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Abstract

The framework for Strategic Systemic Thinking (SST) provides a method for investigating an organisations perceptions, goals and identifying missing resources and posing possible solutions using the groups own understanding of the problem area, using both individual and group participation. Users may be assisted in the contextually relevant application of techniques such as brainstorming and rich pictures as useful ‘methods’ for organisational analysis. It supports adaptation of methods to focus upon contextually dependant problems. To be able to accommodate the contextualisation process, the analytical activities themselves are co-operated upon by a combination of external analyst, internal analyst and ‘clients’. The main parts of the SST framework are analysis A, with individual focus, analysis B with organisational focus and evaluation C, focusing on assessment of conclusions. The research team has started the implementation of the SST framework in a department with approx 25 staff members.

Introduction

This case study discusses the initial application of analysis A as part of the SST framework to an information systems analysis situation within the department of Creative Technologies in the University of Portsmouth. The framework for systemic strategic thinking (SST) was developed by Bednar (2000) in an effort to improve the efficacy analysis and implementation of information systems as applied within an organisational context. Such improvements may be gained when levels of analysis are informed by an understanding of the contextual dependencies existing within the unique situation that is relevant to a particular organisation at hand.

Section two details the background to the application of the SST framework acknowledging theoretical basis of within the systems science field and relating to the

work on autopoiesis (Maturana1980). In analysis A the different levels of analysis focuses on the individual understanding of the situation from the individual point of view, with analysis B then intended to be drawing on the group understandings (from the individual point of view). Evaluation C is the third stage of analysis where reflections from individual, group and analysts come together to reflect on the evidence and results of the study.

This case study has been undertaken as a pilot in terms of the application of the framework in order that a working model for this approach to organisational investigations may be developed and applied within the arena of small to medium sized enterprises (SMEs). The case study described is the initial part of analysis A to be undertaken and the initial experience of working within guidance of the SST framework is commented upon.

Finally a few reflections and conclusions from the early stages of this investigation are made. From the organisational perspective this project is currently in the Analysis A phase.

Strategic Systemic Thinking (SST)

Systems thinking allows us to see the organization as a whole, to consider the patterns of change and inter-relationships, to access the level of complexity required for understanding. Strategic Systemic Thinking is a systematic framework for systemic analysis (see fig 1 and 2).

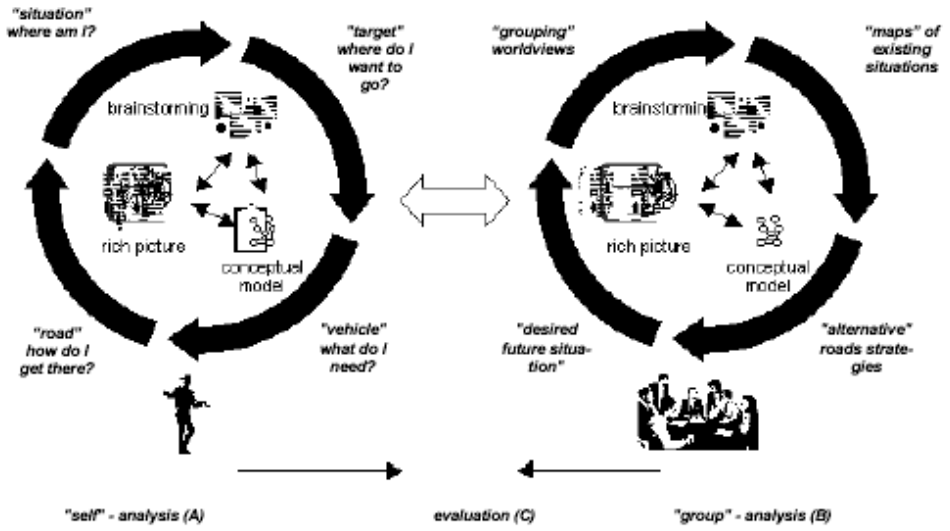

Figure 1: Overview of the SST framework.

