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# Tensions around the adoption and evolution of software quality management systems: a discourse analytic approach

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## Abstract

This paper reports some results from a project to uncover the non-technical factors that affect the adoption and evolution of software quality management systems (SQMS). The data which the paper discusses comes from interviews with people involved in the quality effort in four different companies. Our approach to data collection was to use semi-structured interviews and to encourage interviewees to talk about their experiences of quality management and software development in their own organizations. We analysed this data using discourse analysis, informed by ethnographic observation, and identified a number of themes, one of which was the tensions that exist around the adoption and evolution of SQMS. In this paper, we present and discuss our approach to discourse analysis and some results that illustrate the tensions we found. We hope, thereby, to demonstrate how software engineers may use a technique from the social sciences to better understand their own practices.

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## 1. Background

This paper describes the collection and analysis of qualitative empirical data to investigate the non-technical factors influencing the adoption and evolution of software quality management systems (SQMSs). We collected a variety of data

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through our project, but in this paper we concentrate on data from semi-structured interviews conducted with quality managers.

The importance of non-technical factors in the success of software engineering projects has been recognized for many years (e.g. DeMarco and Lister, 1987; Curtis et al., 1988). Few empirical studies have been reported that look at the impact of non-technical factors on software development practices, although work in the area is growing (e.g. Baddoo and Hall, 2002b) and the significance of studying the human aspects of software engineering through qualitative methods is receiving more attention (e.g. Seaman, 1999; Seaman and Basili, 1998). We began our project because of our concerns that technical innovations did not appear to be producing better quality software systems. Our particular focus was on the effect of quality initiatives such as ISO9000 certification schemes, and the social factors affecting the success, adoption and evolution of SQMSs in response to those schemes (Hall et al., 1993; Hovenden et al., 1994; Sharp et al., 1999).

In the remainder of this introductory section, we provide some background on SQMSs, and the wider project of which this work forms a part.

In the next section, we introduce the methods used for data collection and analysis. Then in Section 3, we present the results of discourse analysis that led to our focus on the tensions around the adoption and evolution of SQMSs. This section includes example discourses from our data that illustrate the tensions we found, where these tensions occurred and where they did not occur. In Section 4 we discuss our results in the context of other relevant work. Finally, we share some observations about the use of discourse analysis in this context.

### *1.1. Software quality management systems*

An SQMS is intended to make the process of software development visible and public. This is partly about accountability, but, more pragmatically, makes knowledge (especially that relating to the practice of developing software) communal, minimizing the problems arising when team members are away, or have left. It also helps to make the process visible to those who have not been involved in the development, such as senior managers, auditors and customers. An SQMS makes the process auditable because it provides guidelines, or benchmarks which can be tested against, and it provides some assurance of adherence to house style. This fulfills a range of requirements, including indicating to customers that certain standards are being met, and strengthening a market image by ‘branding’ through conformance to certain standards. Hence, the introduction of an SQMS can reinforce management control as well as enforce internationally established guidelines.

The following are quoted from (ISO8402, 1994) which provides internationally standardized definitions of quality terms.

- *Quality*: the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs.

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