

ADAPTATION OF SUBJECTS LECTURED AT THE UNIVERSITY OF BURGOS (SPAIN) TO THE EUROPEAN CREDIT TRANSFER SYSTEM

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Abstract

The European Credit Transfer System (ECTS) implies to modify the actual Spanish credit system based on the time that students are attending lectures and seminars. One ECTS stands for around 25-30 hours of work (in and out of class). The aim of this paper has been to adapt to the ECTS system the subjects "Bromatology" (140 hours of teaching "in class"), "Food and Culture" (45 hours), "Microbiology" (60 hours) and "Food Microbiology" (70 hours), currently lectured in Food Science and Technology Degree at the University of Burgos. Focusing on the student, a specific questionnaire was designed. The questionnaire included some sections such as the student work schedule, an evaluation of the seminars and lectures given, and the most appropriate methodology of teaching. The current number of theoretical lectures and seminars should remain, at least, the same for the new design of the mentioned subjects. Theoretical lectures must combine the use of blackboard, transparency films and power point presentations, teaching the students to learn and to value the formative possibilities of the use of the data processing network, and will be necessary to stimulate them to carry out reviews of topics related with the subjects, and to set them out in front of the lecturer and other students.

Key words: ECTS, Food Science and Technology, methodology of teaching, demand on students.

Introduction

The Bologna Declaration of June 1999 on the creation of a European Higher Education Space was a pledge taken by 29 countries to reform the structures of their own higher education system (Pagani and González, 2002) in order to create convergence at European Level, respecting the principles of autonomy and diversity of the Universities implied within the process. The Declaration recognized the value of coordinated reforms, compatible systems and common action.

The main goals of the Bologna Declaration for European Universities could be summarized as follows: the implementation of the Diploma Supplement allowed reaching a common framework of readable and comparable degrees; the learning activities were covered by the ECTS-compatible credit systems; the introduction of first degrees relevant to the labour market was designed by a model of undergraduate and postgraduate levels; all criteria and methods were comparable with an agreement in quality assurance; the free mobility of students and lecturers were guaranteed.

On the 19th of June 1999 the European Ministers of Education signed a joint declaration approving of the Bologna Declaration.

The Tuning Educational Structures in Europe (2002) was a project to look for points of reference convergence and common understanding, emphasizing on the subject area level, instead of on educational systems. The distribution of credits allowed deciding how much time was required to reach each of the proposed learning outcomes that should be adjusted in order to show how much time was available for each teaching/learning activity in the course program.

The European Credit Transfer and Accumulation System (ECTS) implied to modify the actual Spanish credit system based on the time that students are attending lectures and seminars. One ECTS stands for around 25-30 hours of work, in and out of class (Pagani and González, 2002). One academic year and one semester are considered to consist of 1500 hours (60 ECTS) and 750 hours (30 ECTS), respectively.

The aim of this work has been to adapt to the ECTS system the subjects “Bromatology” (140 presential hours of teaching), “Food and Culture” (45 hours), “Microbiology” (60 hours) and “Food Microbiology” (70 hours), currently lectured in Food Science and Technology Degree at the University of Burgos, taking into account the basis of the Tuning project.

Methodology of Research

Participants

A permanent group of work made up of 12 lecturers was set up. All members were educated in the implications of the transformation of the Spanish credits into ECTS. They gathered literature references on the topic, and organized formative workshops inviting experts, who talked about previous experiences in other European Universities, and widely discussed the problems found, as well as possible solutions for them.

Also, students from “Bromatology”, “Food and Culture”, “Microbiology” and “Food Microbiology” subjects were used for the student’s effort questionnaire (see below).

Materials

Group administered questionnaires are widely used to gather information about the program’s effectiveness from alumni at different career stages (Hartel and Gardner, 2003). As a first step of the project, and focusing on the student, all members of the group designed a survey of this type for the subjects lectured in the mentioned degree (Appendix 1). Those questionnaires are currently used in Food Science and Technology courses to obtain some practical information about student learning (Nielsen, 2004). From the results of this survey we obtained relevant information about different methods of teaching.