Multiple levels of analysis can be associated with the different orders of learning as described by Gregory Bateson (Bednar & Adams, 2003; for more on multiple orders of learning see Bateson, 1972) Critical Realism gives us the opportunity from which to consider both the reality of the natural world in the context of events and discourses of a social world (Bednar & Green, 2004).

Stages of the SST framework

Analysis A = 'Intra' 'Micro'	Analysis B = 'Inter' 'Macro'	Evaluation C of **analysis processes**
Situation	*Grouping of worldviews*	*Constructive "what if?"*
target	*Map of existing situation*	*Positive (constructive) criticisms*
road	*Desired future situation*	*Negative (constructive) criticisms.*
vehicle	*The alternative roads*	*Competence.*

Fig 2. Stages of the SST framework

- Analysis A: The Intra-individual perspective - where the individual creates a personal map of resources focusing on situation, target, vehicle, road

- Analysis B: The Inter-individual perspective -where group discussion of problems identifies solutions, which are worked on to produce a common goal.

- Evaluation C: Centres on feasibility, through reflection over the analysis A and B, this encourages an appreciation of multiple perspectives and an in-depth understanding or unique individual and continually dependant processes. The mechanism of this evaluation considers, what if scenario's, positive and negative criticisms, and competency in the domain.

Autopoiesis

In Maturana (1980), Autopoiesis (as a process) is identified through a definition of 'living machines': "An autopoietic machine is a machine organised (described as a unity) as a network of processes of production (transformation, reconstruction and destruction) of components that (re-) produces the components which: (i) through their interactions and transformations continuously regenerate and realise the network of processes (relations) that produced them; and (ii) constitute it (the machine) as a concrete unity in the space in which they (the components) exist by specifying the topological domain of its realisation as such a network." (Maturana 1980, pp. 78-79) This is in effect an abstract cybernetic description of cell metabolism. Put *very* crudely, it reads something like: a system is Autopoietic if the components of which it is composed interact with each other in such a way as to continually (re) produce and maintain that set of components and the relationships between them.

The following section relates analysis A/B/ and evaluation C to autopoiesis and critical realism.

Analysis A

- This is a 'Micro' perspective and as such an enquiry into individually co-created descriptions of 'understandings'…which may be actualised for example with rich pictures or mind-maps etc.
- Autopoiesis – As an effort to acknowledge that the unique individual 'I' as an autopoietic system creates and recreates multiple systemic 'I's, a living system in homeostasis, the critical variable for which is its own being. The living human individual constantly creates and recreates multiple systemic 'I's within its autopoietic space, in the context of interactions with his/her environment.
- Allopoietic - As the individual creates and recreates multiple systemic 'I's, so he/she also creates and recreates systemic views of the wider system within which these 'I's are meaningful, e.g. a continuous (re-) creation of the organization as an existing entity or a 'system'.
- Critical realism offers us the fundamental notion that within the system some aspects are 'real' or objective and some aspects are open to debate, discussion or critique, but both are essential elements.

Analysis B

- This is a 'Macro' perspective enquiry investigating the worldviews that contribute to the group understanding of the organization, from which the organization is emergent.
- Autopoiesis - in that the organization as a system may also be viewed as autopoietic within its boundary. In the course of maintaining homeostasis within the autopoietic space, every measurable property of structure may change in order that identity survives. (Loss of homeostasis would result in death/dissolution of the system.)
- Allopoiesis - where the organization may be seen as allopoietic in that it is created by the 'other' it exists and 'is' a product of the belief of others.
- Focus of analysis B - the individual is a member of a super-system where each individual is part and functions in relationships with other individuals. So the organization exists (only) as long as individuals believe in existence of the organization as an entity.

One of the fundamental definitions of a living system is what biologists call Autopoiesis. Auto meaning self, poiesis from the Greek word that's the root of our word poetry, self-creating. This system continuously (re-) creates itself. That's one of the fundamental definitions of living phenomena. Machines are technically allopoietic in a double sense, created by another (usually ourselves) and creating something other.

The Case study

This section introduces the application of the SST framework to the analysis of the Creative Technologies (CT) department at the University of Portsmouth. There are two main purposes with this case study. First, the department is intended to benefit in

its strive for excellence. Second the current collaboration with, and future support of a number of industrial partners is to benefit from the project results.

