

TECHNICAL SUBJECTS ASSESSMENT: ASSESSED ITEMS INFLUENCE

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Abstract— The aim of this study is to analyze the various factors affecting the evaluation technical subjects and their influence on student learning, in order to establish guidelines for improvement in the assessment. The analysis was performed on the evaluation of students in the course "Structural Concrete", fourth year of the Degree in Edification of the Polytechnic University of Madrid, during the 2013-2014 year. The work reflects the influence on the evaluation of the basis with which students arrive, the students' perceptions of evaluation and the type of evaluation conducted. As for the subject of "Structural concrete", the analysis has been very positive, although it is proposed to review the following course teaching planning, in order to improve the performance of the learning objectives.

Index Terms— Evaluation, objective, teaching, learning, competencies.

I. INTRODUCTION

The university education adaptation to Bologna has meant a change within the teaching orientation. This change starts from general and specific objectives which must be able to train professionals in general and specific skills, which the student must be able to develop, and learning results, which the student must demonstrate.

One of the most important facets in teaching is assessment [1]. Testing and grading are very important aspects within teaching and they affect in the process of helping and encouraging students to learn and understand their progress in learning. They also help us to discover our weaknesses in order to find the best way to teach. What would be ideal is that assessing and grading intertwine benefiting the learning and relating to the planned objectives and obtained results [2].

The type of assessment determines the level of passes but that does not mean that it determines the level of knowledge acquired too. Thus, it is really important to study the influence of different assessment methods in order to learn which one reflects more accurately the learning. Apart from the used method, the human factor also affects in assessment, what is to say the perception the student has about the assessment method, whether it is appropriate or not [3].

Taking into account the previous premises, the aim of this paper is to analyze the different factors which affect assessment in the technical subjects and their influence in the students' learning through the analysis of the "Structural Concrete" subject assessment. This subject belongs to the Building Degree of the Polytechnic University of Madrid, and the assessment was done during the year 2013-2014 in order to establish assessment improvement patterns.

II. APPROACH TO WORK

A. Stages of the research

"Structural Concrete" is a type I compulsory subject studied in fourth grade (seventh semester), with 6 ECTS credits. Continuous assessment carried out in the subject during the year 2013-2014 has been followed by the 98 % of the students. This assessment is has been divided into three general parts:

- Four partial tests, without a minimum score, done along the semester, which are equal to four points in the final score. Each test involves a particular part of the contents different from that of the other tests.
- Class practices, homework, group work, etc., done along the semester, which are equal to two points.
- A global test, done at the end of the semester, which contributes to the final score with two points. In this test, which is global and concurrent to all students, regardless of their group, all the contents of the subject are included and it is necessary to obtain a minimum mark of 3 out of 10 in order to pass the subject.

In order to analyze the type of assessment and respond to the aim of this paper, assessment is going to be studied from different points of view. Firstly, the grades are going to be analyzed directly. Secondly, assessment is going to be studied from the students' point of view, relating their perception of the subject to the results. And, finally, the influence of different types of assessment in the grading is going to be studied.

B. Data gathering strategy

The students' grades are kept in the database of the teachers who teach the subject, whereas the data offered by the students are part of the fulfillment of a datasheet. This datasheet was fulfilled by the students from group 3 of the subject "Structural Concrete" during the year 2013-2014. This datasheet was fulfilled individually in the classroom, three months after having started the classes, but without having done the fourth partial test and the global test, in order to avoid the obtained score to affect the valuation of the subject. All the valuations were made in a scale from 1 to 5, in this way: 1-strongly disagree; 5-strongly agree. The sheet was divided into four large blocks, which allowed the data gathering in the following aspects: the call in which they passed the basic and fundamental subjects for the understanding and learning of the subject, the student valuation of the fulfillment of the learning objectives planned in the subject, the assessment method used and the effectiveness of the assessment system concerning the learning and the encouraging.

III. RESULTS

The global analysis of the gathered data from the students for this research is detailed below:

- The number of students to whom the research has been made is 107. 55 of them have passed all the basic subjects (51.4%) and 62 students have passed the two subjects related to structures from the previous years (57.9%). Only 10 students (9.3%) have not passed three quarters of the basic subjects.
- Only 2 students asked for being examined through the "only final test" option. The percentage of students who have passed the subject is 90.7%.
- The average valuation of the students about the relation between class hours and ECTS credits is 4.1, and that of the valuation about the assessment method is 3.9.
- The average valuation of the students about the achievement of the learning objectives is 3.6, and that of the valuation of the benefits of assessment in learning is 4.3.

Next, the results obtained in the assessment system used in the subject "Structural Concrete" during the year 2013-2014 are shown (Fig.1).