Statistical analysis

One-way ANOVA were carried out with the values of the replicates. When differences were significant, the LSD post-hoc test was also performed (Sokal and Rohlf, 1980). These analyses were carried out with STATGRAPHICS Plus 5.0 software.

We studied the significative differences ($p < 0,05$) between learning methods in each subject and also between subjects.

Results of Research

Subject “Food and Culture”

The questionnaire was answered by the 90% of the students registered in the subject. Students commented that for the preparation of the exam they needed an average of 1.3 hours of study by each lecture’s hour received. 100% of the polled considered useful the lectures of this subject.

Figure 1 shows the answers of the students with regard to the way they consider the lectures were more efficient.

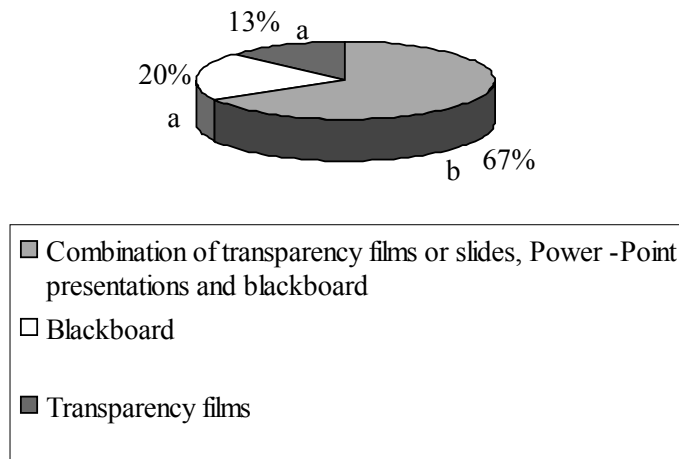


Figure 1. Results of the questionnaire for Food and Culture subject. Simple ANOVA were performed and the different letters indicate significant differences ($p < 0.05$).

67% of students pointed out that they learned more efficiently when using a combination of transparency films or slides, Power Point presentations and blackboard, considering of paramount importance to have in advance the transparencies or slides projected. The 20% indicated that they learned better with the use of the blackboard or Power Point presentations and the 13% considered that transparency films or slides were the most adequate mean to support lectures. There was no significant difference ($p < 0.05$) between blackboard and transparency films methods. There were significant differences ($p < 0.05$) between the combination method compared with other learning methods.

80% of students indicated that seminars would help them to pass the subject and would facilitate the discussion of the themes.

No student thought that preparing reviews of “Food and Culture” related topics could be useful.

In relation to the use of the data processing network, that was negatively valued by 57% of students.

Subject “Bromatology”

The questionnaire was answered by the 90% of the students registered in the subject. Students commented that for the preparation of the exam they needed an average of 2.5 hours of study by each lecture’s hour received, and an average of 1 hour by each laboratory practice’s hour received. 100% of the polled considered useful the lectures of this subject.

Figure 2 shows the answers of the students in respect of the way they consider the lectures were more efficient.

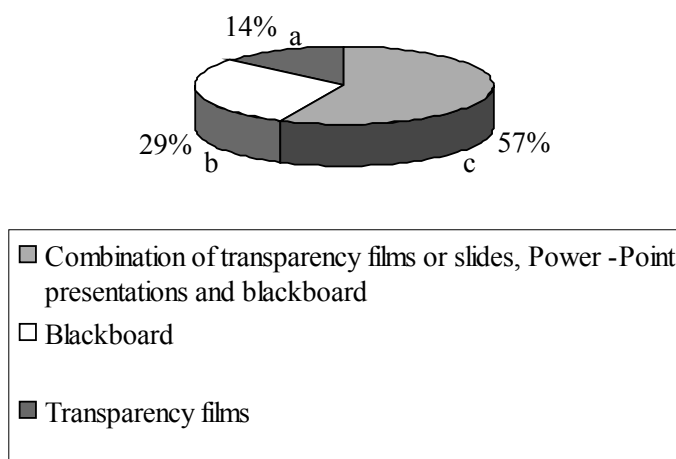


Figure 2. Results of the questionnaire for Bromatology subject. Simple ANOVA were performed and the different letters indicate significant differences ($p < 0.05$).