The idea to investigate the department was originally born of the need to develop a working method of investigation based on the SST framework. The CT department is a new department and in a turbulent subject area, this also means that the department is still in the creation of its identity and thus is drawing on the SST project as a support for its organizational developmental activity and future strategy. For a novice analyst the SST framework is a rather theoretical model and needed 'flesh on its bones' to enable it to be utilised in the aid of the small businesses and industrial collaborators which are the future target of the research group. The utilisation of the theoretical model, to lay the foundations, in practice of a new (simplified) method of enquiry could assist in the review of a variant of the framework, the problem domain of the department and serve as a useful vehicle to develop the understanding and skill set of the researchers involved in the pilot scheme.

Internal and external analyst

Within the project team two typical analyst roles were undertaken, these being the role of the internal analyst and the role of the external analyst (fig 3). Two selected external observers furthermore assist the project team. The internal analysts are members of the department of Creative Technology and have some understanding of the SST framework as described above. One of the internal analysts interviewed the users ('clients') of the system using the SST framework. The framework as described above laid the foundations for the type questions to be asked. The role of the internal analyst was to ensure that the manner in which the questions were asked and the focus of the questions was appropriate in terms of the culture and context of the department of Creative Technologies. The internal analyst brings in depth understanding of the domain in which the information is situated and as such is able to reflect and pursue the investigation for the purpose of information system analysis in a contextually appropriate way. This understanding of the current context is employed by the internal analyst to adapt the framework questions and the test for the validity of the questions to be contextually relevant and specific.

The external analyst brings expertise in the wider sense of systems understanding and is able to reflect on the questions and the findings of the internal analyst. Such reflections may be related to a deeper understanding of the capability of the systems to be deployed, to enable the organization to (for example) take advantage of technologies that may otherwise be passed over for consideration. An external analyst may have a deeper understanding of the implementation of the SST framework and of other methods for the analysis of business process. Such higher level understanding when combined with the local knowledge of the internal analyst can develop a more contextually appropriate and advanced system than would possibly be offered by either party independently. It should be noted that with the division of tasks comes a division of responsibility that the external needs to take into account when choosing and working with the internal analysts. This may also be appropriate to negotiate into any contractual obligation when initiating the investigations.

As an individual, an external analyst (when using other approaches to analysis) may find it problematic to scale-up their investigation in an industrial setting due to the number of hours required to conduct the investigation and the possible time scales of

an investigation. The SST structure of internal and external analyst has a potential for scale up due to the possible involvement of a team of internal analysts. This relationship may be one to one or as is investigated in this study one to many. Whilst using one interviewer may standardise the result of the study if they are carried out in a systematic way, it may theoretically be possible to use a number of internal analysts for all parts of the analysis and evaluation.

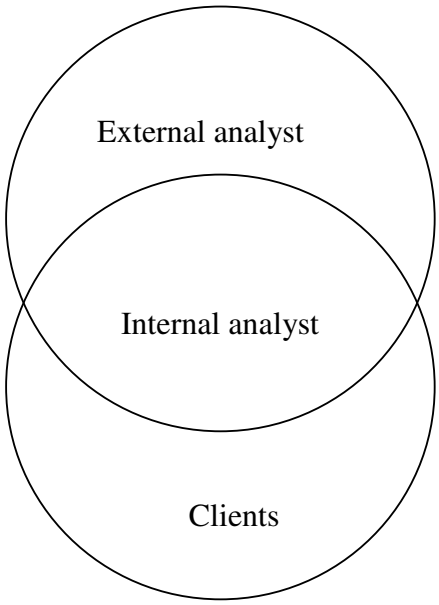

Figure 3: Relationship of analyst to client.

With more than one internal analyst whether or not there are more than one internal analysts acting as interviewer, allows a pooling of understanding when the internal analysts are interpreting their role and their understanding of the investigation. This is not only of benefit within a large organisation; ultimately in a small organisation it may be beneficiary to involve most every member in the role of internal analyst.

