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In this issue:

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A Soft System Approach to the Design of Online Case Method Instruction

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Abstract

Technology has changed and continues to change the manner in which today's organizations manage business. The business of education is certainly not immune to technological change. Decisions concerning what, if any, technologies to incorporate into teaching require an understanding of the requirements of learning as well as the capabilities of technology. One approach to developing technological solutions to business problems is the Soft Systems Methodology (SSM) developed by Peter Checkland. This article presents a practical application of SSM to the problem of teaching a distributed case-based course.

Keywords: SSM, soft systems methodology, distributed courses, theory implementation

1. INTRODUCTION

Case method instruction has been widely used in business, legal, and medical education. It is a teaching method that relies on a narrative of a situation to illustrate the course content being studied. The case situation provides a focus for group discussion and serves as a catalyst for insight and study of concepts covered in a course (Olmstead, 1974). There are many advantages to case-based instruction. For instance, the process of reading, analyzing, and resolving a problem along with collaboratively debriefing of multiple alternatives takes students out of a passive role and puts them into a decision-making position (Silverman & Welty, 1990).

Can such a system of online case method instruction be designed and implemented? What are the requirements? Which technology is right for the method? In this study, we intend to explore the conceptualization of an online case method system. Our focus is to apply Soft System Methodology (SSM) as our modeling approach to derive a conceptual model of an online case instruction system. One of the critical success factors in systems development is to understand the environment and the problems associated with it. The challenge is to identify what the problem is and resolve conflicting views of requirements among stakeholders. We chose SSM because it addresses all of these issues in the analysis and requirement determination (Wilson, 2001, p.246).

The primary objective in this paper is to illustrate how SSM helps us gain an understanding of the complex learning system—it is a system where a case instruction method was adopted for use in a computer-mediated environment. To achieve this goal, we structured our paper as follows. First, we introduce the fundamentals of SSM. What are the core concepts of SSM? Following the overview of SSM, we describe the seven stages of inquiry process and their application in the context of this study. In this section, we tried to express many interacting relationships of an online case instruction

system in the form of rich pictures and root definitions. Based on these two representations, we derived the conceptual model for an online case instruction system. In the final section, we highlight some of the contributions of this paper and the next stage of our research.

2. SOFT SYSTEM METHODOLOGY

SSM was first developed by Peter Checkland and his associates at Lancaster University in England (Checkland, 1981). The core concepts of SSM are derived from systems theory. Rather than reducing the phenomena into smaller components for study, SSM seeks a holistic view especially with the interrelations of various parts of the phenomena (Checkland, 1981). Checkland stated that SSM represents a paradigm shift – from optimization to learning, from prescription to insight, and from reductionism to holism (Checkland and Scholes, 1990, p. 15). His methodological premise has its root in the philosophy of 'systems thinking'. Such a notion of 'systems thinking' is characterized by four fundamental properties: emergence, hierarchy, communication, and control. The so-called 'emergent properties' give rise to the whole and are meaningless in terms of the parts which make up the whole. The idea of emergent properties itself implies a view of reality as existing in layers in a hierarchy. Hence, the structure of hierarchy is an important component to the whole (Checkland, 1999, p.81). To complete his notion of system thinking, Checkland added the processes of communication and control. These two processes provide the key condition for adaptability and survival (Checkland, 1999, p.82).

In the book "Soft Systems Methodology in Action", Checkland and Scholes introduced the term 'Holon' which refers to the idea of 'whole' and can be used to understand or create real-world systems. The requirement for something to be holonic is to have properties of emergence, hierarchy, and processes of communication and control (Checkland and Scholes, 1990, p. 23).

Five key points of system thinking framework are summarized as follows (Checkland and Scholes, 1990):

1. The idea of a whole entity with possible emergent properties;
2. The derivation of abstract wholes for comparison against the perceived real world situation;
3. The process of inquiry as a 'human activity system' – a set of activities so connected as to make a purposeful whole;
4. Seven stages in the inquiry process encompassing these activities: recognizing a problem, expressing a problem, defining a problem in the context of 'human activity system', creating system models, comparing models to the real world, debating about changes, and taking actions to improve;
5. Iteration as a part of the learning process when examining real-world situations through human activity.

