Chapter VIII

Developer-Driven Quality:
Guidelines for Implementing Software Process Improvements

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Abstract

Much attention has been given to Software Process Improvements (SPIs) based on the premise that system development outcomes are largely determined by the capabilities of the software development process. The content of this chapter presents the results of a set of research projects investigating why SPIs have not been diffused and utilized in the software engineering community as expected (Fayad et al., 1996; Fichman & Kemerer, 1997; Luqi & Goguen, 1997; Pfleeger & Hatton, 1997). We show that a software developer’s perceived control over the use of an SPI
impacts its diffusion success. Additionally, we show that a software developer’s perceptions of enhanced software quality and increased individual productivity achieved through SPI use impact the successful diffusion of the SPI. Results of these research efforts support the compilation of a clear set of management guidelines to ensure the effective use of SPIs in software development organizations.

Introduction

The search for new ideas and innovations to improve software development productivity and enhance system quality continues to be a key focus of industrial and academic research. Much attention has been given to Software Process Improvements (SPIs) based on the premise that system development outcomes are largely determined by the capabilities of the software development process. Recent attempts to improve software development practices have focused on defining, monitoring, and measuring development activities in an effort to identify and subsequently verify areas of improvement. Work in this area has resulted in a number of SPI innovations such as the Capability Maturity Model Integration (CMMI), the Personal Software Process (PSP), the Team Software Process (TSP), Cleanroom development methods, agile development methods, and others.

Proponents of SPIs have asserted that well-defined and measured processes eventually lead to gains in software quality and programmer productivity, yet there is evidence that many promising SPI techniques have not been effectively transitioned into successful use. This chapter reports on our research studies that investigate why this trend exists.

Motivation

The motivation for our research is to better understand the phenomenon of SPI diffusion in order to inform software development managers on how to ensure successful use of SPIs in their organizations. Solutions to the problems of software development should include both human and technical dimensions (Constantine, 1995; DeMarco & Lister, 1999; Yourdon, 1996). Thus, a basic premise of our research is that an effective understanding of SPI diffusion should integrate technical research in software engineering with behavioral research in information systems and other fields.
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