# Chapter 43
# Building Efficient Assessment Applications with Personalized Feedback:
## A Model for Requirement Specifications

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## ABSTRACT

*The aim of this chapter is to provide a model for requirement specification, useful in developing efficient e-assessment applications with personalized feedback, which is enhanced by calling a recommender engine. The research was done in the context of using educational technology to facilitate learning processes. The data used to build the requirement model was collected from a set of interviews with the users and creators of an e-assessment application in project management. Requirement analysis assumes human effort and thus introduces uncertainties. To minimize the subjective factor, the data extracted from interviews with the users and the developers of the existing e-assessment application are clustered using a fuzzy logic solution into classes of requirements. These classes are the units of the model. The connections between classes are also mentioned: relations such as "if-then," "switch," or" contains" are explained. The requirements analysis conducts a smart set of specifications, obtained in a collaborative manner, useful for the design of e-assessment applications in project management or other similar domains.*

## INTRODUCTION

The role of educational technologies in improving the learning outcomes was always controversial: there are both positive and negative findings related to the use of technology in educational processes. Among positive aspects, there are: students learn more in less time when using computers, students are more attracted to the classes where computer are necessary, teachers improve their practices, by replacing stand-up lecturing with an interactive approach of teaching. Among negative aspects, there are: computer didn't have positive impact on every area; the level of educational technologies' effectiveness depends on students' population, educator's role, level of student's access to technology, software design. The current chapter embraces the idea of increasing the efficiency and effectiveness of educational technology through a thorough software design, based on a collaborative approach of building software requirements.

Educational technology is seen not only as a solution for improving traditional learning methods, but also a way of "reducing the inequities in educational opportunities around the world". This aspect brings into discussion the reliability of educational software. The reliability issue is strongly connected to quality issues. Quality in educational software is critical, as a study developed by the European Quality Observatory has revealed (Ehlers, Goertz, Hildebrandt, & Pawlowski, 2005). The main quality characteristic is given by the degree of transformation made possible by an educational platform, meaning the increase in the degree of competence, as a result of the learning process: quality means obtaining "the best learning achievement" (Ehlers, Goertz, Hildebrandt, & Pawlowski, 2005).

Upon a study made by Learning Societies Lab (Gilbert, Gale, Warburton, & Wills, 2008), quality of educational technologies means: reliability, security, validity, accessibility, pedagogical appropriateness. Another study proposes a model for an interactive Web-based learning system (Barker, 1999), based on: pedagogical philosophy (knowledge comes from the instructor or knowledge builds itself in the mind of the learner), learning theory (emphasizes observable behavior or internal mental states), goal orientation (sharply focused or offers more than one solution to a problem), task orientation (academic, which focuses on traditional academic exercises or authentic, which focuses on exercises in authentic settings), source of motivation (extrinsic, outside of learning environment or intrinsic, inside of learning environment), teacher role (didactic, meaning that the teacher is repository of knowledge or facilitative, meaning that the teacher guides the students), meta-cognitive support (no support for monitoring progress and adjusting to students' need or with such a support), collaborative learning strategies (students work individually or in pairs/groups), cultural sensitivity (insensitive or respectful), and structural flexibility (fixed or open). The report supports the integration of a Web-based learning product to the above-mentioned criteria, thus obtaining the desired quality.

The importance of technologies to learning is highly mentioned by researchers (Buzzetto-More & Alade, 2006). As assessment is an important part of every learning process, technology also supports authentic assessment (Buzzetto-More & Alade, 2006). To underline the integration of assessment into a learning process, we mention the continuous assessment loop of Martell and Calderon: identification of learning goals and objectives, the gathering of evidence, analysis of evidence, report and discuss results, identify improvement opportunities, reflect and make changes (Martell & Calderon, 2005). The final purpose of an assessment is to improve students' outcome. A qualitative computer based tool for assessment doesn't mean to type good questions in the software application, but to translate the whole assessment process into the new medium (Gilbert, Gale, Warburton, & Wills, 2008). This translation can be successfully achieved only by active participation of all those involved in com-

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