50% of students indicated that they learned better when the lecturer used a combination of transparency films, slides, power point presentations and blackboard, considering essential having in advance the transparencies or slides projected. 29% of students said that they learned more efficiently when the lecturer employed only the blackboard. 14% of students considered that transparency films were the best support for lectures. Only 7% of students indicated that they learned better when the lecturer only used power-point presentations.

There were significant difference ($p < 0.05$) between these learning methods (blackboard, transparency films and combination methods).

75% of students indicated that seminars would help them to pass the subject and would facilitate the discussion of the themes.

71.5% of students thought that preparing reviews of “Bromatology” related topics were not useful at all to contribute to pass the subject.

In relation to the use of the data processing network, that was positively valued by 64% of students.

Subject “Microbiology”

The questionnaire was answered by the 44% of the students registered in the subject. 100% found useful the lectures. Students observed that there are not required more hours of theory or practice. The average hours spent in preparing the test for each hour for each hour theoretical and practical courses provided has been less than 1 hour.

100% students answered that they learned better with a combination of media, and the 11% referred to the importance of prior submission of transparencies or slides projected.

None of the surveyed students believed that a review about any “Microbiology” related topic should be carried and displayed.

Regarding the use of the computer network for the completion and correction of personal written works via on-line, 50% of students considered positive and 50% considered negative.

Subject “Food Microbiology”

The questionnaire was answered by 58% of the students registered in the subject. Students spent an average of 1 hour to prepare the theoretical exam for every hour taught, and just less than

1 hour for every hour practice provided. 100% of students considered useful all the theoretical and practical classes and thought that no more lectures were necessary. One student pointed out that they considered excessive the number of practical sessions, and it should be shortened to 15 hours.

62.5% of students believed that they learned better with a combination of media. They considered important the prior submission of transparencies or slides projected (Figure 3). There were significant differences ($p < 0.05$) between the combination method compared with others learning methods.

20% of students showed that they learned more efficiently with the use of the blackboard, and 17.5% with the support of transparencies (Figure 3). No student considered adequate the use of computer projection for this subject. There was no significant difference ($p < 0.05$) between blackboard and transparency films methods.

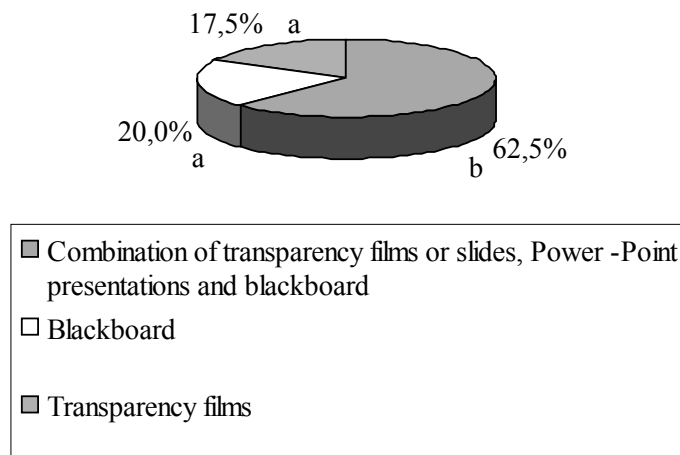


Figure 3. Results of the questionnaire for Food Microbiology subject. Simple ANOVA were performed and the different letters indicate significant differences ($p < 0.05$).

