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Chapter I

Organizational Concepts and Measures for the Evaluation of Data Modeling

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ABSTRACT

This chapter presents a concept for the evaluation of data modeling which is based on existing theoretical approaches and three empirical studies conducted or supervised by the author. The main results of these studies with respect to evaluation suggest to extend existing approaches for the evaluation of data models. It is necessary to focus more on organizational issues of data modeling, more on process instead of product quality, to consider different application scenarios of data modeling as well as to distinguish the enterprise-wide evaluation of data modeling from the evaluation of single projects using data modeling. The evaluation concept presented here focuses on the evaluation of single data modeling projects and consists of recommendations for the evaluation procedure, persons involved, instruments, the design of important organizational dimensions as well as some concrete measures of process and product quality.

INTRODUCTION

In a time where the amount of data managed in organizations explodes at an ever-increasing speed, issues of data management become more and more important.

With the advent of advanced database and data warehouse technologies, the evaluation of models and architectures that are built as blueprints for the solutions to be developed, administrated and/or maintained becomes a critical issue. Unfortunately, both in the literature and practice, the state-of-the-art concerning the evaluation of data modeling, as the most established method used in this field, is up to now restricted to a more or less extensive list of desirable attributes of a data model. It remains uncertain which attributes should be focused on in case of conflicts, to which part a single attribute contributes to goals and in particular how these attributes can be embedded into a comprehensive model for the evaluation of data modeling.

Empirical Studies on Data Modeling and Data Management

Despite the large number of papers in the field of data modeling, there is hardly an author who went to the trouble of conducting an empirical field analysis of the subject. Most empirical studies are laboratory studies, with students acting as surrogates for expert or novice data modelers, testing different notations used to display data structures or different data modeling methods. Empirical field studies were conducted mainly in the '80s in the U.S. and the early '90s in Europe, and neither investigated broadly data administration and data management or dealt exclusively with methods and tools (refer to Maier 1996b, for a list of empirical studies on the subject). The starting point for the author's empirical and theoretical work was the fact that there was little documented knowledge about the use of data modeling within companies and organizations. Thus, the author carried out or supervised three empirical studies on data modeling and related areas which are described briefly in the following. These studies, together with the author's own experiences in concrete data modeling projects, were the main sources of knowledge which were used to design the evaluation concept laid out in this chapter.

Study 1: Quality of data modeling

In 1995-96 the author carried out an empirical study on "benefits and quality of data modeling" (see Maier, 1996b for an overview of the results, see also Maier, 1996a for the detailed results in German). This study consisted of a broad questionnaire and of personal interviews with experienced practitioners. The main part of the study was a broad questionnaire. Before the questionnaire, a series of interviews was used to improve the questionnaire and to clarify the research problem. Another series of interviews was conducted after the questionnaire in order to gain more knowledge about the state-of-the-art of data modeling. The sample consisted of 324 German companies with over 5,000 employees, and 261 German software houses and consulting companies with over 50 employees. Eighty-nine respondents filled out the questionnaire resulting in a response rate of 15.2%.

Study 2: Organization of data management

In 1998 the author (see Grupppp, 1998) supervised a follow-up empirical study, which focused on the organizational design of data management, its tasks, roles and