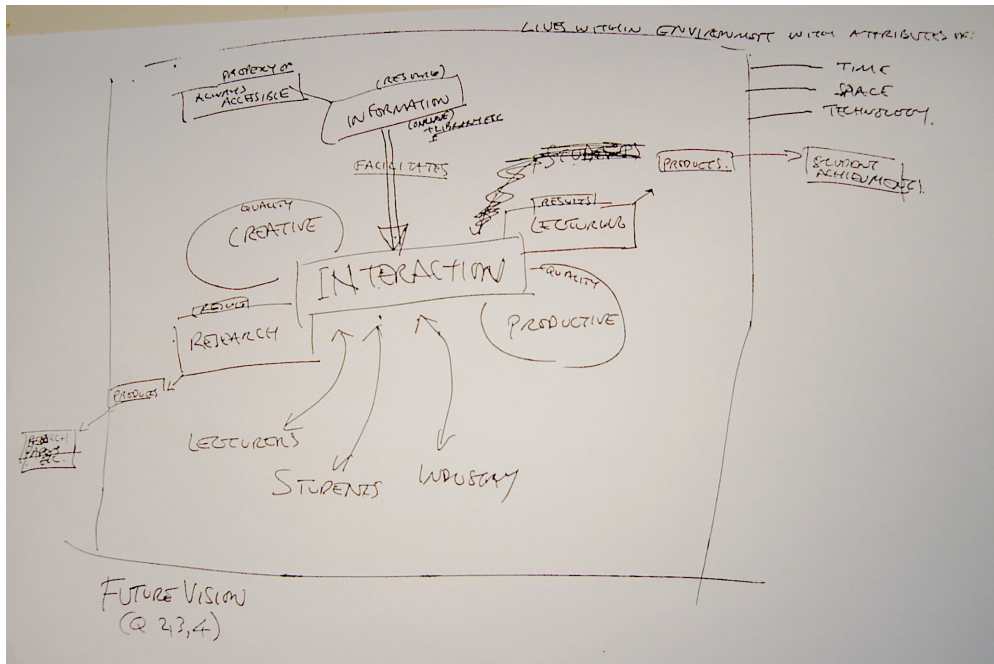
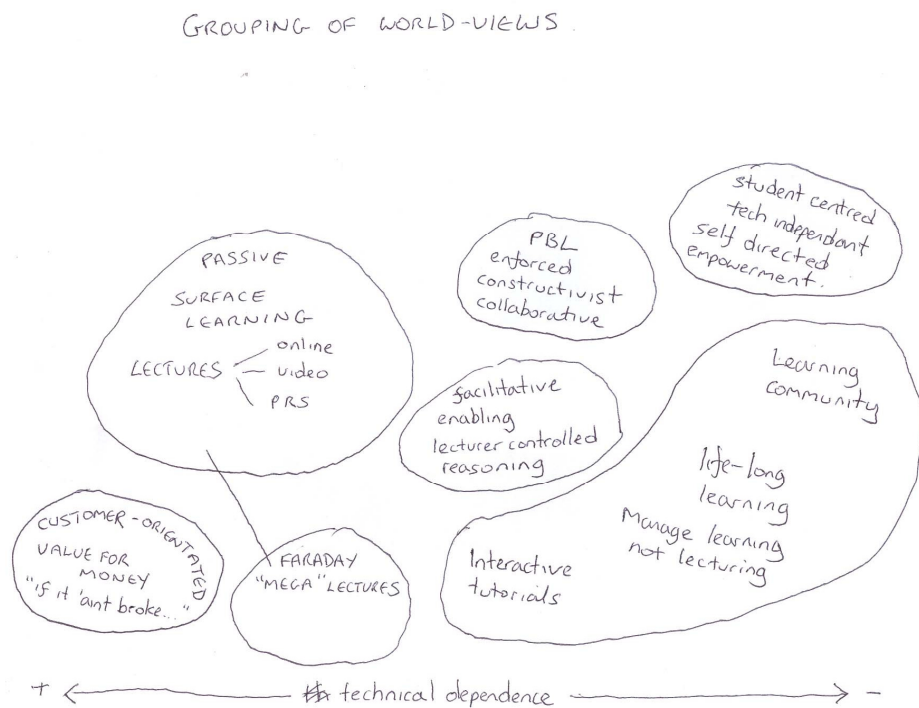**Figure 3.0 rich picture made during Analysis A**

Figure 4.0 grouping of views

The diagram in figure 4 describes part of the process in Analysis B, as it developed through discussion. The vertical axis reflected perspectives as 'student-centred' or 'lecturer- centred'; the horizontal axis reflected perspectives on educational technologies.

Conclusions

It was noted that there was some hostility to making rich pictures, and some participants preferred other methods such as brainstorming and mind mapping. Flexibility was considered to be desirable in supporting participants to create and express their views. When pressure on the internal investigator analyst was high the facilitator was able to support him as communication within the team sometimes proved difficult.

During the interview process it emerged that in practice social pressure aided the investigator in carrying out the interviews. As an 'insider' the internal analysts might be deemed to have a higher emotional capital with his co-workers than an unknown, external analyst could have had. Anecdotal evidence suggested that it was the interpersonal capital of the internal analyst doing the interviews which encouraged co-operation from the interviewees. It was also recognized that the facilitator must be able to give empathic support to other members of the team when required. For these reasons the personalities of the individual internal analysts may be relevant to the success of the investigation and they would need to be selected with care.

Looking forward, issues to which we intend to devote further consideration are related to roles of analyst, scalability and ownership. Internal analysts may have a vital role to play in supporting mobilisation for change and action. It remains to be seen whether or not it is viable for multiple analysts to collaborate on larger scale projects where many people would be involved. While investigations such as this can support participants to express aspirations for change, implementation requires that issues of ownership and responsibility in a problem space are resolved among different stakeholders.

References

Bednar, P.M (2000). Contextual Integration of Individual and Organizational Learning Perspectives as Part of IS analysis. Informing Science Journal, no3, vol.3. 2000 pp.145-156

Bednar, P.M., Green, G.M., Bain A., Eglin R. (2004). *Contextual Analysis in Practice*, Systemist, vol 26 (2) Nov. 2004 pp. 97-108.

Checkland, P. (2004). The need for 'passionate' (not "dispassionate") Research in Management. Systemist, vol 26 (2) Nov. 2004 pp. 142-149.

Maturana H., and Varela F.,(1980) *Autopoiesis and Cognition*. The realization of living. Dordetch: Reidel Publishing Company