An Empirical Study on MBASE and LeanMBASE

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Abstract

From 1998-2005, the successful Model-Based (Systems) Architecting and Software Engineering (MBASE) had been used as a set of guidelines for the keystone two-semester real-client team project graduate software engineering course sequence. However, to fit with small-sized and limited schedule projects, MBASE was trimmed to reduce the huge amount of efforts in documentation. Consequently, LeanMBASE, which is a light-weight software process framework that helps teams identify the high-value activities and helps balance the workload of a development, is being used in the software engineering course. This paper reports the comparison and improvement of the projects that use MBASE and LeanMBASE in terms of content, performance, and customer satisfaction.

1. Introduction

Software Engineering I, II are the USC two-semester team project software engineering course. Students will form a team of 6 on-campus students and 2 off-campus students to develop real-client software projects. Software Engineering I focuses on defining operational concept, requirements, architectures, plans and project feasibility. Software Engineering II emphasizes on building, testing and maintaining software product with an emphasis on quality software production.

MBASE with WinWin Spiral model provides the guidelines in developing software by using risk-driven strategy, iterative refinement, management of stakeholder’s commitment by using anchor-point milestones, and emphasis of system life-cycle issues. MBASE has 4 development phases: Inception, Elaboration, Construction, and Transition phases. The MBASE Guidelines also cover several software tools for various activities, such as the negotiation tool, effort reporting tool, risk identification tool, software cost estimation tool (COCOMOII) and etc.

Based on the students’ performance and critiques the 260 pages of MBASE Inception and Elaboration phase Guidelines were replaced with 90 pages of LeanMBASE Guidelines.

2. Comparing MBASE and LeanMBASE

Although LeanMBASE has the light-weight concept in mind, it inherits all core approaches and phases from MBASE. It contains similar set of artifacts but minimizes all duplications and it is customizable based on project needs and enhance forward and backward traceability.

Based on the data of software engineering classes in Fall 2003 – Spring 2005 (MBASE) and Fall 2005–Spring2007 (LeanMBASE), we compared document size, efforts spent, and client evaluation.

We found that with LeanMBASE guidelines, average document size is smaller by 22.78% in Inception and Elaboration document set and 8.4% in Construction and Transition document set , the teams took less effort by 23.24% in overall documentation, and number of documentation effort in man-hour per page is less by 15.24%. For Client’s evaluation, the average scores are uniformly high and relatively close but LeanMBASE teams had better client evaluation.

3. Conclusion and Future work

From the comparison result, we could say at least for small real-client student-team projects, the LeanMBASE more efficiently supports students in developing software projects, learning software development, and finally providing a win-win result to all key stakeholders. We will continue to improve the course by analyzing risk lists, quality evaluation, and team’s effort, leaning all unnecessary options, and adjusting to ever-changing software engineering environment. We are also developing and experimenting on LeanMBASE electronic process guidelines, which might be a useful resource for students to learn about software process.