3. SEVEN STAGES IN THE INQUIRY PROCESS OF SSM

At the core of the SSM are the seven stages of the inquiry process. The seven stages are shown in figure 1 in the appendix. In this section, we apply the seven stages to guide our modeling of an online case instruction class. At each stage, we present figures and models that emerge from the process. These models represent not only our conceptualization of an online case instruction class but also an illustration of the SSM process involved.

Stages 1 and 2

The first and second stages in the SSM inquiry process involve recognizing a problem and expressing it. The problem in this study is how to offer case-based instruction to learners who take classes via a distance education program. A good way for developing and expressing this problem is to use a rich picture to depict the situation of interest as shown in figure 2 in the appendix.

The rich picture helps to identify the context and the stakeholders as shown in a number of cases (Wilson, 2001). For this study, the context is the situation in which a higher educational institution attempts to design and develop an effective approach for the delivery of its distance learning programs to the prospective distributed learners. The chosen approach is to support instructors who experiment with the use of case method instruction in an online classroom. The idea

is to explore the potential of adapting the effective case method and deploying it for use in an electronic medium rather a traditional face-to-face classroom. The primary client here is the university administration who tries to reach out to the community of distant learners. The owner is the school department that is directly affected by the outcome of the proposed system. The initiators include the instructors and the technical support personnel who are actively involved in the design and delivery of the online case instruction. The customers are the distant learners who demand interactivity as well as flexibility and convenience in their education.

Stage 3

From the rich expression of the problem situation as shown in figure 2, we were able to identify the focus of our modeling process – the online case instruction delivery system. The main objective for the third stage in SSM is to derive a root definition that captures the core purpose of the relevant system. The core purpose normally involves a transformation process in which some form of input is changed into some new form of output as suggested in the CATWOE mnemonic (Checkland, 1990, p. 35).

C **'customer'**: the beneficiary of the transformation

A **'actors'**: those who would do the transformation

T **'transformation'**: the conversion of input to output

W **'weltanschauung'**: the worldview that makes this transformation meaningful

O **'owners'**: those who could stop the transformation

E **'environmental constraints'**: elements outside of the system.

CATWOE is a supporting tool that can be used to ensure the proper structure and formulation of concepts. However, it is important to note that CATWOE yields only a model. This model represents how we think about the reality and not necessarily the reality itself (Wilson 2001, p.187). Using CATWOE, we formulate our root definition for the online case instruction as follows:

C **'customer'**: distant learners

A **'actors'**: instructors and technical support personnel

T **'transformation'**:

- State 1 - distant learners lacking the opportunity to engage in real-time discussion and interaction with their peers and their instructor
- State 2 - using computer mediated communication (CMC) technology such as groupware to deliver online case instruction, thus enabling distant learners to participate in a case discussion class at anytime/anyplace (figure 3).

W **'weltanschauung'**: making online case instruction feasible with today's CMC technology and trying to meet the diverse needs of the growing distant learner population.

O **'owners'**: university administrators

E **'environmental constraints'**: communication infrastructure, case materials, technology including computer software and hardware, funding, time, expertise, etc.

The root definition for this project is stated as follows: An online case instruction delivery system is proposed to improve the effectiveness of a distance learning program. This system makes use of computer mediated communication (CMC) technology such as groupware to facilitate and engage distant learners in an online case discussion. It is organized, designed, and carried out by a qualified instructor who is accountable to the university. The system requires the network infrastructure and the CMC technology which are administered and supported by the university computer center and its technical staff. The proposed system is expected to operate according to the requirements and principles prescribed by the university administration.

Based on this root definition, the abstract level of the project can be visualized as shown in figure 3.

Stage 4

Stage four of SSM focuses on the conceptual model that shows essential activities involved in an online case instruction class. While the root definition describes what an

online case instruction class is, the conceptual model shows what it does. The first-level conceptual model for the proposed online case instruction class is shown figure 4.

The activities are described by action verbs as often used in SSM (Checkland and Scholes 1990). These verbs are drawn directly from the root definition in figure 3. The emphasis here is not on "how" but on "what" activities are to be done in the online case instruction class. Figure 5 provides a logical link and interconnection between these activities in the list from figure 4.

