

Association for Information Systems AIS Electronic Library (AISeL)

UK Academy for Information Systems Conference
Proceedings 2012

UK Academy for Information Systems

Spring 3-27-2012

The Work System Method And Soft Systems Methodology – Some Comparisons

Olga Petkova

Central Connecticut State University, petkovao@ccsu.edu

Doncho Petkov

Eastern Connecticut State University, petkovdon@yahoo.com

Follow this and additional works at: <http://aisel.aisnet.org/ukais2012>

Recommended Citation

Petkova, Olga and Petkov, Doncho, "The Work System Method And Soft Systems Methodology – Some Comparisons" (2012). *UK Academy for Information Systems Conference Proceedings 2012*. 40.
<http://aisel.aisnet.org/ukais2012/40>

This material is brought to you by the UK Academy for Information Systems at AIS Electronic Library (AISeL). It has been accepted for inclusion in UK Academy for Information Systems Conference Proceedings 2012 by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

The Work System Method and Soft Systems Methodology – Some Comparisons

Olga Petkova

Department of Management Information Systems, Central Connecticut State
University, New Britain, Connecticut 06050, USA, petkovao@ccsu.edu

Doncho Petkov

Department of Business Administration, Eastern Connecticut State University,
Willimantic, Connecticut 06226, USA, petkovd@easternct.edu

Abstract

This paper provides a brief comparison between Soft Systems Methodology (SSM) and the Work System Method (WSM) by S. Alter. The latter is a relatively recent systems approach specifically developed with the needs of the Information Systems field. It focuses on previous criticisms towards SSM and suggests how WSM might compare against them. Those comparisons are related to the difference between IS methods and SSM in their philosophical foundations; the ability of SSM to encourage broad stakeholder participation; the ability of SSM to support decision making and the initiation of action in a systemic intervention; the difficulty in transitioning from SSM to IS development techniques and the applicability of SSM to bridge the gap between technical and social aspects of IS development. The insights in the paper might be useful for planning and justifying the use of SSM and WSM in an Information Systems project.

Keywords: Work System Method, SSM, New and alternative approaches to IS

1. Introduction

Checkland's Soft Systems Methodology (SSM) has had a significant impact on the information systems (IS) discipline (see Mingers and White, 2010; Stowell (1995), Checkland, 1999). Another socio-technical approach in IS, the Work System Method (WSM) (see Alter 2006, 2010) is being developed over the last ten years and is gaining acceptance by IS researchers. Both methodologies have been applied independently of each other and have recently been cited together in some articles but not in terms of combining them (see Gregory et al., 2012; Ferreira et al, 2012; Oinas-Kukkonen, 2010). The potential of a joint application of WSM and SSM for specific software project contexts was investigated in Petkov et al. (2012). As a continuation of that work, this short research in progress paper aims at providing some comparisons between the two socio-technical approaches with respect to their applicability to IS development. To the best knowledge of the authors there are no similar previous attempts. Given the long history and popularity of SSM such a comparison may bring some insights into ways in which the Work System Method may contribute better to IS development or for the joint application in IS development of both if possible. This paper contributes to IS development and theory by showing how WSM features against some criticisms that have been raised earlier towards SSM in the IS literature. The next section provides a brief introduction to SSM and WSM which is then followed by an outline of several problematic issues related to the use of SSM in IS development and analysis of the Work System Method against those. The conclusion summarizes the potential contribution of the paper for IS theory and practice.

2. A brief overview of SSM and WSM

Both SSM and WSM assume a broader view of Information Systems development that deals with issues beyond technical artifacts: one is the development and implementation of human activity systems (Checkland, 1999) and the other is IT-reliant work systems (Alter, 2008) that involves in a similar way human participants.

