

# Tools in Spanish Universities to Facilitate the Transition from High School to University and their Assessment

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## ABSTRACT

Incoming students in the University have education deficiencies, so universities studies require a sound basis of scientific knowledge. In this project are analysed instruments to reinforcing knowledge in those areas related to the studies that students are about to embark on public Spanish universities. There are important differences among universities and, in each university there are great differences among titles. Initial courses (cursos cero) are widespread (in 50% of universities) that self-evaluation instruments (14 % of universities). It is necessary to improve diffusion of those instruments because it is not possible to evaluate them. So are proposed the next actuaciones: to make regular standard surveys for professors and students; to publish results of surveys; public universities should institutionalize their basic training offer and improve the dissemination of this offer especially through the web.

This paper presents a questionnaire to assess student opinion about these tools. To analyze the effectiveness, and make an initial estimate of the evaluation of these tools, we conducted a pilot test of the questionnaire with 68 students at the University of Extremadura.

The results of preliminary statistical analysis conducted on the pilot test indicate that the survey results are reliable. A global evaluation of both

tools, with a scale of 1 to 5, gave an average score of 3.29 for initial courses and 3.41 for self-evaluation. The 72.9% of the students consider the "self assessment" more effective than the "initial course".

**Key words:** Spanish universities, instruments to reinforcing, student opinion, pilot survey.

## 1. INTRODUCTION

The underachievement of university students is related in general with several factors: academic, cultural, familial, social ... Research on students with good academic performance indicate that gender, school performance prior to University and the economics are important factors for success. Academic performance also is influenced by other factors such as social integration and ongoing study habits at home [1]

In our daily work as teachers we have observed in recent years that new students have difficulties with the analysis and criticism of the topics discussed, limitations in their knowledge of basic science, failures in problem solving, poor understanding reading, bad study habits and poor capacity for synthesis. These factors, among others, are related to low academic performance of students at the University ([2], [3]).

The first years in the University are usually very difficult for students. In general, its greatest

difficulties are related to the ineffectiveness of the study, little capacity for self learning and lack of basic knowledge for the study of science. Also it has been noted that the new students rarely use the consultation of materials, books, and even information on the net [4].

University professors indicate as a major cause of learning deficiencies of their students are the lack of the background knowledge that should have acquired in earlier stages of education (both primary and secondary levels) as well as lack of study skills [5].

According to the studies mentioned above, one can think of a number of suggestions to educational authorities, universities and state organizations, aimed at actions that systematically be solving the long-term problem ([6], [7] and [8]).

University institutions should enhance their academic services to help the new students, in order to provide opportunities to increase their academic performance progressively. They should also take into consideration the views and concerns of students, in order to remedy or satisfy the needs that arise and resolve them.

This paper presents (1) a study of the tools provided by Spanish universities to facilitate the transition from high school students to University in the learning of knowledge and (2) the results of a pilot survey carried out by a small number of students.

## 2. MATERIALS AND METHODS

### **Instruments: "Zero-courses" and virtual platforms**

Some initiatives, for better adaptation of new students to the University, are already being implemented in Spanish universities. There are 52 public universities in Spain that have information on these tools till the course 2009/2010 [9].

The "zero-courses" and virtual platforms with self-assessment exercises are two widespread activities in Spanish universities. They are aimed at those high school students admitted for the first time in the university and they need to overcome lack of training.

These courses are intended to update the knowledge already acquired in the core subjects required in each course studies of different universities, standardize the level of students from different backgrounds and at the same time, to accustom to the rhythm of university work. The objectives of the subjects introduced at the "zero-courses" are reviewing the concepts studied in high school, included in the official syllabuses of First and Second courses of Baccalaureate.

Zero courses are becoming more numerous and have a greater number of students. However, this broad participation and expressed satisfaction with these courses does not translate into a significant improvement in academic performance. On the

other hand they improve the motivation and participation in courses for first year [10].

The 56.86% overall the public universities offer such courses. The total of different subjects offering is 313. The larger offer is of subjects of Mathematics (34%), followed by Physics (11%), languages (9%), Chemistry (9%), study skills or other subjects relating to the incorporation in the university (8%).

