

# Chapter IX

## Concepts and Strategies for Quality of Modeling

**Patrick van Bommel**

*Radboud University Nijmegen, The Netherlands*

**Stijn Hoppenbrouwers**

*Radboud University Nijmegen, The Netherlands*

**Erik Proper**

*Capgemini, The Netherlands*

**Jeroen Roelofs**

*BliXem Internet Services, Nijmegen, The Netherlands*

### ABSTRACT

*A process-oriented framework (QoMo) is presented that aims to further the study of analysis and support of processes for modeling. The framework is strongly goal-oriented, and expressed largely by means of formal rules. The concepts in the framework are partly derived from the SEQUAL framework for quality of modelling. A number of modelling goal categories is discussed in view of SEQUAL/QoMo, as well as a formal approach to the description of strategies to help achieve those goals. Finally, a prototype implementation of the framework is presented as an illustration and proof of concept.*

### INTRODUCTION

This chapter aims to contribute to the area of conceptual modeling quality assessment and improvement, in particular by providing some fundamental concepts concerning the quality

of the *process* of modeling, and for structured description of *ways of achieving* quality models. Though operationalization of the concepts and strategies is still limited in this version of the framework, an initial application has been realized and is discussed.

There is a clear link between the work presented and the field of Situational Method Engineering. In particular, the basic idea of combining (patterns of) language related aspects of methods with process related aspects is commonplace in method engineering (see for example Mirbel and Ralyté, 2006; Ralyté et al., 2007). We believe the specific contribution of the current chapter lies in its formal, rule-based nature, and a strong emphasis on combinations of rather specific modeling goals. Also, we focus only on modeling, whereas method engineering in general also covers other activities in systems engineering. Finally, we choose a relatively fine-grained view on the activity of modeling, whereas method engineering generally deals with process aspects only at the level of clearly distinguishable *phases* (i.e. has a more course-grained view, which is not to say that such a view is not a very useful one in its own right).

We first present a process-oriented ‘Quality of Modeling’ framework (QoMo), which for a large part is derived from the established SEQUAL framework for quality of models. QoMo is based on knowledge state transitions, the cost of the activities bringing such transitions about, and a goal structure for activities-for-modeling. Such goals are directly linked to concepts of SEQUAL.

We then proceed in two steps. In the first, generic step (section 5: “a generic rule-based meta-model for methods and strategies”) we consider the underlying generic structure of strategies for modeling. We discuss how QoMo’s goals for modeling can be linked to a rule-based way of describing processes for modeling. Such process descriptions hinge on *strategyframes* and *strategy descriptions*, which may be used descriptively (for studying/analyzing real instances of processes) as well as prescriptively (for the guiding of modeling processes). We present a set of concepts for describing quality-oriented strategies.

In the second, implementation step (section 6: “Implementing goals and strategies in a concrete workflow language”) we consider an example

implementation involving a concrete operational workflow language. We present results of a case study in which a specialized version of our generic framework is applied to the description of an elementary method for requirements modeling, as taught in the 2<sup>nd</sup> year of an Information Science Bachelor’s curriculum. We discuss and exemplify how concepts from the generic framework were used, and in some cases how they were amended to fit the task at hand.

## BACKGROUND

Interest in frameworks for quality and assessment of conceptual models has been gradually increasing for a number of years. A generic overview and discussion can be found in (Moody, 2006). A key framework for analysis of the quality of conceptual models is the SEQUAL framework (Krogstie et al., 2006; Krogstie, 2002; Krogstie and Jorgesen, 2002). This framework takes a semiotics-based view on modeling which is compatible with our own (Hoppenbrouwers et al., 2005a). It is more than a quality framework for models as such, in that it includes not just the model but also the knowledge of the modelers, the domain modeled, the modeling languages, agreement between modelers, etc.; it bases quality assessment on relations between such model-related items, i.e. respects the broader context of the model.

As argued in (Hoppenbrouwers et al., 2005b), in addition to analysis of the quality of models, the *process* of which such models are a product should also be taken into account. We briefly summarize the main arguments here:

1. Though some have written about detailed stages in and aspects of “Ways of Working” in modeling, i.e. its process or procedure (for example, see Halpin, 2001), the detailed “how” behind the activity of creating models is still mostly art rather than science. There

21 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:  
[www.igi-global.com/chapter/concepts-strategies-quality-modeling/23789](http://www.igi-global.com/chapter/concepts-strategies-quality-modeling/23789)

## Related Content

---

### A Method of Subtopic Classification of Search Engine Suggests by Integrating a Topic Model and Word Embeddings

Tian Nie, Yi Ding, Chen Zhao, Youchao Lin and Takehito Utsuro (2018). *International Journal of Software Innovation* (pp. 67-78).

[www.irma-international.org/article/a-method-of-subtopic-classification-of-search-engine-suggests-by-integrating-a-topic-model-and-word-embeddings/207726](http://www.irma-international.org/article/a-method-of-subtopic-classification-of-search-engine-suggests-by-integrating-a-topic-model-and-word-embeddings/207726)

### Recognition of Handwritten Hindi Text Using Middle Region of the Words

Naresh Kumar Garg, Lakhwinder Kaur and M. K. Jindal (2015). *International Journal of Software Innovation* (pp. 62-71).

[www.irma-international.org/article/recognition-of-handwritten-hindi-text-using-middle-region-of-the-words/133115](http://www.irma-international.org/article/recognition-of-handwritten-hindi-text-using-middle-region-of-the-words/133115)

### Task Assignment and Personality: Crowdsourcing Software Development

Abdul Rehman Gilal, Muhammad Zahid Tunio, Ahmad Waqas, Malek Ahmad Almomani, Sajid Khan and Ruqaya Gilal (2022). *Research Anthology on Agile Software, Software Development, and Testing* (pp. 1795-1809).

[www.irma-international.org/chapter/task-assignment-and-personality/294544](http://www.irma-international.org/chapter/task-assignment-and-personality/294544)

### An Introduction to Remote Installation Vulnerability in Content Management Systems

Mehdi Dadkhah and Shahaboddin Shamsirband (2015). *International Journal of Secure Software Engineering* (pp. 52-63).

[www.irma-international.org/article/an-introduction-to-remote-installation-vulnerability-in-content-management-systems/142040](http://www.irma-international.org/article/an-introduction-to-remote-installation-vulnerability-in-content-management-systems/142040)

### Eliciting Data Warehouse Contents for Policy Enforcement Rules

Deepika Prakash and Daya Gupta (2014). *International Journal of Information System Modeling and Design* (pp. 41-69).

[www.irma-international.org/article/eliciting-data-warehouse-contents-for-policy-enforcement-rules/112041](http://www.irma-international.org/article/eliciting-data-warehouse-contents-for-policy-enforcement-rules/112041)