Soft Systems Methodology and IS development

The relevance of SSM for Information Systems was widely investigated (see Mingers and White (2010)). The foundations of SSM as an interpretive systems approach are analyzed well in Jackson (2003). The original seven stage model of SSM (known as SSM Mode 1) evolved in the late 1980s to SSM Mode 2, published in Checkland and Scholes (1990). It focuses on the technical analysis and on a cultural and political analysis, thus extending the original SSM approach. Summarizing the recent understanding of SSM for gaining insight into a situation of concern, Checkland and Winter (2006:1436) summarize the “four ways of doing this that emerged:

- Represent the situation in Rich Pictures (Checkland and Scholes, 1990, 44-47);
- Carry out an analysis of the social characteristics of the situation ('Analysis Two': Checkland and Scholes, 1990, 44-50; Checkland, 1999, 16-19);
- Carry out an analysis of the disposition of power in the situation ('Analysis Three': Checkland and Scholes, 1990, 44-51; Checkland, 1999, 19-20);
- Carry out an analysis of the intervention itself ('Analysis One': Checkland and Scholes, 1990, 44-48; Checkland, 1999, 19-20”.

The complexities of the relationship between the social, organizational, and cultural context and the information system can be addressed through SSM, which facilitates a learning process that allows its users to develop a more comprehensive understanding of the situation under study. Often SSM can be combined with other approaches in order to gain understanding of these complex situations. For example, Petkov et al. (2007) dealt with theoretical and practical issues in mixing SSM and other systems approaches in three large projects in the Information and Communications Technologies sector.

The work system method for understanding and developing Information Systems

According to Alter (2006), the Work System Method provides a rigorous but non-technical approach to any manager or business professional to visualize and analyze systems related problems and opportunities. Further Alter (2008:451) defines a work system as a system in which human participants and/or machines perform work (processes and activities) using information, technology, and other resources to produce specific products and/or services for specific internal or external customers. On the other hand, according to him, an Information System is a work system whose processes and activities are devoted to processing information, that is, capturing, transmitting, storing, retrieving, manipulating, and displaying information. In the case when the information system overlaps significantly with the work system that it supports, it is labeled as IT reliant work systems (see Alter, 2008).

The work system method (Alter 2006) is based on two major components: the work system framework, representing a static description of the work system, showing how a work system operates at a particular point in time and the work system life cycle, focusing how a current or

proposed work system evolves over time. Detailed definitions of the elements of the work system framework are presented in Alter (2006, 2008).

Alter (2006) introduces a three step process for the analysis of a work system: Identify the system and problems; Analyze the system and identify possibilities; Recommend and justify changes. We may note a similarity between this process and the rational actors approach to decision making known from Operational Research. The WSM provides the opportunity to conduct the analysis of a work system at three levels of detail depending on the actual purpose and granularity of analysis.

More details and examples of applying WSM analysis at different levels during the three process steps (as defined earlier) are provided in Alter (2006). A more recent development in WSM theory are the WSM metamodel introduced in Alter (2010). The metamodel creates a bridge between the summary description of a system and the more detailed models of the subsystems that are developed during systems analysis and design and a link between socio-technical business analysis and the technical analysis by IS professionals (Alter 2010).

In terms of philosophical underpinnings, WSM is based broadly on pragmatism. Further theoretical analysis of the epistemology of WSM, while desired, is beyond the scope of this paper.

The next section will explore previous criticisms of SSM in the literature and whether the WSM fits these criticisms.

3. Some problematic issues in using SSM in combination with IS development approaches and an evaluation of WSM against those

The following is an evaluation of the Work System Method along the lines of a brief summary of previous criticisms towards SSM in IS development. Those are identified as problematic issues for the combined use of SSM with IS development approaches and labelled for convenience as P1, P2 etc.

P1: *SSM (as an interpretive approach) and IS embodied different and conflicting epistemologies.* This issue was raised first by Mingers (1995). The use of SSM in combination with traditional IS development methods has been explored by Stowell (1995), Mingers and White (2010) and others. A recent example of work on combining SSM and UML is presented in Salahat and Wade (2012). The combination of IS methods and SSM faces the issue of paradigm incommensurability which has been explored without a closure in the field of systems thinking for over 20 years. On the other hand the WSM according to Alter (2008) is based broadly on pragmatism and hence we may conclude that philosophically it is compatible with traditional IS development approaches.