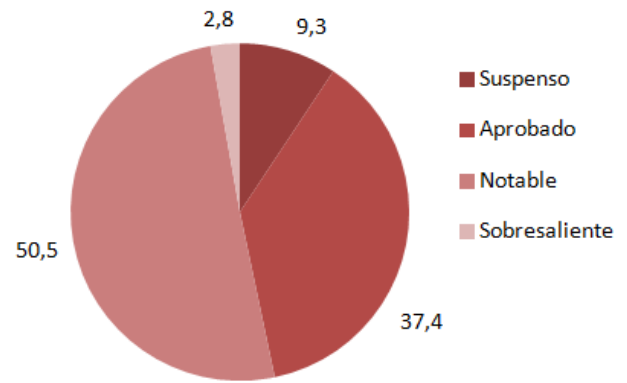


Fig. 1. Percentages depending on grades.

As it can be seen, the percentage of students who have failed the subject is 9.3%, compared to the 90.7% who have passed. This shows a high level of passes in continuous assessment, given that it is a very practical subject (Fig. 1).

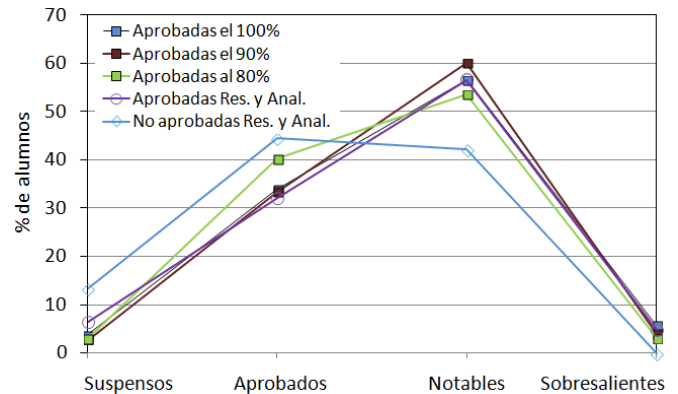


Fig. 2. Percentages of students who have passed the basic and/or essential subjects.

Figure 2 shows the relation between the grades obtained by the students and the knowledge basis with which they start to study the subject. Mathematics I, Physical Mechanics, Mathematics II, Facilities Physics, Statistics and Technical Projects have been considered as basic subjects and Materials Resistance and Construction Structures and Geotechnics have been considered as essential subjects.

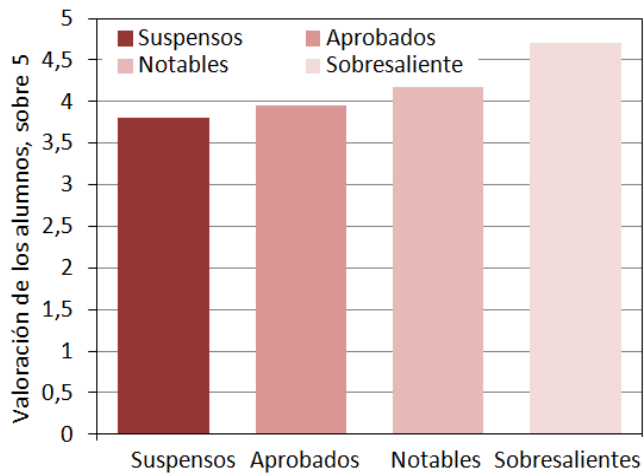


Fig. 3. Relation between scores and hours-ECTS credits valuation.

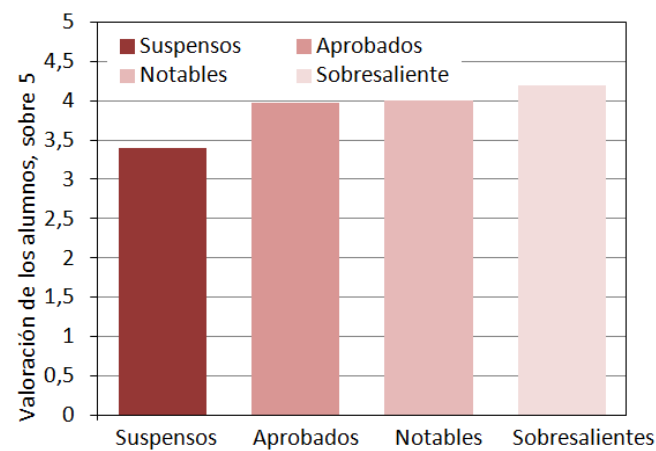


Fig. 4. Relation between scores and assessment method valuation.