This detailed diagram is somewhat similar to a data flow diagram in that it shows some activities to be dependent on the others and some inputs to be needed for the generation of certain outputs. Like the process in a data flow diagram, each of the activities can be broken down following the top-down approach (Checkland, 1999). Hence, more detailed models can be constructed by decomposing each activity recursively with the root definition and conceptual model procedure. For instance, when we decomposed the "carry out" activity into two different activities: discuss in an online mode and discuss in a face-to-face mode, we could derive the next level of conceptual model for discussion in an online mode as shown in figure 6.

Figure 6 shows a sequence of interactions between students and instructor in an online case discussion. Its synthesis is based on the simulation of a typical face-to-face discussion, which normally involves three major components: the study questions require the application of key concepts and examination of relevant issues; the small group work calls for exchanging of ideas and discussing of issues; and the debriefing of the case analysis provides for sharing of various perspectives. However in the proposed online case instruction system, all the interactions are presumed to take place in an electronic medium rather than in a face-to-face setting. The objective here is not to derive exactly how online case instruction is carried out but to represent a particular view that is consistent with the root definition. Hence, these conceptual models are subject to further modification and refinement in the next stages of the SSM.

The next three stages: 5, 6, 7 are closely related to an action research field study that we conducted. Because the analysis of the field study is not yet complete at this point, we can only provide a brief overview of these three stages here.

Stage 5

Stage 5 is a crucial stage in which the conceptual models derived are to be compared and contrasted with the complex world of reality (Checkland and Scholes, 1990; Checkland, 1999). It is at this stage that relevance (or not) of the systems chosen will become evident. Also, insight from this stage helps reveal ideas or pointers for changes and improvement to the proposed systems. There are a number of ways of structuring the comparison. In this study, we select action research to capture and reflect a panoramic view of what actually happened in an online case instruction class and then focus on a few critical episodes that reveal interesting insights for the comparison between our conceptual models and the real world situation.

Stage 6

The main purpose of stage 6 is to bring about improvement to the situation. It is achieved by way of communicating and debating changes needed. The discussion of stage 6 will be presented in a forthcoming paper with the report of our field study.

Stage 7

Following the debate of changes is the final stage in SSM – taking action. The focus now shifts to how to take action to improve the situation or problem. A whole new cycle of SSM can begin. Again, the details in stage 7 will be presented in our forthcoming complete research report.

4. CONCLUSION

To make distance learning effective, we need to have a teaching method that brings into the classroom real-world situations and allows students to engage online in the process of analysis and problem solving. The approach that we proposed here is to take a case method and adapt it for an online environment. This study follows a systematic step to model an online case instruction system through SSM.

Rose (1997) described that SSM may serve as a problem structuring tool, a good-fit research tool, a theory testing and generation tool, or a directive tool. In this study, we applied SSM as a modeling approach for the design of an online case-based instruction class. The application of SSM enables us turn a complex situation into a series of comprehensible models that can be implemented. SSM provides us a lens through which we can conceptualize and understand the essence of an online case instruction system.

Our proposed models based on SSM offer a unique perspective in which they reflect the phenomenon from a holistic systems thinking perspective, which we then compared against the real world situation for further enhancement. At the end, we were able to derive models that provide an abstract understanding of what an online case instruction system is, identify who are stakeholders, highlight what the key activities are and focus on what next steps are need to achieve them.

As we have shown in this paper, SSM works best "not as a prescription to be followed but as an explicit framework of guidance for sense making, leading to processes which can be both described and recovered" (Checkland and Holwell 1998, p.169). From our illustration of analyzing an online case instruction system, it is shown that SSM is a well-developed methodology especially in dealing with ill-structured systems. Its philosophical underpinnings are interpretative and hence best address issues of qualitative nature. Its systemic or holistic approach makes it suitable for dealing with complex human situations because it can explicitly display differing stakeholder views and reconcile them through the concept of Weltanschauung (world view). Its epistemological premise for comparing systems models with reality is a powerful validating measure that is independent from any biased perspective or specific goals (Rose and Haynes 1999).

In the next stage of our research, we intend to provide an in-depth account of the comparison and contrast between the conceptual models derived from SSM and the complex world of reality observed in an actual classroom. The results will potentially shed more light on what happened in an actual online case discussion, and yield more insights on what are need to improve the setup, design, and implementation of an online case instruction system.

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Appendix

Figure 1: The conventional seven-stage model of SSM
(adopted from Checkland and Scholes, P. 1990 and Checkland, 1999).