The Interview Process

The analyst team, this specifically includes all the internal analysts, developed the interview guide and strategy for analysis A. In the first instance the every analyst had to individually transform the questions from the examples suggested in the framework to questions that would make sense within the problem domain. Once the questions had created and renegotiated they were then validated through reflection with the external analyst. Then a contextually appropriate strategy for conducting the interviews was devised as follows:

- A common preamble - indicated the format of the interview and included the following pointers.
- Anonymity – was guaranteed for participants, this was essential as interviewees. were to be encouraged to express their views on the current state of the department.
- One interviewer for everyone – the single interviewer strategy ensures a level of consistency in the data gathering, it also enables cross interviewee

reflections on from the data collected. This will of course not be the case if multiple analyst interviewers are necessary.
- Semi structured Interviews – enable a wider remit and data gathering situation, too focused a strategy from the beginning could narrow and reduce the effectiveness of the investigation.
- Four open-ended questions, based on the framework but contextualised for the problem at hand. Each question was divided into three: A scene setting question, another question designed to encourage reflection and a context setting question.

Below is an example of the transformation of questions as they were contextualised by the team of analysts:

Original question from the SST framework	Example of a contextualised question for the case study
"Target": What do I see as the ultimate aim for my work in this situation? Where is the horizon for accomplishing my goals? *Dynamics: What might I be willing or able to do? What assumptions might I be making?*	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 assumptions am I basing this on? C) 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 (educator) in your current situation? (This describes the ideal future situation).

Guide for analysis A

This section gives a brief of the resulting guide that was used for analysis A. Analysis A for participating professional lecturers – focus is set on education of students. The educational process in practice from a professional lecturers point of view.

The finished guide:

1. 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 role as a professional in your current situation? (This describes the current situation).

2. a) What would I like to do? What are the expectation on me? What is possible according to 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).

3. a) Skills I practice – teaching (behaviour). What is possible? What do I miss? b) How do I interact with students for the purpose 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 currently have.

4. 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 (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).

Note: a) represents examples of 'core' questions while b) represents dynamics for the purpose of putting the core question into perspective. The part b. of each question is contextually dependent on part a. of each question. The part b. of each question is to support critical evaluation of the answers from part a.

- Use of Rich Picture – rich pictures allow the emergence of detailed information which serves as a discussion point between the interviewer and interviewee and can in some circumstances encourage reflection and may help to further develop the investigation.
- Interviews recorded – the interviews were recorded with the direct consent of the interviewees. Details gathered within the interview session can easily be forgotten and lost to the understanding gathered. Transcriptions of the interviews enable further levels of reflection once the initial evaluation has been undertaken.

Initial results – 'The reality'

The interview process is well underway, being undertaken by the internal analyst who has made some observations:

- The interview process is surprisingly arduous. No more than three per day could be sensibly undertaken.

- The use of Rich Picture during the interview can be contentious, with some of the interviewees seemingly hostile to its use.
- Instead of a Rich Picture, several of the efforts so far have resulted in a brainstorm / mind-map mix.
- Interviews have varied enormously with one taking almost two hours and another taking 20 minutes.

These observations, while not necessarily surprising or new to an experienced external analyst, highlight some of the areas, which may need to be explained more thoroughly for a less experienced internal analyst.

Conclusion and summary

The current result is that the questions from the SST framework, "Situation", "Target", "Vehicle" and "Road" are contextualised from analysis A for the organisation and problem space. On this the first steps in Analysis A have been taken. Future work will require development and contextualisation of an initial Analysis B to be made on behalf of the department. At this moment the overall plan is that the results of the initial part of Analysis B are to interpreted and described where the descriptions are to be brought back to each individual for modification (through a new round of interviews). Finally the analyst team will make an initial part of evaluation C. The results are to be presented to the department as a whole at a departmental meeting where the purpose is to gain feedback within the existing organizational political arena. This feedback will be drawn upon to finish evaluation C and to finalize a departmental report. Then the intention is to create a guide for a simplified variant of the SST framework for the support of SME's.

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