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Competency training of students of the Faculty of Chemistry of the University of Barcelona by conducting internal audits

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Abstract

This work deals with the competences and skills training of the students of the Faculty of Chemistry of the University of Barcelona (UB) through participation in internal audits at different laboratories in which different experimental subjects are taught. Students have been able to work cross competences related to ethics, the ability on oral and written expression, the ability to dialogue, the ability to leadership, the teamwork, the analysis and the data interpretation, among others.

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Keywords: Transversal competences and skills; Audits; Quality Management System; Analysis; Leadership; Creativity.

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1. Introduction

The fact that the Real Decreto 1393/2007, as amended by Real Decreto 861/2010, obliges all Degrees have a Quality Management System (QMS) [Real Decreto 1393/2007], also provides an opportunity to influence competency training of students. A QMS requires the completion of all processes in a scheduled manner and following previously established, documented procedures that allow, at all times, keep careful track of the development of different teachings [Compañó & Ríos, 2002, UNE-EN ISO 9001:2008]. Transfer to students this way of working provides scheduled and documented many possibilities ahead of their training because it allows them to assimilate new knowledge and attitudes and also helps them to be able to express integrated, systemic and continuous improvement visions.

An important tool of any QMS is to perform audits. Given the characteristics of the audit concept, and considering that the auditor has to demonstrate a range of skills, personal attributes necessary to apply knowledge and skills [Vélez & Vélez, 2008], audits provides a valuable opportunity for working acquisition of transferable skills by students. This work is described as implemented conducting internal audits in the labs of the Faculty of Chemistry in the context of the subject Quality and Prevention belonging to the Degree of Chemistry. Students who have participated in the experience, have had the opportunity to develop skills related to ethics, oral and written expression, the capacity for dialogue, leadership skills, ability to work in teams or the ability to develop integrated and systemic attitudes and visions. In addition, audits can deepen competency training of scientific and technical information that asks students in grades developed in the Faculty (Chemistry, Chemical Engineering and Materials Engineering).

Audits allow influencing basic aspects for a scientist or a competent engineer, among which stand out, analysis and interpretation of data, quality management, respectful work environment and safety. In general, also permit the student to take awareness of their responsibility within society, considering technical training and, somehow, lets analyze issues that are as important as all those related to health and sustainability. The audits allow integrating the dynamic of management systems for quality, safety and environment in their training, being a very good tool towards their professional future.

This type of task also encourages critical thinking and creativity of students and a greater understanding and integration of all the work that students develop while doing the labs, promoting teamwork. Therefore promotes critical and self-critical capacity of analysis, synthesis, overviews and application of knowledge, always from an ethical perspective to accompany the performance of any auditor. Moreover, audits also require interaction with audited, which means working communication skills and the ability to understand the work of others and adapt and understand situations and new attitudes.

It can be argued that all the tasks that students have made to conduct the audits have also contributed to assume a culture of continuous improvement, which adds value in their professional and skills training. It can also be considered that in surveys and external assessments made in any of the teachings of the Faculty, it became clear that graduates had a very good education, but had gaps in generic skills. Thus, the audits try to improve these aspects a little weaker in the formation of our students. All the above shows that this work is contextualized within the framework of QMS but its link with the teachings of the Faculty of Chemistry has been complete because it has been applied to almost all degrees of Faculty by, virtually, all departments of the Faculty [Gimenez et al. 2006; Gimenez et al. 2012].

It must be pointed out that the teachers responsible for this work belong to different departments of the Faculty and therefore this makes that this activity is a useful tool and acts as a unifying element in planning the management practices laboratory. The work is part of a teaching innovation project in which all authors have participated.

2. Methodology

The methodology for the development work has been based on three pillars: the training of students, conducting audits, obviously, and monitoring and evaluation of the whole process. First, the students have been trained to could develop their work as audit documentation. This documentation includes the questionnaire audit, the auditor manual procedures, the form of the audit report, the survey auditors, etc. The auditors are chosen among students of the subject Quality and Prevention of the Degree of Chemical and this activity has been part of the continuous

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