



TEACHING AND LEARNING INNOVATION IMPACTS

SEMINARS AS A USEFUL TOOL OF ACTIVE LEARNING

The study case of the Zoology in the Environmental Sciences

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- 1. ABSTRACT:** En aquest treball es mostra com la incorporació de seminaris en la Zoologia de les Ciències Ambientals ajuda a millorar les qualificacions respecte a la mitja de les titulacions. Es conclou que la utilització de seminaris està molt ben valorat pels estudiants i n'augmenta la seva motivació. És un entorn molt participatiu que facilita treballar els continguts procedimentals i actitudinals que desperten un alt interès per part dels estudiants, així com avaluar les competències transversals.
- 2. ABSTRACT:** This paper shows how the incorporation of seminars in the Zoology of Environmental Sciences helps to improve the qualifications with regard to the average of the degree qualifications. We conclude that the use of seminars is highly valued by students and increases their motivation. It is a type of active learning that facilitates to engage in procedures and attitudes, which aroused high interest from students, as well as the assessment of generic competences.
- 3. KEYWORDS:** seminaris, Zoologia, aprenentatge actiu, procediment, actituds, competències transversals.

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4. DEVELOPMENT:

INTRODUCTION

Zoology in the Degree of Environmental Science

The main aim of the Degree of Environmental Science is to ensure the training of professionals with a multidisciplinary and global vision of the current environmental problems that the Earth is facing. Zoology is included in the Degree of Environmental Science as a mandatory subject consisting of 6 ECTS that is imparted during the first semester of the second course (Soler-Membrives, 2015).

The percentage of students who failed the subject of Zoology included in the old degree program was very high (57% of failures in the 2005-2006 course). The implementation of new teaching methods in the degree reduced this percentage to 17% in the course 2007-2008 (Garcia-del-Pino and Carrassón, 2007). Currently, the number of failures is less than the average of the degree and the grades have improved during the period 2011-2014 (Figure 1).

One of the particularities of this subject within the Degree of Environmental Science is the use of seminars as an educational tool.



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The teaching contents of the subject of Zoology are divided in three main categories: conceptual (facts, notions and ideas that should be known and comprehended), procedural (practical application of knowledge) and attitudes (to acquire values about the way we perceive life in an environmental context) (Table 1). A concept can be learned in many ways, however a procedure is required to properly acquire it. The procedures facilitate the learning of concepts as well as encourage the development of attitudes (Mestres 1994), which are essential for training professionals in this area. The degree of knowledge of the different types of contents that will be required to pass the course are often difficult to acquire exclusively through theoretical classes.

Seminars in the Zoology of the degree of Environmental Science

Seminars are an active learning method, which is defined as a method in which the student actively participates in the learning process, that serves as a junction between theory and the practice (González i Wagenaar, 2008). Once knowledge is reached during master classes, this has to be “matured”, and seminars are a proper tool to do it. Besides, seminars allow treating current issues, treating specific cases, and interacting with professionals from diverse fields. The seminars are not only very useful to deepen in conceptual contents, but also to work the procedural and attitudinal contents (Table 1).

In such a context, the main aim of this work is to assess the usefulness of the seminars and the different types of exercises performed during these sessions to achieve the specific and generic competences of the subject of Zoology.

METHODOLOGY

Including the seminars in the programme of the course implies a reduction of 25% of the hours dedicated to master classes. Moreover, in order to facilitate the interaction between the teacher and the student, the group of theory is divided into two seminar groups (in master classes the number of students ranges between 70 and 80, while in seminars the number of students ranges between 35 and 40). Seminars are organized with the aim that students develop a participatory activity, working alone or in reduced groups, depending on the kind of exercise being performed. Specific materials are prepared to perform the seminar and to evaluate it (25% of the final mark).

In recent years, the seminars of this course have incorporated different kinds of participative activities: solving of practical exercises, preparation of examination questions, discussion and correction of examinations, critical analysis of scientific information, definition and discussion of concepts, discussion of current topics, lectures by professionals, and oral presentations by students.

In order to assess the usefulness of seminars in this work we analyse the evolution of the grades in the subject of Zoology in the degree of Environmental Science in recent years



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(2011-2014). In addition, we also analyse the results of the surveys performed to students about their perception on the helpfulness of the different methodologies used during the seminars (73 students, course 2015-2016).

RESULTS

Following the ECTS 5-point grading scale, the number of E (failures) was considerably lower than the average of the degree. The number B (above the average standard but with some errors) was equal to or higher than the average of the degree and tends to increase during the period studied; this has reduced the current numbers of C-D qualifications (fair but with a number of notable errors). However, less A qualifications (excellent/outstanding) was observed.

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Regarding the survey results, the overall rating of students on the seminars was 7.6 out of 10. The 91.7% of students believed that the realization of seminars helped to understand and assimilate the continuously matter. Moreover, the 93% considered that the methodology used in the evaluation of seminars allowed them to assimilate content more efficiently.

A 91.7% of students found suitable work within small groups during the seminars, and only 8.3% preferred individual activities. Within the small-group activities, 42.4% preferred to work in pairs while 57.6% preferred to do it in groups of 3-4 students.