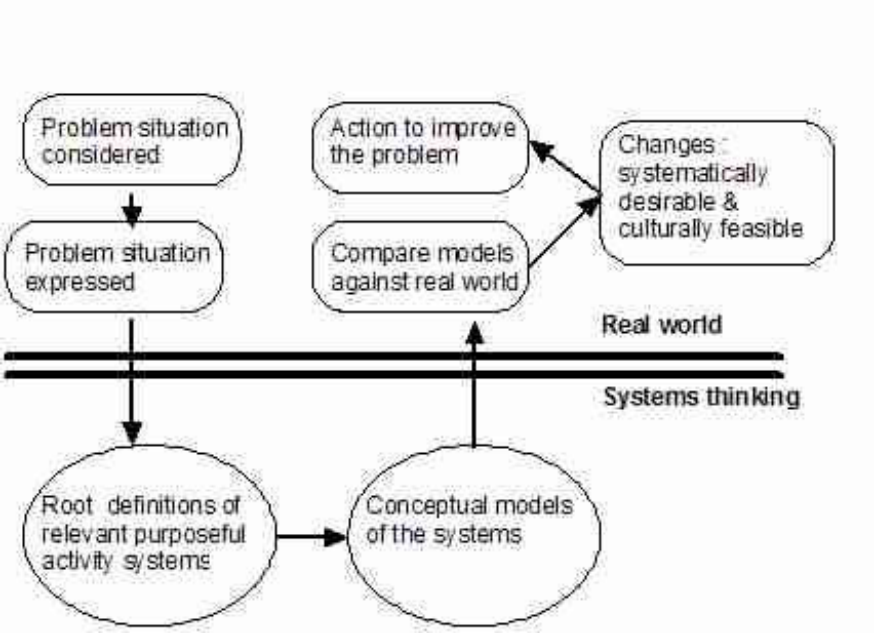

Figure 2: Rich picture of an online case instruction system

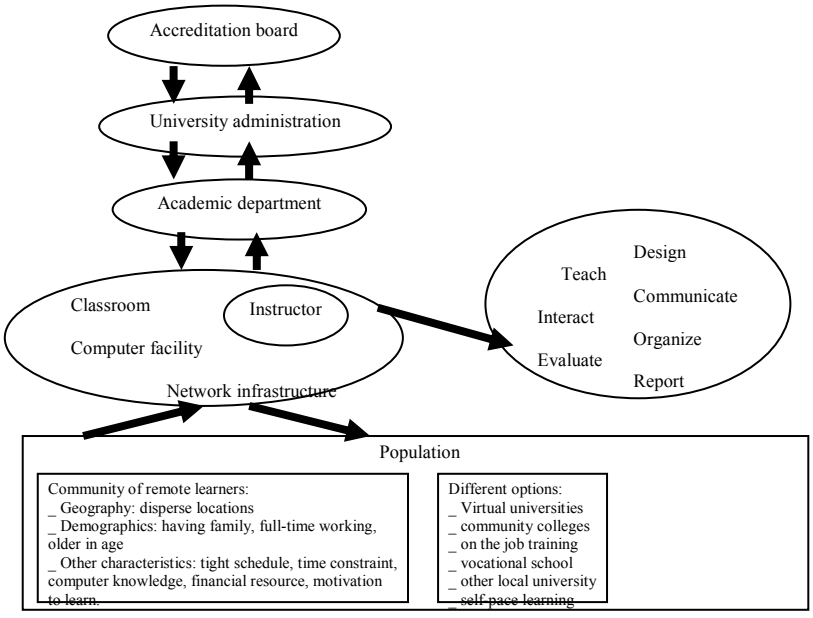

Figure 3: Conceptual model of the system for the delivery of an online case-based instruction according to the root definition.

