Navigating the Methodology Jungle – The communicative role of modelling techniques in information system development

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1 Introduction

In this position paper, we claim that more attention should be paid to the communicative role of modelling techniques in information system development. The communicative role of a modelling technique refers to it providing a language for communication between the different actors involved in system development, about particular aspects of the system being developed.

When using the term modelling technique we (roughly) refer to the combination of (1) a modelling language/notation and (2) procedures/guidelines for the creation of models. This use of the term modelling techniques, is in line with definitions that can be found in e.g. [OHM ‘88, Avi95, BMS98]. Our understanding of model (and its model description) is rather broad. In line with [FVSV ‘98], we consider a model to be a purposely abstracted, clear, precise and unambiguous conception of some domain. Given a modelling technique, a model description (or representation) can be produced using the syntactic constructs of the modelling language provided by the technique, while following its modelling procedures/guidelines. The underlying modelling language could be a formal language (i.e. a language with a well-defined semantics) or an informal language. It could have a one-dimensional representation style (e.g. natural language, mathematical languages, etc.), or a multi-dimensional representation style (e.g. a graphical modelling language, an animation based language, etc.)

During the development of an information system, practitioners quite often select modelling techniques rather ad hoc, without explicit reasoning as to the suitability of the technique to the (communicative) tasks at hand. As a result, “accidents” in the selection of these techniques do indeed occur. For example, a modelling technique which is well suited to the modelling and communication of functionality and structure of software (e.g. UML) is not likely to be suitable to communicate the impact which future system may have on the business processes using it, to
business management. This may sound logical and maybe even trivial; nevertheless, selection of techniques that are inapt for the task at hand does occur in practice [BPH04].

Meanwhile, scholars have been produced numerous modelling techniques [Bub86, AW91, Avi95, BMS98], adding to the multitude of modelling techniques practitioners can select from. The authors of this paper have themselves contributed their fair share of modelling techniques [BHW91, HW93, BBMP95, PW94, CP96, CHP96, HVH97]. The resulting plethora of techniques has, in the past, already been referred to as “a methodology jungle” [Avi95]. This jungle leaves developers of information systems with the burden of selecting modelling techniques that are apt for the modelling/communication tasks at hand. Quite often, these modelling techniques are explicitly based on the (communicative) requirements posed on them as a result of the roles they are destined to play in information system development.

The selection of modelling techniques from the “methodology jungle” has been addressed before by other scholars. In [HW92, HP98, HR00], it was argued how the “methodology jungle” may be chopped down by formalising both syntax and semantics of the modelling languages underlying these techniques. This observation has inspired us, in our former work on modelling techniques, to at least provide these techniques [BHW91, HW93, BBMP95, PW94, CP96, CHP96] with a formal underpinning. Even though a formalisation of syntax and semantics may indeed lead to some clearings in the jungle, it does not provide insight into the utility [PVSH04] of a modelling language with regards to a modelling task at hand. Developers are still left with the task of finding an apt modelling technique to fit the goals of their modelling task.

The field of method engineering [Bri96, RB96], does aim to provide a better rationalisation of the selection of so-called method fragments that are suitable to a situation at hand, where a (part of a) modelling technique should be regarded as a method fragment. This has resulted in complex and layered modeling approaches to analyse and model organisations and information systems. Even though method engineering does provide guidelines [Bri96] for the selection of method fragments (such as modelling techniques), it does not provide a deep study into the role of modelling techniques as a means of communication.

In this paper, we hypothesise that more attention needs to be paid to the communicative role which modelling techniques play during information system development, and furthermore, that criteria for selection need to be developed. Having such an understanding, would contribute towards improved selection (and construction) of modelling techniques for specific (communicative) tasks during information system development. In the remainder of this position paper, we undertake a first exploration in building up a fundamental understanding of this communicative role. In doing so, we take the view that information system development can be regarded as a communication-driven knowledge transformation process, and that a modelling technique’s main purpose is to provide a means (language) for communication (sharing of knowledge).

What we present in our exploration is a (still loosely coupled) conceptual framework to reason about the role of modelling techniques as a communication means in information system development. In figure 1 we depict the conceptual framework as it stands at present1. Work on refinement, integration, instantiation, and validation of this framework is underway, but we would very much welcome additional efforts to explore and further this field of research.

2 Development Community

Given a focus on communication, it is important to identify the elements that can play a role in the communication taking place during system development. We will make a distinction between elements that can be regarded as doing the actual communicating and elements that can be regarded as being communicated upon. The former class of elements will be referred to as actors, while the latter class is referred to as representations.

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1 This model has been represented using a refined version [CP96, Pro99] of Object-Role Modelling [Hal01].