Most universities that offer "zero-courses" offered the Mathematics. Some universities include up to 5 different Math subjects: Calculus, Algebra, Mathematical Analysis, Mathematical Models or Mathematical basis. In some cases the subject is taught with different levels for different orientations. The same subject can be taught with different levels depending on the orientation of the title to study, the center or the professor.

Moreover, in some Spanish universities have set in motion the incorporation of self-assessment questionnaires on a range of subjects. In this way students can check the level of their knowledge, both new students, as students already enrolled in curriculum materials for universities.

The self-evaluation through virtual environments is perfectly feasible using evidence of objective response and allows activities that promote learning before, during and after the academic period [11]. However, recent studies has shown that the use of self-assessment tools on the Web improves the learning of theoretical concepts but not practical as occur with laboratory practical ([12], [13] and [14]). So it seems a particularly useful tool to remind and reinforce basics knowledges.

From a theoretical point of view, the self-assessment has the advantage that it can face the diversity of students. Facilitate adaptation to different rates of learning according to their different characteristics of the students. Self-evaluation is particularly appropriate to teach in the responsibility and to learn how to value the individual learning carried out [15].

Despite the theoretical advantages of this tool has not been sufficiently developed in Spanish universities. We believe that this is due to two main reasons:

Increase the teaching load of teachers. Require the preparation of a large amount of materials, including questionnaires that have to be precise and well checked to measure adequately the degree of knowledge acquired. They also require appropriate monitoring of student learning.

The effectiveness of this methodology is not sufficiently tested empirically. Experiences carried out with the appropriate procedures have produced results in favour of this tool, but they are not yet significant.

Only seven of the 52 universities analyzed have this tool. They present four different ways to structure these instruments. Two of them offer the tool in relation to their course zero, the other three presents self-assessment in subjects isolated. The Complutense University of Madrid (UCM) with a tool called "Comprueba" and the Polytechnic University of Madrid (UPM) with the system "starting point" display their self-study materials and self-assessment tests as a whole, even though with different characteristics

The "comprueba" tool of the UCM offers the possibility to choose a subject from a list of 23 and to test the knowledge that is have got. Subjects include literature, art history, languages, electrical engineering, mechanical, Latin, industrial technology, artistic drawing, biology, etc. Each course provides two options: a random test of 10 questions about all list of topics or of a general review. It is possible check the marks at the end of the test. "Comprueba" tool is of free access and is available since 2003 at:

<http://alamo.sim.ucm.es/comprueba/intro.htm>.

Starting point (Punto de inicio) of UPM) was opened in the year 2004/2005. It Uses the Virtual Classroom of Moodle and access is restricted to students who have an e-mail account of the UPM for which they should be registered in the respective courses. The courses are grouped into 20 categories corresponding to 20 schools of UPM. They incorporate different materials of one or more subjects: Mathematics, Physics, Chemistry, Technical drawing, technical English and other related with the assistance to the work of student like study techniques and time scheduling. There are great differences in the materials offered by each school. Self-evaluations can be performed as often as desired and statistics can be generated on the percentage of correct answers, the time taken to perform the tests and the number of hits on different materials. The most widely used self-tests are the subject of Mathematics. The students that more have used the platform are of the Technical Telecommunications School. The access link is: <http://moodle.upm.es/puntodeinicio/>.

### Opinion questionnaire.

The report of the study "Instruments used in the Spanish public universities to facilitate the transition from high school to University [9], shows the design of a survey conducted to assess the views of the new students about the usefulness of these instruments offered by the universities.

The questionnaire consists of 13 questions in four pages, with a brief presentation on the objective of the survey. The first seven questions are related to different aspects of the courses "zero"; the following three items are related to the self-evaluations; there are two items to describe the sample (sex and age) and finally a control question over the opinion expressed.

Most questions were developed based on multiple-choice Likert scale, with scores assigned to each

item ranging from 1 to 5, depending on the degree of agreement or disagreement with statements that are expressed.

Also is included an open question, to ask about highly rated aspects and issues to improve in "zero-courses".

### Statistical analysis.

This paper provides a detailed analysis of the pilot survey at the University of Extremadura where the total number of respondent students was 68.

The age range of the sample was 17 to 24 years, with an average of 18.8 years. The 72.1% of respondents were male, while 27.9% were women.

