Chapter XXII
A Quality–Aware Engineering Process for Web Applications

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ABSTRACT

This chapter introduces the necessity to consider quality management activities as part of the Web engineering (WE) process to improve the final quality of Web applications with respect to creative practices. We explore principles and achievements that, uncovered in different Web quality lines of research, provide insights into how to deal with quality in each of the different workflows that a typical WE process defines, from requirements to implementation. Also, in order to preserve the semiautomatic nature of WE processes, we propose the definition of measurable concepts, measures, and decision criteria in a machine-readable way that facilitate the automation of the quality evaluation process, thus preserving the model-driven engineering (MDE) nature of WE processes. In this way, we are providing the user of a WE methodology with the advantages associated with managing quality from the early stages of development with little extra development costs.

INTRODUCTION

It is an avowed fact that WE practices, understood as the application of systematic, disciplined, and quantifiable approaches to the cost-effective development and evolution of high-quality applications in the World Wide Web (Heuser, 2004), lack an impact on industry (Lang & Fitzgerald,
We can name at least two possible reasons for this behaviour:

- From the point of view of Web developers, it is too hazardous to decide on the use of a methodology that systematizes the Web application construction, due to the small amount of reliable information available on methodologies, technologies, and tools. In fact, just around 5% of the claims of the WE field about improved time-to-market and reduced development costs are based on actual facts, even if it is well-known that conventional wisdom, intuition, conjecture, and proofs of concepts are known not to be reliable sources of credible knowledge (Mendes, 2005); and

- From the point of view of the final user of the application, the use by the Web developers of a WE methodology does not guarantee any kind of improvement on the quality in use of the deployed applications. In fact, it has been empirically assessed that, while Web stakeholders’ interest is focused, besides cost and time-to-market, on usability and visual appearance (Calero, Ruiz, & Piatinni, 2005), these concerns are just tangentially tackled in Web methodologies.

We believe that this situation is a clear symptom of the immatureness of the field. There is a lack of reliable data that empirically supports all the WE claims (reduced costs, time-to-market, and better quality in use of the developed applications). Although the existence of WE tools is already permitting to gather project data that are corroborating the WE claims regarding costs and time-to-market, we are still far from being able to assure that, merely by following a given WE methodology, the developed application is going to comply with a set of predefined quality requirements. In fact, WE development processes do not even consider specific support for this type of requirements. As far as we know, only WebSA (Meliá & Gómez, 2006), which tackles architectural issues that may influence some aspects related to the final quality in use of the application, is an exception in this sense.

We do believe that this situation should be reversed if we aim at increasing the confidence of industry on our methodologies. Unfortunately, the WE community is not yet familiar with systematic quality evaluation issues, and therefore tools and guidelines to ease this shift are necessary. Concretely, a general framework is needed in WE to guide the way in which WE methodologies are able to:

- Assure the quality of the different WE development processes (i.e., process quality), and empirically prove the advantages that they provide to analysts, designers, developers, and maintainers compared to creative approaches. Given the fact that WE processes are commonly based on the MDE paradigm (Kent, 2002), this process quality involves assessing the quality of the semi-automated transformations defined as part of any WE methodology;

- Assure the quality of the WE intermediate artifacts (i.e., internal product quality). These artifacts correspond with the intermediate models generated as part of the process, and it should be empirically proven how they help (indeed) to manage the complexity of Web development;

- Assure the quality of the application that is delivered using such methodologies under testing conditions (i.e., external product quality), and how it relates to the internal product quality; and

- Assure the quality of the application that is delivered using such methodologies under real conditions of use (i.e., quality in use), and how it relates to the external and internal product quality.