

Chapter 39

Data Mining to Identify Project Management Strategies in Learning Environments

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ABSTRACT

Projects have become a key strategic working form. It is agreed that project performance must achieve its objective and be aligned with criteria that the project stakeholders establish. The usual metrics that are considered are cost, schedule, and quality. Configuration for the management of projects is a matter of decision that influences the project's evolution. There also are factors like virtual teamwork and team building processes that are relevant to that evolution. Effectiveness in managing projects depends on these factors and is investigated in this work by means of educational data mining as they can help to build more effective learning and operating procedures. The conclusions from this study can help higher education course designers as well as teachers and students by making apparent the influence of smarter strategies in the learning process. In fact, the same benefits will help practitioners too, as they can improve their continuous learning procedures and adjust their project management policies and strategies.

INTRODUCTION

One of the most important organizational developments in recent years has been the significant growth of project work in different economic sectors and industries (Winter, Smith, Morris, & Cicmil, 2006). Thus, projects have become a key strategic working form. Further, it has been shown that all industries can benefit from project-based working (OPSR, 2003).

DOI: 10.4018/978-1-5225-7598-6.ch039

No longer just a sub-discipline of engineering, the management of projects -including program management and portfolio management- is now the dominant model in many organizations for strategy implementation, business transformation, continuous improvement and new product development (Winter et al., 2006). However, there is growing recognition that different types of projects require different approaches to their management (Müller & Turner, 2007). Furthermore, the increasing globalization of projects and project management adds intercultural challenges for project managers (Müller & Turner, 2004).

There is no doubt that management's configuration of projects affects the project's evolution. There are also factors like virtual teamwork and team building processes that are relevant to that evolution. Since effectiveness in managing projects depends on these factors, the authors conducted this research to determine whether project performance varies according to project management and other factors. Thus, with a view to complementing other research to link project management to project success (Din, Abd-Hamid, & Bryde, 2011; Mir & Pinnington, 2014), this work considers factors such as virtual team configuration, team composition, knowledge competence, policy and strategy, project life monitoring and the level of detail implemented in managing projects that are undertaken in the learning process.

The data for this research was provided by an educational framework that was specifically designed to facilitate the learning experience of project management engineering students. The main purpose of this learning experience was to highlight how to move from simply learning content by rote to understanding, discussing and sharing (Alba-Elías, González-Marcos, & Ordieres-Meré, 2014). In this case, practitioners learned and applied by means of an experimental learning approach, a defined project management methodology that enables them to manage projects better.

Data mining and data analytics were used in this work to identify and understand the relationships between project performance and the analyzed factors. Data mining is widely applied in the educational area to predict students' performance (Romero & Ventura, 2010; Shahiri, Husain, & Rashid, 2015). In the present research, we are much more interested in the project effectiveness that unexperienced project teams achieve, depending on specific factors. Thus, this study concentrates on using data mining for discovering patterns in project success, i.e., the performance of students as a team, instead of the performance of individual students.

The conclusions of our study can help higher education course designers, as well as teachers and students, by making clear the influence of smarter strategies in the learning process. In fact, the same benefits will help practitioners too, as they can improve their continuous learning procedures and adjust their own project management policies and strategies. Thus, the proposed research can be used as a specific decision tool of benefit in organizing projects according to specific parameters.

BACKGROUND

Project management is the application of knowledge, skills, tools and techniques to project activities to meet project requirements (PMI, 2008). The literature concerning project management includes many studies of critical success factors as can be seen in Wi & Jung (2010) or Alias, Zawawi, Yusof & Aris (2014). It is often agreed that project performance must achieve its objective and be aligned with criteria that the project stakeholders establish (Barclay, 2008). The usual metrics that are considered are cost, schedule and quality (ur Rehman Toor & Ogunlana, 2010). Indeed, the currently available standards are basically using these criteria in a process-oriented approach throughout the project's entire life cycle.

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