Measurement-Based Feedback
in a Process-Centered
Software Engineering Environment

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Abstract

Software development organizations measure their real-world processes, products, and resources to achieve the goal of improving their practices. Accurate and useful measurement relies on explicit models of the real-world processes, products, and resources. These explicit models assist with planning measurement, interpreting data, and assisting developers with their work. However, little work has been done on the joint use of measurement and process technologies.

We hypothesize that it is possible to integrate measurement and process technologies in a way that supports automation of measurement-based feedback. Automated support for measurement-based feedback means that software developers and maintainers are provided with on-line, detailed information about their work. This type of automated support is expected to help software professionals gain intellectual control over their software projects.

The dissertation offers three major contributions. First, an integrated measurement and process modeling framework was constructed. This framework establishes the necessary foundation for integrating measurement and process technologies in a way that will permit automation. Second, a process-centered software engineering environment was developed to support measurement-based feedback. This system provides personnel with information about the tasks expected of them based on an integrated set of measurement and process views. Third, a set of assumptions and requirements about that system were examined in a controlled experiment. The experiment compared the use of different levels of automation to evaluate the acceptance and effectiveness of measurement-based feedback.