The best ranked methodologies according to surveys of students were the discussion of topical/current scientific issue and talks given by professionals. These were followed by the discussion and correction of tests and the oral presentations by students. The methodologies that least helped them to understand and assimilate the subject were the exercises of definitions and concepts, and secondly the development of multiple choice questions (Table 2).

DISCUSSION

The evaluation of the seminars, in an average of 7.6, is more than one and a half points higher than that obtained with the same question in the 2007-2008 survey (score 5.9) (García-del-Pino and Carrassón, 2007). Therefore, conducting seminars is a highly well valued item and has been improved over the years with the innovation of new methodologies.



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Expository lectures to big groups often difficult the active participation and debate. The fact of working seminars in small groups facilitates better communication with the teacher and the student participation and also encourages students to take initiative. In general, group activities (2-4 students) have a good assessment by students. These help to maintain good interaction among students, encourage the cooperation work and facilitate the discussion and the formation of their own critical point of view. Therefore, during the seminars it may be achieved a better and closer relationship student - teacher / student-student in comparison to that in expository lectures. Moreover, unlike expository lectures, seminars present an ideal environment to acquire many of the generic competences and skills of the course (Membrives-Soler, 2015).

The two better valued activities (the discussion of topical/current scientific issue and talks given by professionals) denote that students are interested in going beyond the contents; these activities are important to implement in class discussions the procedural and attitudinal contents, fact which is important, in turn, for the training of future professionals.

Besides all the advantages that seminars point out, a disadvantage have also been detected.. While there are a lower number of failures (E score), so do the outstanding ones (A scores). It would be very interesting to discuss and study in the future, if the presence of many different items to evaluate (including seminars) and the scoring of small-group activities determine a decrease in the detecting the outstanding students.

To conclude, the use of seminars has proven to be a useful tool to apply different teaching methodologies and assess the generic competences and skills, which are important for the curricular success of an environmental sciences student. It provides a very participatory environment which facilitates the debate and provides the opportunity to work individually or in small groups, depending on the activity to develop.

4.1. GRAPHIC OR TABLE 1

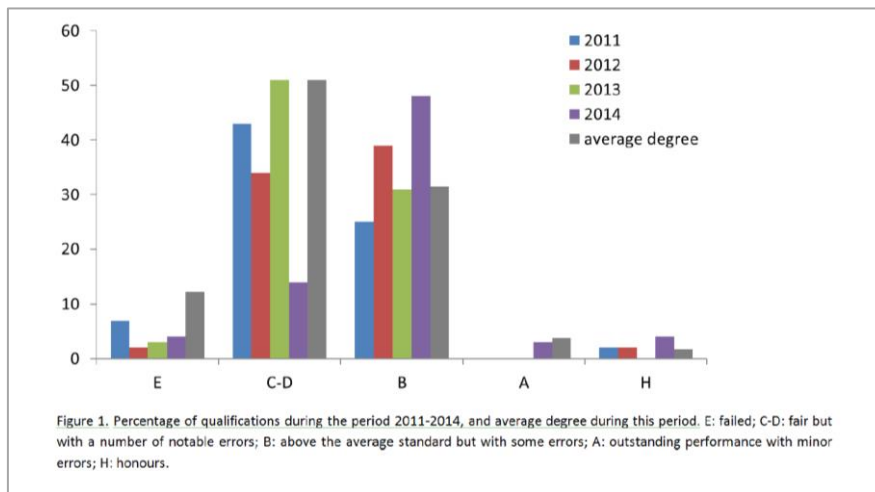
Table 1. Contents of the subject of Zoology in the Degree of Environmental Science.

| CONCEPTUAL | PROCEDURAL | ATTITUDINAL |
|-------------------------------|---------------------------|--|
| Principles of Zoology | Identify animal diversity | Appreciation of the importance of maintaining animal diversity |
| The classification of animals | | Respect for animals and their function in the ecosystem |
| Reproduction and development | Classification of animals | To apply the knowledge acquired in the practice |
| Invertebrates and Vertebrates | | To develop a critical view |



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4.2. GRAPHIC OR TABLE 2



4.3. GRAPHIC OR TABLE 3

Table 2. Results of the surveys of studies on the three methodologies preferred used during the seminars. A: solving practical exercises; B: development of multiple choice questions; C: correction of exams and discussion; D: discussion of educational/scientific material; E: definition and discussion of concepts; F: discussion of current/topical scientific issues; G: talks given by professionals; H: oral presentation by the students.

| Methodologies used during the seminars | | | | | | | | |
|--|-------|------|-------|-------|------|-------|-------|-------|
| | A | B | C | D | E | F | G | H |
| 1st place | 6 | 3 | 7 | 6 | 0 | 6 | 10 | 4 |
| 2nd place | 3 | 3 | 7 | 4 | 3 | 10 | 6 | 5 |
| 3rd place | 6 | 5 | 3 | 3 | 3 | 7 | 8 | 8 |
| sum | 15 | 11 | 17 | 13 | 6 | 23 | 24 | 17 |
| percentage | 11,90 | 8,73 | 13,49 | 10,32 | 4,76 | 18,25 | 19,05 | 13,49 |

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