To compare the two instruments: virtual platform and "zero-courses", is realized a descriptive statistical analysis and a test to compare medians with the help of spreadsheet Excel and Statistical software Statgraphics 5.1.

## 3. RESULTS

### Questions about zero courses

In relation to the importance that students attach to different aspects of their participation in courses zero, these are summarized in 6 points: difficulty (c1), place (c2), subject (c3), date and time (c4), professor (c5) and content (c6). All of them obtained a mean score between 3 and 3.9. Students considered the difficulty and the place where they are taught as the aspects less important when making these courses. The most valued were the contents. Fig. 1 shows the average values for each aspect rated from 1 to 5 and the 95 % confidence interval.

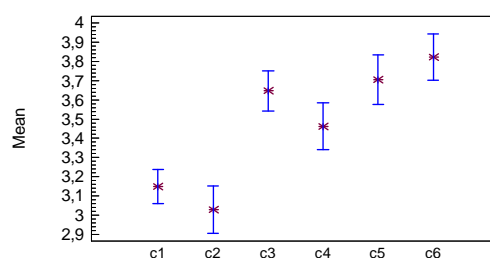


Figure 1. Average rating and 95% confidence intervals of aspects about student participation in courses zero.

The following questions were posed to assess student opinion regarding the importance of including "zero-courses" in the University. The 85.3% of respondents agreed with this importance, while the 88.2% stated that they did not influence their choice of university. The 95.6% considered them useful and 73.1% would like to have more courses of this type. A 94.1% of respondents considered appropriate content.

The number of "zero-courses" that are offered was assessed with a Likert scale from 1 = insufficient to 5 = too. The average value was 2.38 and the median

value obtained is equal to 2. The respondents considered scarce the "zero courses" offered at their university.

On the question of the quality of different aspects of the "zero courses" were considered 7 of them: issues (c1), number of hours (c2), explanations (c3), date (c4), professor (c5), content (c6) and materials (c7). Their mean score resulted between 2.9 and 3.5. Fig. 2 shows the average value and its confidence interval of each one of those aspects.

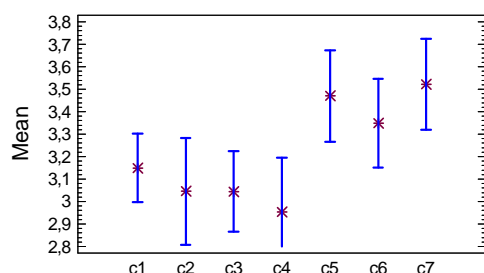


Figure 2. Average rating for the quality of courses and confidence intervals 95%

In open-ended questions, the best aspects evaluated by the students were content and methodology (works and continuous assessment), while the least valued aspects were the schedule, the methodology of practices and explanations in class.

A 73.1% of respondents would do a "zero- course" again in his university.

The overall assessment given by students about "zero courses" on a scale of 1 to 5 is 3.3 with a standard error of 0.11 in the estimate. The 95% confidence interval for the average rating is 3.07 to 3.51. So the global assessment of those courses is positive.

Similarly was assessed "the degree of interest" in courses zero by students. The mean value was of 3.36 with a standard error of 0.09, a 95% confidence interval for the average rating of 3.17 to 3.55. So the interest of the students is slightly above the mean.

#### Questions about self evaluations

The degree of help that the self-assessments provide to students was assessed with a Likert scale from 1 = insufficient to 5 = very helpful. The average value was 2.91 and the median was of 3. Respondents thought it sufficient to support obtained by the self-assessments to overcome the new year at university.

The 72.9% of respondents chose the self-evaluations as the tool that more help was provided them to start the subjects of the first course in the university.

The mean value of the overall assessment of self-evaluations, given by students on a scale of 1 to 5 was of 3.33 with a standard error of 0.12 in the estimate. The 95% confidence interval for the average rating was of 3.09 to 3.57. So the overall assessment of self-evaluations was positive.

For those students who evaluated both options, courses zero and self-evaluations, no significant differences were found between the two cases (p-value = 0.99 sign test for medians).

#### 4. CONCLUSIONS

In general, respondents evaluate positively the students support tools developed by universities. Spanish universities have fostered zero courses facing to self-assessment tools. However, students surveyed show their preferences by self-evaluations comparing to courses zero.

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