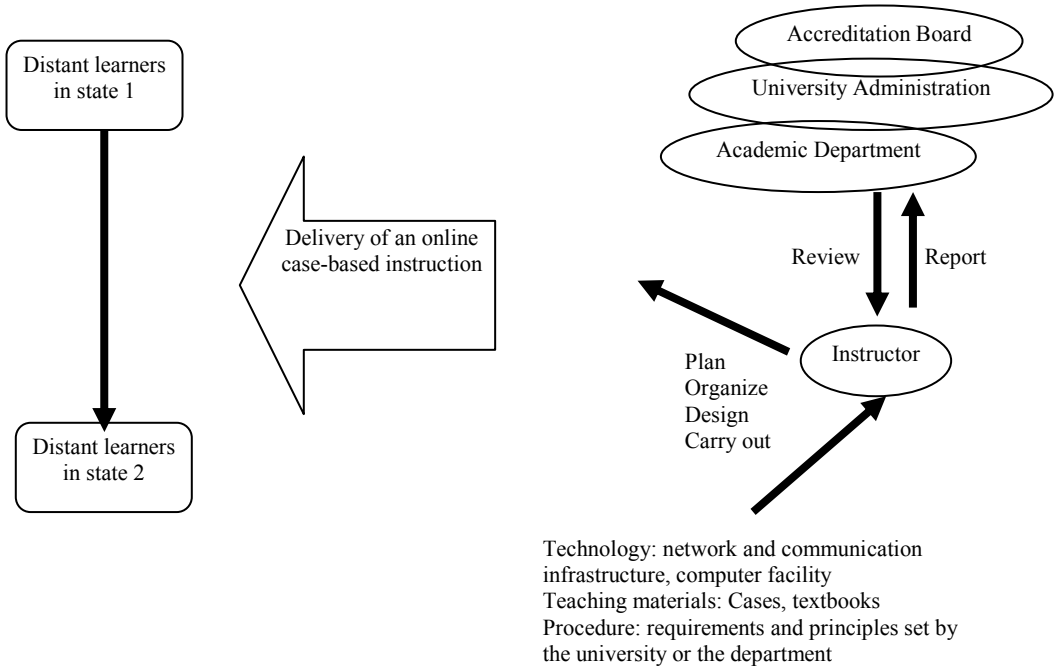

Figure 4: The list of major activities in an online case instruction

ACTION	**FOCUS**
Recognize	The need and the opportunity for teaching an online case instruction class
Identify	The appropriate technology to support an online case instruction
Plan	The structure of the course and the integration of technology into the course
Design	The organization of content and method of facilitation and discussion
Carry out	Instructing and supporting learners in either a traditional classroom or from disperse remote locations
Evaluate	The performance of learners and the effectiveness of the online case instruction
Report (monitor and control)	The progress and feedback to the school department and the university administrator
Review (monitor and control)	The online case instruction and instructor performance.

Figure 5: The first level conceptual models of an online case instruction

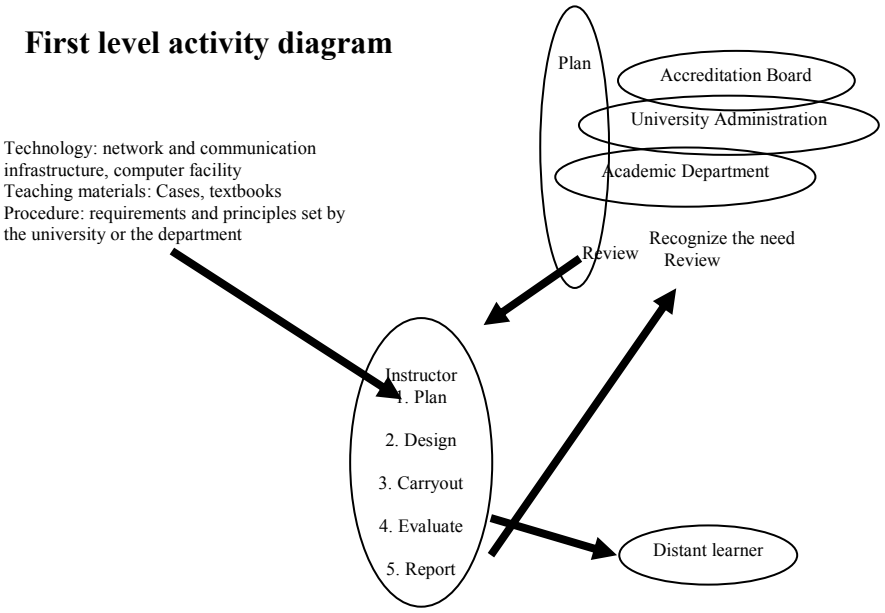

Figure 6: The detailed-level conceptual model of the "carry out" activity.