

On the Suitability of Soft Systems Methodology and the Work System Method in Some Software Project Contexts

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ABSTRACT

This paper proposes the use of the System of Systems Methodologies (SOSM) framework by Jackson and Keys for mapping of diverse software project contexts analyzed previously in the software development literature. In addition it presents an evaluation of the suitability of Soft Systems Methodology by Checkland and the Work System Method by Alter for those specific situations within SOSM. Thus we extend the work by Bustard and Keenan and by Alter and Browne on software project contexts that may lead to better tailoring of software development processes by mixing methods within a particular project.

Keywords: Soft Systems Methodology (SSM), Software Development, System of Systems Methodologies, Systems Thinking, Work System Method

INTRODUCTION

Systems approaches such as Checkland's Soft Systems Methodology (SSM) have influenced information systems development (see Mingers & White, 2010; Checkland, 1999; and Petkov, Edgar-Nevill et al., 2008). They have been

recognized also in Software Engineering and in particular by Boehm (see Boehm, 2006; Lane et al., 2008). Following Mingers and White (2010) and Jackson (2006), we recognize that the complexity of problem situations in software development rarely can be addressed by a single whole systems approach. The use of SSM in combination with traditional IS development methods has been explored by Stowell (1995),

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Mingers and White (2010) and others. Possibilities for combining SSM with IS methodologies raise a number of unanswered theoretical and practical questions whose discussion is outside the scope of the paper.

Meanwhile the Work System Method (WSM) (see Alter, 2006, 2010) emerged over the last decade as a new systems approach within the field of Information Systems. WSM is a rigorous but not technically complicated attempt to bring together systems thinking with the needs of software requirements analysis. It is gaining wider acceptance within the IS research community (see Petkov et al., 2011). However, to the best of our knowledge its application in conjunction with Soft Systems Methodology has not been discussed in the literature, even though aspects of WSM have been applied in projects performed by student programmers in several academic settings in relation to needs of real world clients.

This paper's goal is to explore the nature of software project contexts within the System of Systems Methodologies (SOSM), a well-known framework in the field of Systems Thinking (for more details see Jackson, 2003) and the positioning of SSM and WSM within SOSM. Thus it potentially provides insights about the applicability and limitations of each of those methods, and also ways in which they might be used together within a single project.

The current research is motivated by the possibility that SSM, and WSM might be used together in the same project under some circumstances. This paper's goal is to provide insights about the applicability and limitations of each of those methods, and also ways in which they might be used together within a single project.

Methodologically this research is based on elements from the body of knowledge of systems thinking applied to software development. We analyze SSM and the Work System Method with respect to their positioning within the System of Systems Methodologies (SOSM), an "ideal-type" grid of problem contexts proposed originally in the systems literature in 1984 by

Jackson and Keys (see Jackson & Keys, 1984; Jackson, 2003). The latter is a tested framework for relating particular systems approaches to certain problem contexts (Jackson, 2003). We map software and system project contexts onto the SOSM after an analysis of the software development contexts discussed by Bustard and Keenan (2005) and the typology of systems analysis and design (SA&D) contexts proposed by Alter and Browne (2005).

This paper contributes to systems theory by positioning SSM and WSM in relation to problem contexts mapped in the dimensions of the System of Systems Methodologies. The practical contribution to software development involves exploring the mapping of software development contexts in the SOSM and suggesting possibilities for mixing the above methodologies in particular project contexts. These contributions provide support for possible tailoring of software development processes for particular project contexts, thereby extending the work by Bustard and Keenan and also by Alter and Browne on developing a typology of software development contexts.

ON THE SUITABILITY OF SSM AND WSM TO SOFTWARE AND SYSTEM DEVELOPMENT

We explore two software and system development methodologies in turn: SSM, WSM. Throughout this section remember the distinction between software development and system development. Software development is literally about developing software. System development can be construed in a broader way to mean the development and implementation of human activity systems (Checkland, 1999) or IT-reliant work systems (Alter, 2006, 2008) that contain human participants, and therefore are not purely technical artifacts. The distinction between systems as sociotechnical systems and systems as completely automated technical systems is sometimes overlooked in discussions of analysis and design

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