Active Learning Strategies Applied to Experimental Research Works Conducted by Foreign Students in Food Engineering Studies

Isabel Achaerandio, Rosa Carbó

Departament d'Enginyeria Agroalimentaria i Biotecnologia
Escola Superior d'Agricultura de Barcelona
UNIVERSITAT POLITÈCNICA DE CATALUNYA
maria.isabel.achaerandio@upc.edu
rosa.carbo@upc.edu

Abstract
Foreign students that come for a short stay usually need a cultural adaptation process due mainly to lacks in language skills and cultural differences. These facts involve that some alternative methods have to be developed in order to optimize the short time of the stay to achieve efficiently the knowledge objectives. This work showed an active learning experience applied at the ESAB-UPC at the spring semester of 2008. We can point that the use of active learning in research work that cover different disciplines could be a useful strategy for integrating students from other countries.

Workshop Topics
Autonomous learning: Beyond active learning

I INTRODUCTION

Erasmus student exchange program is a successful strategy to reduce cultural differences between European countries. This period could be considered as an open-mind experience, as the students live abroad during 3-12 month and they acquire new knowledge and learning tools of the issues of their undergraduate studies.

The number of students that arrives at the Escola Superior d'Agricultura de Barcelona (ESAB) is increasing year by year. Foreign students that come for a short stay usually need a cultural adaptation process due mainly to lacks in language skills and cultural differences. Sometimes, these lacks make difficult the adaptation of the student to a classic lecture and cooperative learning. According to the third and seventh principles of the seven principles for good practice in undergraduate education (uses active learning techniques and respects diverse talents and ways of
learning) [1], teachers have to adapt and design some alternative learning methods in order to settle down, and motivate foreign students. These alternative strategies have to join two points: the short available period of the student stay at the exchange school (usually six months) and how to the student can achieve efficiently the knowledge objectives proposed by the teachers.

II APPROACH OF THE LEARNING STRATEGY

II.1 Background

The ESAB offers an optional subject to foreign students, who came in an Erasmus six-month stay. This subject, named *Treball Experimental en Enginyeria de Biosistemes* (Experimental Work in Bio-system Engineering), involves 200 h, eight European Credit Transfer System (ECTS).

II.2 Objectives

The main aim of this learning experience was to join two food engineering areas: food microbiology and meat processing to develop some competences as knowledge acquisition use of technological tools, critical thinking and practical capabilities, which are essential in laboratory tasks. Additional competences developed were bibliographic research, language and social skills.

II.3 Learning experience development

In the case presented, some active learning strategies were applied. We designed an experimental research work for a Romanian student, who had a low level of Spanish. The experimental issue selected was interesting for the student, as she came from a region where the meat industry is one of the main economical activities. The experimental work was conducted in two steps (table 1).

<table>
<thead>
<tr>
<th>Table 1. Phases of the learning strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase</td>
</tr>
<tr>
<td>-------</td>
</tr>
</tbody>
</table>
| (1)   | Autonomous work | - Bibliographic review of the issues  
       |             | - Improvement of specific vocabulary  
       | Tutorial session | - Critical thinking and discussion  
       |             | - Progress in social skills  
| (2)   | Experimental work | - Practical skills  
       |             | - Critical thinking and discussion  
       |             | - Oral communication and writing skills |

1Adapted from de Miguel (2006) [2]
The first part of the project was to review the issue studied (meat-cured food). The student worked individually in the library using some databases, books and scientific papers, mainly in Spanish. During this step individual tutorial sessions were made in order to establish feed-back with the student. This step ended when a summary of the review was written by the student and approved by the teachers. The learning strategies of this part of the work were to improve the previous knowledge of the issues developed in the work and to promote bibliographic research skills.

The second part of the work was to prepare and conduct the experimental work. The student worked individually in different facilities of the school (microbiology and chemical laboratories and meat industry pilot plant) during 45 days. In this case, we wanted to broaden the laboratory practice skills of the student and to improve the student sense of curiosity of the engineering process and control. Additionally, the research work conducted in laboratories involved to improve personal skills of oral communication in Spanish.

Finally, the student prepared an oral communication and a research article, which was written in Spanish. The research work was revised by a three-member evaluation tribunal.

III Results

The student achieved the learning objectives proposed. She improved her knowledge of the issue, developing technical competences and language skills. The bibliographic review was useful to advance in the issue, mainly acquiring technical vocabulary and basic knowledge of the food process studied. The tutorial sessions confirmed the progress of the student.

Social adaptation was allowed by the experimental work made at the laboratories of the school, making easier to the student to interact with other students. Specific knowledge of the subjects was also gain, and critical thinking was also applied in the discussion of the results obtained.

We can point that the use of active learning in research work that cover different disciplines could be a useful strategy for integrating students from other countries that come in a short stay.

IV Future Work

Nowadays we are working in applying the strategies employed to the methodology of the subject “Experimental Work in Bio-system Engineering” at the ESAB. Additionally, we want to verify the results obtained in this teaching experience with other students and, also it is necessary to establish an evaluation procedure for this experience.
REFERENCES
