How Does the Extraversion of Software Development Teams Influence Team Satisfaction and Software Quality?
A Controlled Experiment

Marta N. Gómez, Escuela Politécnica Superior and Universidad CEU San Pablo, Madrid, Spain
Silvia T. Acuña, Escuela Politécnica Superior and Universidad Autónoma, Madrid, Spain
Marcela Genero, Universidad de Castilla-La Mancha, Madrid, Spain
José A. Cruz-Lemus, Universidad de Castilla-La Mancha, Madrid, Spain

ABSTRACT

Team member knowledge and expertise are the aspects typically considered important for software team development formation. However, the authors believe that the formation of teams, as is found in literature, could be based on factors related to the personalities of the members of the development team, and that these factors might affect both the quality of the software product developed and the satisfaction perceived by the development team. In this work they present a controlled experiment, which was carried out during an academic course on Data Bases. The intention of this experiment was to evaluate whether the work team's level of extraversion influenced, on the one hand, the final quality of the software products obtained and, on the other, the satisfaction perceived while this work was being carried out. The results obtained indicate that when forming work teams, project managers and lecturers should carry out a personality test beforehand in order to balance the amount of extraverted team members with those who are not extraverted. This would permit the team members to feel satisfied with the work carried out by the team without reducing the quality of the software products developed.

Keywords: Controlled Experiment, Extraversion, Personality Factors, Quality, Satisfaction, Team Building

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INTRODUCTION

Team member knowledge and expertise, aspects typically considered important for forming effective software development teams. Some software studies have found that developer ability is one of the most decisive team performance factors (Curtis, Krasner, & Iscoe, 1988; Rasch & Tosi, 1992). However, these factors appear to be insufficient if high quality in the results obtained and the satisfaction perceived during the development of work is to be ensured.

Studies carried out in the academic setting (Salleh, Mendes, Grundy, & Burch, 2010a, 2010b) show the influence that certain personality factors, such as conscientiousness or openness to experience have on the performance of software developers who carry out programming in pairs. Reviews of the empirical studies carried out (Salleh, Mendes, & Grundy, 2011) show that the students’ level of skill is one of the factors that influences development efficiency when pair programming takes place.

Various researchers have examined the effect that team members, the characteristics of the team structure and the means of communication have on the team’s productivity in the field of information systems development (Borovits, Ellis, & Yeheskel 1990; Curtis et al., 1988; Rasch & Tosi, 1992; White, 1984). The development of software demands that software engineers work in a team, despite carrying out interdependent tasks with complex relations. Teams must therefore plan their project, follow its progress and coordinate their work, but they must also reach an agreement as to their objectives, have a common work method, communicate freely and frequently, and create a working climate that is appropriate to the realization of their activities.

A correlational quasi-experiment was designed by following the research line of personality factors (Acuña, Gómez, & Juristo, 2009). This empirical study obtained positive and direct relationships between the average extraversion personality factor of teams and the quality of the software obtained. It showed that the teams that are most satisfied with their work are precisely those whose members have the highest measures for the personality factors agreeableness and conscientiousness. There is also a direct positive relationship between the personality factors, extraversion and agreeableness. The outcomes showed that teams with high satisfaction levels are teams with members whose combined personality had mean levels of team extraversion. On the other hand, extraverted, social and participative teams developed better quality software products.

The aforementioned work and its conclusions have led us to carry out an experimental design within the framework of two disciplines: building teams in software development and in empirical software engineering.

In this research we have carried out a controlled experiment in the subject of Data Bases with the third year students on Computer Engineering and Technical Engineering in Systems and Management Computing degrees from the Computer Science department (ESI) at the University of Castilla-La Mancha (UCLM) in Ciudad Real, Spain during the 2010-2011 course. The controlled experiment consisted of forming teams composed of different factors as regards a specific type of personality — extraversion (Table 1) — and analyzing and comparing the relationships that existed between this per-

<table>
<thead>
<tr>
<th>Degree of extraversion</th>
<th>Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extraverted (EXT)</td>
<td>4 extraverted subjects</td>
</tr>
<tr>
<td>Mixed (MIX)</td>
<td>2 extraverted subjects and 2 non-extraverted subjects</td>
</tr>
<tr>
<td>Non-extraverted (NO-EXT)</td>
<td>4 non-extraverted subjects</td>
</tr>
</tbody>
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