

A Critical Heuristics Approach for Approximating Fairness in Method Engineering

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ABSTRACT

Information system (IS) development projects often fail because of unclear wishes and needs of concerned parties, or because the developed IS or the used system development method (SDM) is not fully supported by concerned parties. This study investigates how stakeholders that are concerned with the SDM are identified and involved in the engineering of such methods. The critical systems heuristics (CSH) method can be used to identify stakeholders in method engineering, along with their concerns. CSH is meta-modelled and reviewed in 12 interviews with practitioners in software development, system engineering, and consultancy in order to evaluate its applicability in an organizational context. Subsequent modifications made to the contemporary CSH method are validated in an expert validation session. The resulting evolved CSH method enables method engineers to take into account their challenges and contexts, and the method can be instantiated for organizations that engineer methods for internal or external use.

KEYWORDS

Boundary Critique, Critical Systems Heuristics Method, Design Science, Fairness, Inclusivity, Meta Modelling, Method Engineering, Stakeholder Involvement

INTRODUCTION

The engineering of new methods and the customizing of existing methods for software development is a complex process that concerns a variety of actors. Examples of these actors are method engineers, software developers, system engineers, top management, and clients. Similar as with the development of systems, actors can be divided in two groups (Ulrich, 1983): actors that are involved in the process of engineering the method and thus have an influence on the outcome of the engineering process (1), and actors that are not involved in the process of engineering the method but are affected by the method (2). Software developers and clients belong to this first group, and they may have certain expectations of the method engineer (Nuseibeh et al., 1996). As a result, they are more frequently involved in the process of designing the method. The second group is often bypassed, but may have the costs and feel the side-effects of the process of designing the system (Ulrich, 1996).

TERMS AND DEFINITIONS

Research has shown that the benefits of involving stakeholders include an improvement in the quality of decisions made and better relationships among stakeholders in the process of making

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decisions (Beierle & Konisky, 2001). In this research, the roles that are included in the definition of *stakeholders* are the roles that can be mapped on the involved and affected actors mentioned above, in an organizational context. In the case of a software development organization that decides to replace an existing software product with a new product, the involved stakeholders are management and software developers, while their clients are the stakeholders that are only affected and not involved. Competitors of the software development organization are not part of the definition of stakeholders.

In order to improve stakeholder involvement in method engineering, this research uses the Critical Systems Heuristics (CSH) method (Ulrich, 1983). The heuristics, that were originally intended as reflective practice for practical philosophy and systems thinking (Ulrich, 2005), are mapped on method engineering practices. The objective of the CSH method is to be used in the design of a purposeful social system, where a purposeful social system is self-reflective with respect to its own normative implications, seen from the point of view not only of the involved but also of the affected (Ulrich, 1983). This research uses the *method engineering* definition as formulated by Brinkkemper: method engineering is “the engineering discipline to design, construct and adapt methods, techniques, and tools for the development of information systems” (Brinkkemper, 1996, p. 276). This definition for method engineering is used throughout the entire paper. In this context, a *method* is defined as an approach to perform a systems development project, based on a specific way of thinking, consisting of directions and rules, structured in a systematic way in development activities with corresponding development products (Brinkkemper, 1996, pp. 275-276). In an organizational context, the terms method and business process are used interchangeably because the role of method engineer is often performed by process managers or process designers. A *business process* is defined as “a sequence of activities which transform inputs into outputs” (Lindsay, Downs, & Lunn, 2003, p. 1016). In comparison to the definition of a method, the definition of a business process is more abstract when compared to how a method is defined here. However, a method is in fact also a sequence of activities which transform inputs into outputs. Therefore, a method can be thought of as a specific type of business process as it describes how a systems development project can be performed by executing development activities and development products as a result.

MOTIVATION

The main objective of this research is to enhance the method engineering process in such a way that it involves all stakeholders, intending to improve the overall fairness of method engineering. In this context, ‘fair’ means that all people that are in some way affected by the method to be designed or redesigned are identified, in order for them to be involved in the design process. The main research question therefore is: “*How can the Critical Systems Heuristics method be utilized to realize inclusive stakeholder involvement in the engineering of purposeful system development methods?*”

People tend to adapt processes rather than to use them as they were initially designed (Alter, 2015), so another objective of this research is to ensure that methods designed with the CSH method, and also the CSH method itself, do not restrict the method users, but rather extend their capabilities.

To answer the main research question and achieve the two specified objectives of this research, the following sub-questions are defined:

- SQ1: What are the strengths and weaknesses of the Critical Systems Heuristics method according to theory?
- SQ2: What are the strengths and weaknesses of the Critical Systems Heuristics method in practice?
- SQ3: What are the shortcomings in method engineering regarding stakeholder involvement?
- SQ4: How can the Critical Systems Heuristics method be modified in order to be more applicable in a method engineering context?
- SQ5: How can the modifications to the Critical Systems Heuristics method resolve the shortcomings in method engineering regarding stakeholder involvement?

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