Abstract. In a world of growing competitiveness, “quality” is a main subject. On recent years, there has been a trend towards the improvement of software projects’ quality. This means improving not only the final software products, but especially the quality of leadership and of project management. It is now recognized that the quality of software products and services can be improved if quality management is accomplished according to the unique characteristics and complexity of each project. In this paper we present the main concepts of quality management, as also some approaches of software quality assurance.

Keywords: Quality, Management, Software, Project.

1 Introduction

A recent study made in China in 2004 concluded that organisations obtain high benefits when quality management and related standards are properly enforced [1]. Specifically, a project has a higher probability of success when a careful quality management is carried out.

To fully understand quality management, it is essential to clarify its concepts, starting from the quality one. There are many quality definitions, which vary in context and the time by which it is (was) specified. This variety unveils the difficulty involved in defining and measuring quality. Lately, the way quality is approached has been changing radically. Nowadays, it is quality management that gains relevance, announcing quality as a strategy to gain competitive advantage [2]. However, it is not enough to say that quality management is important. In the context of software production, we must aim for an explicit definition for software quality. Additionally, we must create a set of activities that will help assuring that the work involved in the software process is monitored through quality assurance activities on every software project. Also, we must develop strategies for improving the software process, and as a consequence, improving the quality of the software product.

In this paper we present the main concepts in the area of quality management for software projects. We define quality and the corresponding activities in this context, and also the key elements for a Total Quality Management (TQM) approach.
The paper is organised as follows: the next section introduces quality concepts and their relationships with software and software projects. In section 3 we present the main concepts in the area of quality management, in section 4 we address Software Quality Assurance (SQA) and related concepts. Section 5 concludes the paper.

2 The Quality Concept in the Software Context

Software quality is defined by the Institute of Electrical and Electronics Engineers (IEEE) as the degree that a system, component or process addresses [3]: (1) the specified requirements and (2) user/customer expectation. The International Standards Organization (ISO) defines quality in the general-purpose standard ISO 9000 [4] as the degree of fulfilment of requirements, given by a set of intrinsic characteristics. According to this standard, a requirement is a need or expectance expressed, generally implicit or mandatory. These two definitions come from respected standards organisations, and point out the quality of a product as strictly bound to the requirements it aims to fulfil.

Back in 1993, Juran predicted a rapid expansion in the competitiveness for quality worldwide [5]. According to him, that expansion was caused by joined forces such as the proliferation of multinational companies, a growing global competitiveness, the development of global markets which destroyed protectionism, and environment protection. He then concluded that “The 20th century has been the century of productivity. The 21st century will be the century of quality” [5]. Quality has evolved from an important to a fundamental characteristic demanded by the customer. Therefore, Feigenbaum says that “a poor man can’t afford to buy cheap, he has to buy quality” [6].

Pressman defines software quality as the conformance of a software product regarding its performance requirements, explicitly declared functional requirements, the software method documentation and the implicit features expected throughout all software products developed by professionals [7].

Laudon advocates that solutions for the problem of software quality include adopting an adequate software method, assigning the right resources during its development, and the use of appropriated metrics and tools to support this development [8]. He specifically mentions the need of using adequate software tools for managing the software project, along with those for designing, implementing and testing the software product.

By presenting software quality in the context of TQM, Basili refers that quality is a multidimensional concept. He also relates quality with the customer’s satisfaction and its key elements [9].

3 Quality Management in Project Management

Quality cannot be obtained from an isolated effort in a single area, and should not be constrained to the activities of a single organisational level. It must, therefore, be carefully planned and executed. For this reason, the quality management area has this great potential of creating synergies with the one of project management [10].