P2: *The processes entailed by SSM do not prescribe a method of encouraging broad participation.* According to Jackson (2003): soft systems thinkers (and we may add IS developers) play down the obstacles to full and effective participation and assume that there is an overarching goal guiding the interests of the stakeholders even if they are pluralist in nature. It fits simple and complex pluralist problem situations in the System of Systems Methodologies by Jackson and Keys (see Jackson, 2003). Elsewhere, we have concluded that the Work System

Method fits both unitary and simple-pluralist problem situations in the System of Systems Methodologies by Jackson and Keys (see Petkov et al., 2012). On the basis of our experience with applying WSM and doing research in it we may note that the WSM assumes implicitly that there are no strictly opposing differences in the interests of the stakeholders in IS development. Thus in a way similar to SSM, the Work System Method assumes that participation is implied and hence the criticism by Jackson is applicable to it as well.

P3: *Initiating action and support of the choice phase in Simon's model of decision making is unclear in SSM*, an issue raised originally in Jayaratna (1994). The lack of means in SSM for supporting action and decision making has led to the need to combine it with Multi Criteria Decision Making methods for supporting the “choice phase” in decision making following Simon's model (see Petkov et al., 2007). We may note that the same criticism applies to WSM as the issue of taking action or support for the choice phase of decision making on a particular design aspect is also implied without any provision for supporting it.

P4: *No reasoning is provided on how an SSM analysis may be reduced to an Information Systems development techniques* from structured analysis and design or from UML, an issue pointed first by Mingers (1995). A review on this issue and a practical case study showing how it was implemented is presented in Sewchurran and Petkov (2007). Ferreira et al (2012) and others cite both SSM and WSM as requirements elicitation techniques that can contribute to more accurate requirements elicitation but do not investigate that further. Recent work on linking WSM to use case modelling (Alter et al., 2009) and the metamodels in WSM introduced in Alter (2010) are demonstrating attention towards the transition from WSM analysis to IS modelling.

However the work in this direction needs further refinement and more field testing before deriving a strong conclusion.

P5: *Bridging the gap between social and technical aspects of IS development through SSM is not easy.* SSM can be used as a learning framework in IS development for bridging the gap between social and technical aspects of IS development both in the original seven stage (Mode 1) model and with its mode 2 process incorporating the technical, cultural and political analysis. However very few published accounts exist to demonstrate the process of creating a good shared understanding of the technical and social features of the problem situation in practical projects (among the few exceptions can be mentioned Champion, Stowell and O’Callaghan, 2005). The WSM pays extensive attention to bringing the gap between the analysis of the social and technical aspects of a work system (see Alter, 2010). However the WSM is not claiming explicitly to be providing any particular framework for organizational learning. Deciding whether it is more successful in practice than SSM requires further field work.

4. Conclusion

The short paper provided a brief review of the development and of some research issues in soft systems methodology and the work system method. It focuses on previous criticisms towards SSM with respect to IS development and suggests how WSM might compare against them. Thus the difference between IS development methods and SSM in their philosophical foundations is not observed when we consider IS and the WSM. We found a similarity between SSM and the WSM in their weakness in encouraging broad stakeholder participation in IS development. Another similarity was the inability of SSM and WSM to support decision making and the

initiation of action in a systemic intervention or in an IS development project. There is some evidence (however it requires further support data from IS practice) that the WSM is less prone to the difficulty in transitioning from SSM to IS development techniques. We may conclude also that the WSM has a better overall potential than SSM with respect to ability to bridge the gap between technical and social aspects of IS development. The insights in the paper might be useful for planning and justifying the use of SSM and WSM in an Information Systems project.

We may conclude that the two socio-technical approaches that are the focus of the analysis in this paper have certain differences in their philosophical assumptions and in their possible use in developing IS applications. When using WSM in complex pluralist problem situations, the analysts may consider augmenting existing techniques within WSM with elements of SSM such as Rich Pictures in order to deal more effectively with the plurality of stakeholder interests and the related cultural and political aspects of the problem. This is in line with the suggestion in Alter (2006) that other techniques should be used in conjunction with WSM whenever appropriate. Besides the practical value for IS development of the findings from this paper linked to combinations of WSM, SSM and IS development approaches in software projects, its findings are relevant theoretically also to systems thinking applied to software development as the WSM was not compared previously against SSM.