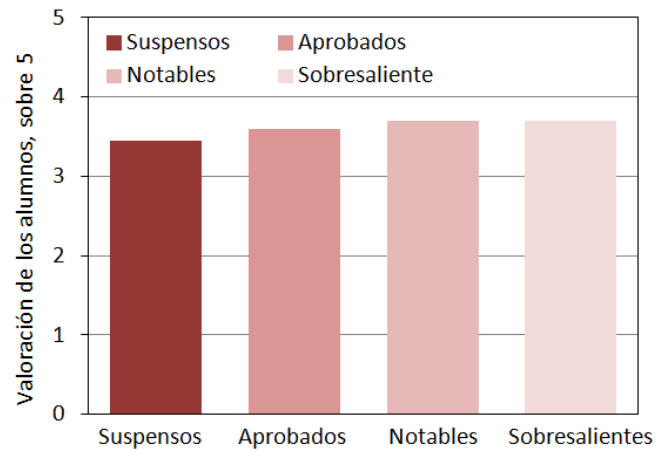


Fig. 5. Relation between scores and learning objectives valuation.

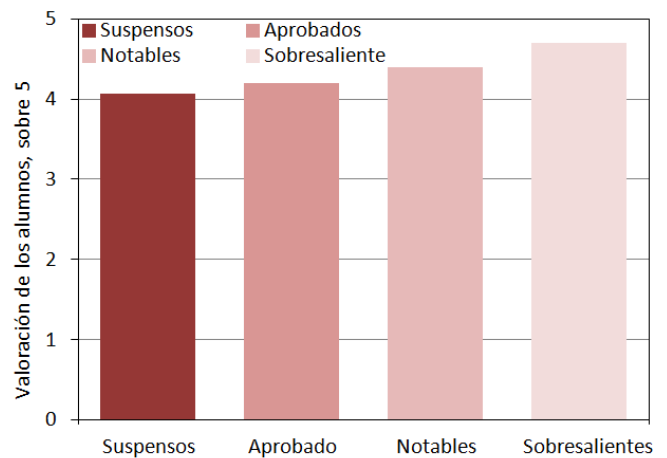


Fig. 6. Relation between scores and assessment method benefits in learning valuation.

Below, the grades are going to be compared with the students' perceptions in different aspects. Figure 3 shows the relation between the grades and the students' perception between hours used in the subject and ECTS credits. It shows that the students with higher scores express a better relationship between hours and credits. Figure 4 shows the relation between scores and the students' valuation of the assessment method. It shows that the more comfortable the students feel with the assessment method, the higher the scores are.

Figure 5 shows the relation between scores and the learning objectives fulfillment perception. Figure 6 shows the relation between scores and the usefulness to learn of the assessment method valuation.

IV. RESULTS ANALYSIS

The students' scores (Fig. 1) show that the percentage of students who have passed the subject reaches the 90.7%, which implies a high interest in the subject.

Figure 2 shows that the students who have passed between 90% and 100% of the basic subjects manage to get higher scores than the students who have passed only 80% of them. The students who have passed the essential subjects have really high percentages of passes, whereas those who have not passed these subjects reach a higher percentage of fails and passes, to the detriment of the number of outstandings and grades of B.

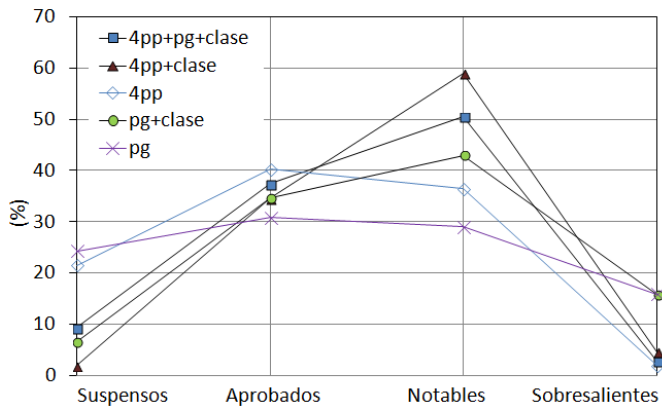


Fig. 7. Relation between scores and assessment method.

Figure 7 shows that, from the same learning of the students, the assessment method affects the grades. Whereas an assessment method based in partial tests and homework, without a final test, diminishes the number of fails and increases that of grades of B, an assessment done regardless of the home- and classwork would affect the results negatively. If the assessment was done only with a final test, the results would be worse. These results, however, will improve if the classwork is added to the grade.

V. CONCLUSIONS

As a response to the objective of the research, the obtained conclusions and the possible improvement strategies are detailed below:

- The students' perception of the subject is a determining factor in their motivation, obtaining better results the students who have a more positive valuation of the subject.

- The overcoming of basic and fundamental subjects from previous years affects, clearly, the scores.
- It is fundamental that the assessment benefits the learning, encouraging the feedback, the motivation and the comprehension ability of the students of their own learning process. This way, the students will assimilate it as one more part of their learning process and they will improve their results.
- The assessment method used affects decisively the scores and the way of confronting the subject learning, being continuous assessment the better way to encourage the students' work and the easiest one to acquire the skills.
- Though the analysis of the assessment used in the subject "Structural Concrete" has demonstrated that it has helped the students' learning and their development of skills and has obtained really high results, it is considered necessary to check the teaching planning in order to fulfill, more properly, the learning objectives.

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