Practical Software Measurement

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Abstract

This tutorial provides a one-day overview of Practical Software Measurement (PSM). The measurement approach focuses on satisfying the information needs of project managers. Innovative elements of PSM include the measurement process model and the measurement information model. Rather than discussing specific numerical techniques in detail, this course emphasizes basic concepts.

1. Introduction

This tutorial provides an ***introduction*** to the basic concepts of software measurement for project management purposes including measurement planning, project estimation, feasibility analysis, and status monitoring. The specific objectives of the course are to:

- o Describe a systematic approach to software measurement for project management purposes.
- o Explain the relationship of this approach to other initiatives and approaches
- o Introduce "standard" measurement information and process models

This tutorial is based on the book of the same name [1]. This book is an implementation guide for ISO/IEC Standard 15939 [2]. The standard defines two key concepts – the measurement information model and measurement process model. This course explains how those models can be instantiated to support project management decision-making. (ISO/IEC 15939 has been adopted as the basis for the Measurement and Analysis Process Area of the CMMI [3].)

2. Measurement Information Model

One of the goals of the standardization effort was define a consistent set of terminology for basic measurement concepts. The result was a structure that defines the relationships among information needs, several types of measures (i.e., indicators, derived measures, base measures), and measurable entities. This Measurement Information Model defines a generic measurement product. PSM further describes the type of product appropriate for project management. It defines seven categories of information needs. Information needs are similar to goals in the GQM approach [4]. However, they are more general (not limited to goals) and less open-ended (PSM provides potential solutions for the project manager).

3. Measurement Process Model

Regardless of the purpose for which measurement is conducted, several activities have to be undertaken to obtain meaningful measurement results. The Measurement Process Model defines four basic activities:

Plan Measurement – the activity in the process model concerned with understanding the information needs of the project and defining appropriate measures to satisfy them. It "designs" the desired measurement product.

Perform Measurement – the activity in the process model concerned with populating or executing the information model to produce the results necessary to support decision-making.

Evaluate Measurement – the activity in the process model concerned with evaluating the measures, themselves, as well as the measurement process.

Establish Measurement – the activity in the process model concerned with establishing and sustaining a measurement program within an organization.

The first two activities are sometimes referred to as the "core" measurement process. The attached figure shows all major components of the measurement process model

4. Summary

PSM provides a systematic method of planning and performing software measurement and analysis. The PSM and ISO/IEC 15939 approach to software measurement is becoming increasingly widely accepted in industry around the world. However, these concepts may also be of interest to measurement researchers who desire to understand the context in which their ideas may be applied in practice. PSM and ISO/IEC 15939 provide a common language that may improve communication on software measurement issues between practitioners and researchers.

More information about PSM, including a list of qualified trainers, may be obtained at www.psmsc.com.

5. References

[1] J. McGarry, D. Card, et al., *Practical Software Measurement*, Addison Wesley, 2002.

[2] K. el Emam and D. Card (Editors), *ISO/IEC Standard 15939, Software Measurement Process*, International Organization for Standardization, 2002.

[3] CMMI Development Team, *Capability Maturity Model - Integrated Systems/Software Engineering*, Software Engineering Institute, 2002.

[4] V. Basili and D. Weiss, A Methodology for Collecting Valid Software Engineering Data, *IEEE Transactions on Software Engineering*, October 1984.