References

- Alter, S. (2006). *The work system method: connecting people, processes, and IT for business results*. Work System Press, Lakspur, CA.
- Alter, S. (2007). Service system fundamentals: work system, value chain, and life cycle. *IBM Systems Journal*, 47(1), 71-85.

- Alter, S. (2008). Defining Information Systems as Work Systems: Implications for the IS Field. *European Journal of Information Systems*, 17(5), 448-469.
- Alter, S. (2009). Project Collaboration, Not Just User Participation, *Proceedings of the Fifteenth Americas Conference on Information Systems*, San Francisco, California August 6th-9th 2009.
- Alter, S. (2010). Bridging the Chasm between Sociotechnical and Technical Views of Systems in Organizations, *Proceedings of ICIS 2010, the 31st International Conference on Information Systems*.
- Champion, D., Stowell, F. & O'Callaghan, A., (2005). Client-Led Information System Creation (CLIC): navigating the gap, *Information Systems Journal*, 15 (3), 213-231.
- Checkland, P. (1999). *Systems thinking, systems practice. Includes a 30 –year retrospective*, Wiley, Chichester.
- Checkland P. & Scholes, J. (1990). *Soft Systems Methodology in Action*, Wiley, Chichester.
- Checkland, P. & Holwell, S. (1998). *Information, Systems and Information Systems*. Wiley, Chichester.
- Checkland, P. & Winter, M. (2006). Process and content: two ways of using SSM. *Journal of the Operational Research Society*, 57, 1435–1441.
- Gregory, M., Kehal, M, & Descubes, I. (2012), Mentored action learning applied to personal knowledge management - a research in progress, paper presented at *UKAIS 2012*, Oxford University, UK.
- Ferreira, N., Santos, N, Machado R. J. & Gašević, D. (2012). Derivation of Process-Oriented Logical Architectures: An Elicitation Approach for Cloud Design, in Dieste, O., Jedlitschka, A. and Juristo N. (Eds.) *Proceedings of PROFES 2012*, Lecture Notes in Computer Science No 7343, Springer Verlag, Berlin-Heidelberg, 44–58.
- Jackson M.C. (2003). *Systems thinking: creative holism for managers*, Wiley, Chichester.
- Jayaratra N. (1994). *Understanding and Evaluating Methodologies*, McGraw Hill, London.
- Mingers, J. (1995). Using soft systems methodology in the design of information systems. In F. Stowell (Ed.), *Information systems provision: The contribution of soft systems methodology*, 18-50. London: McGraw-Hill.
- Mingers, J. & White, L. (2010). A review of the recent contributions of systems thinking to operational research and management science, *European Journal of Operational Research*, 207 (3), p.1147, Dec 2010
- Oinas-Kukkonen, H. (2010). The Discipline of Information Systems: A Natural Strategic Alliance for Web Science, *Web Science Conf. 2010*, April 26-27, 2010, Raleigh, NC, USA

- Petkov, D., Petkova, O, Andrew, T. & Nepal, T. (2007). Mixing Multiple Criteria Decision Making with soft systems thinking techniques for decision support in complex situations. *Decision Support Systems*, 43, 1615-1629.
- Petkov, D., Alter S., Wing J., Singh, J., Petkova O., Andrew, T. & Sewchurran, K., Project Contexts and the Possibilities for Mixing Software Development and Systems Approaches, in Mora, M., Steenkamp, L. et al (eds) *Research Methodologies in Systems/Software Engineering and Information Systems: Philosophies, Methods and Innovations*, IGI Global 2012, 360-375.
- Salahat, M. & Wade, S. (2012), Pedagogical Evaluation of a Systemic Soft Domain-Driven Design Framework, paper presented at *UKAIS 2012*, Oxford University, UK.
- Sewchurran, K and Petkov, D., Mixing Soft Systems Methodology and UML in Business Process Modeling, in Mehdi Khosrow-Pour (ed), *Best Practices and Conceptual Innovations in Information Resources Management: Utilizing Technologies to Enable Global Progression* IGI Global. 82-102. 2009
- Stowell, F. (ed.) (1995). *Information systems provision - The contribution of soft systems methodology*. McGraw-Hill Publishing Co., London.