No Improvement Without Feedback: Experiences from Goal-Oriented Measurement at Schlumberger*

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Abstract

Schlumberger is an international technology oriented company and started its company wide software process improvement program in 1989. This industrial experience paper describes how goal-oriented measurement was established and which role feedback sessions played as a critical success factor within this process.

By feedback sessions we mean well-organized, structured meetings between the project team and the measurement team. Main objective is to review the data collected so far and to analyze and interpret it. The interpretations derived are fed back both into the software development process and into the measurement process. Thus, feedback sessions serve multiple purposes: they maintain motivation and momentum in the measurement program, they ensure that the interpretations derived from the collected data are correct, and they allow the identification of small-scale changes that can be immediately implemented in order to improve both the measurement and the software development process. In addition to that, the interpretations derived from the data allow identification of larger-scale changes to the software development process which can be implemented and validated in subsequent software projects.

We describe practical experiences with feedback sessions based on two projects: the Omega 2010 project for development of both hardware and software for a point-of-sale system with quality focus on reliability and reusability, and the DEMP project with quality focus on interrupt handling. The experience report will give detailed answers to pragmatic questions, such as, how feedback sessions were prepared, how they were performed, which results were derived, and which lessons were learned for future projects. As a main conclusion, feedback sessions are characterized as the back-bone of any industrial measurement program.

Keywords: Goal-oriented measurement, Schlumberger, experience report, feedback session, analysis and interpretation.

¹Supported by ESPRIT/ESSI project # 10358, Customized Establishment of Measurement Programs (CEMP).
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1. Introduction

Schlumberger is an international technology oriented company. Schlumberger’s businesses include wellsite exploration and production services for the petroleum industry, testing and electronic transaction products, and metering products for domestic and industrial application. The Retail Petroleum Systems (RPS) division manufactures and services systems for self-service petrol stations, such as dispensers, point-of-sale systems, and electronic fund transfer systems. Schlumberger started its company-wide software process improvement program in 1989 [WR94]. As part of improvement activities in Schlumberger RPS, several measurement activities were introduced in the areas of project planning, project tracking, bug tracking, testing, and review and inspections [vL94].

Before starting with goal-oriented measurement as part of the CEMP project the measurement practices were scattered at Schlumberger RPS. These isolated measurements were lacking a context and an explicitly stated purpose resulting in a decreasing interest and loss of motivation after the initial phases. Due to the need for a measurement approach that takes into account a careful description of the context, that strongly involves project team members in design and analysis of measurement program, and that continuously feeds back information, goal-oriented measurement following the Goal-Question-Metric (GQM) paradigm was introduced. The GQM approach [BW84], [Rom91], [BCR94b] has been successfully applied in organizations like NASA [nas94] and Allianz [GRR94]. In [vLHO+] it is described, how GQM-based measurement was implemented at Schlumberger RPS. This includes how it was done, which were the results, and which were lessons learned. The emphasis of this paper is on feedback sessions, which appeared to be the most critical success factor in performing goal-oriented measurement.

Before the application of GQM was started at Schlumberger, people felt unsatisfied about measurement program execution mainly due to poor analysis and interpretation of the data collected. The reason was that feedback sessions were not performed at all or were not performed properly. Feedback sessions are well organized, structured meetings integrating members of the project and the measurement team. As an essential method for analysis and interpretation, main objective of feedback sessions is to discuss the results of the measurement program and to derive interpretations by the project team from the data collected so far. Depending on the results and the current status of both the measurement and the software development process, immediate changes and modifications for both processes can be suggested.

This paper is organized as follows. In section 2, we provide a short overview on the basic principles underlying the GQM approach, we show the state of GQM technology on which the Schlumberger experiment could be built and we motivate why we put such a strong emphasis on feedback sessions. In section 3, a brief description is given on how the measurement program was performed at Schlumberger RPS. As an essential method for analysis and interpretation, feedback sessions are studied in more detail in section 4. In section 5, results from the measurement program of Schlumberger are reported. Finally, summary and conclusions are given.

2. The GQM Approach to Goal-Oriented Measurement

Measurement is considered to be an essential background and support for the improvement process initiated within the company. We applied the Quality Improvement Paradigm [BCR94a] as a framework for achieving systematic improvement within a software organization.