85% of those students who answered to the questions concerning the seminars believed that they should not be done. Only one student thought that seminars could be useful, but they should not last longer than 1 hour.

83% of students answered that a review about any “Food Microbiology” related topic and oral presentations of it should be compulsory. The other students were unanimous in expressing their opinion, contrary to this assessment.

In respect of the use of the computer network for the completion and correction of homework via on-line, 75% of students thought that it would be positive, and 25% negative.

Discussion

Johnson et al (2004) evaluated if there is a significant difference in student achievement, attitude and instructional cost and time efficiency between hands-on laboratories, live demonstrations and videotape demonstrations for nonscience major students. As in our study, they developed an attitude survey to determine students’ perceptions toward the effectiveness (how well they learned) and efficiency (the amount learned for the time spent) of these teaching methods and the students’ perceived enjoyment of each teaching technique.

In the new design of the studied subjects for the European Higher Education Space, the current number of theoretical lectures and seminars should remain at least the same. Teaching/learning methods are changing considerably (Dumoulin, 2004). It is very important to improve the oral communication skills of students (Reitmeier, Svendsen, Vrchota, 2004). From our results, seminars

seem to be a very useful tool to improve the students' oral communication. In research by Reitmeier (2002), students concluded they learned more when they were able to communicate with a team rather than when working alone.

Other authors such as Culbertson and Smith (2003) tracked and compared the performance of traditional classroom and on-line students in two introductory level food science classes. They concluded that on-line students performed in an academically superior fashion when compared to Face-to-face students.

Generally, one-way ANOVA analysis performed between these subjects showed that there was no significant difference ($p < 0.05$) between blackboard and transparency films methods. Otherwise, there were significant differences ($p < 0.05$) between the combination method compared with other learning methods.

Conclusion

From our results, students learned more efficiently when using a combination of transparency films or slides, Power Point presentations and blackboard.

Theoretical lectures must combine the use of blackboard, transparency films and power point presentations, teaching the students to learn and to value the formative possibilities of the employment of the data processing network.

From our surveys results, students answered that a review about any "Bromatology/Food and Culture/ Microbiology and/or Food Microbiology" related topic were not useful at all to contribute to pass the subject. Only for "Food Microbiology" they thought that a review should be compulsory.

It will be necessary to stimulate the students to carry out reviews of topics related with the subjects and to present them orally.

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APPENDIX 1

FOOD SCIENCE AND TECHNOLOGY DEGREE STUDENT'S EFFORT QUESTIONNAIRE	
Subject:	Spanish credits: (hours of lectures)
1. - Estimated student work time in hours	
<input type="checkbox"/> Less than 1 hour <input type="checkbox"/> 1 <input type="checkbox"/> 1.5 <input type="checkbox"/> 2 <input type="checkbox"/> 2.5 <input type="checkbox"/> Longer (How long?):	
2. - In your opinion:	
Are the lectures useful?	
If not, please mention an alternative:	
Should more lectures be given?	
If yes, please mention the most appropriate number of them:	
3. - In your opinion: How do you learn more efficiently during the lectures? (Please, indicate the option/s that are more appropriate).	
<input type="checkbox"/> -With transparency films.	
<input type="checkbox"/> -With power-point slides.	
<input type="checkbox"/> -With the blackboard.	
<input type="checkbox"/> -With a combination of means.	
4. - Seminars:	
Are they useful? <input type="checkbox"/> yes <input type="checkbox"/> no	
How long should they last?	
5. - If you have prepared and presented a review about any "Bromatology/Food and Culture/Microbiology and/or Food Microbiology" related topic, please, indicate if it has been useful for you to pass the subject:	
<input type="checkbox"/> Yes <input type="checkbox"/> no	
6. - In your opinion: Are the data processing network useful to prepare this subject?	
<input type="checkbox"/> Yes <input type="checkbox"/> no	
MANY THANKS FOR YOUR COLLABORATION	

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