Chapter 19

Human Resource Related Problems in Agile and Traditional Software Project Process Models

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ABSTRACT

This paper explores the impacts associated with different software process models on the staff. The main research question addressed is whether any process model leads to a higher satisfaction of staff, and less human resource related problems, including staff turnover or increased stress levels. This issue is empirically investigated using a set of projects from 15 different software developing companies. Agile-oriented models are not necessarily limited to small projects, but both groups showed nearly identical distributions for team size and duration. Interestingly, rigid-type models tend to exhibit higher effort estimations, and lower correctness in these estimations. Also customer satisfaction is slightly lower. With regard to human resource issues, the differences are not major overall, but there are some noticeable exceptions. In general, satisfaction and acceptance are higher at lower stress and overtime levels for agile-type project participants, but, interestingly and contrary to theory, people wish for more responsibility. Agile-type projects also enjoy some advantages in information sharing and communication, and in some quality aspects. Rigid-type projects show considerable higher abilities to cope with absence of personnel.

INTRODUCTION

Software development is, above all, a task performed by human beings. Nevertheless, human factors and human resource management have not been a major issue in the context of software engineering and software development, with some notable exceptions (Brooks, 1999; DeMarco & Lister, 1999; DeMarco, 2002; Cherry & Robillard, 2008; Good & Romero, 2008; Tenenberg, 2008). In this paper, we will explore the impacts associated with different software process models on the staff. With this term, we subsume all people directly involved in the respective projects, and therefore include analysts, programmers, management and others.

The main research question addressed is whether any process model leads to a higher satisfaction of staff, and less human resource related problems, including staff turnover or increased stress levels. Naturally, impacts of staff satisfaction on the quality of the final product, and on efficiency and effectiveness of work should not be underestimated. For example, eXtreme Programing (XP) explicitly has a "no overtime" rule designed to maintain spirit and motivation (Beck, 1999). We addressed this question with a literature review on human resource related topics in software development, and an empirical study. The empirical study included interviews with a number of project participants, mostly project managers from different software developing companies.

The outline of the paper is as follows: We will start with a literature review which covers the types of software process models included in our study, as well as possible human resource related problems and prior research on the intersection of both issues. Then we will detail the empirical study undertaken, starting with a description of the methodology, followed by the results themselves. The paper closes with discussion and directions for future research.

LITERATURE REVIEW

Process Models in Software Development

The concept of a process model in software development is still not uniformly defined, and some of the approaches to be found in the literature are not detailed enough to be called a full-blown process model. The basic idea we will use is that a process model contains a list of time-successive steps in a problem-solving process, thus constituting a guideline for developing software, structuring the overall project, helping in achieving goals including quality levels, and aiding in planning, controlling and monitoring (Liu et al., 2008). Also a process model helps in giving a common understanding to all involved parties, and defining clear interfaces between different tasks. Process models also gain special importance in multi-project management (Demirkan & Nichols, 2008).

In the literature, a plethora of approaches can be found including the V-model, SA/SD, XP, Scrum and many more. Although they are difficult to group, for this paper we will adopt a widespread differentiation between those models which are of a more consecutive, waterfall-based nature (Royce, 1970) like V-model or SA/SD, for which Syed-Abdullah et al. (2006) also use the term designed-based approaches, and those which show more prototyping, spiral-oriented features (Boehm, 1988). This last group is currently primarily embodied by agile approaches like Scrum or XP, which are based on the Agile Manifesto. This holds as central tenant that both the business and technology environment continue to change at an increasing pace. Therefore the main question to be addressed is how to better handle these changes, not stop them early in the life cycle by anticipating them all, while still aiming at achieving high quality and timeliness. A focal point therefore is the flexibility that is to be ensured (Ollson, 2008). This leads to a set of principles, which value individuals and interactions over processes and tools, work-

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